
Literature Report

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Abstract

A network based dynamic air traffic flow model for en route airspace system traffic flow optimization

- Transportation Research Part E: Logistics and Transportation Review---2017---Dan Chen,Minghua Hu,Honghai Zhang,Jianan Yin,Ke Han

This study proposes a mesoscopic dynamic air traffic model based on a dynamic network for en route airspaces by characterizing the dynamics and distribution of traffic speed. Based on this model, we solve a flow optimization problem for enforcing capacity constraints with the minimum operational cost using a dual decomposition method. A case study of an en route airspace in Shanghai demonstrates the accuracy of the proposed model in successfully capturing the flow dynamics, as well as the effectiveness of the proposed optimization framework to reduce en route delays by balancing the dynamic traffic demand and airspace capacity.

Values of information sharing: A comparison of supplier-remanufacturing and manufacturer-remanufacturing scenarios

- Transportation Research Part E: Logistics and Transportation Review---2017---Yanting Huang,Zongjun Wang

This paper investigates values of information sharing in supplier-remanufacturing and manufacturer-remanufacturing scenarios where the retailer possesses private demand information. In the supplier-remanufacturing scenario, the supplier acts as the mere component provider. While in the manufacturer-remanufacturing, the supplier acts as both a component provider and a competitor to the manufacturer. We find that information sharing is profitable for both the supplier and the manufacturer, while it is detrimental to the retailer. The supplier with shared information would adjust the wholesale price and acquisition price to reach an equilibrium between forward and reverse flows.

Manpower allocation and vehicle routing problem in non-emergency ambulance transfer service

- Transportation Research Part E: Logistics and Transportation Review---2017---Zizhen Zhang,Hu Qin,Kai Wang,Huang He,Tian Liu

We present a manpower allocation and vehicle routing problem (MAVRP), which is a real-life healthcare problem derived from the non-emergency ambulance transfer service in Hong Kong public hospitals. Both manpower and vehicles are critical resources for the hospitals in their daily operations. The service provider needs to make an effective schedule to dispatch drivers, assistants and ambulances to transport patients scattered in different locations. We formulate the MAVRP into a mathematical programming model and propose several variable neighborhood search (VNS) algorithms to solve it. We tested the VNS with steepest descent, first descent and a mixed of two descent strategies on the MAVRP instances. The computational results demonstrate the effectiveness and efficiency of the VNS algorithms. Moreover, we also conducted additional experiments to analyze the impact of the number of vehicles on the solutions of the MAVRP instances.

Non-myopic relocation of idle mobility-on-demand vehicles as a dynamic location-allocation-queueing problem

- Transportation Research Part E: Logistics and Transportation Review---2017---Hamid R. Sayarshad, Joseph Y.J. Chow

Operation of on-demand services like taxis, dynamic ridesharing services, or vehicle sharing depends significantly on the positioning of idle vehicles to anticipate future demand and operational states. A new queueing-based formulation is proposed for the problem of relocating idle vehicles in an on-demand mobility service. The approach serves as a decision support tool for future studies in urban transport informatics and design of new types of urban mobility systems like car-sharing, ridesharing, and smart taxis. A Lagrangian Decomposition heuristic is developed and compared with a relaxed lower bound solution. Using New York taxicab data, the proposed algorithm reduces the cost by up to 27% compared to the myopic case.

Supply chain coordination with a single supplier and multiple retailers considering customer arrival times and route selection

- Transportation Research Part E: Logistics and Transportation Review---2017---Ilkyeong Moon, Xuehao Feng

We address a novel decentralized supply chain with one supplier and multiple independent retailers based on the practice of several supply chains in the real world. Coordination of such a supply chain has rarely been studied. Despite overcoming the well-known double marginalization, the supplier's route selection can obstruct supply chain coordination. We present a wholesale-price-and-carpooling contract to coordinate such a supply chain. We demonstrate supply chain coordination under such a contract and show that the profit along the supply chain can be arbitrarily allocated. We show that the popular revenue-sharing contract may lose flexibility in profit allocations.

Investors' behavior and dynamics of ship prices: A heterogeneous agent model

- Transportation Research Part E: Logistics and Transportation Review---2017---Amir H. Alizadeh, Helen Thanopoulou, Tsz Leung Yip

Distinguishing investors into speculators and operators, and classifying the former group into momentum and contrarian investors, we develop a heterogeneous agent model (HAM) to examine the dynamics of price of second-hand dry bulk ships. The results suggest that momentum strategies based on short-term measures of earnings perform significantly better than the contrarian or passive (buy-and-hold) strategies. The HAM seems to capture the dynamics of vessel prices and the investors' behavior in the market for ships very well. Finally, an increase in participation of momentum investors tends to increase price volatility, whereas higher demand from contrarian investors seems to lower price variability.

Robust aircraft sequencing and scheduling problem with arrival/departure delay using the min-max regret approach

- Transportation Research Part E: Logistics and Transportation Review---2017---K.K.H. Ng,C.K.M. Lee,Felix T.S. Chan,Yichen Qin

This study considers the aircraft sequencing and scheduling problem under the uncertainty of arrival and departure delays for multiple heterogeneous mixed-mode parallel runways. To enhance runway resilience, runway operations should remain robust to mitigate the effects of delay propagation. The main objective of this research was to identify an optimal schedule by evaluating the robustness of feasible solutions under its respective worst-case scenario. A novel artificial bee colony algorithm was developed and verified by experimental results. The proposed efficient artificial bee colony algorithm can obtain close-to-optimal results with less computational effort in regard to a one-hour flight traffic planning horizon.

Mechanism design for collaborative production-distribution planning with shipment consolidation

- Transportation Research Part E: Logistics and Transportation Review---2017---Minghui Lai,Xiaoqiang Cai,Xiang Li

This paper considers firms making collaborative production-distribution planning with shipment consolidation to reduce costs. However, the firms have private cost information which they are not willing to disclose. We develop a computable mechanism based on a decentralized local search heuristic combined with simulated annealing, which allows for not only system optimization but also cost allocation. The mechanism is especially applicable to the firms with private cost information, due to its good incentive properties and budget balance in almost all the cases. Computational experiments indicate that the cost savings are significant for both the system and the individual firm.

Is there a systematic relationship between random parameters and process heuristics?

- Transportation Research Part E: Logistics and Transportation Review---2017---Camila Balbontin,David Hensher,Andrew T. Collins

• Inclusion of decision process heterogeneity together with preference heterogeneity. • Mean and standard deviation parameters conditioned by process strategies. • Value learning process strategy. • Links between process rules and random parameters under standard LPAA. • Influence on the estimates' distribution and willingness to pay.

Multi-objective inter-terminal truck routing

- Transportation Research Part E: Logistics and Transportation Review---2017---Leonard Heilig,Eduardo Lalla-Ruiz,Stefan Voß

A tremendous growth in containerized trade has led to severe traffic problems in urban port areas associated with negative effects on both efficiency and pollution. In this paper, we address the multi-objective inter-terminal truck routing problem by specifically considering truck emissions. We present an efficient multi-objective archived simulated annealing approach and a visualization technique. Managerial insights are discussed based on an analysis of trade-offs. The algorithm is embedded in a cloud-based decision support system to consider contextual data, including traffic data and the current positions of trucks. This allows ports to utilize potentials of digitalization and optimization while addressing environmental issues.

Simulation-based robust optimization for the schedule of single-direction bus transit route:

The design of experiment

- Transportation Research Part E: Logistics and Transportation Review---2017---Wei Zhang,(Ato) Xu, Wangtu

In this paper, the design of experiment (DOE) technique is used to formulate the robust schedule for the single-direction transit route. Factors affecting transit

schedule performance are classified into two categories: the controllable and the uncontrollable. With Taguchi design method, these two types of factors are crossed mutually to carry out the Monte Carlo simulation to obtain the expected and variance values of the total schedule deviation. Next, two Kriging metamodels are fitted to describe relationships between controllable factors and the total transit schedule deviation. Based on these Kriging metamodels, the Pareto-optimal solution of the robust transit schedule is obtained.

An exact algorithm for the container drayage problem under a separation mode

- Transportation Research Part E: Logistics and Transportation Review---2017---Yujian Song,Jiantong Zhang,Zhe Liang,Chunming Ye

In this paper, we consider the container drayage problem under a separation mode in which a container can be separated from the truck during (un-)loading operation, and some emptied containers should return to the depot for maintenance. The problem is equivalently transformed into a variant of the asymmetric vehicle routing problem with time windows (a-VRPTW) based on a determined-activities-on-vertex (DAOV) graph. We present an arc-flow formulation and propose a branch-and-price-and-cut algorithm to exactly solve it. Computational results on a set of randomly generated instances show that the proposed algorithm outperforms CPLEX in terms of efficiency and effectiveness and the separation mode is advantageous over the stay-with mode.

Capacity investment in supply chain with risk averse supplier under risk diversification contract

- Transportation Research Part E: Logistics and Transportation Review---2017---Juan He,Chao Ma,Kai Pan

In a supply chain with one risk neutral manufacturer and one risk averse supplier, we propose a risk diversification contract under which the manufacturer shares the losses of excess capacity and inadequate capacity

with the supplier, and a side payment is transferred from the supplier to the manufacturer. Under the Conditional Value-at-Risk (CVaR) criterion, risk diversification contract has a Pareto improvement and can allocate system performance appropriately in both symmetrical and asymmetrical demand information. In addition, this contract can coordinate supply chain and has a larger market than an option, capacity reservation, payback, revenue-sharing contract under the symmetrical demand information.

Managing default risk under trade credit: Who should implement Big-Data analytics in supply chains?

- Transportation Research Part E: Logistics and Transportation Review---2017---Yu-Chung Tsao

This paper considers a supplier-retailer channel in which providing trade credit to customers incurs default risk. Big-data analytics (BD-A) could be used to mitigate default risk. The aim is to identify the party that should implement BD-A in the supply chain. Our results indicate that when the retailer (supplier) is dominant in determining the credit period, the retailer (supplier) prefers to implement BD-A unilaterally if the optimal BD-A effort is higher than a threshold. The credit period, quantities ordered, and BD-A effort increase when BD-A effort cost is shared.

A bi-objective robust model for berth allocation scheduling under uncertainty

- Transportation Research Part E: Logistics and Transportation Review---2017---Xi Xi-ang,Changchun Liu,Lixin Miao

This study examines the berth allocation problem with the consideration of uncertainty factors, including the arrival and operation times of the calling vessels. A bi-objective robust berth allocation model, which focuses on economic performance and customer satisfaction, is formulated. The model aims to optimize the robustness of the berth allocation policy, and an adaptive grey wolf optimizer algorithm is developed to solve the proposed model. The performance of the heuristic is evaluated

through randomly generated instances. Experimental results show that the proposed heuristic provides good solution quality and calculation efficiency.

The impact of path selection on GHG emissions in city logistics

- Transportation Research Part E: Logistics and Transportation Review---2017---Martin Behnke,Thomas Kirschstein

In this paper, we formulate an emission-minimizing vehicle routing problem with heterogeneous vehicles and give rise to the effects of path selection. We take into account different paths for traveling between two locations differing with respect to their emissions. Computational experiments with artificial and real-world data illustrate the effects of path selection by considering networks with different road types like urban roads and highways. The experiments suggest an emission saving potential of about 2–4%. We conclude that in reality a larger emission reduction potential exists when multiple paths are considered in transportation planning.

Optimal pricing decisions under the coexistence of “trade old for new” and “trade old for remanufactured” programs

- Transportation Research Part E: Logistics and Transportation Review---2017---Zu-Jun Ma,Qin Zhou,Ying Dai,Jiuh-Biing Sheu

Under the coexistence of “trade old for new” (TON) and “trade old for remanufactured” (TOR) programs, we study a firm’s optimal pricing decisions and identify the thresholds that determine whether the firm should offer TON and TOR simultaneously. The result shows that adopting two kinds of trade-ins simultaneously does not necessarily benefit the firm and that the firm should use different trade-in schemes under different conditions. Moreover, we extend the model to the case with budget constraints on the TOR subsidy. The result shows that the firm’s profit decreases when the actual TOR quantity exceeds the upper limit.

Dispatching policies for last-mile distribution with stochastic supply and demand

- Transportation Research Part E: Logistics and Transportation Review---2017---Robert A. Cook,Emmett J. Lodree

Relief distribution has received considerable attention in the disaster operations management literature. However, the majority of this literature assumes that supply is always available. In reality, a significant portion of the materials that flow through the humanitarian relief chain are donations, which represent an uncertain supply source in terms of both quantity and timing. This paper investigates a two-stage relief chain consisting of a single staging area (SA) where donations arrive over time in uncertain quantities, which are periodically distributed to random numbers of disaster survivors located at a point of distribution (POD). A single vehicle travels back and forth between the SA and POD transporting relief supplies during a finite horizon. The goal of this study is to identify dispatching policies for the vehicle with the sole purpose of minimizing unsatisfied demand at the POD. To this end, we examine the effectiveness of two common-sense heuristic policies relative to the optimal dispatching policy, the latter of which is determined via stochastic dynamic programming. Our findings indicate that although continuously dispatching the vehicle between the SA and POD is not an optimal policy, it is either optimal or close to optimal in most situations.

A two-stage stochastic programming approach for value-based closed-loop supply chain network design

- Transportation Research Part E: Logistics and Transportation Review---2017---Hossein Badri,S.M.T. Fatemi Ghomi,Taha-Hossein Hejazi

The ultimate goal for almost all companies in the current business world is to increase their value; therefore, managers concentrate their efforts on the control of value drivers. This research develops a two-stage stochastic programming model for the value-based supply chain network design, where all parts of a supply

chain are configured and controlled in such a way that the total value of the company increases. The proposed model is a three-echelon, multi-commodity, and multi-period model for the tactical and strategic decision making. Also, a comprehensive computational analysis is conducted to evaluate the performance of the proposed approach.

Modeling the acceptability of crowdsourced goods deliveries: Role of context and experience effects

- Transportation Research Part E: Logistics and Transportation Review---2017---Aymeric Punel,Amanda Stathopoulos

Crowdshipping is a frontier in logistics systems designed to allow citizens to connect via online platforms and organize goods delivery along planned travel routes. The goal of this paper is to highlight the factors that influence the acceptability and preferences for crowdshipping. Through a survey using stated choice scenarios discrete choice models controlling for context and experience effects are specified. The results suggest that distinct preference patterns exist for distance classes of the shipment. In the local delivery setting, senders value transparency of driver performance monitoring along with speed, while longer shipments prioritize delivery conditions and driver training and experience. The model developed in this paper provides first key insights into the factors affecting preferences for goods delivery with occasional drivers.

Pre-disaster investment decisions for strengthening the Chinese railway system under earthquakes

- Transportation Research Part E: Logistics and Transportation Review---2017---Yongze Yan,Liu Hong,Xiaozheng He,Min Ouyang,Srinivas Peeta,Xueguang Chen

This study proposes a framework to determine the investment plan to strengthen a railway system which is subject to earthquake hazard. The proposed framework includes four parts: (1) Construct a two-layer

(physical layer and service layer) railway network representation; (2) Generate earthquake scenarios based on historical earthquake data; (3) Formulate an investment optimization model to minimize the expected railway system service loss subjected to an investment budget constraint, where the service loss is quantified based on the affected train flow; (4) Solve the optimization model by using Genetic Algorithm. Taking the Chinese railway system (CRS) as an example, the proposed framework has been applied and the results show that the solution of the proposed framework is more responsive to the earthquake impact on railway system compared to topology-based methods. Note that the proposed framework can also be extended to identify pre-disaster investment plans for other transportation systems under natural disasters.

Non-collaborative emission targets joining and quantity flow decisions in a Stackelberg setting

- Transportation Research Part E: Logistics and Transportation Review---2017---Dincer Konur

This study considers a Stackelberg channel, where the leader determines the quantity flow along the channel. Both the leader and the follower have emission targets and the leader should respect those targets. In this setting, the leader and the follower can join their emission targets to lower costs while ensuring that the channel emissions do not exceed the cumulative target. The decisions for joining targets define a non-collaborative game between the leader and the follower. We characterize the equilibrium of this game. Furthermore, we analyze the effects of channel leadership. A manufacturer-retailer scenario is used to demonstrate the model.

Integrated optimization of regular train schedule and train circulation plan for urban rail transit lines

- Transportation Research Part E: Logistics and Transportation Review---2017---Yihui Wang,Tao Tang,Bin Ning,Lingyun Meng

This paper presents an integrated model to optimize

the train schedule and circulation plan simultaneously based on a given service pattern generated by the demand analysis and line planning. The operation of train services, the turnaround operations, the entering/exiting depot operation, and the number of available trains are involved in the model. The proposed integrated and extended integrated optimization problems are transformed into mixed integer linear programming (MILP) problems, which can be efficiently solved by the CPLEX solver. Numerical examples based on the Beijing Yizhuang line are implemented to demonstrate the performance of the proposed models and solution approach.

Crowdsourcing the last mile delivery of online orders by exploiting the social networks of retail store customers

- Transportation Research Part E: Logistics and Transportation Review---2017---Aashwinikumar Devari,Alexander G. Nikolaev,Qing He

This paper demonstrates the potential benefits of crowdsourcing last mile delivery by exploiting a social network of the customers. The presented models and analysis are informed by the results of a survey to gauge people's attitudes toward engaging in social network-reliant package delivery to and by friends or acquaintances. It is found that using friends in a social network to assist in last mile delivery greatly reduces delivery costs and total emissions while ensuring speedy and reliable delivery. The proposed new delivery method also mitigates the privacy concerns and not-at-home syndrome that widely exist in last mile delivery.

Improved formulations and an Adaptive Large Neighborhood Search heuristic for the integrated berth allocation and quay crane assignment problem

- Transportation Research Part E: Logistics and Transportation Review---2017---Çağatay Iris,Dario Pacino,Stefan Ropke

This paper focuses on the integrated berth allocation

and quay crane assignment problem in container terminals. We consider the decrease in the marginal productivity of quay cranes and the increase in handling time due to deviation from the desired position. We consider a continuous berth, discretized in small equal-sized sections. A number of enhancements over the state-of-the-art formulation and an Adaptive Large Neighborhood Search (ALNS) heuristic are presented. Computational results reveal that the enhancements improve many of the best-known bounds, and the ALNS outperforms the state-of-the-art heuristics for many instances. We also conduct further analysis on a new larger benchmark.

Time constrained liner shipping network design

- Transportation Research Part E: Logistics and Transportation Review---2017---Christian Vad Karsten,Berit Dangaard Brouer,Guy Desaulniers,David Pisinger

We present a mathematical model and a solution method for the liner shipping network design problem. The model takes into account coordination between vessels and transit time restrictions on the cargo flow. The solution method is an improvement heuristic, where an integer program is solved iteratively to perform moves in a large neighborhood search. Our improvement heuristic is applicable as a real-time decision support tool for a liner shipping company. It can be used to find improvements to the network when evaluating changes in operating conditions or testing different scenarios. Computational results on the benchmark suite LINER-LIB are reported.

Operational planning of routes and schedules for a fleet of fuel supply vessels

- Transportation Research Part E: Logistics and Transportation Review---2017---Marielle Christiansen,Kjetil Fagerholt,Nikolaos Rachaniotis,Magnus Stålhane

This paper considers a real operational problem of routing and scheduling a fleet of fuel supply vessels used to service customer ships anchored outside a major port.

The problem can be formulated as a rich multi-trip vehicle routing problem, including constraints related to stowage and time-dependent sailing times. An arc-flow and a path-flow model are developed and compared. A computational study shows that the path-flow model is superior and can be used in real planning situations. We also discuss how the model can be used in a real-time setting when new orders arrive and deviations from the plan occur.

Anticipatory freight selection in intermodal long-haul round-trips

- Transportation Research Part E: Logistics and Transportation Review---2017---Arturo E. Pérez Rivera,Martijn R.K. Mes

We consider the planning problem faced by Logistic Service Providers (LSPs) transporting freights periodically, using long-haul round-trips. In each round-trip, freights are delivered and picked up at different locations within one region. Freights have time-windows and become known gradually over time. Using probabilistic knowledge about future freights, the LSP's objective is to minimize costs over a multi-period horizon. We propose a look-ahead planning method using Approximate Dynamic Programming. Experiments show that our approach reduces costs up to 25.5% compared to a single-period optimization approach. We provide managerial insights for several intermodal long-haul round-trips settings and provide directions for further research.

Reducing port-related empty truck emissions: A mathematical approach for truck appointments with collaboration

- Transportation Research Part E: Logistics and Transportation Review---2017---Frederik Schulte,Eduardo Lalla-Ruiz,Rosa G. González-Ramírez,Stefan Voß

Port-related emissions are a growing problem for urban areas often located directly next to maritime container terminals highly frequented by container trucks. Empty truck trips, caused by a lack of coordination among

truckers, are responsible for a significant share of these emissions, and collaboration among truckers is seen as the major opportunity to address this issue. Truck appointment systems (TASs) schedule truck activities and enable collaboration for transportation between terminals and client locations. The aim of this work is to introduce a collaborative planning model to be operated within a TAS and to investigate its impact on emission and cost objectives. Starting with a review of requirements for a TAS with collaboration, an optimization model based on the multiple traveling salesman problem with time windows is developed, leveraging collaboration to reduce costs and emissions. The results for a real-world case demonstrate that the developed approach provides appropriately coordinated truck schedules and effectively reduces truck emissions and costs.

Integrating train scheduling and delay management in real-time railway traffic control

- Transportation Research Part E: Logistics and Transportation Review---2017---Francesco Corman,D' Ariano, Andrea,Alessio D. Marra,Dario Pacciarelli,Marcella Samà

Optimization models for railway traffic rescheduling tackle the problem of determining, in real-time, control actions to reducing the effect of disturbances in railway systems. In this field, mainly two research streams can be identified. On the one hand, train scheduling models are designed to include all conditions relevant to feasible and efficient operation of rail services, from the viewpoint of operations managers. On the other hand, delay management models focus on the impact of rescheduling decisions on the quality of service perceived by the passengers. Models in the first stream are mainly microscopic, while models in the second stream are mainly macroscopic.

Distributed model predictive control for cooperative synchromodal freight transport

- Transportation Research Part E: Logistics and Transportation Review---2017---Le Li,Rudy R. Negenborn,Bart De Schutter

This paper investigates cooperative synchromodal freight transport planning among multiple intermodal freight transport operators in different and interconnected service networks. The cooperative planning is formulated as a cooperative model predictive container flow control problem, and solved with three Distributed Model Predictive Flow Control (DMPFC) approaches: the parallel and serial Augmented Lagrangian Relaxation (ALR) based DMPFC approaches, and the Alternating Direction Method of Multipliers (ADMM) based DMPFC approach. The simulation results show that the serial ALR-based DMPFC approach requires the least iterations and information exchanges while the ADMM-based DMPFC approach takes the least amount of actual computation time.

Closed-loop scheduling and control of waterborne AGVs for energy-efficient Inter Terminal Transport

- Transportation Research Part E: Logistics and Transportation Review---2017---Huarong Zheng,Rudy R. Negenborn,Gabriël Lodewijks

We propose closed-loop energy-efficient scheduling and control of an autonomous Inter Terminal Transport (ITT) system using waterborne Autonomous Guided Vessels (waterborne AGVs). A novel pick-up and delivery problem considering safety time intervals between berthing time slots of different waterborne AGVs is proposed. Waterborne AGVs are controlled in a cooperative distributed way to carry out the assigned schedules. Real-time scheduling and control loop is closed by a partial scheduling model and an interaction model with feedback reflecting neglected lower level factors. Simulation results demonstrate the effectiveness of the proposed methodology and the potential of applying waterborne AGVs towards an autonomous ITT system.

Using beta regression to explore the relationship between service attributes and likelihood of customer retention for the container shipping industry

- Transportation Research Part E: Logistics and Transportation Review---2017---Kee Kuo Chen,Rong-Her Chiu,Ching-Ter Chang

This study segments container shipping market by analyzing the relationships between service attributes and likelihood of customer retention for the container shipping industry and find: (1) service quality, as a partitioned variable, separates the overall model into five sub-models having different functional relationships, (2) the attributes of price and discount, personal selling and customer relationship have significant impact on likelihood of customer retention, (3) satisfactory price and discounts are a necessary attribute to support the likelihood of customer retention, and (4) satisfactory personal selling is the most important attribute for increasing the likelihood of customer retention.

Warehouse capacity sharing via transshipment for an integrated two-echelon supply chain

- Transportation Research Part E: Logistics and Transportation Review---2017---Xuehao Feng,Ilkyeong Moon,Kwangyeol Ryu

Warehouse capacity constraint has been one obstacle to achieving the channel-wide optimal decision in inventory management. We studied an integrated inventory model consisting of a single vendor and multiple buyers with warehouse capacity sharing via transshipment. We proposed an optimal transshipment policy by developing nonlinear programming models and genetic algorithms as well as obtaining Karush-Kuhn-Tucker points. This inventory policy can significantly reduce the channel-wide cost and the performance is influenced by the consideration of fixed transshipment costs. Sensitivity analyses show that parameters have different impacts on the channel-wide cost and the performances of the algorithms.

Herd behavior in the drybulk market: an empirical analysis of the decision to invest in new and retire existing fleet capacity

- Transportation Research Part E: Logistics and Transportation Review---2017---Nikos Papapostolou, Panos K. Pouliasis, Ioannis Kyriakou

We examine whether investors herd in their decision to order or scrap vessels in the drybulk market. We decompose herding into unintentional and intentional, and test for herd behavior under asymmetric effects with respect to freight market states, cycle phases, risk-return and valuation profiles, and ownership of the vessel. We detect unintentional herd behavior during down freight markets and contractions. Furthermore, we find evidence of spill-over unintentional herding effects from the newbuilding to the scrap market. Finally, asymmetric herd effects are evident between traditional and liberal philosophy towards the ownership of the vessel, and during extreme risk-return and valuation periods.

Evaluating airline operational performance: A Luenberger-Hicks-Moorsteen productivity indicator

- Transportation Research Part E: Logistics and Transportation Review---2017---Juergen Heinz Seufert, Amir Arjomandi, K. Hervé Dakpo

This study proposes a by-production Luenberger-Hicks-Moorsteen indicator that includes undesirable outputs, here CO₂ emissions, in airline performance analysis. We use capital and staff as inputs and tonne-kilometres available as a desirable output to evaluate operation stage efficiency and productivity of the world's major airlines between 2007 and 2013. Our results demonstrate European airlines are relatively stronger performers in terms of both pollution-adjusted operational efficiency and productivity. Middle-Eastern airlines have made gains in terms of output growth but perform poorly in terms of pollution-adjusted productivity, evidence that ETSs may produce greener airlines.

Blood supply chain network design under uncertainties in supply and demand considering social aspects

- Transportation Research Part E: Logistics and Transportation Review---2017---Reza Ramezani, Zahra Behboodi

Blood supply chain design is an issue which has been investigated in the literature to some extent. Blood donation is a voluntary activity and blood donors are important in the blood supply chain. It is suitable to attempt to increase blood donors' utility in order to reduce shortages and harmful damages. Parameters including distance of blood donors from blood facilities, experience factor of donors in blood facilities and advertising budget in blood facilities are considered social aspects and applied to form utility function used in this paper. The aim was to increase utility and motivate blood donors to donate blood. First, a deterministic location-allocation model is proposed applying a mixed integer linear programming (MILP) optimization. Due to the stochastic nature of demand and cost parameters, the aforementioned model is developed to incorporate uncertainty using a robust optimization approach that can overcome the limitations of scenario-based solution methods, i.e., without excessive changes in complexity of the underlying base deterministic model. The application of the proposed model is evaluated by a case study in Tehran. Numerical results obtained and sensitivity analysis helps administrators in the decision making process for investment projects.

Airline baggage fees and flight delays: A floor wax and dessert topping?

- Transportation Research Part E: Logistics and Transportation Review---2017---Amirhossein A. Yazdi, Pritha Dutta, Adams B. Steven

We examine the linkages between the implementation of baggage fees and late flights in the airline industry. We find that baggage fees policies result in improvements in on-time performance as assessed through late flights, directly through improvements in airport-side sorting and loading efficiencies, and indirectly through

lower air travel demand. We further find that these relationships are contingent upon the presence of a hub airport on a route. Our findings have important managerial and public policy implications as baggage fees have often been cited as a driver of security queue, aircraft alley, and overhead bin congestions, and ultimately delayed flights. Our results suggest that these suppositions could be misplaced.

A practical solution approach for the green vehicle routing problem

- Transportation Research Part E: Logistics and Transportation Review---2017---Valeria Leggieri,Mohamed Haouari

Green vehicle routing (GVRP) is an active research area that is concerned with the development and analysis of distribution activities with eco-friendly vehicles. We propose a practical solution approach for the GVRP that uses a mixed-integer linear formulation and a reduction procedure. The newly formulation offers two significant advantages: compactness and flexibility. We provide empirical evidence that the formulation and the reduction procedure enable to derive optimal solutions for medium-sized instances using a general-purpose solver. We show that the proposed exact approach consistently outperforms a state-of-the-art branch-and-cut algorithm and constitutes an appealing and practical alternative for optimally solving GVRPs.

Designing the optimal multi-deep AS/RS storage rack under full turnover-based storage policy based on non-approximate speed model of S/R machine

- Transportation Research Part E: Logistics and Transportation Review---2017---Peng Yang,Kaidong Yang,Mingyao Qi,Lixin Miao,Bin Ye

The design of an optimal rack for 3D multi-deep AS/RS under full turnover-based storage policy is explored in this paper. The acceleration and deceleration characteristics of storage and retrieval (S/R) machine are considered based on non-approximate speed model of

S/R machine. We divided three typical scenarios to investigate. With regards to each scenario, we derive the expected retrieval time for single-command cycles adopting exact speed model and develop the model for optimally designing 3D multi-deep AS/RS rack. From the model, we can derive the optimal rack dimensions for various scenarios more precisely. Our findings are demonstrated by a practical example.

Integration of aircraft ground movements and runway operations

- Transportation Research Part E: Logistics and Transportation Review---2017---Julien Guépet,Olivier Briant,Jean-Philippe Gayon,Rodrigo Acuna-Agost

The Ground Routing Problem focuses on finding the optimal routing of aircraft from parking stands to runways. The Runway Sequencing Problem consists in ordering the sequence of takes-offs and landings on runways. We study the integration of these two problems with the aim of simultaneously increasing runway efficiency and reducing taxi times. We propose a heuristic sequential approach based on a novel mathematical formulation. We test our methods using real data of a major European airport. Our approach significantly reduces the total completion and taxi times within reasonable computation times, making it viable to be used in daily operations.

What makes a freight market index? An empirical analysis of vessel fixtures in the offshore market

- Transportation Research Part E: Logistics and Transportation Review---2017---Roar Adland,Pierre Cariou,François-Charles Wolff

We estimate a hedonic pricing regression to generate a market index from heterogeneous fixture data in the Offshore Support Vessel (OSV) market. We consider a fixed effect framework where we control for vessel characteristics and contract-specific variables. Applied to a dataset of more than 30,000 transactions from 1989 to 2015, estimates show that around 70–80% of variation in dayrates is explained by the time fixed

effects used to estimate the market index. Spot freight rates increase with engine power and transport capacity. The volatile market index is seasonal and is positively correlated to both oil prices and production volumes.

Stakeholder's profitability of carrier-led consolidation strategies in urban goods distribution

- Transportation Research Part E: Logistics and Transportation Review---2017---Miquel Estrada,Mireia Roca-Riu

This paper presents the necessary conditions to ensure a minimal profitability of carrier-led consolidation strategies in urban distribution. These conditions are shown by compact formulas obtained by continuous approximations representing the cost of the stakeholders involved: society, regular carriers, consolidation facility operator and environment. The domain of the retailer density variable that always produces negative effects on each stakeholder has been identified. The envelope of this domain does not depend on vehicle costs and other site-related parameters. On the other hand, there is a critical density of receivers that makes the carrier cost savings higher than the CF operator costs.

Ocean carrier canvassing strategies with uncertain demand and limited capacity

- Transportation Research Part E: Logistics and Transportation Review---2017---Zhuzhu Song,Wansheng Tang,Ruiqing Zhao

To study ocean carriers' canvassing strategies, we consider a sea cargo service chain where liner companies canvass using two strategies involving freight forwarders and non-vessel-operating common carriers (NVOCCs). This paper uses a principal-agent model to describe the relationships among these partners. We show that high capacity can encourage the freight forwarder to exert effort, whereas low capacity can prevent the liner company from identifying the NVOCC's private information. Using numerical examples, we

investigate the effects of several parameters on strategy selection. Finally, liner companies have different strategy preferences for long-term development.

Revisiting port performance measurement: A hybrid multi-stakeholder framework for the modelling of port performance indicators

- Transportation Research Part E: Logistics and Transportation Review---2017---Min-Ho Ha,Zaili Yang,Theo Notteboom,Adolf K.Y. Ng,Man-Wook Heo

This study develops a new port performance measurement model by taking the perspectives from different port stakeholders. The novelty lies in the modelling of interdependencies among port performance measures, and the combination of weights of interdependent measures with both qualitative and quantitative evaluations of the measures from multiple stakeholders for quantitative port performance measurement. It represents an effective performance measurement tool and offers a diagnostic instrument for performance evaluation and/or monitoring of ports and terminals so as to satisfy different requirements of various port stakeholders in a flexible manner.

Optimizing container relocation operations at container yards with beam search

- Transportation Research Part E: Logistics and Transportation Review---2017---Ching-Jung Ting,Kun-Chih Wu

Container relocation problem (CRP) involves the retrieval of all containers from the container yard with a minimum number of relocations. The CRP is an NP-hard problem such that the large-scale instances cannot be solved to optimality by exact solution methods within a reasonable computational time. This article proposes a beam search (BS) algorithm embedded with heuristics to evaluate the problems. The proposed beam search is tested on benchmark instances and compared with other leading heuristics from the literature. Computational results demonstrate that

the beam search algorithm is compatible with other heuristics and can obtain good solutions in short time.

Robust optimization model for integrated procurement, production and distribution in platelet supply chain

- Transportation Research Part E: Logistics and Transportation Review---2017---Hamidreza Ensaifian,Saeed Yaghoubi

This paper presents an integrated platelet supply chain where demand is age-differentiated according to the type of patient. At first, considering the apheresis method and traditional production platelet method, two mixed-integer programming models are developed based on FIFO and LIFO issuing policies. Since in practice fresh platelets have been preferred, a bi-objective model has been then developed in which the first objective maximizes the freshness of the units delivered and the second minimizes the total cost. To cope with uncertain demand, a robust optimization approach is presented and the application of the proposed model is discussed in a case study.

Behavioral analysis of airline scheduled block time adjustment

- Transportation Research Part E: Logistics and Transportation Review---2017---Lei Kang,Mark Hansen

Scheduled block time (SBT) is the time between gate departure and gate arrival assumed by airlines for use in published timetables and operations planning. SBT setting has critical impacts on airlines' operating cost and on-time performance. Air carriers regularly update their SBTs to respond to changing operating conditions and evolving business strategies. Most existing studies have focused on investigating the impact of SBT on on-time performance or predicting SBT based on historical performance and market characteristics. However, the dynamics of adjusting SBT, which may allow deeper understanding about the trade-offs airlines make between SBT and on-time performance, have been rarely

studied. In this paper, we assume that SBT adjustment choices reveal preferences. Based on airlines' practice in setting SBT, hypothetical SBT scenarios and their corresponding on-time performance profiles are re-constructed to mimic the situations faced by airline schedulers. This enables us to infer how airlines trade-off between SBT, on-time arrivals, and earliness. By using correlated mixed logit models, we find that our five study airlines are willing to increase SBT from 0.38 to 0.54min to increase on-time performance by 1%. We also find that both on-time performance and early arrival are valued by airlines, but the former is considerably more valuable. The estimated models can also be used to predict airlines' SBT adjustments in response to changes in operational performance.

Simulating participatory urban freight transport policy-making: Accounting for heterogeneous stakeholders' preferences and interaction effects

- Transportation Research Part E: Logistics and Transportation Review---2017---Edoardo Maruccci,Michela Le Pira,Valerio Gatta,Giuseppe Inturri,Matteo Ignaccolo,Alessandro Pluchino

This paper proposes a novel approach to support participatory decision-making processes in the context of urban freight transport through the integration of discrete choice modeling and agent-based modeling. The methodology is based on an innovative multilayer network and opinion dynamics models and applied to the case study of Rome' s limited traffic zone. Simulation results produce a ranking of plausible policies that maximize consensus building while minimizing utility losses due to the negotiation process. These results can be used to support real participatory decision-making processes on freight-related policies accounting both for stakeholders' heterogeneous preferences and their interaction effects.

Static and dynamic resource allocation models for single-leg transportation markets with service disruptions

- Transportation Research Part E: Logistics and Transportation Review---2017---Xinchang Wang

This work considers the stochastic resource allocation problem for single-leg transportation markets with service disruptions. The single-period version of the problem is formulated as a stochastic model with arbitrarily distributed resource capacity. We then completely characterize the optimal solution to the stochastic model. The multi-period version of the problem is formulated as a dynamic programming model. We characterize the monotone structure of the optimal solution for the dynamic model under uniform resource consumption rates. For the case with general resource consumption rates, a counterexample is provided to show that there exist cases where the optimal solution is not monotone.

Toward an integrated sustainable-resilient supply chain: A pharmaceutical case study

- Transportation Research Part E: Logistics and Transportation Review---2017---Behzad Zahiri,Jun Zhuang,Mehrdad Mohammadi

In this paper, a novel multi-objective integrated sustainable-resilient mixed integer linear programming model for designing a pharmaceutical supply chain network under uncertainty is presented. To cope with the uncertainty aspect of the model, a new fuzzy possibilistic-stochastic programming approach is developed. Additionally, due to NP-hard nature of the problem, we propose a novel Pareto-based lower bound method as well as a new meta-heuristic algorithm. Several numerical examples, as well as a case study targeting Truvada® supply chain for the LGBTQ community, as they account for majority of the market for such product, in France is proposed.

An approximate hypercube model for public service systems with co-located servers and multiple response

- Transportation Research Part E: Logistics and Transportation Review---2017---Sardar Ansari,Soovin Yoon,Laura A. Albert

Spatial queueing models help to evaluate the design of public safety systems such as fire, emergency medical service, and police departments, where vehicles are sent to geographically dispersed calls for service. We propose a new approximate hypercube spatial queueing model that allows for multiple servers to be located at the same station as well as multiple servers to be dispatched to a single call. We introduce the $M[G]/M/s/s$ queueing model as an extension to the $M/M/s/s$ model which allows for a single customer to request multiple servers with a general discrete probability distribution G . We use the $M[G]/M/s/s$ queueing model to derive approximate formulas for the hypercube spatial queueing outputs. A simulation study validates the accuracy of the queueing approximations. Computational results suggest that the models are effective in evaluating the performance of emergency systems.

MIP models and a hybrid method for the capacitated air-cargo network planning and scheduling problems

- Transportation Research Part E: Logistics and Transportation Review---2017---Canrong Zhang,Fanrui Xie,Kun Huang,Tao Wu,Zhe Liang

This paper examines hub location and plane assignment problems for the air-cargo delivery service. Two mixed integer programming models are constructed. Their difference lies in the way they control the number of visiting hubs for serving each O-D pair. Due to the NP-hardness of the problem, a two-stage hybrid algorithm is developed to solve large-scale instances. The first stage settles partial critical variables by heuristics and the second stage settles the rest of variables by a commercial solver. Based on the real-life data, numerical experiments are conducted to test the performance of the models and algorithm.

Optimal planning of swapping/charging station network with customer satisfaction

- Transportation Research Part E: Logistics and Transportation Review---2017---Jun Yang,Fang Guo,Min Zhang

Key to the mass adoption of electric vehicles is the establishment of a sufficient battery service infrastructure network on the basis of customer behavior and psychology. Motivated by EV service infrastructure network design under the battery leasing/electric car sharing service business models, we present an electric vehicle battery service network design problem considering a customers satisfaction related to “range anxiety” and “loss anxiety” . The problem is formulated as a linear integer programming model under deterministic and fuzzy scenarios. A Tabu Search heuristic combined with GRASP is proposed to efficiently solve the problem. Finally, we conduct parametric analysis on real-world road networks.

A new look at the morning commute with household shared-ride: How does school location play a role?

- Transportation Research Part E: Logistics and Transportation Review---2017---Fangni Zhang,Wei Liu,Xiaolei Wang,Hai Yang

Recent studies examined the households’ trip-timing decisions where adults have to drive their children to school. These studies focus on the cases where school is near workplace. However, different school locations can affect travels and activity patterns significantly. This study re-looks at the household shared-ride problem where school is near home. It is found that the resulting dynamic commuting equilibrium has very different properties, which have been examined and discussed accordingly. Three management strategies have been proposed to reduce total travel cost, and efficiencies of these strategies are evaluated and compared.

An unpaired pickup and delivery vehicle routing problem with multi-visit

- Transportation Research Part E: Logistics and Transportation Review---2017---Dongyang Xu,Kunpeng Li,Xuxia Zou,Ling Liu

This paper studies an unpaired pickup and delivery vehicle routing problem allowing for multi-visit. The problem consists of two interacted decisions: the pairing of supply and demand and the vehicle routing. Given the complexity of the problem, a novel unified model is formulated to decouple the interactions between the two decisions. Based on the unified model, some valid inequalities are derived and a tabu search algorithm is proposed. The computational results show that the tabu search algorithm can provide high quality solutions to the problem under investigation and the closely related problem studied in Chen et al. (2014).

Non-differentiated green product positioning: Roles of uncertainty and rationality

- Transportation Research Part E: Logistics and Transportation Review---2017---Yenming J. Chen,Jiuh-Biing Sheu

This study examines the effect of market uncertainty and consumer rationality on product strategy when a company evaluates its entry into the green market. The risk in launching a green product is high because consumers may not be as environmentally conscious as they claim to be. This study develops a composite condition consisting of preference uncertainty, loss aversion, investment cost, and competition intensity to guide companies to react either conservatively or aggressively. An upgraded non-differentiation strategy is suggested for heterogeneous markets, loss-averse consumers, or high-quality reference when the indicator falls within the greenness range. Unlike conventional competitive analysis for non-green products, differentiation may not always be the best option to benefit the entire society and non-differentiation to green is favorable in the context of our analysis.

Optimal design of sustainable transit systems in congested urban networks: A macroscopic approach

- Transportation Research Part E: Logistics and Transportation Review---2017---Mahyar Amirgholy,Mehrdad Shahabi,H. Oliver Gao

Mass transit is a key component of a sustainable transportation system in urban networks. In this research, we propose a continuum approximation model to optimize the line spacing, stop spacing, headway, and fare of the transit system by minimizing a linear combination of (1) users generalized cost, (2) agency operating cost, and (3) external cost of the emission in the urban region. The design of the transit system can be optimized by minimizing the total cost of the transportation system in three different network allocation scenarios: (i) mixed network (Bus), (ii) dedicated lanes (BRT), and (iii) parallel networks (Metro).

Profitability change in the global airline industry

- Transportation Research Part E: Logistics and Transportation Review---2017---Davide Scotti,Nicola Volta

This paper studies airline profitability change computed through a Bayesian estimation of a cost function. The stochastic frontier is applied to a dataset including the largest worldwide airlines in the period 1983–2010. We show that productivity change is mainly driven by technical change becoming continuously positive from early 1990s. Furthermore, in the last decade profitability change is mainly driven by input price change which exhibits a similar pattern to output price change. In presence of productivity growth, the output price increase is lower than the input price increase suggesting that part of productivity gains are transferred from airlines to consumers.

Responsive contingency planning of capacitated supply networks under disruption risks

- Transportation Research Part E: Logistics and Transportation Review---2017---Anubhuti Parajuli,Onur Kuzgunkaya,Navneet Vidyarthi

This paper prescribes an appropriate risk mitigation model for a capacitated supply chain subject to pre-meditated attacks on facilities. It presents a unified approach to responsive contingency planning and optimizing protection of supply facilities utilizing a game-theoretic framework of attack and defense which involves multi level optimization. Gradual capacity back-ups is proposed for the first time in the context of protection under intentional attacks in a capacitated supply system. A recursive tree search algorithm is proposed to solve the tri-level optimization problem. Computational efficiency of the algorithm is demonstrated and managerial insights are presented.

Exact route-length formulas and a storage location assignment heuristic for picker-to-parts warehouses

- Transportation Research Part E: Logistics and Transportation Review---2017---Arjan S. Dijkstra,Kees Jan Roodbergen

Order picking is one of the most time-critical processes in warehouses. We focus on the combined effects of routing methods and storage location assignment on process performance. We present exact formulas for the average route length under any storage location assignment for four common routing methods. Properties of optimal solutions are derived that strongly reduce the solution space. Furthermore, we provide a dynamic programming approach that determines storage location assignments, using the route length formulas and optimality properties. Experiments underline the importance of the introduced procedures by revealing storage assignment patterns that have not been described in literature before.

Using bilateral trading to increase ridership and user permanence in ridesharing systems

- Transportation Research Part E: Logistics and Transportation Review---2017---Neda Masoud,Roger Lloret-Batlle,R. Jayakrishnan

One of the main obstacles that has challenged peer-to-peer (P2P) ridesharing systems in operating as stand-

alone systems is reaching a critical mass of participants. Toward this goal, we propose what we call the P2P ride exchange mechanism to increase matching rate and customer retention in a ridesharing system. This mechanism gives riders the opportunity to purchase other riders' itineraries while it provides suitable alternative rides to the sellers, thus increasing the service rate in a ridesharing system. The proposed mechanism aims to maximize expected user surplus, is robust towards selfish user manipulation, and has very low information requirements. Using numerical experiments, we demonstrate what type of ridesharing systems can benefit the most from P2P ride exchange. Furthermore, we study the impact of customer flexibility on the rate of exchange. If implemented properly, P2P ride exchange can effectively increase the number of served riders and enhance customer loyalty by engaging customers in the ride-matching process.

The optimal pricing strategy for two-sided platform delivery in the sharing economy

- Transportation Research Part E: Logistics and Transportation Review---2017---Ling-Chieh Kung,Guan-Yu Zhong

Nowadays many platforms emerge to provide delivery services by having independent shoppers to deliver groceries from independent retailers to consumers. To understand how to price this service, we formulate a two-sided platform's profit maximization problem by considering network externality. We focus on three pricing strategies, membership-based pricing, transaction-based pricing, and cross subsidization. When time discounting is absent and consumers' order frequency is price-insensitive, it is shown that these three strategies are equivalent. As membership-based pricing collects money the earliest and maximize price-sensitive order frequency, our analysis explains some platforms' promotion of it.

The multi-criteria constrained shortest path problem

- Transportation Research Part E: Logistics and Transportation Review---2017---Ning Shi,Shaorui

Zhou,Fan Wang,Yi Tao,Liming Liu

In this study, we propose an exact method for finding all the Pareto-optimal paths for a multi-criteria constrained shortest path problem. We show that solving the special bi-criteria problem is equivalent to generating at most $|P|$ constrained shortest paths with successive tightened constraints, where $|P|$ is the total number of all Pareto-optimal paths. For the general multi-criteria case, we propose a decomposition procedure and theoretically prove that this method can identify all the Pareto-optimal paths from at most $(u-1)!|P|$ candidate paths, where u is the number of criteria. Numerical studies demonstrate that our algorithm is highly efficient and robust.

Site selection and vehicle routing for post-disaster rapid needs assessment

- Transportation Research Part E: Logistics and Transportation Review---2017---Burcu Balcik

In the immediate aftermath of a disaster, relief agencies perform rapid needs assessment to investigate the effects of the disaster on the affected communities. Since assessments must be performed quickly, visiting all of the sites in the affected region may not be possible. Therefore, assessment teams must decide which sites to select and visit during the assessment horizon. In this paper, we address site selection and routing decisions of the rapid needs assessment teams which aim to evaluate the post-disaster conditions of different community groups, each carrying a distinct characteristic. We define the Selective Assessment Routing Problem (SARP) that constructs an assessment plan to cover different characteristics in a balanced way. The SARP is formulated as a variant of the team orienteering problem with a coverage objective. We develop an efficient tabu search heuristic, which produces high-quality solutions for the SARP. We illustrate our approach with a case study, which is based on real-world data from the 2011 Van earthquake in Turkey.

Multi-objective inventory routing problem: A stochastic model to consider profit, service level and green criteria

- Transportation Research Part E: Logistics and Transportation Review---2017---Mohammad Rahimi,Armand Baboli,Yacine Rekik

The Inventory Routing Problem has been mainly studied in recent decades under an economic performance perspective. In this paper, we develop a multi-objective mathematical framework for the IRP to link: (i) the economic performance, (ii) the achieved server level in terms of shortage and delivery delays and (iii) the environmental footprint. The framework developed addresses the uncertainty by considering fuzzy distributions for certain problem inputs, such as the demand and the transportation costs. We show the negative impact on the economic performance when service level targets are exogenously chosen without coordination with the logistics components (inventory and distribution).

Multiple airport regions based on inter-airport temporal distances

- Transportation Research Part E: Logistics and Transportation Review---2017---Xiaoqian Sun,Sebastian Wandelt,Mark Hansen,Ang Li

We formulate and implement a new metric for identifying multiple airport regions (MARs) around the world, based on the temporal distance between airports. This metric, opposed to existing studies based on spatial distance, takes into account the real travel time between airports of latent passengers and their journeys via ground transportation. We investigate a variety of properties of the newly built MARs network at the global scale for the year 2015, including the importance of MARs in global air transportation, similarity clustering, destination overlap, and airport roles inside a MAR. Commonalities and differences to the simplified spatial distance are identified.

Modeling the effects of unilateral and uniform emission regulations under shipping company and port competition

- Transportation Research Part E: Logistics and Transportation Review---2017---Dian Sheng,Zhi-Chun Li,Xiaowen Fu,David Gillen

This study develops an integrated model to investigate the economic and environmental effects of a unilateral maritime emission regulation vis-à-vis a uniform maritime emission regulation. The proposed model explicitly incorporates the effects of competition between regional ports and between shipping companies, and captures operational considerations such as the inventory costs of in-transit cargo, and the tradeoff between enlarged fleet size and slow steaming. The behaviors of shipping companies and ports are modeled in a two-stage game so that market equilibria under alternative regulations can be solved and compared. The findings suggest that a unilateral regulation may actually lead to an increase in total emissions, whereas a uniform regulation always reduces total emissions. Under either type of regulation, there can be asymmetric effects on shipping companies and ports. Therefore, regulators and the maritime industry need to strike a balance between emission reduction and fair competition. Our study cautions against unilateral regulations, and emphasizes the importance to take into account the effects of alternative emission policies on the operations of shipping companies and ports.

Government incentive impacts on private investment behaviors under demand uncertainty

- Transportation Research Part E: Logistics and Transportation Review---2017---Shuai Li,Hubo Cai

This paper elaborates the impacts of government incentives on the private investment behaviors including the choices of investment timing, capacity, and price under demand uncertainty. The results suggest that revenue guarantee, concession period extension, lump-sum subsidy, and unit subsidy can induce timely investment. Revenue guarantee and concession period extension

have limited impacts on the choices of capacity and price. Lump-sum subsidy leads to a smaller capacity and a higher price, while unit subsidy leads to a larger capacity and a lower price when comparing to the choices by a monopoly without government incentives.

Impacts of airline mergers on passenger welfare

- Transportation Research Part E: Logistics and Transportation Review---2017---Vikrant Vaze,Tian Luo,Reed Harder

Since 2005, the US airline industry has undergone a series of consolidations. We provide a comprehensive assessment of the overall effects of five major recent mergers on passengers' welfare. We compute consumer surplus changes using passenger discrete choice models based on the attributes of airlines and routes. We then evaluate these changes, as well as changes in frequency and fare, using a difference-in-differences approach. Our major findings include large consumer welfare gains following the DL-NW and UA-CO mergers, welfare gains in regions dominated by the larger carrier in the merger, and welfare losses in highly concentrated markets following legacy mergers.

Alliance formation in a cooperative container shipping game: Performance of a real options investment approach

- Transportation Research Part E: Logistics and Transportation Review---2017---Philipp Rau,Stefan Spinler

This paper develops an integrated alliance formation and investment simulation model within container shipping. In light of low profitability and frequent alliance changes, the optimal choice of investment approach is addressed. This is achieved by comparing the performance of three investment approaches: real options analysis, and individual and collective discounted cash flow. It turns out that the real options trigger performs best, especially under conditions of high competitive intensity and freight rate volatility. A sensitivity analysis concludes that competitive intensity, alliance

complexity cost, and freight rate volatility lead to alliance instability and that shorter lead times increase industry concentration.

Responsive and resilient supply chain network design under operational and disruption risks with delivery lead-time sensitive customers

- Transportation Research Part E: Logistics and Transportation Review---2017---Mohammad Fattahi,Kannan Govindan,Esmail Keyvanshokoh

We address a multi-period supply chain (SC) network design where demands of customers depend on facilities serving them based on their delivery lead-times. Potential customer demands are stochastic, and facilities' capacity varies randomly because of possible disruptions. Accordingly, we develop a multi-stage stochastic program, and model disruptions' effect on facilities' capacity. The SC responsiveness risk is limited and, to obtain a resilient network, both mitigation and contingency strategies are exploited. Computational results on a real-life case study and randomly generated problem instances demonstrate the model's applicability, risk-measurement policies' performance, and the influence of mitigation and contingency strategies on SC's resiliency.

Logistics planning for hospital pharmacy trusteeship under a hybrid of uncertainties

- Transportation Research Part E: Logistics and Transportation Review---2017---Ming Liu,Zhe Zhang,Ding Zhang

This paper presents two medicine logistics planning models by using a time-space network approach, one with deterministic variables and the other with stochastic variables. Flow dependent variable costs, random demand and random service time are featured in our models in addressing economies of scale and uncertainties in a real-world medical logistics problem. Effective computational schemes are designed, and an evaluation method is proposed to derive and assess a solution to the models. Numerical tests are conducted and

show promising results for applications to a real-world problem.

Entropy maximising facility location model for port city intermodal terminals

- Transportation Research Part E: Logistics and Transportation Review---2017---Collins Teye,Michael G.H. Bell,Michiel Bliemer

This paper employs the principle of entropy maximisation to solve the multi-user intermodal terminal (IMT) location problem in a context where users have the option not to use an IMT. The proposed model is a non-linear mixed integer programming problem, which decomposes into an IMT location sub-problem and an IMT choice sub-problem linked in one direction by the choice of IMT location(s) and in the other by dual variables relating to cost sensitivity and IMT capacity. The principal features of the model are illustrated by a numerical example based on the state of NSW, Australia, where new IMTs are planned.

Analysis of optimal BOT highway capacity and economic toll adjustment provisions under traffic demand uncertainty

- Transportation Research Part E: Logistics and Transportation Review---2017---Zhaoyang Lu,Qiang Meng

For planning a build-operate-transfer (BOT) highway, a rigid contract between a government and private firms with fixed capacity and economic toll adjustment (ETA) provisions to traffic demand variations is practically adopted to cope with the risk caused by uncertain traffic demand. This study develops a two-stage stochastic programming model to determine its optimal highway capacity and ETA strategy, and deeply analyze some insightful properties of this type of contract. Finally, it is compared with two other “very rigid” single-stage BOT contracts with the fixed toll and capacity provisions.

Global planning in a multi-terminal and multi-modal maritime container port

- Transportation Research Part E: Logistics and Transportation Review---2017---Xavier Schep-ler,Stefan Balev,Sophie Michel,Éric Sanlaville

This paper introduces an optimization model of a multi-terminal, multi-modal maritime container port, such as the ones in the European northern range. The decisions concern the scheduling of ships, trains and trucks on terminals, while limiting inter-terminal transport of containers and minimizing weighted turnaround time. Heuristics based on the decomposition of the resulting mixed-integer program are proposed and tested on realistic generated instances with up to four terminals. The efficiency of the restrict-and-fix heuristic allows to investigate the impact of a global management on port’ s performance: an average improvement of 5% was observed.

Dynamic programming for optimal ship refueling decision

- Transportation Research Part E: Logistics and Transportation Review---2017---Lu Zhen,Shuaian Wang,Dan Zhuge

This study investigates an optimal control policy for a liner ship to decide at which ports and how much fuel the liner ship should be refueled under stochastic fuel consumption in each leg and stochastic fuel price at each port. Based on some properties proved in this study, a dynamic programming algorithm is then designed to obtain some important threshold values, which are used in the optimal control policy for ship refueling decision. Extensive experiments show that the proposed method can obtain the optimal decision within a reasonable time (about 170s) for various scales of problem instances (up to 30 ports) as well as various settings of probability distributions. In addition, some comparative experiments also show that the proposed optimal decision policy can save at least 8% fuel consumption cost by comparing with some relatively simple rules and save about 1% cost on average by comparing with some brilliantly-designed rules.

Evaluating the reliability of a stochastic distribution network in terms of minimal cuts

- Transportation Research Part E: Logistics and Transportation Review---2017---Yi-Feng Niu,Zi-You Gao,William H.K. Lam

This paper presents a d-minimal cut based algorithm to evaluate the performance index R_{d+1} of a distribution network, defined as the probability that a specified demand $d+1$ can be successfully distributed through stochastic arc capacities from the source to the destination. To improve the efficiency of solving d-minimal cuts, a novel technique is developed to determine the minimal capacities of arcs. Also, two new judging criteria are proposed to detect duplicate d-minimal cuts. Both theoretical and computational results indicate that our algorithm outperforms the existing methods. Furthermore, a real case study is provided to illustrate the application of the algorithm.

Robust Scheduling: An Empirical Study of Its Impact on Air Traffic Delays

- Transportation Research Part E: Logistics and Transportation Review---2017---Marc Christopher Lonzius,Anne Lange

We develop an econometric model to analyze the real-life impact of two robust scheduling approaches, namely limiting hub connectivity and implementing swap opportunities, based on a broad dataset of the U.S. domestic market. Our analysis is from a novel aircraft routing perspective. We confirm a delay-driving effect of direct hub connectivity and a delay-reducing effect of swap opportunities. Indirect hub connectivity provides airlines with another approach to limit delays. We furthermore contrast that the business model of Southwest Airlines cannot leverage the delay-reducing effects resulting from swap opportunities.

Optimal recharging scheduling for urban electric buses: A case study in Davis

- Transportation Research Part E: Logistics and Transportation Review---2017---Yusheng Wang,Yongxi Huang, Jiuping Xu,Nicole Barclay

In this paper, a modeling framework to optimize electric bus recharging schedules is developed, which determines both the planning and operational decisions while minimizing total annual costs. The model is demonstrated using a real-world transit network based in Davis, California. The results showed that range anxiety can be eliminated by adopting certain recharging strategies. Sensitivity analyses revealed that the model could provide transit agencies with comprehensive guidance on the utilization of electric buses and development of a fast charging system. The comparative analyses showed that it was more economical and environmentally friendly to utilize electric buses than diesel buses.

Valuing travel time savings: A case of short-term or long term choices?

- Transportation Research Part E: Logistics and Transportation Review---2017---Matthew J. Beck,Stephane Hess,Manuel Ojeda Cabral,Ilka Du-bernet

The valuation of travel time is of crucial importance in many transport decisions. Most studies make use of data framed around short-term decisions such as route choice. However, people may have a greater ability to trade time and money in a longer term setting, such as when considering changes in residential or employment locations. We study the value of travel time in both the short and long-term, finding differences in the valuations. Given the importance of these valuations for policy making, our results call for more research into how time-cost trade-offs should be represented with stated preference.

The spatial scope of airline competition

- Transportation Research Part E: Logistics and Transportation Review---2017---Mark Lijesen,Christiaan Behrens

We investigate whether alternative city- or airport pairs are viable substitutes and the extent to which they impact airline competition between the United Kingdom and continental Europe. To this end, we employ and

measure airlines' best responses in equilibrium. Using monthly airline-route seat capacity levels and two stage least-squares dummy-variables regression models, we estimate airlines' strategic reaction to the competitors' capacity levels, including competitors on other routes. We show that airlines' relevant market extends beyond the airport-pair level. Strategic reactions depend on airline type, but all airline types have a similar strategic reaction towards high speed rail.

Information technology for competitive advantage within logistics and supply chains: A review

- Transportation Research Part E: Logistics and Transportation Review---2017---Angappa Gunasekaran,Nachiappan Subramanian,Thanos Papadopoulos

This paper offers a systematic review of the literature on the use of information technology (IT) in logistics and supply chain management to achieve competitive advantage. While IT has revolutionized traditional logistics and supply chains to achieve numerous benefits such as increased efficiency and responsiveness, it is not still clear to what extent IT has contributed to competitive advantage within logistics and supply chains. This paper contributes to this debate by: (i) reporting the literature on the role of IT in achieving competitive advantage within logistics and supply chains based on the linkages between 'adaptation', 'alignment', and 'agility', (triple A's) (Lee, 2004), and (ii) discussing managerial implications and identifying future research directions.

SOSTA: An effective model for the Simultaneous Optimisation of airport Slot Allocation

- Transportation Research Part E: Logistics and Transportation Review---2017---Paola Pellegrini,Tatjana Bolić,Lorenzo Castelli,Raffaele Pessenti

In this paper, we propose SOSTA, an integer linear programming model for optimisation of the airport slot allocation process on the European scale. The main

contribution of SOSTA is the simultaneous allocation of slots at all European airports, while applying the existing regulation and practices. Additionally, SOSTA considers aircraft rotations through the turnaround time constraints, which is another novel contribution. In an experimental analysis based on real data, we show the benefits of the simultaneous allocation, and the flexibility and capabilities of SOSTA, along with the extremely good computational performance.

Managing congestion in supply chains via dynamic freight routing: An application in the biomass supply chain

- Transportation Research Part E: Logistics and Transportation Review---2017---Mohammad Marufuzzaman,Sandra Duni Ekşioğlu

This paper manages congestion in the supply chain via dynamic freight routing and using multi-modal facilities in different time periods of a year. The proposed mixed integer non-linear program (MINLP) model captures the trade-offs that exists between investment, transportation, and congestion management decisions. A linear approximation of the proposed MINLP model is then solved using a hybrid Benders-based rolling horizon algorithm. The performance of the algorithm is tested on a case study that uses data from the South-east USA biomass supply chain network. Extensive numerical experiments provide managerial insights to manage congestion from the biomass supply chain network.

A multi-objective evolutionary algorithm for multi-period dynamic emergency resource scheduling problems

- Transportation Research Part E: Logistics and Transportation Review---2017---Yawen Zhou,Jing Liu,Yutong Zhang,Xiaohui Gan

The resource distribution in post-disaster is an important part of emergency resource scheduling. In this paper, we first design a multi-objective optimization model for multi-period dynamic emergency resource

scheduling (ERS) problems. Then, using the framework of multi-objective evolutionary algorithm based on decomposition (MOEA/D), an MOEA is proposed to solve this model. In the proposed algorithm, new evolutionary operators are designed with the intrinsic properties of multi-period dynamic ERS problems in mind. The experimental results show that the proposed algorithm can get a set of better candidate solutions than the non-dominated sorting genetic algorithm II (NSGA-II).

The liquefied natural gas infrastructure and tanker fleet sizing problem

- Transportation Research Part E: Logistics and Transportation Review---2017---David Franz Koza, Stefan Ropke, Anna Boleda Molas

We consider a strategic infrastructure and tanker fleet sizing problem in the liquefied natural gas business. The goal is to minimize long-term on-shore infrastructure and tanker investment cost combined with inter-related expected cost for operating the tanker fleet. A non-linear arc-based model and an exact solution method based on a set-partitioning formulation are developed. The latter approach allows very fast solution times. Computational results for a case study with a liner shipping company are presented, including an extensive sensitivity analysis to account for limited predictability of key parameter values, to analyze the solutions' robustness and to derive basic decision rules.

Modelling port subsidy policies considering pricing decisions of feeder carriers

- Transportation Research Part E: Logistics and Transportation Review---2017---Chenrui Qu, Grace W.Y. Wang, Qingcheng Zeng

Feeder transportation is a key element of a port-oriented intermodal transportation system. In this paper, a pricing model is developed to investigate port subsidies to various players, i.e., mainline companies, feeder carriers, and shippers. The results show that

port subsidies change the market equilibrium. Subsidies to mainline carriers increase the profit of the entire mainline-feeder liner shipping system. Subsidies to shippers decrease the equilibrium freight rates and stimulate the shipping demand, while subsidies to feeder carriers reduce operational costs and increase profitability. The results serve as policy recommendations to achieve various long-term goals in port development.

Freight transport platoon coordination and departure time scheduling under travel time uncertainty

- Transportation Research Part E: Logistics and Transportation Review---2017---Wei Zhang, Erik Jenelius, Xiaoliang Ma

The paper formulates and analyzes a freight transport platoon coordination and departure time scheduling problem under travel time uncertainty. The expected cost minimization framework accounts for travel time cost, schedule miss penalties and fuel cost. It is shown that platooning is beneficial only when scheduled arrival times differ less than a certain threshold. Travel time uncertainty typically reduces the threshold schedule difference for platooning to be beneficial. Platooning in networks is less beneficial on converging routes than diverging routes, due to delay at the merging point. The model provides valuable insights regarding platooning benefits for freight transport planning.

The effects of the Morocco-European Union open skies agreement: A difference-in-differences analysis

- Transportation Research Part E: Logistics and Transportation Review---2017---Valeria Bernardo, Xavier Fageda

In this paper, we examine the effects of the open skies agreement signed between the EU and Morocco in December 2006. Specifically, we exploit the fact that Morocco was the only country in North Africa to sign such an agreement and that the pre-liberalization traffic in all North African countries presented a common

trend. We use data at the route level for the period 2003–2010 to run difference-in-differences regressions and to test for heterogeneous responses. We find a 20–35% increase in the number of seats offered on pre-existing routes and a notable increase in the number of new routes offered.

Reducing ATFM delays through strategic flight planning

- Transportation Research Part E: Logistics and Transportation Review---2017---Tatjana Bolić,Lorenzo Castelli,Luca Corolli,Desirée Rignonat

This paper presents an integer programming model for strategic redistribution of flights so as to respect nominal sector capacities, in short computation times for large-scale instances. The main contribution lies in the combination of tackling large-scale strategic flight planning using hard capacity constraints, while considering the whole network (i.e., both airports and sectors). Real historic data for network and traffic description are used for our test instance. Strategic and tactical impact assessments show that early flight planning can lead to the reduction of delays and their costs, showing potential for actual implementation.

Identifying critical disruption scenarios and a global robustness index tailored to real life road networks

- Transportation Research Part E: Logistics and Transportation Review---2017---Saeed Asadi Bagloee,Majid Sarvi,Brian Wolshon,Vinayak Dixit

The ability to maintain functionality in transport infrastructure is critical during disruptions. To ensure operational robustness in transportation networks, it is necessary to identify the most vital or critical roads (or links), then reinforce them to increase their resilience. In the literature, conventional approaches to analyze road network robustness have involved efforts to first remove selected road segments (one by one, not collectively), then measure the impact of these changes. Based on these results, the levels of impact are ranked

and links that demonstrate the most significant impacts are deemed to be the most critical. One of the most significant limitations of such approaches, however, is that they disregard the combined effect of road connectivity. This study advances the state of knowledge in transportation-based resilience analysis through the development of an approach to assess the impact of “critical combination scenarios”. The methodology involves a two-phase process. The first phase is based on the sensor (loop detector) location problem, within which, a selected number of high demand roads are identified as “candidate” critical links. Then, the second phase employs a series of discrete network design problem (DNBP) to find a variety of critical combination scenarios. The DNBP are solved based on a system optimal relaxation method using Bender’s Decomposition. Building further from these results, the extent to which a road network is robust (or fragile) is analyzed. The results of the DNBP solutions are demonstrated to be similar to a Lorenz Curve in which the area under the Lorenz Curve (in percentage) can be viewed as a global robustness index. This index can be used to compare and assess the robustness of different road networks and mitigation scenarios. To illustrate the practical utility of this method, this research applied the methodology to the Winnipeg, Canada road network.

Economic information transmissions and liquidity between shipping markets: New evidence from freight derivatives

- Transportation Research Part E: Logistics and Transportation Review---2017---G. Alexandridis,S. Sahoo,I. Visvikis

Economic return and volatility spillovers of derivatives markets on a number of assets have been extensively examined in the general economics literature. However, there are only a limited number of studies that investigate such interactions between freight rates and the freight futures, and no studies that also consider potential linkages with freight options. This study fills this gap by investigating the economic spillovers between time-charter rates, freight futures and freight

options prices in the dry-bulk sector of the international shipping industry. Empirical results indicate the existence of significant information transmission in both returns and volatilities between the three related markets, which we attribute to varying trading activity and market liquidity. The results also point out that, consistent with theory, the freight futures market informationally leads the freight rate market, though surprisingly, freight options lag behind both futures and physical freight rates. The documented three-way economic interactions between the related markets can be used to enhance budget planning and risk management strategies, potentially attract more investors, and thus, improve the liquidity of the freight derivatives market.

A simulation model for the management and expansion of extended port terminal operations

- Transportation Research Part E: Logistics and Transportation Review---2017---Radu Cimpanu,Mel T. Devine,O' Brien, Conor

This study introduces a discrete event simulation model for the analysis of bulk carrier unloading and material transport, storage and discharge at Europe' s largest alumina refinery, RUSAL Aughinish Alumina. With novel features such as the integration of additional unloading functionality, auxiliary infrastructure units, as well as efficient maintenance scheduling into the material processing chain, the model is used to predict and evaluate the performance gain in the port system in the context of long-term investment and planning scenarios. Promising strategic directions in terms of large scale performance indicators such as berth occupancy and costs have been identified.

Green process innovation and differentiated pricing strategies with environmental concerns of South-North markets

- Transportation Research Part E: Logistics and Transportation Review---2017---Rui Dai,Jianxiong Zhang

This paper investigates the green process innovation

and differentiated dynamic pricing strategies for a Southern firm under a two-market framework where a North country imposes a carbon tariff and a South country announces an emission cap. Results from the dynamic optimization problem show that carbon tariff decreases innovation, domestic price, the firm' s profit and the Southern social welfare but increases foreign price. A less strict binding emission cap enhances innovation, the firm' s revenue and the Northern social welfare but cuts domestic price. The domestic price can be higher, lower or intersect with its counterpart in the North under different situations.

Dynamic pricing and market segmentation responses to low-cost carrier entry

- Transportation Research Part E: Logistics and Transportation Review---2017---Rafael R. Varella,Jessica Frazão,Alessandro V.M. Oliveira

This paper develops an empirical model of online airfares to inspect the impact of the entry of a low-cost carrier (LCC). We utilize a database collected from the website of an online travel agent in Brazil. We test whether incumbents reshape their airfare temporal profiles in an attempt to attract the price-sensitive passengers who constitute the target market of the newcomer. Our results suggest that LCC entry partially spoils the existing market segmentation schemes of incumbents, forcing them to revise their distribution management strategy, simplify their fare structure and migrate from a non-monotonic to a weakly monotonic price curve.

Closed-loop coordination of inland vessels operations in large seaports using hybrid logic-based benders decomposition

- Transportation Research Part E: Logistics and Transportation Review---2017---Shijie Li,Rudy R. Negenborn,Gabriel Lodewijks

This paper addresses two coordination problems that exist in the waterborne transport in large seaports, the long time of stay of inland vessels and insufficient terminal and quay crane planning with respect to their

sailing schedules. A novel coordination model is proposed and tackled using logic-based Benders decomposition and Large Neighborhood Search. In addition, a closed-loop perspective is taken, in which possible disturbances that may occur are considered. Simulation results show that our approach can scale to real-world sizes and provide better schedules for inland vessels within the port. The potential of using inland vessels for inter-terminal transport is also extensively investigated.

Bi-objective programming approach for solving the metro timetable optimization problem with dwell time uncertainty

- Transportation Research Part E: Logistics and Transportation Review---2017---Xin Yang,Anthony Chen,Bin Ning,Tao Tang

For optimization of timetables in metro systems with regular cyclic operation, this paper develops a bi-objective programming approach addressed to minimization of net energy consumption and total travel time with provision for dwell time uncertainty. Firstly, we formulate the bi-objective timetable optimization problem as an expected value model with speed profile control. Secondly, we use the ϵ -constraint method within a genetic algorithm framework to determine the Pareto optimal solutions. Finally, numerical examples based on the real-life operation data from the Beijing Metro Yizhuang Line are presented in order to illustrate the practicability and effectiveness of the approach developed in the paper.

Quay crane scheduling with draft and trim constraints

- Transportation Research Part E: Logistics and Transportation Review---2017---Lingxiao Wu,Weimin Ma

This paper discusses the quay crane scheduling problem with draft and trim constraints (QCSPDT), an extension to the current quay crane scheduling problem. We propose a linear mixed integer programming model with the objective to minimize the total handling

time for the considered problem. A branch and bound method and a hybrid genetic algorithm are developed to solve the studied problem with different sizes. Computational experiments are conducted to examine the proposed model and solution algorithms. The computational results show that the solution methods are effective and efficient in solving the QCSPDT.

Bulk ship fleet renewal and deployment under uncertainty: A multi-stage stochastic programming approach

- Transportation Research Part E: Logistics and Transportation Review---2017---Ayse N. Arslan,Dimitri J. Papageorgiou

Faced with simultaneous demand and charter cost uncertainty, an industrial shipping company must determine a suitable fleet size, mix, and deployment strategy to satisfy demand. It acquires vessels by time chartering and voyage chartering. Time chartered vessels are acquired for different durations, a decision made before stochastic parameters are known. Voyage charters are procured for a single voyage after uncertain parameters are realized. We introduce the first multi-stage stochastic programming model for the bulk ship fleet renewal problem and solve it in a rolling horizon fashion. Computational results indicate that our approach outperforms traditional methods relying on expected value forecasts.

Modeling a green inventory routing problem with a heterogeneous fleet

- Transportation Research Part E: Logistics and Transportation Review---2017---Chun Cheng,Peng Yang,Mingyao Qi,Louis-Martin Rousseau

This paper introduces a green inventory routing problem with a heterogeneous fleet which extends the conventional inventory routing problem by considering environmental impacts and heterogeneous vehicles. A comprehensive objective is proposed, which minimizes the sum of inventory cost and routing cost, where the latter includes driver wage, vehicle fixed cost, fuel and

emission costs, in which fuel consumption and emissions are determined by load, distance, speed and vehicle characteristics. We first construct a mixed-integer program, and then conduct numerical tests to quantify the benefits of using a comprehensive objective and heterogeneous vehicles. Managerial insights are also drawn from parameter analyses.

Determinants of safe and productive truck driving: Empirical evidence from long-haul cargo transport

- Transportation Research Part E: Logistics and Transportation Review---2017---Jelle de Vries,René de Koster,Serge Rijsdijk,Debjit Roy

Using GPS data of 370 long-haul trips in India, survey data of 49 truck drivers, and ERP data, this study examines the role of driver personality characteristics in predicting risky and productive driving. The results show that more conscientious drivers display more risky driving behavior. More extravert drivers are less productive, whereas driver safety consciousness positively relates to productivity. These results can serve as a starting point for further studies into how long-haul transport companies may use individual truck driver characteristics in their training and selection procedures to meet operational safety and productivity objectives.

Capacity and production planning with carbon emission constraints

- Transportation Research Part E: Logistics and Transportation Review---2017---Shuang Song,Kannan Govindan,Lei Xu,Peng Du,Xiaojiao Qiao

This paper builds a two-stage, stochastic model to study capacity expansion problem in logistics under cap-and-trade and carbon tax regulations. The optimal capacity expansion and production decisions are obtained, and the effects of carbon emission regulations on capacity expansion are studied. Through analytical study and a real case numerical analysis, we find that the carbon tax exhibits different impacts on optimal

capacity expansion decisions in low tax rate and high tax rate, and the volatility of capacity investment cost has a larger impact on optimal capacity expansion than that of production cost.

A matheuristic for the Cargo Mix Problem with Block Stowage

- Transportation Research Part E: Logistics and Transportation Review---2017---Jonas Christensen,Dario Pacino

The cargo-mix problem aims at selecting the amount of containers of a given type to load on a vessel. In this article we present an extended definition that includes the analysis of a circular route with draft restrictions, limitations on expected cargo and the use of a block stowage strategy. A compact formulation of the problem based on the state-of-the-art heuristic decomposition is shown not to be able to solve the extended problem, thus a matheuristic approach is presented that can achieve high quality results in a matter of seconds.

Integrating attribute non-attendance and value learning with risk attitudes and perceptual conditioning

- Transportation Research Part E: Logistics and Transportation Review---2017---Camila Balbontin,David Hensher,Andrew Collins

This study integrates multiple decision process strategies (Attribute Non-Attendance and Value Learning) with risk attitudes, perceptual conditioning and overt experience, which, to the best of our knowledge, has not been done before. We propose a way to include multiple heuristics as an alternative to current dominant paradigms, which supports a behavioural view that more than one heuristic simultaneously is at play in attribute and alternative processing. Our results show that including multiple decision process strategies, and integrating of all these components, significantly improves the model's performance and enhances our understanding of how preferences are made.

Vehicle routing with private fleet, multiple common carriers offering volume discounts, and rental options

- Transportation Research Part E: Logistics and Transportation Review---2017---Christian Gahm,Christian Brabänder,Axel Tuma

The problem addressed in this paper extends the vehicle routing problem with private fleet and common carriers by three aspects: two types of rental options, a cost function considering volumes and distances, and volume discounts offered by the common carriers. For its solution, we present a mixed integer program and three heuristics based on Variable Neighborhood Search. The computational analysis demonstrates the suitability of these heuristics and the positive effects of two newly introduced mechanisms. Analyzing the interdependencies between available outsourcing options and economic benefits, it shows that a subset of options is sufficient to reduce costs remarkable.

The impact of new entrants and the new entrant program on motor carrier safety performance

- Transportation Research Part E: Logistics and Transportation Review---2017---David E. Cantor,Thomas M. Corsi,Curtis M. Grimm

Due to the importance of the recent Federal Motor Carrier Safety Administration requirement that all motor carriers participate in the New Entrant Safety Assurance Program (NESAP), the purpose of this study is to examine the relationship of the NESAP to motor carrier safety performance. Our study finds that carriers who entered the industry before the NESAP program (e.g., more experienced carriers) have significantly better safety performance in comparison to new entrant carriers. We also demonstrate that new entrants who successfully complete the requirements of the NESAP have significantly better safety performance than new entrants who fail to complete the program successfully. The implications of the study are also discussed.

Competition, cooperation, and coopetition of green supply chains under regulations on energy saving levels

- Transportation Research Part E: Logistics and Transportation Review---2017---Ashkan Hafezalkotob

We develop price-energy-saving competition and cooperation models for two green supply chains (GSCs) under government financial intervention. First, we study the best response strategies of the chains for the given tariffs of a government. Second, we formulate 16 mathematical programming models regarding governments' energy-saving, social welfare, and revenue-seeking policies. We find that the government can orchestrate GSCs to fulfil the financial, social, and environmental objectives by an appropriate tariff mechanism. Moreover, cooperation in a GSC and between GSCs may facilitate the government's sustainable development policies. A comprehensive analysis on case study of brick production GSCs reveals some important managerial insights.

Dynamic routing for milk-run tours with time windows in stochastic time-dependent networks

- Transportation Research Part E: Logistics and Transportation Review---2017---Ali R. Güner,Alper Murat,Ratna Babu Chinnam

We consider finding static yet robust recurring milk-run tours while dynamically routing the vehicle between site visits. The network arcs experience recurrent congestion, leading to stochastic and time-dependent travel times. Based on vehicle location, time of day, and current and projected network congestion states, we generate dynamic routing policies (DRP) for every pair of sites using stochastic dynamic programming (SDP). By simulating DRP we find travel time distributions for each pair of sites which is used to build the robust tour using another SDP formulation. Results are very promising when the algorithms are tested in a simulated network using historical traffic data.

Manufacturer and retailer coordination for environmental and economic competitiveness: A power perspective

- Transportation Research Part E: Logistics and Transportation Review---2017---Xu Chen,Xiaojun Wang,Hing Kai Chan

This study examines the role of power relationship and coordination in sustainable supply chain management. We investigate a two-echelon supply chain that consists of a manufacturer and a retailer whose Customer demand is carbon emission sensitive. Using the game-theoretic approach, we compare the equilibrium solutions under three supply chain power structures to analyse the effects of power relationship on supply chain decisions and sustainability performance. A two-part tariff contract is designed to coordinate the supply chain. The findings provide important managerial insights that can help firms develop a better understanding of power relationship and coordination in achieving sustainability goals.

Developing a model for measuring the resilience of a port-hinterland container transportation network

- Transportation Research Part E: Logistics and Transportation Review---2017---Hong Chen,Kevin Cullinane,Nan Liu

The ongoing development of world trade has increased the demand for safe and resilient container transport. In this paper, we apply the concept of resilience to the context of a port-hinterland container transportation network. We first propose our definition of resilience within this context, and then build an integer programming model to obtain a quantitative measure of resilience from the perspective of shippers. The model is tested using a numerical simulation based on the specific case of Gothenburg Port and part of its hinterland. Finally, the validity and reliability of the model are tested.

Optimal transit fare and service frequency of a nonlinear origin-destination based fare structure

- Transportation Research Part E: Logistics and Transportation Review---2016---Di Huang,Zhiyuan Liu,Pan Liu,Jun Chen

This paper proposes a new nonlinear distance-based transit fare structure, which is measured by a function of the Euclidean distance between the origin and destination stations, termed as Origin-Destination (OD)-based fare. The novel fare structure encourages passengers to freely choose the most efficient trip plan. An optimization model is formulated based on a three-party game (involving the transport authority, transit company, and passenger) to determine the optimal fare function and frequency. An artificial bee colony algorithm is adopted to solve the model. Finally, a numerical example is provided to verify the proposed method.

Trade promotion policies in manufacturer-retailer supply chains

- Transportation Research Part E: Logistics and Transportation Review---2016---Yu-Chung Tsao,Jye-Chyi Lu

This study considers a manufacturer-retailer supply chain in which the manufacturer provides trade promotions the retailer. We compare with four trade promotions (off-invoice, scan-back, unsold-discount and target rebate). Consider the linear price sensitive and uncertain demand, the results indicate that both manufacturer and retailer benefit from the unsold-discount policy; only manufacturer benefits from the target rebate policy. However, target rebate can benefit both manufacturer and retailer when the wholesale price is determined within the appropriate range of an agreement. Consider the price-elasticity and uncertain demand, both manufacturer and retailer can only benefit from the target rebate policy.

Hub network design problems with profits

- Transportation Research Part E: Logistics and Transportation Review---2016---Armaghan Al-

This paper presents a class of hub network design problems with profit-oriented objectives, which extend several families of classical hub location problems. Potential applications arise in the design of air and ground transportation networks. These problems include decisions on the origin/destination nodes that will be served as well as the activation of different types of edges, and consider the simultaneous optimization of the collected profit, setup cost of the hub network and transportation cost. Alternative models and integer programming formulations are proposed and analyzed. Results from computational experiments show the complexity of such models and highlight their superiority for decision-making.

Three effective metaheuristics to solve the multi-depot multi-trip heterogeneous dial-a-ride problem

- Transportation Research Part E: Logistics and Transportation Review---2016---Mohamed Amine Masmoudi,Manar Hosny,Kris Braekers,Abdelaziz Dammak

The Heterogeneous Dial-a-Ride Problem (HDARP) is an important problem in reduced mobility transportation. Recently, several extensions have been proposed towards more realistic applications of the problem. In this paper, a new variant called the Multi-Depot Multi-Trip Heterogeneous Dial-a-Ride Problem (MD-MT-HDARP) is considered. A mathematical programming formulation and three metaheuristics are proposed: an improved Adaptive Large Neighborhood Search (ALNS), Hybrid Bees Algorithm with Simulated Annealing (BA-SA), and Hybrid Bees Algorithm with Deterministic Annealing (BA-DA). Extensive experiments show the effectiveness of the proposed algorithms for solving the underlying problem. In addition, they are competitive to the current state-of-the-art algorithm on the MD-HDARP.

Shipping investor sentiment and international stock return predictability

- Transportation Research Part E: Logistics and Transportation Review---2016---Nikos Papapostolou,Panos K. Pouliasis,Nikos K. Nomikos,Ioannis Kyriakou

Stock return predictability by investor sentiment has been subject to constant updating, but reaching a decisive conclusion seems rather challenging as academic research relies heavily on US data. We provide fresh evidence on stock return predictability in an international setting and show that shipping investor sentiment is a common leading indicator for financial markets. We establish out-of-sample predictability and demonstrate that investor sentiment is also economically significant in providing utility gains to a mean-variance investor. Finally, we find evidence that the predictive power of sentiment works best when negative forecasts are also taken into account.

Stochastic seat allocation models for passenger rail transportation under customer choice

- Transportation Research Part E: Logistics and Transportation Review---2016---Xinchang Wang,Hua Wang,Xiaoning Zhang

We study the seat allocation problem for passenger rail revenue management, in which a rail operator attempts to determine the optimal quantity of seats to be allocated to each cabin class for each train service. We formulate the problem with single-stage and multi-stage decisions as two stochastic programming models that incorporate passengers' choice behavior. We transform the stochastic models into equivalent deterministic mathematical programs that are easy to solve. Then, we form a variety of seat allocation policies from the optimal solutions to the seat allocation models. A number of simulation tests are offered to test the policies.

A profit-maximization location-capacity model for designing a service system with risk of service interruptions

- Transportation Research Part E: Logistics and Transportation Review---2016---Pooya Hoseinpour, Amir Ahmadi-Javid

This paper considers the design of an immobile service system in which each facility's service process is subject to the risk of interruptions. The location-capacity decisions and allocations are simultaneously made to maximize the difference between the service provider's profit and the sum of customers' transportation and waiting costs. An efficient Lagrangian-based solution algorithm is developed, which solves large-sized instances with up to 50 service facilities and 500 customers in a few seconds. Several sensitivity analyses and managerial insights are presented. The model is also applied to a case study on a logistics network design problem in the zinc mining industry.

The multi-period service territory design problem – An introduction, a model and a heuristic approach

- Transportation Research Part E: Logistics and Transportation Review---2016---Matthias Bender, Anne Meyer, Jörg Kalcsics, Stefan Nickel

In service territory design applications, a field service workforce is responsible for providing recurring services at their customers' sites. We introduce the associated planning problem, which consists of two subproblems: In the partitioning subproblem, customers must be grouped into service territories. In the scheduling subproblem, customer visits must be scheduled throughout the multi-period planning horizon. The emphasis of this paper is put on the scheduling subproblem. We propose a mixed integer programming model for this subproblem and present a location-allocation heuristic. The results of extensive experiments on real-world instances show that the proposed heuristic produces high-quality solutions.

A Generalized Nash Equilibrium network model for post-disaster humanitarian relief

- Transportation Research Part E: Logistics and Transportation Review---2016---Anna Nagurney, Emilio Alvarez Flores, Ceren Soylu

We develop a Generalized Nash Equilibrium network model for post-disaster humanitarian relief by non-governmental organizations (NGOs). NGOs derive utility from providing relief supplies to victims of the disaster at demand points in a supply chain context while competing with each other for financial funds provided by donations. The shared constraints consist of lower and upper bounds for demand for relief items at the demand points to reduce materiel convergence or congestion. This game theory problem is reformulated as an optimization problem and numerical examples and a theoretical case study on Hurricane Katrina given.

Modeling the joint choice of access modes and flight routes with parallel structure and random heterogeneity

- Transportation Research Part E: Logistics and Transportation Review---2016---Chih-Wen Yang, Pei-Han Liao

This study focuses on the influence of ground access transportation on air travel. The error components logit model with parallel structure is first adopted to formulate the joint choice behavior of access, airports, and flights. The proposed model proves to be effective in exploring interdependence between choice dimensions and travelers heterogeneity. The empirical results indicate that fare discounting should be introduced at the city airport and the frequency of existing flight routes should be increased. To benefit the hub airport, authorities of the new airport mass rapid transit system should reconsider the tradeoff between time and cost for express trains.

A rolling horizon approach to the high speed train rescheduling problem in case of a partial segment blockage

- Transportation Research Part E: Logistics and Transportation Review---2016---Shuguang Zhan,Leo G. Kroon,Jun Zhao,Qiyuan Peng

This paper reschedules train services on a double-track high speed railway in a disrupted situation, where one track of a segment is temporarily unavailable. We have to decide the sequence of train services passing through the blocked segment, the arrival and departure time of each train service at each station, and the canceled train services. Three practical train rescheduling strategies are explicitly compared and formulated by three MILP models. The uncertain duration of the disruption is handled. A rolling horizon approach is applied to solve our models. The models are tested on a real-world instance of the Beijing-Shanghai high speed railway.

The effect of continuous improvement capacity on the relationship between of corporate social performance and business performance in maritime transport in Singapore

- Transportation Research Part E: Logistics and Transportation Review---2016---Kum Fai Yuen,Vinh V. Thai,Yiik Diew Wong

Drawing on organisational learning theory, this study argues that shipping firms with high continuous improvement capacities have better success in transforming corporate social performance (CSP) into business performance. Survey data were collected from 223 shipping firms in Singapore and analysed using multi-sampling analysis, hierarchical regression modelling, and simple slope analysis. The results support the study's argument and show that business performance is maximised when continuous improvement programmes targeted at CSP are carried out at a gradual pace and at regular intervals. This implies that shipping firms should adopt a dynamic, value-driven approach to improving CSP.

Stable vessel-cargo matching in dry bulk shipping market with price game mechanism

- Transportation Research Part E: Logistics and Transportation Review---2016---Zixuan Peng,Wenxuan Shan,Feng Guan,Bin Yu

This paper proposes a model of stable vessel-cargo matching with price game mechanism in the dry bulk shipping market. The research aims at mimicking the bid of disadvantaged participants in the process of matching preferred objects. The matching equilibrium and price equilibrium are formulated between the shippers and carriers. A price game mechanism based Gale-Shapley algorithm is developed. Three scenarios of market dominated by shippers, market dominated by carriers, and equilibrium market are discussed in computational experiments. It is showed that if disadvantaged participants bid with the price game mechanism, they may gain more surpluses even in the negative position.

An adaptive large-neighborhood search heuristic for a multi-period vehicle routing problem

- Transportation Research Part E: Logistics and Transportation Review---2016---Iman Dayarian,Teodor Gabriel Crainic,Michel Gendreau,Walter Rei

This problem involves optimizing product collection and redistribution from production locations to a set of processing plants over a planning horizon. This horizon consists of several days, and the collection-redistribution is performed on a repeating daily basis. A single routing plan must be prepared for the whole horizon, taking into account the seasonal variations in the supply. We model the problem using a sequence of periods, each corresponding to a season. We propose an adaptive large-neighborhood search with several specifically designed operators and features. The results show the excellent performance of the algorithm in terms of solution quality and computational efficiency.

Multi-objective supplier selection and order allocation under disruption risk

- Transportation Research Part E: Logistics and Transportation Review---2016---S. Prasan-naVenkatesan,M. Goh

We formulate a multi-objective MILP model to find the optimal choice of suppliers and their order quantity allocation under disruption risk. Suppliers are evaluated and ranked, based on the preference values obtained using a hybrid fuzzy AHP-fuzzy PROMETHEE. Multi-objective Particle Swarm Optimization is then applied to yield a set of Pareto-optimal solutions for the choice of suppliers and their order allocation. Numerical experimentation suggests that the supplier failure probability affects the expected total cost more than supplier flexibility and loss cost. Sensitivity analysis is performed on the failure probability, the output flexibility, and loss cost of the suppliers.

Reliable design of an integrated supply chain with expedited shipments under disruption risks

- Transportation Research Part E: Logistics and Transportation Review---2016---Jianxun Cui,Meng Zhao,Xiaopeng Li,Mohsen Parsafard,Shi An

This paper studied the design of a two-echelon supply chain where a set of suppliers serve a set of terminals that receive uncertain customer demands. In particular, we considered probabilistic transportation disruptions that may halt product supply from certain suppliers. We formulated this problem into an integer nonlinear program to determine the optimal system design that minimizes the expected total cost. A customized solution algorithm based on Lagrangian relaxation was developed to efficiently solve this model. Several numerical examples were conducted to test the proposed model and draw managerial insights into how the key parameters affect the optimal system design.

Experience conditioning in commuter modal choice modelling – Does it make a difference?

- Transportation Research Part E: Logistics and Transportation Review---2016---David Hensher,Chinh Q. Ho

This paper investigates the impact of decision maker's experience on model elasticities and predicted market share, using data collected in Sydney on commuter mode choice. Usage frequency is used as a proxy for experience and two separate mode choice models are estimated – one with experience conditioning choice and one without. Key model outputs are compared and we find that differences in the value of travel time savings and model elasticities are very marked. This suggests that ignoring experience that one has with each alternative in their choice set may be a candidate source of error in travel demand forecasts. We develop a method to obtain the level of experience for use in application of choice models to increase their prediction power.

Arc routing problems to restore connectivity of a road network

- Transportation Research Part E: Logistics and Transportation Review---2016---Maziar Kasaei,F. Sibel Salman

After a disaster, restoring accessibility in the affected area is critical for response operations. We study two arc routing problems for clearing blocked roads. The first problem minimizes the time to reconnect the road network, while the second maximizes the total benefit gained by reconnecting network components within a time limit. For each problem, we develop a mixed integer programming formulation and two versions of a heuristic algorithm. We conduct computational experiments on Istanbul data and instances adapted from the literature. The heuristics achieve near-optimal or optimal solutions quickly in most of the tested instances.

A multi-objective sustainable load planning model for intermodal transportation networks with a real-life application

- Transportation Research Part E: Logistics and Transportation Review---2016---Adil Baykasoğlu,Kemal Subulan

Growing importance of intermodal transportation necessitates modeling and solving load planning problems by taking into account various complex decisions simultaneously like transportation mode/service type selection, load allocation, and outsourcing. This paper presents a mixed-integer mathematical programming model for a multi-objective, multi-mode and multi-period sustainable load planning problem by considering import/export load flows to satisfy transport demands of customers and many other related issues. Several multiple objective optimization procedures are utilized in order to handle conflicting objectives simultaneously under crisp and fuzzy decision making environments. A real-life case study is also performed to present application and usefulness of the proposed model.

Planning and optimization of intermodal hub-and-spoke network under mixed uncertainty

- Transportation Research Part E: Logistics and Transportation Review---2016---Kai Yang,Lixing Yang,Ziyu Gao

This paper addresses the planning and optimization of intermodal hub-and-spoke (IH&S) network considering mixed uncertainties in both transportation cost and travel time. Different from previous studies, this paper develops a novel modeling framework for the IH&S network design problem to jointly minimize the expected value of total transportation costs and the maximum travel time requirement in term of critical value. A new hybrid methodology by combining fuzzy random simulation (FRS) technique and multi-start simulated annealing (MSA) algorithm is designed to solve the proposed model. Numerical experiments are implemented to verify the effectiveness of the proposed model and solution approach.

Container Ocean-transportation System Design with the factors of demand fluctuation and choice inertia of shippers

- Transportation Research Part E: Logistics and Transportation Review---2016---Kang Chen,Dongxu Chen,Xueshan Sun,Zhongzhen Yang

This paper introduces an optimization model (COSDM) for a Container Ocean-transportation System with the objective of maximizing the revenue of a liner company while taking into account the seasonal fluctuation in transportation demand and the choice inertia of shippers. The COSDM optimizes shipping network design and fleet deployment simultaneously, and it optimizes plans for changing the shipping network and for distributing slots in ships based on the fluctuation in demand and the characteristics of the shippers' choice inertia. To solve COSDM, a heuristic algorithm is created that combines Genetic Algorithm and Simplex Method. The results show that the COSDM gives an optimized design scheme of the system that takes into account the stability of transportation services and improves the user experience of shippers while increasing the revenue of the liner company. Moreover, the results also reveal new explanations for the increasing size of container ships.

An analysis of Brazilian flight delays based on frequent patterns

- Transportation Research Part E: Logistics and Transportation Review---2016---Alice Sternberg,Diego Carvalho,Leonardo Murta,Jorge Soares,Eduardo Ogasawara

In this paper we applied data indexing techniques combined with association rules to unveil hidden patterns of flight delays. Considering Brazilian flight data and guided by six research questions related to causes, moments, differences, and relationships between airports and airlines, we evaluated and quantified all attributes that may lead to delays, showing not only the main patterns, but also their chances of occurrence in the

entire network, in each airport and airline. We observed that Brazilian flight system has difficulties to recover from previous delays and when operating under adverse meteorological conditions, delays occurrences may increase up to 216%.

Reliable product-service supply chains for repairable products

- Transportation Research Part E: Logistics and Transportation Review---2016---Shabnam Reza-pour, Janet K. Allen, Farrokh Mistree

A mathematical model is developed for integrated flow planning in forward and after-sales supply chains of a company supplying repairable product-warranty packages to markets. Ignoring their interactions, these two supply chains are usually planned separately in literature. We consider demand- and supply-side variations in pre- and after-sales demands and qualified outflow of the SCs' facilities. We show that to neutralize the impact of variations, orders should be amplified by moving from the downstream to the upstream of chains. Results of an example from the gear industry show what interdependencies exist between the company' s retail price, service levels, and warranty strategies.

Determinants of port centrality in maritime container transportation

- Transportation Research Part E: Logistics and Transportation Review---2016---Yuhong Wang, Kevin Cullinane

This paper adapts Freeman' s measures of degree, closeness and betweenness centrality and applies them to assessing: port centrality in relation to direct connectivity; accessibility to all ports in the network (direct and indirect routes) and; as an intermediary between other ports. An additional parameter added to the formulae ensures that the relative importance of available shipping capacity and foreland market coverage are also accounted for. Validation of this adapted measure is provided by the results obtained from an empirical

application. These reveal that foreland market coverage exerts a particularly strong influence on a port' s demand and closeness centrality.

Port connectivity in a logistic network: The case of Bohai Bay, China

- Transportation Research Part E: Logistics and Transportation Review---2016---Grace Wang, Qingcheng Zeng, Kevin Li, Jinglei Yang

While traditional port literature uses origin and destination pairs in global shipping networks, recent developments of dry ports in the hinterland, feeder service networks, and heavy foreign trade traffic make the ports in Bohai Bay a unique case in the analysis of inter-port connectivity and competitiveness. Using an integrated port connectivity index to define the above features, the advantages and challenges of individual ports can be assessed in a dynamic interconnected environment. The model can provide unbiased port development strategies for each port to ensure long-term sustainability.

Analyzing the spatial-temporal evolution of a gateway' s hinterland: A case study of Shanghai, China

- Transportation Research Part E: Logistics and Transportation Review---2016---Jinglei Yang, Meifeng Luo, Abing Ji

This paper analyzes the spatial-temporal evolution of the attractiveness of a country' s gateway for its international trade, using Shanghai as an example. The attractiveness is regressed on the transportation facilities and geographical conditions. Seaport development is found to have a major positive impact, followed by inland waterway, highway, and airport development. These positive impacts decrease with the need for highway haulage and with the distance from Shanghai—showing an inverse U-shape distribution. Rail appears to have a U-shape distribution, implying a low application of multimodal transportation. A geographical pattern for the impacts of different transportation modes is delineated.

A strategic model of port-hinterland freight distribution networks

- Transportation Research Part E: Logistics and Transportation Review---2016---Ronald A. Halim,Jan H. Kwakkel,Lóránt A. Tavasszy

This paper presents a strategic model for port-hinterland freight distribution networks. The approach utilizes a combination of a multi-objective optimization model to estimate locations and networks of distribution centers and an assignment model that recognizes distributed service level preferences. Our example application concerns the European continent and is transferable to other regions. The model calibration is able to explain the European port-hinterland distribution structures satisfactorily. We compute novel performance measures that take into account port-hinterland distribution structures. The measures include port-hinterland transport cost, port-hinterland transport time, and distribution center-hinterland transport time. These measures can provide inputs for port-connectivity studies.

Estimation of interregional input–output table using hybrid algorithm of the RAS method and real-coded genetic algorithm

- Transportation Research Part E: Logistics and Transportation Review---2016---Tomoru Hiramatsu,Hiroki Inoue,Yasuhiko Kato

In this paper, we propose a method for improving the accuracy of the estimation of interregional input–output tables, by combining the RAS method and the real-coded Genetic Algorithm (GA); these are simple representative methods for the estimation of an interregional input–output table. By comparing the performance evaluation results obtained using the proposed method, the RAS method, and Simulated Annealing, we verified that the combination of the genetic algorithm and the RAS method can enhance the estimation accuracy of an interregional input–output table. In addition, performance is further enhanced by adjusting GA parameters.

A hybrid decomposition algorithm for designing a multi-modal transportation network under biomass supply uncertainty

- Transportation Research Part E: Logistics and Transportation Review---2016---Sushil Raj Poudel,Mohammad Marufuzzaman,Linkan Bian

This study presents a two-stage stochastic programming model for the design and management of a biomass co-firing supply chain network under feed-stock supply uncertainty. To represent a more realistic case, we generate scenarios from prediction errors of the historical and forecasted biomass supply availabilities. We solve the model using a hybrid decomposition algorithm that combines Sample average approximation with an enhanced Progressive hedging algorithm. The proposed algorithm is validated via a real-world case study using data from Mississippi and Alabama. Computational results indicate that the proposed algorithm is capable of producing high quality solutions in a reasonable amount of time.

A milk collection problem with blending

- Transportation Research Part E: Logistics and Transportation Review---2016---Germán Paredes-Belmar,Vladimir Marianov,Andrés Bronfman,Carlos Obreque,Armin Lüer-Villagra

A milk collection problem with blending is introduced. A firm collects milk from farms, and each farm produces one out of three possible qualities of milk. The revenue increases with quality, and there is a minimum requirement at the plant for each quality. Different qualities of milk can be blended in the trucks, reducing revenues, but also transportation costs, resulting in higher profit. A mixed integer-programming model, a new cut, and a branch-and-cut algorithm are proposed to solve medium-sized instances. A three-stage heuristic is designed for large instances. Computational experience for test instances and a large-sized real case is presented.

A robust optimization approach to the integrated berth allocation and quay crane assignment problem

- Transportation Research Part E: Logistics and Transportation Review---2016---Xiao Ting Shang,Jin Xin Cao,Jie Ren

This paper investigates the integrated berth allocation and quay crane assignment problem in container terminals. A deterministic model is formulated by considering the setup time of quay cranes. However, data uncertainties widely exist, and it may cause the deterministic solution to be infeasible. To handle the uncertainties, a robust optimization model is established. Furthermore, to control the level of conservativeness, another robust optimization model with the price constraints is proposed. A genetic algorithm and an insertion heuristic algorithm are suggested to obtain near optimal solutions. Computational experiments indicate that the presented models and algorithms are effective to solve the problems.

Port multi-service congestion

- Transportation Research Part E: Logistics and Transportation Review---2016---Wayne K. Talley,ManWo Ng

Port multi-service congestion occurs when port users of two or more different services (i.e., multi-services) provided at the same port node or over the same port link interfere with one another to the extent that they experience service congestion at the shared node or over the shared link. Container port nodes shared in the provision of port multi-services include, for example, the berth and yard. Container port links shared in the provision of port multi-services include, for example, the yard-to-departure-gate link, entrance-gate-to-yard link, berth-to-yard link and yard-to-berth link. If port multi-service congestion exists at a port node (or over a port link), then port multi-service congestion can be propagated to other port nodes and links in the port as long as there is a connecting path.

Default risk drivers in shipping bank loans

- Transportation Research Part E: Logistics and Transportation Review---2016---Manolis Kavussanos,Dimitris Tsouknidis

This paper proposes a credit scoring model for the empirical assessment of default risk drivers of shipping bank loans. A unique dataset, consisting of the credit portfolio of a ship-lending bank is used to estimate a logit model with two-way clustered adjusted standard errors, ensuring robust inferences. Industry specific variables, captured through current and expected conditions in the extremely volatile global shipping freight markets, the risk appetite of borrowers—the shipowners – expressed through the chartering policy they follow – and a pricing variable, are shown for the first time to be the important factors explaining default probabilities of bank loans.

On the multi-dimensionality and sampling of air transport networks

- Transportation Research Part E: Logistics and Transportation Review---2016---Seddik Belkoura,Andrew Cook,José Maria Peña,Massimiliano Zanin

Complex network theory is a framework increasingly used in the study of air transport networks, thanks to its ability to describe the structures created by networks of flights, and their influence in dynamical processes such as delay propagation. While many works consider only a fraction of the network, created by major airports or airlines, for example, it is not clear if and how such sampling process bias the observed structures and processes. In this contribution, we tackle this problem by studying how some observed topological metrics depend on the way the network is reconstructed, i.e. on the rules used to sample nodes and connections. Both structural and simple dynamical properties are considered, for eight major air networks and different source datasets. Results indicate that using a subset of airports strongly distorts our perception of the network, even when just small ones are discarded; at the same time, considering a subset of airlines yields a

better and more stable representation. This allows us to provide some general guidelines on the way airports and connections should be sampled.

Optimal assignment of airport baggage unloading zones to outgoing flights

- Transportation Research Part E: Logistics and Transportation Review---2016---Edward Huang,Pratik Mital,Marc Goetschalckx,Kan Wu

The outbound airport baggage handling system (BHS) consists of a set of unloading zones (chutes) which are assigned to outgoing flights. Airport baggage operations have inherent uncertainties such as flight delays and varying number of bags. In this paper, the chute assignment problem is modeled as a Stochastic Vector Assignment Problem (SVAP) and multiple extensions are presented to incorporate the various design needs of the airport. A real airport outbound BHS is presented. This case study also guided the optimization models' design process. The performance of the optimization models is compared with the methods used in practice and literature.

Measuring the perceived container leasing prices in liner shipping network design with empty container repositioning

- Transportation Research Part E: Logistics and Transportation Review---2016---Jianfeng Zheng,Zhuo Sun,Fangjun Zhang

This paper aims to measure the perceived container leasing prices at different ports by presenting a two-stage optimization method. In stage I, we propose a practical liner shipping network design problem with empty container repositioning. The proposed problem further considers the use of foldable containers and allows the mutual substitution between empty containers to decrease the number of empty containers to be repositioned. In stage II, the inverse optimization technique is used to determine the perceived container leasing prices at different ports, based on the solution obtained in stage I. Based on a set of candidate liner shipping service routes, a mixed-integer nonlinear programming

model is built for the proposed problem in stage I. The nonlinear terms are linearized by introducing the auxiliary variables. Numerical experiments based on a realistic Asia-Europe-Oceania liner shipping network are carried out to account for the effectiveness of our two-stage optimization method.

A GRASP algorithm for the container stowage slot planning problem

- Transportation Research Part E: Logistics and Transportation Review---2016---Francisco Parreño,Dario Pacino,Ramon Alvarez-Valdes

This work presents a generalization of the Slot Planning Problem which raises when the liner shipping industry needs to plan the placement of containers within a vessel (stowage planning). State-of-the-art stowage planning relies on a heuristic decomposition where containers are first distributed in clusters along the vessel. For each of those clusters a specific position for each container must be found. Compared to previous studies, we have introduced two new features: the explicit handling of rolled out containers and the inclusion of separations rules for dangerous cargo. We present a novel integer programming formulation and a Greedy Randomized Adaptive Search Procedure (GRASP) to solve the problem. The approach is able to find high-quality solution within 1s. We also provide comparison with the state-of-the-art on an existing and a new set of benchmark instances.

Joint implementation of tradable credit and road pricing in public-private partnership networks considering mixed equilibrium behaviors

- Transportation Research Part E: Logistics and Transportation Review---2016---Hua Wang,Xiaoning Zhang

This paper investigates joint road charging schemes in a public-private partnership (PPP) network by simultaneously taking into account Cournot-Nash (CN) players and user equilibrium (UE) players. Each joint scheme comprises a tradable credit plan for public roads and a regular tolling plan for private roads. We

show that, under UE-CN mixed equilibrium, there exist anonymous nonnegative joint schemes that can support a system optimum link flow pattern. By using preemptive approach, we further design three bi-objective optimization models with hybrid implementation of tradable credit and road pricing. Numerical examples demonstrate that the proposed methods are effective in managing PPP networks.

Modeling the mixed storage strategy for quay crane double cycling in container terminals

- Transportation Research Part E: Logistics and Transportation Review---2016---Xiaoju Zhang,Qingcheng Zeng,Zhongzhen Yang

A mixed storage strategy was proposed to improve the efficiency of yard operations and horizontal transportation to corporate with quay crane double cycling. The effects of the mixed storage strategy on terminal operations, including truck travel distance, yard crane operations and the number of required trucks, were analyzed. An approach based on cycle-time models, the queuing theory was proposed to evaluate the performances from long-term run. Results show using the mixed storage strategy, the truck travel distance can be decreased and the number of required trucks and yard crane's operation time can be reduced by 16% and 26% respectively.

Real-time relief distribution in the aftermath of disasters – A rolling horizon approach

- Transportation Research Part E: Logistics and Transportation Review---2016---Chung-Cheng Lu,Kuo-Ching Ying,Hui-Ju Chen

This paper presents a rolling horizon-based framework for real-time relief distribution in the aftermath of disasters. This framework consists of two modules. One is a state estimation and prediction module, which predicts relief demands and delivery times. The other is a relief distribution module, which solves for optimal relief distribution flows. The goal is to minimize the total time to deliver relief goods to satisfy the demand, considering uncertain data and of the risk-averse attitude

of the decision-maker. A numerical example based on the large-scale earthquake that occurred on September 21, 1999 in Taiwan is presented to demonstrate the system.

Truthful multi-unit multi-attribute double auctions for perishable supply chain trading

- Transportation Research Part E: Logistics and Transportation Review---2016---Meng Cheng,Su Xiu Xu,George Q. Huang

This paper aims to propose multi-attribute double auctions for perishable supply chain trading (PSCT). We first construct a multi-unit/single-unit multi-attribute double auction (MS-MDA) for PSCT where suppliers can submit bids on a single unit of one item (i.e., single output restriction). We then relax the single output restriction and propose a multi-unit multi-attribute double auction (M-MDA) for PSCT in which each supplier offers multiple units of one item. Both the MS-MDA and M-MDA mechanisms are incentive compatible, individually rational, budget balanced and computationally efficient. The computational study shows that all proposed mechanisms are of high allocation efficiency and practically implementable.

Cooperation among truck carriers in seaport containerized transportation

- Transportation Research Part E: Logistics and Transportation Review---2016---Claudia Caballini,Simona Saccone,Mahnam Saeednia

Nowadays the majority of goods passing through seaports are transported by road, resulting in a large number of empty movements and high total costs. This paper proposes an optimization model for the cooperative planning of multiple truck carrier operations in a seaport environment for maximizing the total profit derived from their cooperation. A compensation mechanism is introduced to motivate carriers to share their trips. Time windows, trip deadlines and fleet sizes are considered. The planning approach is evaluated using real data sets from the Italian port of Genoa.

Numerous scenarios are tested and an extensive computational analysis is reported.

Min–Max exact and heuristic policies for a two-echelon supply chain with inventory and transportation procurement decisions

- Transportation Research Part E: Logistics and Transportation Review---2016---Luca Bertazzi,Adamo Bosco,Demetrio Laganà

We study the problem in which one supplier delivers a product to a set of retailers over time by using an outsourced fleet of vehicles. Since the probability distribution of the demand is not known, we provide a Min–Max approach to find robust policies. We show that the optimal Min-Expected Value policy can be very poor in the worst case. We provide a Min–Max Dynamic Programming formulation that allows us to exactly solve the problem in small instances. Finally, we implement a Min–Max Matheuristic to solve benchmark instances and show that it is very effective.

Optimal placement of multiple types of detectors under a small vessel attack threat to port security

- Transportation Research Part E: Logistics and Transportation Review---2016---Xihong Yan,Xiaofeng Nie

We focus on a threat scenario where a terrorist would utilize a small vessel to attack a maritime target. We consider how to place multiple types of detectors to protect maritime targets from such an attack. Detectors are not perfectly reliable. The resulting detector placement problem is formulated as a nonlinear binary integer program such that the expected damage cost caused by the small vessel attack is minimized. Two exact algorithms and a greedy adding heuristic are proposed. Moreover, we conduct a detailed computational study and provide a case study in New York Harbor.

Braess Paradox of traffic networks with mixed equilibrium behaviors

- Transportation Research Part E: Logistics and Transportation Review---2016---(Walker) Wang,

Wei,David Z.W. Wang,Huijun Sun,Zengzhe Feng,Jianjun Wu

Under the user equilibrium (UE) behavior assumption, the Braess Paradox (BP) and its variations have been well investigated. However, users do not always follow the UE behavior. In reality, there are likely quiet a few non-collaborative Cournot–Nash (CN) players coexisting with UE players in the common traffic network. Users in a CN player are completely collaborative to minimize their total travel cost and users subordinating to different players are perfectly competitive. Considering both UE and CN players in the congested network, it remains unclear that under what conditions the BP will occur. In this paper, the BP occurrence conditions under the UE–CN mixed equilibrium are firstly investigated using the classical Braess network with linear link cost function. Then, the BP conditions are studied to the ordinary grid network with nonlinear link cost function. It is shown that the BP occurrence in the conventional Braess network depends upon the link travel time function parameters and the demand level of users controlled by UE/CN players, and the BP occurs in the grid network only for certain demand combinations of users under one UE player and two CN players.

Optimizing the service area and trip selection of an electric automated taxi system used for the last mile of train trips

- Transportation Research Part E: Logistics and Transportation Review---2016---Xiao Liang,Gonçalo Homem de Almeida Correia,Bart van Arem

We propose two integer programming models for optimizing an automated taxi (AT) system for last mile of train trips. Model S1: trip reservations are accepted or rejected by the operator according to the profit maximization; model S2: any reservation on a selected zone by the model must be satisfied. Models were applied to a case-study. Results indicate that fleet size influences the profitability of the taxi system: a fleet of 40 ATs is optimal in S1 and 60 ATs in S2. Having electric ATs

constrains the system for small fleets because ATs will not have time for charging.

Investment into container shipping capacity: A real options approach in oligopolistic competition

- Transportation Research Part E: Logistics and Transportation Review---2016---Philipp Rau,Stefan Spinler

We develop a container industry-specific real options investment model in oligopolistic competition taking into account endogenous price function, fuel-efficient investment, endogenous lead times, and endogenous price formation in the second-hand vessel market. We assess how optimal capacity is influenced by competitive intensity, number of players, volatility, fuel-efficiency, lead time, and cost. Moreover, we investigate optimal investment policies. We find that strategic action increases firm value and that it is worthwhile to consider alliances. Additionally, players in the market should consider retrofitting old vessels for fuel economy in economic downturns and using new, fuel-efficient vessels for capacity expansion in market upswings.

Enhancing emergency evacuation response of late evacuees: Revisiting the case of Australian Black Saturday bushfire

- Transportation Research Part E: Logistics and Transportation Review---2016---Shahrooz Shahparvari,Prem Chhetri,Babak Abbasi,Ahmad Abareshi

This paper develops a multi-objective integer programming model to support tactical planning decision-making during a short-notice evacuation using the situated context of the 2009 Black Saturday bushfires in Victoria. Various bushfire scenarios and sensitivity analysis considering short time windows, availability of resources and road disruptions were implemented to demonstrate the robustness and reliability of the model. The ϵ -constraint technique was applied to solve the problem. Results showed that it would be possible to evacuate all late evacuees during the Black

Saturday bushfire events, even if one or two resources are disrupted within the hard time window constraint.

Multi-period equilibrium modeling planning framework for tradable credit schemes

- Transportation Research Part E: Logistics and Transportation Review---2016---Mohammad Miralinaghi,Srinivas Peeta

This study proposes the concept of multi-period tradable credit scheme (TCS) for a planning context. In it, travelers determine their actions in terms of consumption or sale of credits in the current period or transfer to future periods. In the first scheme, travelers can transfer credits to future periods without penalty. In the second scheme, the effects of two regulatory instruments are investigated on the market behavior. Study insights suggest that a multi-period TCS dampens credit price volatility. It allows the central authority to develop TCSs with stable credit prices in which travelers can hedge against potential monetary losses.

Tacit collusion between two terminals of a port

- Transportation Research Part E: Logistics and Transportation Review---2016---Gang Dong,Rongbing Huang,Peggy Ng

With the recent deregulation of container service rates and the establishment of more joint venture terminals in China, the separation of ownership and operation of container terminals will make price competition fierce in one port area. In this study we present an analysis of the price competition between two container terminals using a two-stage non-cooperative game theoretical model. Our main finding is that price-matching strategies facilitate tacit collusion between container terminals. Numerical simulation is applied to the container terminals at the Yangshan Deepwater Port in Shanghai, China.

Pricing strategies for a taxi-hailing platform

- Transportation Research Part E: Logistics and Transportation Review---2016---Xiaolei Wang,Fang He,Hai Yang,H. Oliver Gao

Taxi hailing apps that facilitate taxi-customer matching quickly become popular in recent years. By combining the theories of two-sided market and taxi market, this paper models the taxi market in the presence of a single taxi hailing app through an aggregate and static approach. Based on the equilibrium model, the existence and stability of equilibria are examined, and a partial-derivative-based sensitivity analysis is conducted to quantitatively evaluate the impacts of the platform's pricing strategies to the taxi market performance. The features of desirable price perturbations that improve social welfare and/or the platform's profitability are also characterized.

A novel mathematical model for a multi-period, multi-product optimal ordering problem considering expiry dates in a FEFO system

- Transportation Research Part E: Logistics and Transportation Review---2016---Z. Sazvar,S.M.J. Mirzapour Al-e-hashem,K. Govindan,B. Bahli

One of the main challenges of retail units is to determine the order quantities of different types of products, each with a specific expiry date, so that the system cost including shortage cost is minimized. We study a new multi-product multi-period replenishment problem for a First Expired-First Out (FEFO) based warehouse management system. The proposed nonlinear model is first converted to a linear one and then solved by applying two evolutionary algorithms: the Genetic Algorithm (GA) and Particle Swarm Optimization (PSO), in which design parameters are set using Taguchi method. Computational results demonstrate the applicability of the proposed model for perishable items and comparing the results shows the efficiency of the proposed metaheuristics as well.

Two-sided platforms in airport privatization

- Transportation Research Part E: Logistics and Transportation Review---2016---Humberto F.A.J. Bettini,Alessandro V.M. Oliveira

This paper develops an empirical model to examine the relationship between ownership change and two-

sided-platform formation in the air transport industry. We investigate whether privatization enhances the dynamic capabilities of airports so that they more closely resemble a two-sided platform. We study the case of the recent privatization of Brazilian airports. We find evidence of a permanent, ceteris paribus increase in demand triggered after the privatization program. The results are consistent with a preemption of assets with a view to expanding operations and so benefiting from the network effects offered by a two-sided platform.

Towards enhancing the last-mile delivery: An effective crowd-tasking model with scalable solutions

- Transportation Research Part E: Logistics and Transportation Review---2016---Yuan Wang,Dongxiang Zhang,Qing Liu,Fumin Shen,Loo Hay Lee

In urban logistics, the last-mile delivery from the warehouse to the consumer's home has become more and more challenging with the continuous growth of E-commerce. It requires elaborate planning and scheduling to minimize the global traveling cost, but often results in unattended delivery as most consumers are away from home. In this paper, we propose an effective large-scale mobile crowd-tasking model in which a large pool of citizen workers are used to perform the last-mile delivery. To efficiently solve the model, we formulate it as a network min-cost flow problem and propose various pruning techniques that can dramatically reduce the network size. Comprehensive experiments were conducted with Singapore and Beijing datasets. The results show that our solution can support real-time delivery optimization in the large-scale mobile crowd-sourcing problem.

Analytical models of rail transportation service in the grain supply chain: Deconstructing the operational and economic advantages of shuttle train service

- Transportation Research Part E: Logistics and Transportation Review---2016---Michael F. Hyland,Hani S. Mahmassani,Lama Bou Mjahed

This paper introduces conceptual and mathematical models of the domestic grain supply chain incorporating trucking, elevator storage, and rail transportation. We compare conventional rail service supported by country elevators with shuttle service supported by terminal elevators across three critical transportation service dimensions: travel time, cost, and capacity. Even after taking into account trucking and elevator storage, the time and cost model results indicate that shuttle service transports grain faster and reduces logistical supply chain costs, respectively, relative to conventional service. The rail capacity model results demonstrate that shifting grain from conventional to shuttle service significantly increases rail capacity.

The maximum and minimum-maximum HAZMAT routing problems

- Transportation Research Part E: Logistics and Transportation Review---2016---Andrés Bronfman,Vladimir Marianov,Germán Paredes-Belmar,Armin Lüer-Villagra

We design routes for transportation of hazardous materials (HAZMAT) in urban areas, with multiple origin-destination pairs. First, we introduce the maximum HAZMAT routing problem, which maximizes the sum of the population-weighted distances from vulnerable centers to their closest point on the routes. Secondly, the minimum-maximum HAZMAT routing problem trades-off maximum versus the population-weighted distance from the route to its closest center. We propose efficient IP formulations for both NP-Hard problems, as well as a polynomial heuristic that reaches gaps below 0.54% in a few seconds on the real case in the city of Santiago, Chile.

Stochastic resource allocation for containerized cargo transportation networks when capacities are uncertain

- Transportation Research Part E: Logistics and Transportation Review---2016---Xinchang Wang

We consider the stochastic resource allocation problem for containerized cargo transportation with uncertain

capacities and network effects, in which a freight operator needs to allocate a certain amount of capacity to each product to maximize the expected profit. We formulate the problem as a constrained stochastic programming model and provide theoretical results that completely characterize the optimal solution to the model under a special case. Under a general case, we build an approximation model of the problem and propose a sampling based algorithm to solve the approximation model. A number of numerical experiments are offered to test the algorithm.

Cost-effective pallet management strategies

- Transportation Research Part E: Logistics and Transportation Review---2016---Debjit Roy,Andres L. Carrano,Jennifer A. Pazour,Akash Gupta

The existing industry strategies for managing pallets, (single-use expendable pallets, buy/sell programs, and leased pallet pooling programs), are analyzed and compared using push and pull inventory control policies. A two-stage integrated framework is developed that combines cost relationship models with data gathered in industry with multi-echelon inventory performance measures. For the base case, the single-use expendable pallet approach presents the least cost of all strategies, but the leased pallet pooling programs outperform the buy/sell programs in terms of total cost. The intervals where each strategy is most attractive are shown with respect to pallet cost, salvage cost, dwell fees, effective issue fees, retention rates, and transportation costs.

A MILP model for planning the trips of dynamic positioned tankers with variable travel time

- Transportation Research Part E: Logistics and Transportation Review---2016---Leonardo Salsano de Assis,Eduardo Camponogara

The transportation of the crude oil produced in offshore oilfields to onshore terminals is performed by vessels, known as shuttle tankers. Scheduling shuttle-tanker operations entails solving complex problems to ensure

a timely offloading of the platforms, taking into account several logistics and inventory constraints. This work proposes a new MILP formulation that advances previous works by considering variable travel time between platforms and terminals. The combination of the MILP formulation with an optimization solver constitutes a decision-support tool to aid engineers reach optimal decisions for a planning horizon. To handle large-scale instances, rolling-horizon and relax-and-fix strategies are proposed.

Truck and trailer scheduling in a real world, dynamic and heterogeneous context

- Transportation Research Part E: Logistics and Transportation Review---2016---Olivier Regnier-Coudert, John McCall, Mayowa Ayodele, Steven Anderson

We present a new variant of the Vehicle Routing Problem based on a real industrial scenario. This VRP is dynamic and heavily constrained and uses time-windows, a heterogeneous vehicle fleet and multiple types of job. A constructive solver is developed and tested using dynamic simulation of real-world data from a leading Scottish haulier. Our experiments establish the efficiency and reliability of the method for this problem. Additionally, a methodology for evaluating policy changes through simulation is presented, showing that our technique supports operations and management. We establish that fleet size can be reduced or more jobs handled by the company.

Reliable flow in forward and after-sales supply chains considering propagated uncertainty

- Transportation Research Part E: Logistics and Transportation Review---2016---Shabnam Reza-pour, Janet K. Allen, Farrokh Mistree

An integrated mathematical framework for production planning is presented for companies providing product-warranty packages through both their forward and after-sales supply chains. This model integrates manufacturers and merchandisers of the pre- and after-sales operations and incorporates the interactions between

forward and after-sales chains. The demands and qualified output of facilities are stochastic. We demonstrate that service levels depend on the local reliability of facilities and that there are critical prices at which the order of profitability of the warranty options changes. This order becomes more fragile in price-sensitive markets and more stable in warranty-sensitive markets.

Optimizing station location and fleet composition for a high-speed rail line

- Transportation Research Part E: Logistics and Transportation Review---2016---Hugo M. Repolho, Richard L. Church, António P. Antunes

This paper proposes a new strategic planning model for high-speed rail ventures. It is a mixed-integer optimization model that applies to a given line and focuses on two key strategic decisions: station location and fleet composition. Our purpose is to improve on previous station location models by including fleet composition decisions. In the new model, we additionally take into account in an approximate fashion the interrelationships between strategic and subsequent tactical decisions, regarding line planning, train scheduling and fleet assignment issues. The usefulness of the model is demonstrated for a case study involving a planned Lisbon-Oporto high-speed rail line.

The competitive facility location problem under disruption risks

- Transportation Research Part E: Logistics and Transportation Review---2016---Ying Zhang, Lawrence V. Snyder, Ted K. Ralphs, Zhaojie Xue

Two players sequentially locate a fixed number of facilities, competing to capture market share. Facilities face disruption risks, and each customer patronizes the nearest operational facility, regardless of who operates it. The problem therefore combines competitive location and location with disruptions. This combination has been absent from the literature. We model the problem as a Stackelberg game in which the leader locates facilities first, followed by the follower, and

formulate the leader's decision problem as a bilevel optimization problem. A variable neighborhood decomposition search heuristic which includes variable fixing and cut generation is developed. Computational results suggest that high quality solutions can be found quickly. Interesting managerial insights are drawn.

Advance purchase behaviors of air passengers: A continuous logit model

- Transportation Research Part E: Logistics and Transportation Review---2016---Yu-Chiun Chiou, Chia-Hsin Liu

Modeling the advance purchase behaviors of air passengers is essential when airlines develop revenue management strategies. Therefore, this study empirically investigates advance purchase behaviors based on the air ticket transaction data by using a continuous logit model. The estimation results show that advance purchase behaviors are significantly affected by price, price uncertainty, time of day (morning, afternoon and evening flight), days of week (flight on Friday), months of year (peak or off-peak seasons), and consecutive holiday. Accordingly, different pricing strategies should be used for different flights to maximize revenue.

An approximation approach to a trade-off among efficiency, efficacy, and balance for relief pre-positioning in disaster management

- Transportation Research Part E: Logistics and Transportation Review---2016---Mohammad Rezaei-Malek, Reza Tavakkoli-Moghaddam, Naoufel Cheikhrouhou, Alireza Taheri-Moghaddam

This work develops a multi-objective, two-stage stochastic, non-linear, and mixed-integer mathematical model for relief pre-positioning in disaster management. Improved imbalance and efficacy measures are incorporated into the model based on a new utility level of the delivered relief commodities. This model considers the usage possibility of a set of alternative routes for each of the applied transportation modes and consequently

improves the network reliability. An integrated separable programming-augmented ϵ -constraint approach is proposed to address the problem. The best Pareto-optimal solution is selected by PROMETHEE-II. The theoretical improvements of the presented approach are validated by experiments and a real case study.

Operational shadow pricing in back haul container shipping

- Transportation Research Part E: Logistics and Transportation Review---2016---Shao Hung Goh, Yuxian Chan

Minimum acceptable rates for back haul cargo are difficult for carriers to establish in practice. They depend on complex factors such as availability of empty containers in the vicinity, cost of repositioning empties and container on-hiring decisions. A shadow pricing and "shadow credit" approach is proposed and applied to an inland network. Such a model can help carriers undertake yield management at the operational level to improve financial performance in a post-conference era. Results also suggest a positive relationship between variability in the imbalance situation of laden containers in a particular trade and volatility of short-term back haul freight rates.

A quality function deployment approach to improve maritime supply chain resilience

- Transportation Research Part E: Logistics and Transportation Review---2016---Jasmine Siu Lee Lam, Xiwen Bai

Being international and involving numerous organizations as the basic nature, maritime supply chains are exposed to various natural and man-made risks. This paper aims to develop an original quality function deployment approach to enhance maritime supply chain resilience, taking both customer requirements and maritime risks into consideration. The empirical analysis is carried out through in-depth studies of three major shipping lines and their respective major shippers. The top three resilience measures are contingency plan, monitoring and maintenance, and supply chain

relationship management. The study also unveils the relatively low visibility and integration in maritime supply chains.

Capacity retirement in the dry bulk market: A vessel based logit model

- Transportation Research Part E: Logistics and Transportation Review---2016---Amir H. Alizadeh,Siri Pettersen Strandenes,Helen Thanopoulou

The paper investigates the effect of vessel specific and market variables on the probability of scrapping dry bulk ships. Using a dataset from 2012 to 2015, we find that the probability of scrapping increases with age, but that the relation between vessel size and scrapping probability varies across the different segments. In addition, while the relation between earnings and probability of scrapping ships is negative, bunker prices seem to affect only the scrapping rate of smaller tonnage. Scrapping probability also increases with an increase in interest rates, freight market volatility and scrap steel prices.

Combined fleet deployment and inventory management in roll-on/roll-off shipping

- Transportation Research Part E: Logistics and Transportation Review---2016---Saurabh Chandra,Marielle Christiansen,Kjetil Fagerholt

In maritime transportation of automobiles, roll-on/roll-off (ro-ro) shipping companies operate liner shipping services across major trade routes. Large ro-ro shipping companies are well placed to offer end-to-end integrated logistics services to auto manufacturers engaged in international trade of vehicles. Therefore, we present a new mixed integer programming model for fleet deployment including inventory management at the ports along each trade route. Due to the complexity of the problem, a rolling horizon heuristic (RHH) is proposed. The RHH solves the problem by iteratively solving sub-problems with shorter planning horizon. Computational results based on real instances are presented.

A fuzzy approach for container positioning considering sustainable profit optimization

- Transportation Research Part E: Logistics and Transportation Review---2016---A. Graf von Westarp,O. Schinas

Liner companies are forced to operate efficiently due to regulatory and market competition patterns and requirements. Container positioning is a vital part of their strategy. Instead of minimizing costs of moving empty units as preferred in the literature, this paper presents a formulation that optimizes the trade-off between full and empty units. Paradoxically, carrying empty instead of full units in some cases leads to more profitable operations. This paper considers these as well as the derived CO2 footprint aspects. Owing to the seasonality and incompleteness of data, a fuzzy optimization approach is chosen.

Shipping route choice across geographies: Coastal vs. landlocked countries

- Transportation Research Part E: Logistics and Transportation Review---2016---Mona Kashiha,Jean-Claude Thill,Craig Depken

This paper investigates how geography and transportation costs influence the decisions by shippers of which port of export to use. Using a large sample of disaggregated shipments originating from several countries in Europe, we show that European logistics networks exhibit a low level of international integration that affects shipping route choice. Furthermore, we find significant differences in shipping behaviors across landlocked and coastal countries, with shippers in landlocked countries avoiding long land transportation, crossing borders readily, and placing more value on transportation infrastructure. These findings have implications in designing port competitiveness strategies and economic development policies in landlocked countries.

A comparison of two exact methods for passenger railway rolling stock (re)scheduling

- Transportation Research Part E: Logistics and Transportation Review---2016---Jørgen T.

Haahr,Joris C. Wagenaar,Lucas P. Veelenturf,Leo G. Kroon

The assignment of rolling stock units to timetable services in passenger railways is an important optimization problem that has been addressed by many papers in different forms. Solution approaches have been proposed for different planning phases: strategic, tactical, operational, and real-time planning. In this paper we compare two approaches within the operational and real-time planning phase. The first exact approach is based on a known Mixed Integer Linear Program (MILP) which is solved using CPLEX. The second approach is a new method that is an extension of a recently introduced MILP, which is solved using a column and row generation approach. In this paper, we benchmark the performance of the methods on networks of two countries (Denmark and The Netherlands). We use the approaches to make daily schedules and we test their real time applicability by performing tests with different disruption scenarios. The computational experiments demonstrate that both models can be used on both networks and are able to find optimal rolling stock circulations in the different planning phases. Furthermore, the results show that both approaches are sufficiently fast to be used in a real-time setting.

Optimal traffic calming: A mixed-integer bi-level programming model for locating sidewalks and crosswalks in a multimodal transportation network to maximize pedestrians' safety and network usability

- Transportation Research Part E: Logistics and Transportation Review---2016---Eghbal Rashidi,Mohsen Parsafard,Hugh Medal,Xiaopeng Li

We study the effect that installing sidewalks and crosswalks, as traffic calming facilities, has on the safety and usability of a transportation network with automobile, public transit and walking as modes of transportation. A mathematical programming model is proposed for this problem whose objective is to minimize the safety hazard for pedestrians and the total transportation

cost of the network. We utilize a customized greedy heuristic and a simulated annealing algorithm for solving the problem. The computational results indicate that installing sidewalks and crosswalks at proper locations can reduce the overall transportation cost and improve pedestrians' safety.

Robust planning and disruption management in roll-on roll-off liner shipping

- Transportation Research Part E: Logistics and Transportation Review---2016---Andreas Fischer,Håkon Nokhart,Henrik Olsen,Kjetil Fagerholt,Jørgen Glomvik Rakke,Magnus Stålhane

This paper presents different strategies for handling disruptions in fleet deployment in roll-on roll-off liner shipping, which basically consists of assigning a fleet of vessels to predefined voyages at minimum cost. A new mathematical model of the problem is presented, including a set of robust planning strategies, such as adding slack and rewarding early arrivals. To solve real-life instances a rolling horizon heuristic is proposed. A computational study, where we also propose some recovery planning strategies, is conducted, and simulation results show that adding robustness significantly reduces the actual cost of the plan and the total delays of the voyages.

Integrated inventory-transportation model by synchronizing delivery and production cycles

- Transportation Research Part E: Logistics and Transportation Review---2016---Y.C.E. Lee,Chi Kin Chan,A. Langevin,H.W.J. Lee

This paper develops an integrated single-vendor multi-buyer inventory-transportation synchronized supply chain model. In this paper, the decisions of truck assignment and routing are also considered and as a result, a series of vehicle routing problems (VRP) are required to be solved. Due to the highly complicated objective function and the NP-hard VRP problems, the problem cannot be solved analytically. Hence, meta-heuristics are proposed. By means of the numerical

examples and a case study, the meta-heuristics developed are shown to be very effective in solving such comprehensive supply chain models, and the results so obtained are promising.

Dynamic volatility spillovers across shipping freight markets

- Transportation Research Part E: Logistics and Transportation Review---2016---Dimitris Tsouknidis

This paper examines the existence of dynamic volatility spillovers within and between the dry-bulk and tanker freight markets by employing the multivariate DCC-GARCH model and the volatility spillover index developed by Diebold and Yilmaz (2012, 2009). This methodology is invariant to ordering the variables when estimating a VAR model and allows for the disaggregation of volatility spillovers in total, directional, net and net pairwise. Results reveal the existence of large time-varying volatility spillovers across shipping freight markets, which are more intense during and after the global financial crisis.

Effect of variable transportation and carbon emission in a three-echelon supply chain model

- Transportation Research Part E: Logistics and Transportation Review---2016---Biswajit Sarkar,Baishakhi Ganguly,Mitali Sarkar,Sarla Pareek

Several industries controls carbon emission during transporting products due to increased transportation for obtaining the best transportation way with reduced cost. This study considers a three-echelon supply chain model where the supplier makes semi-finished products and transports to manufacturer for finished products. The manufacturer transports products by single-setup-multi-delivery policy to multi-retailer. The aim of the model is to reduce the supply chain cost by considering variable transportation and carbon emission costs are considered due to several shipments. An algebraic approach is employed to obtain the closed-form solution.

Numerical example, sensitivity analysis, and graphical representations are given to illustrate the model.

Fair profit contract for a carrier collaboration framework in a green hub network under soft time-windows: Dual lexicographic max–min approach

- Transportation Research Part E: Logistics and Transportation Review---2016---Amir Hossein Niknamfar,Seyed Taghi Akhavan Niaki

This paper models a novel and practical bi-objective hub-location problem under a centralized carrier collaboration framework between one holding company and multiple carriers. The holding company first establishes a hub-and-spoke network in order to locate p hubs and to assign the center nodes to the located hubs. Then, it allocates the transportation routes of the hub network to the carriers. In contrast, the carriers should select an appropriate vehicle type to serve the transportation requests in a green hub network. The carriers are also able to meet the transportation requests within a certain time-window based on a soft time-window mechanism. Moreover, aiming to emphasize green transportation, a vehicle emission model is used to take into account CO₂ emissions of the vehicles where the fuel consumption is a function of speed level. Aiming to identify a win–win deal between the holding company and the carriers, a dual lexicographic max–min (LMM) approach is used in order to optimize their profits in a fair way. Finally, some numerical experiments are presented to demonstrate the applicability of the proposed methodology. The computational results show that not only the holding company and the carriers can better generate a fair profit contract among themselves using the LMM approach, but also both can obtain more profit in the worst case for their businesses rather than using the max–min approach. In addition, sensitivity analyses show that increasing the size of the soft time-window leads to a reduction in the delivery schedule violations, while results in raising the total profit. Moreover, the tax cost of fuel consumption as well as the number of potential vehicles has a substantial impact on both the fuel consumption

and carrier's profit.

Combinatorial clock-proxy exchange for carrier collaboration in less than truck load transportation

- Transportation Research Part E: Logistics and Transportation Review---2016---Haoxun Chen

A carrier collaboration problem in less-than-truck load transportation is considered, where multiple carriers exchange their pickup and delivery requests in order to improve their operational efficiency. We extend the clock-proxy auction proposed by Ausubel et al. (2006) to a combinatorial clock-proxy exchange for the problem. This mechanism combines the price discovery of the clock exchange designed based on Lagrangian relaxation with the efficiency of the proxy exchange determined based on the information observed in the clock phase. Numerical experiments on randomly generated instances demonstrate the necessity of the proxy phase and the effectiveness of the clock-proxy exchange.

Traffic managements for household travels in congested morning commute

- Transportation Research Part E: Logistics and Transportation Review---2016---Zehui Jia,David Z.W. Wang,Xingju Cai

Due to the high car ownership cost or car ownership restrictions in many major cities, household travels, which include multiple trips for all the household members, become very common. One typical household travel can be observed as the consecutive school trip and work trip, which sends the traveler's children to school first and then drive to their workplaces. In this paper, we analyse the departure time choice of the household travels and the equilibrium trip scheduling, i.e., extending the standard Vickrey's bottleneck model from work commute with one single preferred arrival time (work start time) to household commute with two consecutive preferred arrival times (school start time and work start time). Then, we investigate one step toll in peak hour window to best manage the morning commute of household travels and analyse

the impact of the school-work start time difference on individual cost, social cost and traffic managements, so that we can optimally set the school-work start time difference to minimize the total travel cost. In addition, an alternative tradable credit scheme is designed to manage the morning commute as a replacement of the road toll scheme.

Making dynamic ride-sharing work: The impact of driver and rider flexibility

- Transportation Research Part E: Logistics and Transportation Review---2016---Mitja Stiglic,Niels Agatz,Martin Savelsbergh,Mirko Gradisar

We conduct an extensive computational study to quantify the impact of different types of participants' flexibility on the performance of a single-driver, single-rider ride-sharing system. Our results consistently show that small increases in flexibility, e.g., in terms of desired departure time or maximum detour time, can significantly increase the expected matching rate, especially when the number of trip announcements in the system is small. The insights gained from our study can provide the basis for the design of information campaigns and incentives schemes aimed at increasing the performance and success of ride-sharing systems.

The Self-Learning Particle Swarm Optimization approach for routing pickup and delivery of multiple products with material handling in multiple cross-docks

- Transportation Research Part E: Logistics and Transportation Review---2016---Mu-Chen Chen,Yu-Hsiang Hsiao,Reddivari Himadeep Reddy,Manoj Kumar Tiwari

Vehicle Routing Problems (VRPs) in distribution centers with cross-docking operations are more complex than the traditional ones. This paper attempts to address the VRP of distribution centers with multiple cross-docks for processing multiple products. In this paper, the mathematical model intends to minimize the total cost of operations subjected to a set of constraints. Due to high complexity of model, it is solved by using

a variant of Particle Swarm Optimization (PSO) with a Self-Learning strategy, namely SLPSO. To validate the effectiveness of SLPSO approach, benchmark problems in the literature and test problems are solved by SLPSO.

Optimization models for placement of an energy-aware electric vehicle charging infrastructure

- Transportation Research Part E: Logistics and Transportation Review---2016---Zonggen Yi,Peter H. Bauer

This paper addresses the problem of optimally placing charging stations in urban areas. Two optimization criteria are used: maximizing the number of reachable households and minimizing overall e-transportation energy cost. The decision making models used for both cases are mixed integer programming with linear and nonlinear energy-aware constraints. A multi-objective optimization model that handles both criteria (number of reachable households and transportation energy) simultaneously is also presented. A number of simulation results are provided for two different cities in order to illustrate the proposed methods. Among other insights, these results show that the multi-objective optimization provides improved placement results.

Exploring the choice of battery electric vehicles in city logistics: A conjoint-based choice analysis

- Transportation Research Part E: Logistics and Transportation Review---2016---Philippe Lebeau,Cathy Macharis,Joeri Van Mierlo

Adoption of electric vehicles by transport companies remains limited although major European cities should reach CO₂-free city logistics by 2030. This paper explores therefore the vehicle choice behaviour of transport companies through a conjoint-based choice analysis.

Benchmarking the noise-oriented efficiency of major European airports: A directional distance function approach

- Transportation Research Part E: Logistics and Transportation Review---2016---Augusto Voltes-Dorta,Juan Carlos Martín

The EU Environmental Noise Directive (END) requires member states to produce noise action plans for all major airports every five years. Using that data, this paper employs a directional distance function approach to estimate noise-oriented efficiency of 60 European airports between 2006 and 2011. Technical change is calculated using the Malmquist productivity index. The results indicate that European airports have improved their noise efficiency between 2006 and 2011, and some degree of convergence in noise performance across countries is seen. Larger aircraft size is linked to better noise performance. Inefficient airports would also benefit from more stringent night movement limits.

East Coast vs. West Coast: The impact of the Panama Canal' s expansion on the routing of Asian imports into the United States

- Transportation Research Part E: Logistics and Transportation Review---2016---Camil Martinez,Adams B. Steven,Martin Dresner

Asian firms shipping to inland US points choose between West and East Coast ports. West Coast shipments often have lower transit times but higher freight charges. To investigate factors affecting this routing decision, a coast choice model is estimated. Results are then used to project shifts in demand with the coming completion of the Panama Canal expansion. Our simulations show that if the Panama Canal expansion generates significant transit time savings on shipments from Asia, as projected, that there will be major shifts in traffic from West to East Coast ports, raising important policy implications for port operators on both coasts.

A robust inventory routing policy under inventory inaccuracy and replenishment lead-time

- Transportation Research Part E: Logistics and Transportation Review---2016---Ming Li,Zheng Wang,Felix T.S. Chan

In this paper, we study an inventory routing problem under replenishment lead-time and inventory inaccuracy, which exist extensively in distribution systems for fresh products, but are often ignored in existing research. To solve the problem, a robust inventory routing policy is developed in three steps. At first, we propose the methods of updating the probability of the current net inventory and predicting those in future periods. For each candidate route, we develop a Robust TQL Algorithm to optimize the replenishment time, replenishment quantity and replenishment stage length. Finally, a genetic algorithm-based method is developed to optimize the delivery route.

Marrying supply chain sustainability and resilience: A match made in heaven

- Transportation Research Part E: Logistics and Transportation Review---2016---Behnam Fahimnia,Armin Jabbarzadeh

Sustainable supply chain management has become an integral part of corporate strategy for virtually every industry. However, little is understood about the broader impacts of sustainability practices on the capacity of the supply chain to tolerate disruptions. This article aims to explore the sustainability–resilience relationship at the supply chain design level. A multi-objective optimization model featuring a sustainability performance scoring method and a stochastic fuzzy goal programming approach is developed that can be used to perform a dynamic sustainability tradeoff analysis and design a “resiliently sustainable” supply chain. Important managerial and practical insights are obtained from an empirical case study.

Disruption-driven supply chain (re)-planning and performance impact assessment with consideration of pro-active and recovery policies

- Transportation Research Part E: Logistics and Transportation Review---2016---Dmitry Ivanov,Alexander Pavlov,Alexandre Dolgui,Dmitry Pavlov,Boris Sokolov

In this study, an approach to re-planning the multi-stage supply chain (SC) subject to disruptions is developed. We analyze seven proactive SC structures, compute recovery policies to re-direct material flows in the case of two disruption scenarios, and assess the performance impact for both service level and costs with the help of a SC (re)planning model containing elements of system dynamics and linear programming. In the result, an explicit connection of performance impact assessment and SC plan reconfiguration issues with consideration of the duration of disruptions and the costs of recovery has been achieved.

Impact of decision sequence on reliability enhancement with supply disruption risks

- Transportation Research Part E: Logistics and Transportation Review---2016---Guo Li,Lijun Zhang,Xu Guan,Junjun Zheng

This paper considers a supply chain that consists of a manufacturer and a supplier who faces disruption risks. We investigate the impact of decision sequence on the supplier’s endogenous reliability enhancement and the firms’ equilibrium pricing strategies. The supply chain reliability achieves a higher level under the supplier–leader game, but this does not always lead to a higher payoff for the supply chain. Each firm prefers to make the decision first, while any decision sequence can become dominant for the supply chain. We also show that the supply chain can achieve coordination via the revenue sharing contract.

Increasing the resilience of air traffic networks using a network graph theory approach

- Transportation Research Part E: Logistics and Transportation Review---2016---Sarah Dunn,Sean

Air traffic networks are essential to today's global society. They are the fastest means of transporting physical goods and people and are a major contributor to the globalisation of the world's economy. This increasing reliance requires these networks to have high resilience; however, previous events show that they can be susceptible to natural hazards. We assess two strategies to improve the resilience of air traffic networks and show an adaptive reconfiguration strategy is superior to a permanent re-routing solution. We find that, if traffic networks have fixed air routes, the geographical location of airports leaves them vulnerable to spatial hazard.

Transportation disruption risk management: business interruption insurance and backup transportation

- Transportation Research Part E: Logistics and Transportation Review---2016---Xueping Zhen,Yongjian Li,Cai, Gangshu (George),Dan Shi

Business interruption (BI) insurance and backup transportation have been widely used in distribution centers' daily risk management. If disruption occurs, a firm (distribution center) can exert efforts to resume its transportation, although its unit transportation cost during the recovery process is uncertain. This paper studies how ex ante BI insurance can affect the ex post transportation recovery, and compares BI insurance with the ex post action—backup transportation. We investigate four strategies: basic strategy, BI insurance strategy, backup transportation strategy, and mixed strategy (integration of the last two). The distribution center that seeks the least profit loss prefers the mixed strategy to other three strategies. However, the mixed strategy might in turn require longer transportation recovery time than the BI insurance strategy. The BI insurance and transportation recovery are complementary, but the BI insurance and backup transportation are substitutable, the backup transportation and the transportation recovery are also substitutable. We also find that the choice of BI insurance strategy and the

backup transportation strategy depends on transportation market, insurance market and distribution center's operational environments.

Store brand introduction in a two-echelon logistics system with a risk-averse retailer

- Transportation Research Part E: Logistics and Transportation Review---2016---Qinquan Cui,Chun-Hung Chiu,Xin Dai,Zhongfei Li

We study a risk-averse retailer's optimal decision of introducing her store brand product by using the mean-variance formulation. The effects of the substitution factor, the capital constraint, and the development cost are examined. Taking the product quantities as the decision variables, the risk deducted surplus of the store brand product and the substitution factor play a vital role in the retailer's optimal policies. Both the capital constraint and the development cost reduce the mean-variance efficient solution set of the retailer and hence distort the risk management of the retailer. Some meaningful insights are generated.

Diversification strategy with random yield suppliers for a mean-variance risk-sensitive manufacturer

- Transportation Research Part E: Logistics and Transportation Review---2016---Weili Xue,Tsan-Ming Choi,Lijun Ma

We consider the diversification strategy for a mean-variance risk-sensitive manufacturer with unreliable suppliers. We first analyze the linear model and find that the suppliers are selected according to the descending order of their contributed marginal expected profit, and increasing the manufacturer's risk-averseness leads to a more even allocation of demand across the suppliers. Then, we study the general newsvendor model. By approximating the leftover inventory with a normal distribution, we establish the general properties of the active supplier set and show that the supplier selection rule is similar to that under the risk-neutral setting when the demand uncertainty is large. Moreover, we conjecture that the selection

rule also applies when the demand uncertainty is low, which we verify with an extensive numerical study. Our paper makes two contributions: First, we establish the properties of the optimal diversification strategy and develop corresponding insights into the trade off between cost and reliability under the mean–variance framework. Second, we perform comparative statics on the optimal solution, with a particular emphasis on investigating how changes in the supplier’s cost or reliability affect the risk-averse manufacturer’s ordering decisions and customer service level.

Pricing strategies of a dual-channel supply chain with risk aversion

- Transportation Research Part E: Logistics and Transportation Review---2016---Mengqi Liu, Erbao Cao, Coulibaly Kigbajah Salifou

We investigated the effect of risk aversion on the optimal policies of a dual-channel supply chain under complete information and asymmetric information cases. We determined that the optimal value added only depends on the value-added cost. The optimal prices under a risk-averse case are lower than those in a risk-neutral case. Information asymmetry increases wholesale and retail prices but reduces direct sale price, and tends to engender inefficiency. The value of information increases with the mean of the manufacturer’s estimation about the retailer’s risk aversion.

Managing the risks of outsourcing: Time, quality and correlated costs

- Transportation Research Part E: Logistics and Transportation Review---2016---Xiaowei Zhu

Cost, quality and time to market are three main factors for outsourcing management. A game theoretic model is used to design optimal outsourcing contracts including these three factors for a buyer and a supplier under Full Information (F) case and Asymmetric Information (A) case where the buyer does not share her internal variable cost information with the supplier. Optimal outsourcing contracts are derived and results of numerical experiment are also presented. Several insights of

managing the outsourcing risks due to the Asymmetric Information are given for various industries, like cost-sensitive industry, time-sensitive industry, and quality-sensitive industry.

Supplier hoarding, government intervention, and timing for post-disaster crop supply chain recovery

- Transportation Research Part E: Logistics and Transportation Review---2016---Jiuh-Bing Sheu

This work presents a multi-methodological approach to address the issue of post-disaster crop supply chain recovery under the influences of government intervention and supplier hoarding intention. A conceptual model which characterizes the antecedents of supplier hoarding intention is proposed, and validated using survey data. Grounded in the empirical study, an analytical model is then proposed for decision analysis of a two-tier crop supply chain recovering from post-disaster supply disruptions. Analytical results indicate that hoarding behavior reduces the time taken by supply chain members for supply recovery; and however, contributes to mixed effects on the expected profits of supply chain members.

A location-routing model for prepositioning and distributing emergency supplies

- Transportation Research Part E: Logistics and Transportation Review---2016---Aakil M. Caunhye, Yidong Zhang, Mingzhe Li, Xiaofeng Nie

We propose a two-stage location-routing model with recourse for integrated preparedness and response planning under uncertainty. The model is used for risk management in disaster situations where there are uncertainties in demand and the state of the infrastructure. We solve the two-stage model by converting it into a single-stage counterpart. The latter is then implemented in an illustrative example. Comparative analyses are run to investigate the (1) value of planning location and routing in a single model, (2) value of transshipment, (3) differences when an expected-value

objective is used, and (4) value of transshipment in the expected-value model.

Interrelationships of risks faced by third party logistics service providers: A DEMATEL based approach

- Transportation Research Part E: Logistics and Transportation Review---2016---Kannan Govindan, Atanu Chaudhuri

This paper analyses the interrelationships between risks faced by third party logistics service providers (3PLs) in relation to one of its customers using DEMATEL. Novel analysis of both within and between risk categories and generation of threshold value to prioritize risks generate useful insights. Results show that arms-length relationship between the customer and the 3PLs has strong influence on other risks and there is a need for collaborative relationships between 3PLs and its customers. Moreover, analysis indicates that the 3PLs need to improve internal processes related to quality management, flexibility of its operations and also geographical coverage of their services.

Effects of carbon emission reduction policies on transportation mode selections with stochastic demand

- Transportation Research Part E: Logistics and Transportation Review---2016---Xu Chen, Xiaojun Wang

We are witnessing more frequent extreme weather events due to the global warming. There is an urgent need for governments, industries, general public, and academics to take coordinated actions in order to tackle the challenges imposed by the climate change. It is essential to incorporate the environmental objective in the transportation mode selection problem as transportation is a main contributor to carbon emissions. With this in mind, our paper studies the retailer's ordering and transportation mode selection problem using stochastic customer demand and investigates the optimal ordering and transportation mode selection decisions under different carbon emission reduction

policies. Our analytical results reveal that there are some important transportation mode shifting thresholds under different carbon emissions reduction policies. These findings do not only help firms to make optimal decisions under different carbon emission reduction policies but also support policy makers to develop effective policies on carbon emissions reduction.

Exploring impact factors of shippers' risk prevention activities: A European survey in transportation

- Transportation Research Part E: Logistics and Transportation Review---2016---Julia C. Bendul, Alexander C.H. Skorna

This paper reports results of a survey examining the impact factors for shippers to implement risk prevention activities. A regression analysis illustrates the relations between risk and quality related impact factors and the shippers' ability to implement risk prevention activities. The study identifies the corporate risk culture and product vulnerability as main impact factors for the implementation of prevention activities in transportation. This paper will be beneficial for transportation managers considering the implementation of risk prevention activities in the transportation field, and will support further empirical research in the transportation management and supply chain risk management research area.

Mergers and service quality in the airline industry: A silver lining for air travelers?

- Transportation Research Part E: Logistics and Transportation Review---2016---Adams B. Steven, Amirhossein Alamdar Yazdi, Martin Dresner

We examine the relationship between mergers in the US domestic market and service quality, as measured through late flights, mishandled bags, involuntary boarding denials and flight cancellations. We find that in the immediate years following a merger, service quality generally deteriorates, and that the drop in service is due simultaneously to the merger and the increased

concentration of the market. Thus, recent mergers in the US, including Delta and Northwest, United and Continental, Southwest and AirTran, have likely resulted in increased market concentration and decreased service levels. From a public policy perspective, our results point to the importance of regulators monitoring airline actions, such as mergers and acquisitions, that serve to increase the concentration of markets, and may also result in decreased service quality.

Stochastic optimization for investment in facilities in emergency prevention

- Transportation Research Part E: Logistics and Transportation Review---2016---Shao-Long Hu,Chuan-Feng Han,Ling-Peng Meng

A coordinated approach is developed to integrate three preventive measures (i.e. building reinforcement, reinforcement of road networks, and facility location of relief supplies), with the objectives of minimizing budgets and risk-induced penalties. The Conditional Value-at-Risk is employed as a decision-making tool to evaluate diverse decisions of prevention based on the degree of risk aversion. Based on a real-world case of an earthquake, a series of scenarios were designed, and the applicability of the proposed model was studied. The coordinated approach for investing preventive measures is cost-efficient in helping reduce the impact of disaster on society.

The Electric Traveling Salesman Problem with Time Windows

- Transportation Research Part E: Logistics and Transportation Review---2016---R. Roberti,M. Wen

To minimize greenhouse gas emissions, the logistic field has seen an increasing usage of electric vehicles. The resulting distribution planning problems present new computational challenges.

Decomposition approach for integrated intermodal logistics network design

- Transportation Research Part E: Logistics and Transportation Review---2016---Mohammad Ghane-Ezabadi,Hector A. Vergara

The integrated intermodal logistics network design problem consists of determining terminal locations and selecting regular routes and transportation modes for loads. This problem was formulated using a path-based formulation and a decomposition-based search algorithm has been proposed for its solution. Computational results show that this approach is able to obtain optimal solutions for non-trivial problem instances of up to 150 nodes in reasonable computational times. Previous studies have only been able to obtain approximate solutions for network problems of this size. A few general insights about the effects of design parameters on solution characteristics were also obtained.

A model for a multi-size inland container transportation problem

- Transportation Research Part E: Logistics and Transportation Review---2016---Julia Funke,Herbert Kopfer

In the multi-size Inland Container Transportation Problem (mICT) trucks are able to transport up to two 20-foot or one 40-foot container at a time along routes with various pickup and delivery locations. A mixed-integer linear program for the mICT is presented using two alternative objective functions: minimization of the total travel distance and minimization of the total operation time of the trucks. The presented model is tested on instances which vary in size. Computational experiments show that by means of the presented model small problem instances can be solved optimally.

The price of anarchy in competitive reverse supply chains with quality-dependent price-only contracts

- Transportation Research Part E: Logistics and Transportation Review---2016---Yu-Sen Ye,Zu-Jun Ma,Ying Dai

To quantify the efficiency of decentralized competitive reverse supply chains (RSCs) with quality-dependent price-only contracts, we characterize the worst-case efficiency loss with the price of anarchy (PoA). Several scenarios with unilateral or bilateral horizontal competition under push or pull configurations of RSCs are discussed. Given the uncertainty in the returns of used products, we consider different consumers' return behaviors and investigate the effect of the quality levels of used products. We clarify the effect of horizontal competition for each scenario and find distinctive features of RSCs that differentiate them from traditional forward activities. Additional managerial insights are provided for discussion.

Analysis of the Chinese Airline Network as multi-layer networks

- Transportation Research Part E: Logistics and Transportation Review---2016---Wen-Bo Du,Xing-Lian Zhou,Oriol Lordan,Zhen Wang,Chen Zhao,Yan-Bo Zhu

This paper encapsulates the Chinese Airline Network (CAN) into multi-layer infrastructures via the “k-core decomposition” method. The network is divided into three layers: Core layer, containing airports of provincial capital cities, is densely connected and sustains most flight flow; Bridge layer, consisting of airports in Tier 2 and Tier 3 cities, mainly connects two other layers; and Periphery layer, comprising airports of remote areas, sustains little flight flow. Moreover, it is unveiled that CAN stays the most robust when low-degree nodes or high flight flow links are removed, which is similar to the Worldwide Airline Network (WAN), albeit less redundant.

US airport ownership, efficiency, and heterogeneity

- Transportation Research Part E: Logistics and Transportation Review---2016---Levent Kutlu,Patrick McCarthy

All US commercial airports are in the public sector yet not all have the same ownership type. For medium

and large hub US airports we use stochastic frontier analysis to analyze the efficiency differences for alternative airport ownership types. We find that while form of ownership may matter for cost efficiency, in general its effect is relatively small. Yet type of public sector ownership does have cost efficiency implications in certain environments. Further, when heterogeneity is not controlled, the results change substantially so that type of ownership matters much more which demonstrates the importance of controlling for cross section heterogeneity.

Understanding overall output efficiency in public transit systems: The roles of input regulations, perceived budget and input subsidies

- Transportation Research Part E: Logistics and Transportation Review---2016---Kofi Obeng,R. Sakano,Cephas Naanwaab

This paper examines the combined effects of subsidies, regulations and perceived budget on overall output and technical efficiency in a sample of single-mode bus transit systems using an indirect production function. The main findings are that the average transit system is 67.21% output efficient and systematic and stochastic technical inefficiencies decrease output. In addition subsidies increase output, regulations decrease output and the overall budget effect is an increase in output. Additionally, it identifies the characteristics of two groups of transit systems whose perceived costs after subsidies and regulations are either less or greater than actual total costs.

Analyzing discrepancies between willingness to pay and willingness to accept for freight transport attributes

- Transportation Research Part E: Logistics and Transportation Review---2016---María Feo-Valero,Ana Isabel Arencibia,Concepción Román

In this paper we use discrete choice data to analyze asymmetries in the preference for freight transport attributes. A reference dependent utility specification

allowed us to test for the existence of substantial asymmetries in perception of the transport cost. Hence, the re-estimation of our models in the WTP/WTa space helped us to quantify significant discrepancies between the WTP and WTa for the attributes included in the choice experiment, namely transit time, service frequency and delays in delivery time. Results are deemed essential to define alternative services to road capable to attract substantial volumes of freight.

Hazmat facility location and routing analysis with explicit consideration of equity using the Gini coefficient

- Transportation Research Part E: Logistics and Transportation Review---2016---Natalia Romero,Linda K. Nozick,Ningxiong Xu

This paper develops a model to analyze facility location and routing decisions in the context of hazardous materials transportation. A novel aspect of this model is the explicit consideration of equity using the Gini coefficient, an established computation to evaluate equity. To solve the model, we develop a method that combines Lagrangean relaxation with column generation and illustrate that method using a realistic case study. We present a case study of hazardous material railway transportation with consideration of social horizontal equity categorizing the population by household income.

Sustainable design of a closed-loop location-routing-inventory supply chain network under mixed uncertainty

- Transportation Research Part E: Logistics and Transportation Review---2016---M. Zhalechian,R. Tavakkoli-Moghaddam,B. Zahiri,M. Mohammadi

Considering economic, environmental and social impacts, this paper presents a new sustainable closed-loop location-routing-inventory model under mixed uncertainty. The environmental impacts of CO₂ emissions, fuel consumption, wasted energy and the social impacts of created job opportunities and economic development are considered in this paper. The uncertain nature of

the network is handled using a stochastic-possibilistic programming approach. Furthermore, for large-sized problems, a hybrid meta-heuristic algorithm and lower bounds are developed and discussed. Finally, a real case study is provided to demonstrate the applicability of the model in real-world applications, and several in-depth analyses are conducted to develop managerial implications.

Lead time aggregation: A three-echelon supply chain model

- Transportation Research Part E: Logistics and Transportation Review---2016---Jafar Heydari,Mansour Mahmoodi,Ata Allah Taleizadeh

In this paper, destructive effects of upstream aggregated stochastic lead times on the supply chain (SC) performance are analyzed. For this purpose, a three-echelon SC consisting of one producer, one distributor, and one retailer is modeled. Both the producer and distributor face stochastic lead times, which can be also aggregated to create a long unpredictable lead time. In order to scale down shortages at the retailer site, an incentive scheme is proposed to convince the upstream members to increase their reorder points. Applying the coordinated model considerably increases the total profit earned by the whole SC as well as all SC members.

Reducing the wasted transportation capacity of Personal Rapid Transit systems: An integrated model and multi-objective optimization approach

- Transportation Research Part E: Logistics and Transportation Review---2016---Olfa Chebbi,Jouhaina Chaouachi

This study addresses the problem of wasted transportation capacity in Personal Rapid Transit (PRT) systems. We propose a two-tier transportation model that integrates PRT and capillary transportation systems. We study a related multi-objective empty vehicle redistribution problem that attempts to minimize empty movement and the number of vehicles used. Furthermore, we design a hybrid multi-objective genetic algorithm

that integrates multiple crossover operators and linear programming techniques to solve the proposed problem. Evaluations indicate that our algorithm produces satisfactory results, and simulations confirm the efficiency of our proposed two-tier transportation system.

Improving service quality in public transportation systems using automated customer feedback

- Transportation Research Part E: Logistics and Transportation Review---2016---Anselmo Stelzer, Frank Englert, Stephan Hörold, Cindy Mayas

In this paper the necessity for standardised automated information exchange between travellers and transportation company is evaluated to improve the service quality of public transport. Therefore the needs and expectations of transportation companies and travellers are defined and the usage of a novel approach for bidirectional information and communication systems in public transport is proposed. As a result, application scenarios for the usage of customer information are described and the advantages of this novel approach, especially for dispatching processes, are highlighted. Furthermore, the benefits for customers and transportation companies in regard to service quality are pointed out.

Dynamic road lane management study

- Transportation Research Part E: Logistics and Transportation Review---2016---Chen Wang, Bertrand David, René Chalon, Chuantao Yin

Our Smart City contribution is transportation-oriented in that it proposes a dynamic road lane management system in order to share appropriately the space devoted to traffic. After a historical view of a series of solutions from physical to ICT supported, we present our proposal extensively supported by up-to-date ICT. Following a main presentation, we describe the system architecture and its working conditions. Then, we present the proposed simulator designed to study operating and driver's conditions with respect to the

new traffic signs proposed. We also describe a Mock-up technology validation and give preliminary information on in-the-field deployment.

Port economic cost functions: A service perspective

- Transportation Research Part E: Logistics and Transportation Review---2016---Wayne K. Talley, ManWo Ng

Ports provide services rather than producing physical products. However, port cost functions specify port cost as functions of physical products, e.g., port cargo throughput long-run cost is a function of port resource prices and cargo throughput (a physical product). In comparison, port cargo service long-run cost is a function of port resource prices, cargo service and shipper cargo received. The shipper provides cargo that is serviced by the port. A service cannot be touched and its user is involved in its provision. This paper derives port cost functions for which port outputs are "service outputs", e.g., cargo, vessel and vehicle services.

A multi-start heuristic approach for the split-delivery vehicle routing problem with minimum delivery amounts

- Transportation Research Part E: Logistics and Transportation Review---2016---Anthony Fu-Wah Han, Yu-Ching Chu

We propose a new multi-start solution approach for the split-delivery vehicle routing problem with minimum delivery amounts (SDVRP-MDA). Initial solutions are generated by both node-insertion and route-addition procedures with a single parameter to control the restart. These solutions are then improved by a variable neighborhood descent metaheuristic with a novel search operator inspired by node-ejection chains. We test the proposed approach with 32 benchmark instances for four different minimum delivery fractions. Using the proposed algorithm, out of 128 cases tested, we find 81 best known solutions and 34 new best solutions; overall, we find 43 new best solutions.

Delimiting port hinterlands based on intermodal network flows: Model and algorithm

- Transportation Research Part E: Logistics and Transportation Review---2016---Xinchang Wang,Qiang Meng,Lixin Miao

This study aims to propose a tangible approach to delimiting the probabilistic hinterland of a port of interest. We first build a geometric model for the probabilistic port hinterland based on intermodal network flows jointly using discrete choice analysis and geographical information of shippers. We further design an algorithm that can efficiently determine the hinterland boundaries using the sample approximation of shippers' choice probabilities. We provide theoretical results that characterize the minimum computational effort required to achieve a certain degree of accuracy in the sample approximation. We also offer two numerical case studies to justify the proposed approach.

Improved approaches to the network design problem in regional hazardous waste management systems

- Transportation Research Part E: Logistics and Transportation Review---2016---Jun Zhao,Lixia Huang,Der-Horng Lee,Qiyuan Peng

This paper investigates the network design problem arising from the regional hazardous waste management system. The problem is to identify the locations of various waste facilities, and determine the transportation routes of hazardous wastes and waste residues between those waste facilities. Aiming at minimizing jointly the total cost and total risk, the problem is formulated as a multi-objective mixed integer linear programming model. By exploiting the advantages of the model, three multi-objective optimization approaches are customized to find highly qualified non-dominated solutions. The effectiveness and efficiency of the approaches are examined both on a hypothetical case and a realistic case.

Passenger facility charge vs. airport improvement program funds: A dynamic network DEA analysis for U.S. airport financing

- Transportation Research Part E: Logistics and Transportation Review---2016---Young-Tae Chang,(Kevin) Park, Hyosoo,Bo Zou,Nabin Kafle

Passenger Facility Charge (PFC) and the Airport Improvement Program (AIP) are two major sources to finance U.S. airports. This paper develops a novel dynamic network DEA framework to investigate the substitutability between PFC and AIP funds. We find that the studied U.S. airports can substitute PFC for 8–35% of the current AIP funds and contribute significantly to the proposed plan of the US congress to cut AIP funding. In addition, the amount of PFC-for-AIP funds substitution negatively correlates with the productive efficiency of airports. The findings send an important message for future policy reforms on U.S. airport financing.

Exploring the relationship between truck load capacity and traffic accidents in the European Union

- Transportation Research Part E: Logistics and Transportation Review---2016---José I. Castillo-Manzano,Mercedes Castro-Nuño,Xavier Fageda

Applying econometric techniques to EU28 panel data and controlling for explanatory variables such as road types, we find that increased truck load capacity does not necessarily aggravate road traffic safety. Specifically, heavy trucks do not seem to be linked with greater numbers of traffic fatalities/accidents, medium trucks appear to be the worst performers in terms of fatalities, and light trucks seem to be the worst for accidents. In summary, our results clarify the complex relationship between truck load capacity and road safety, pointing to the existence of a negative correlation for accidents per capita and an inverse U-shaped curve for fatalities per capita.

Robust grain supply chain design considering post-harvest loss and harvest timing equilibrium

- Transportation Research Part E: Logistics and Transportation Review---2016---Kun An,Yanfeng Ouyang

This paper presents a bi-level robust optimization model, where a food company maximizes its profit and minimizes post-harvest loss by optimally deploying grain processing/storage facilities and determining grain purchase price, while a group of spatially distributed non-cooperative farmers determine harvest time, shipment, storage, and market decisions under yield uncertainty and market equilibrium. The non-cooperative behavior of the food company and the farmers is represented by a bi-level Stackelberg leader follower's game model with mixed-integer decision variables. The proposed model and solution approach are applied to case studies for Illinois and Brazil.

Systematic risk behavior in cyclical industries: The case of shipping

- Transportation Research Part E: Logistics and Transportation Review---2016---Wolfgang Drobetz,Christina Menzel,Henning Schröder

This study explores macroeconomic and industry-level effects on corporate systematic risk (or beta) for the international shipping industry. We document the extent to which stock market betas fluctuate over time in this asset-intensive and cyclical industry. Moreover, we analyze the fundamental determinants of systematic risk. We find evidence for high levels of systematic risk in shipping stocks, which match the fundamental risk characteristics of the industry (such as high financial and operating leverage). Shipping firms exhibit distinct industry-specific beta dynamics compared to firms from benchmark sectors or the average firm in the S&P 500 index. Changes in both economic conditions and industry-specific risk factors explain large proportions of beta variation in the cross-section of firms and over time.

The heterogeneous green vehicle routing and scheduling problem with time-varying traffic congestion

- Transportation Research Part E: Logistics and Transportation Review---2016---Yiyong Xiao,Abdullah Konak

The green vehicle routing and scheduling problem (GVRSP) aims to minimize green-house gas emissions in logistics systems through better planning of deliveries/pickups made by a fleet of vehicles. We define a new mixed integer liner programming (MIP) model which considers heterogeneous vehicles, time-varying traffic congestion, customer/vehicle time window constraints, the impact of vehicle loads on emissions, and vehicle capacity/range constraints in the GVRSP. The proposed model allows vehicles to stop on arcs, which is shown to reduce emissions up to additional 8% on simulated data. A hybrid algorithm of MIP and iterated neighborhood search is proposed to solve the problem.

Scheduling aircraft take-offs and landings on interdependent and heterogeneous runways

- Transportation Research Part E: Logistics and Transportation Review---2016---Alexander Lieder,Raik Stolletz

This paper presents an optimization method for the aircraft scheduling problem with general runway configurations. Take-offs and landings have to be assigned to a runway and a time while meeting the sequence-dependent separation requirements and minimizing the costs incurred by delays. Some runways can be used only for take-offs, landings, or certain types of aircraft while schedules for interdependent runways have to consider additional diagonal separation constraints.

Third-party remanufacturing mode selection: Outsourcing or authorization?

- Transportation Research Part E: Logistics and Transportation Review---2016---Zong-Bao Zou,Jian-Jun Wang,Gui-Shi Deng,Haozhe Chen

Many original equipment manufacturers (OEMs) allow third-party remanufacturers (3PRs) to perform remanufacturing operations of branded or patented products – through either outsourcing or authorization. This study compares these two modes by modeling the game between the OEM and the 3PR on equilibrium quantities, prices, and profits. The results suggest that when consumers perceive the remanufactured products with a low value, the 3PR prefers the authorization approach; otherwise the 3PR prefers the outsourcing approach. However, in both scenarios, the OEM obtains higher profit through outsourcing than through authorization. Our further analysis compares two modes' impacts on consumer surplus, social welfare, and environment.

Robust global supply chain network design under disruption and uncertainty considering resilience strategies: A parallel memetic algorithm for a real-life case study

- Transportation Research Part E: Logistics and Transportation Review---2016---Aliakbar Hasani, Amirhossein Khosrojerdi

A mixed-integer, non-linear model is developed for designing robust global supply chain networks under uncertainty. Six resilience strategies are proposed to mitigate the risk of correlated disruptions. In addition, an efficient parallel Taguchi-based memetic algorithm is developed that incorporates a customized hybrid parallel adaptive large neighborhood search. Fitness landscape analysis is used to determine an effective selection of neighborhood structures, while the upper bound found by Lagrangian relaxation heuristic is used to evaluate quality of solutions and effectiveness of the proposed metaheuristic. The model is solved for a real-life case of a global medical device manufacturer to extract managerial insights.

The origin–destination airport choice for all-cargo aircraft operations in Europe

- Transportation Research Part E: Logistics and Transportation Review---2016---Franziska

Kupfer, Roselinde Kessels, Peter Goos, Eddy Van de Voorde, Ann Verhetsel

In this paper, we analyze the origin–destination airport choice for freighter operations of combination and all-cargo carriers in Europe. First, we discuss the choice process of airlines qualitatively. Next, using a stated choice experiment, we show that the presence of forwarders at an airport is the primary factor in explaining airlines' choices, especially for airlines serving main airports. For airlines primarily serving regional airports, the possibility for night-time flights is most important. Finally, the presence of passenger operations at an airport is not a significant factor and the level of origin–destination demand is of limited importance.

Modeling port competition from a transport chain perspective

- Transportation Research Part E: Logistics and Transportation Review---2016---Dong-Ping Song, Andrew Lyons, Dong Li, Hossein Sharifi

This paper considers the competition between two ports involving both hinterland shipments and transshipments. Taking a transport chain perspective including deep-sea, port, feeder and inland transportation, we present a static cost model to examine ports' relative competitiveness and justify the development of game models. A non-cooperative game model is then formulated for a two-ports-one-ocean carrier system. The optimal ports' pricing and the carrier's port-of-call decisions are derived. A centralized supply chain model is then discussed. The game model is further extended to uncertain demand situations. A case study of Southampton and Liverpool ports is provided to illustrate the results.

Integrated recovery of aircraft and passengers after airline operation disruption based on a GRASP algorithm

- Transportation Research Part E: Logistics and Transportation Review---2016---Yuzhen Hu, Yan Song, Kang Zhao, Baoguang Xu

This paper considers the integrated recovery of both aircraft routing and passengers. A mathematical model is proposed based on both the flight connection network and the passenger reassignment relationship. A heuristic based on a GRASP algorithm is adopted to solve the problem. A passenger reassignment solution is demonstrated to be optimal in each iteration for a special case. The effectiveness of the heuristic is illustrated through experiments based on synthetic and real-world datasets. It is shown that the integrated recovery of flights and passengers can decrease both the recovery cost and the number of disrupted passengers.

Delivery leadtime and channel structure decisions for make-to-order duopoly under different game scenarios

- Transportation Research Part E: Logistics and Transportation Review---2016---Tiaojun Xiao,Tsan-Ming Choi,T.C.E. Cheng

We develop game-theoretic models to explore the quoted delivery leadtime, price, and channel structure decisions for a make-to-order duopoly system under three game scenarios. Under the integrated-manufacturer first scenario, we find that (i) decentralization of the supply chain increases quoted leadtime; and (ii) both manufacturers may choose different channel structures under symmetric duopoly. By comparing with the symmetric scenario and the retailer first scenario, we find that a manufacturer facing a decentralized rival adopts decentralization when leadtime sensitivity, leadtime cost, and price elasticity are very small; the effect of decentralization on quoted leadtime largely depends on game scenario.

Capacity-oriented passenger flow control under uncertain demand: Algorithm development and real-world case study

- Transportation Research Part E: Logistics and Transportation Review---2016---Xin-yue Xu,Jun Liu,Hai-ying Li,Man Jiang

This paper proposes a problem of passenger flow organization in subway stations under uncertain demand.

The existing concepts of station service capacity are extended and further classified into three in different demand scenarios. Mathematical models are put forward to measure the three capacities and a unified simulation-based algorithm is developed to solve them. To increase computing speed, data envelopment analysis (DEA) and genetic algorithms (GA) are embedded in this algorithm. A case study will demonstrate the performance of the proposed algorithm and give a detailed procedure of passenger flow control based on station service capacity in various demand scenarios.

Solving an integrated operational transportation planning problem with forwarding limitations

- Transportation Research Part E: Logistics and Transportation Review---2016---Mario Ziebuhr,Herbert Kopfer

In integrated operational transportation planning (IOTP) problems, the traditional vehicle routing problem is extended by using external resources for the fulfillment of transportation requests. IOTP is getting more complex when the choice of the fulfillment mode is limited for some requests. In this paper, an existing column generation-based heuristic for IOTP is extended by two strategies for handling forwarding limitations. The computational experiments indicate that one of the extended versions of the heuristic outperforms all previous approaches in literature. Further on, the impact of forwarding limitations on different location structures and on the size of the private fleet is analyzed.

Evaluating the solution performance of IP and CP for berth allocation with time-varying water depth

- Transportation Research Part E: Logistics and Transportation Review---2016---Tianbao Qin,Yuquan Du,Mei Sha

This paper considers the berth allocation problem (BAP) with time-varying water depth at a tidal river port. Both integer programming (IP) and constraint programming (CP) models are developed. Numerical experiments find that CP tends to be superior to IP

when the feasible domain is small (e.g. dynamic vessel arrivals), when the restriction of the objective towards decision variables is loose (e.g. makespan, departure delay), or when the size of IP models is too large due to fine time resolution. Meanwhile, CP's incapability of proving optimality can be compensated by post-optimization with IP, by using a simple CP/IP hybrid procedure.

Branch-and-price algorithm for the location-routing problem with time windows

- Transportation Research Part E: Logistics and Transportation Review---2016---Sattrawut Ponboon, Ali Gul Qureshi, Eiichi Taniguchi

This study proposes a branch-and-price algorithm to solve the Location-Routing Problem with Time Windows (LRPTW) which has never been attempted with the exact solutions before. The problem is solved by the simplex algorithm in the master problem and elementary shortest path problems with resource constraint corresponding to column generation in the subproblem until only the non-negative reduced cost columns remain. The proposed algorithm can solve many testing instances effectively. The computational results and the effect of time windows are also compared and discussed.

A time-period choice model for road freight transport in Flanders based on stated preference data

- Transportation Research Part E: Logistics and Transportation Review---2016---Gerard de Jong, Marco Kouwenhoven, Kim Ruijs, Pieter van Houwe, Dana Borremans

This paper presents one of the first models explaining the choice of time-period in road freight transport. Policies that would shift some fraction of the trucks from peak to earlier and later periods will contribute to the reduction of congestion. Therefore there is an increasing interest in modelling the time-period sensitivity of road freight transport to changes in travel time and cost by period. The model developed here is based on a

stated preference survey amongst receivers of goods in Flanders and was implemented in the strategic freight transport model of the Flemish authorities.

A tabu search heuristic for the heterogeneous vehicle routing problem on a multigraph

- Transportation Research Part E: Logistics and Transportation Review---2016---David S.W. Lai, Ozgun Caliskan Demirag, Janny M.Y. Leung

We study a time-constrained heterogeneous vehicle routing problem on a multigraph where parallel arcs between pairs of vertices represent different travel options based on criteria such as time, cost, and distance. We formulate the problem as a mixed-integer linear programming model and develop a tabu search heuristic that efficiently addresses computational challenges due to parallel arcs. Numerical experiments show that the heuristic is highly effective and that freight operators can achieve advantages in cost and customer service by considering alternative paths, especially when route duration limits are restrictive and/or when vehicles of smaller capacity are dispatched to serve remote customers.

Inventory control for returnable transport items in a closed-loop supply chain

- Transportation Research Part E: Logistics and Transportation Review---2016---Barry R. Cobb

An inventory control model for returnable transport items (RTI) where the manager selects the optimal length for inspection, repair, and purchase cycles is described. Repaired and newly obtained RTI are used in combination to satisfy current production requirements. Uncertain returns are incorporated into the model by determining a satisfactory safety stock level to buffer the inventory of used and repairable containers. The minimum cost solution is obtained when inspection and repair runs begin simultaneously. Cycle times are a function of the expected return rate and repairable percentage, while variability in these random assumptions affects the required safety stock.

The influence of charterers and owners on bulk shipping freight rates

- Transportation Research Part E: Logistics and Transportation Review---2016---Roar Adland,Pierre Cariou,François-Charles Wolff

We propose a model for freight rate formation in individual contracts that incorporates charterer and owner heterogeneity and owner–charterer match effects. We estimate fixed effect regressions and implement a variance decomposition for 2863 VLCC tanker and 1789 Capesize fixtures between 2011 and 2014. Although market conditions and routes remain the most influential covariates, the characteristics of charterers, owners and of their matches are also significant microeconomic determinants of the freight rate level. The contribution of the charterer fixed effect is large in the VLCC market, while the charterer and match effects are large contributors to the Capesize spot freight rate.

A strategic analysis of incorporating CSR into managerial incentive design

- Transportation Research Part E: Logistics and Transportation Review---2016---Junsong Bian,Kevin W. Li,Xiaolei Guo

A strategic analysis is conducted to incorporate corporate social responsibility (CSR) considerations into managerial incentive design in a duopoly where each firm comprises an owner and a manager. Consumer surplus is adopted to represent the firms' CSR concerns and a CSR-related incentive is introduced to accommodate both profit and consumer surplus. Bertrand and Cournot competition modes are discussed with the firms' products being complementary, independent, or substitutable. We first examine the equilibrium of CSR-related incentive design and, then, analyze how CSR-related incentives affect the firms' profitability and CSR performance, measured by consumer surplus and social welfare.

An integer programming approach to the bloodmobile routing problem

- Transportation Research Part E: Logistics and Transportation Review---2016---Serkan Gunpinar,Grisselle Centeno

Every day, a blood center must determine a set of locations among a group of potential sites to route their vehicles for blood collection so as to avoid shortfalls. In this study, a vehicle routing problem is modeled using an integer programming approach to simultaneously identify number of bloodmobiles to operate and minimize the distance travelled. Additionally, the model is extended to incorporate uncertainty in blood potentials and variable durations in bloodmobile visits. Optimal routings are determined using CPLEX solver and branch-and-price algorithm. Results show that proposed algorithm solve the problem to optimality up to 30 locations within 3600s.

The liner shipping berth scheduling problem with transit times

- Transportation Research Part E: Logistics and Transportation Review---2016---Line Blander Reinhardt,Christian E.M. Plum,David Pisinger,Mikkel M. Sigurd,Guillaume T.P. Vial

In this paper speed optimization of an existing liner shipping network is solved by adjusting the port berth times. The objective is to minimize fuel consumption while retaining the customer transit times including the transshipment times. To avoid too many changes to the time table, changes of port berth times are only accepted if they lead to savings above a threshold value. Since the fuel consumption of a vessel is a non-linear convex function of the speed, it is approximated by a piecewise linear function. The developed model is solved using exact methods in less than two minutes for large instances. Computational experiments on real-size liner shipping networks are presented showing that fuels savings in the magnitude 2–10% can be obtained. The work has been carried out in collaboration with Maersk Line and the tests instances are confirmed to be representative of real-life networks.

Bi-objective bilevel optimization of distribution center locations considering user equilibria

- Transportation Research Part E: Logistics and Transportation Review---2016---Walter J. Gutjahr,Nada Dzubur

We propose a bi-objective, bilevel optimization model for the location of relief distribution centers (DCs) in humanitarian logistics. The upper-level decision-maker (an aid-providing organization) selects locations for capacitated DCs. On the lower level, beneficiaries choose a DC according to distance and amount of supply to be expected. This effects a user equilibrium on the lower decision level. Upper level objectives are to minimize total opening cost for the DCs and total uncovered demand. We develop an exact algorithm for determining the Pareto frontier of the problem, integrating the adaptive epsilon-constraint method, a branch-and-bound procedure, and the Frank–Wolfe procedure.

The value of specific cargo information for substitutable modes of inland transport

- Transportation Research Part E: Logistics and Transportation Review---2016---Hongtao Zhang,Chung-Yee Lee,Tian Li

Communication about containers onboard a cargo carrier approaching a harbor with a hinterland operator who is to receive the containers usually reveals the total amount of goods (aggregate number of containers) to be transported inland upon unloading at the arrival dock. This communication is useful for the hinterland operator to plan and deploy its transport capacities. However, further transport of containers on the hinterland involve various transport modes at differing costs. For example, the delivery time requirement of a container dictates the most appropriate mode of inland transport, be it truck, rail, or barge, in decreasing order of speed, flexibility and cost, to move the container to the next destination. In general there may be several types of delivery time requirements and containers of each type is most economically moved inland in a corresponding transport mode. Trucking is usually used for

containers that need urgent delivery and train or barge for not so urgent types. In order to efficiently plan the transport capacities for after-arrival conveyance of containers having multi-type delivery time requirements, not only should the aggregate number of containers, but also the number of containers of each type, be made available to the hinterland operator. We consider several information scenarios and in each scenario we solve a single-period capacity planning serving multi-type demands with product substitution. We then compare expected transport costs between information scenarios to evaluate the benefit of specific cargo information in improving the next-step transporting after containers are unloaded at the port of entry.

A robust optimization approach for the road network daily maintenance routing problem with uncertain service time

- Transportation Research Part E: Logistics and Transportation Review---2016---Lu Chen,Michel Gendreau,Minh Hoàng Hà,André Langevin

This paper studies the robust optimization approach for the routing problem encountered in daily maintenance operations of a road network. The uncertainty of service time is considered. The robust optimization approach yields routes that minimize total cost while being less sensitive to substantial deviations of service times. A robust optimization model is developed and solved by the branch-and-cut method. In computational experiments, the behavior of the robust solutions and their performance are analyzed using Monte Carlo simulation. The robust optimization model is also compared with a classic chance-constrained programming model. The experimental analysis provides managerial insights for decision makers to determine an appropriate routing strategy.

Price promotion with reference price effects in supply chain

- Transportation Research Part E: Logistics and Transportation Review---2016---Zhibing Lin

We consider the price promotion in a supply chain comprising one manufacturer and one retailer, who take into account the reference price effects of consumers. The problem is analyzed as a manufacturer-lead Stackelberg game. The results indicate that reference price effects could mitigate “double marginalization” effects, and improve the channel efficiency. We also show that the optimal price promotion benefits the manufacturer, retailer and consumers in consumer promotion model. Furthermore, we provide the conditions under which the retailer has an interest in offering price promotion to consumers. Finally, we employ numerical analysis to demonstrate more managerial insights.

Adaptive large neighborhood search heuristics for the vehicle routing problem with stochastic demands and weight-related cost

- Transportation Research Part E: Logistics and Transportation Review---2016---Zhixing Luo,Hu Qin,Dezhi Zhang,Andrew Lim

The vehicle routing problem (VRP) with stochastic demands and weight-related cost is an extension of the VRP. Although some researchers have studied the VRP with either stochastic demands or weight-related cost, the literature on this problem is quite limited. We adopt the a priori optimization to tackle this problem and propose a dynamic programming to compute the expected cost of each route. We develop the adaptive large neighborhood search heuristics equipped with several approximate methods for the problem. To evaluate our heuristics, we generate 84 test instances. Computational results demonstrate the performance of our heuristics and can serve as benchmarks for future researchers.

Institutional performance and ship registration

- Transportation Research Part E: Logistics and Transportation Review---2016---Kyriaki Mitroussi,Michael Arghyrou

The paper introduces a new concept in ship registration, the net flag-out ratio (in contrast to the standard flag-out ratio) and examines the potential contribution

of metrics of corruption and institutional measures as decisive factors in explaining flag choice. Context-related factors are also controlled and included in the study. The study uses a cross-sectional, multiple regression econometric approach. Focusing on a sample of the 33 largest ship owning countries, we find that institutional factors do not explain the traditional flag-out measure but determine the net flag-out ratio. Our findings indicate a potential effect of institutional performance/environment on ship registration.

The impact of seaports on the regional economies in South Korea: Panel evidence from the augmented Solow model

- Transportation Research Part E: Logistics and Transportation Review---2016---Jin Suk Park,Young-Joon Seo

This study reveals the economic impact of seaports on regions in Korea. Econometrics analysis employing an augmented Solow model is conducted based on the panel data covering all the regions of Korea over the period 2000–2013. The econometrics analysis shows that cargo ports without sufficient throughput obstruct regional economic growth, whilst cargo ports contribute to regional economic growth only when they have sufficient throughput. Furthermore, the result indicates that container port activities positively affect regional economic growth, whilst port investment indirectly leads to economic growth. This study contributes to the better understanding of the role of ports in Korean economies.

Urban bus fleet-to-route assignment for pollutant emissions minimization

- Transportation Research Part E: Logistics and Transportation Review---2016---Felipe Jiménez,Alfonso Román

This study proposes a methodology to optimize the assignment of an urban bus fleet to a set of fixed routes, taking into account the differences among routes and the differences among vehicle types and propulsion technologies in order to reduce pollutant emissions

(CO₂, CO, THC, NO_x and PM). A Mixed Integer Linear Programming optimization model is stated and two scenarios are assessed: minimization of CO₂ and NO_x. The results show that it is feasible to obtain a fleet distribution in which emissions for any given pollutant are reduced without increase in emissions of other pollutants.

Interregional trade network analysis for road freight transport in Greece

- Transportation Research Part E: Logistics and Transportation Review---2016---Theodore Tsek-
eris

This paper suggests a flexible decision support framework for the strategic planning of a freight transport hub network in Greece. The proposed methodology treats practical aspects related to the optimal number, location and geographical covering of hubs, through the network analysis of interregional trade, based on original survey data for road freight flows during 2004–2012. The results offer insights into the hierarchical structure of the network and related investment priorities, as the hub role of a prefecture is found to be strongly influenced by high population densities and manufacturing specialization, and its location along highway corridors.

A hedging policy for carriers' selection under availability and demand uncertainty

- Transportation Research Part E: Logistics and Transportation Review---2016---Yassin Feki,Adnène Hajji,Monia Rekik

We address a stochastic dynamic distribution problem where a family of products needs to be shipped from a warehouse to a distribution center (DC). Uncertainty is on carriers' availability and demand at the DC. Internal, external and spot carriers must be optimally selected to minimize the expected discounted cost of transportation, inventories and shortages. We numerically prove that an optimal selection policy, SDMBSP, is based on three thresholds of the available inventory in the DC. A simulation model is proposed and proves

the robustness of the SDMBSP and its outperformance over two other carrier selection policies.

The congested multicommodity network design problem

- Transportation Research Part E: Logistics and Transportation Review---2016---Dimitris C. Paraskevopoulos,Sinan Gürel,Tolga Bektaş

This paper studies a version of the fixed-charge multicommodity network design problem where in addition to the traditional costs of flow and design, congestion at nodes is explicitly considered. The problem is initially modeled as a nonlinear integer programming formulation and two solution approaches are proposed: (i) a reformulation of the problem as a mixed integer second order cone program to optimally solve the problem for small to medium scale problem instances, and (ii) an evolutionary algorithm using elements of iterated local search and scatter search to provide upper bounds. Extensive computational results on new benchmark problem instances and on real case data are presented.

Multi-objective optimization for planning liner shipping service with uncertain port times

- Transportation Research Part E: Logistics and Transportation Review---2015---Dong-Ping Song,Dong Li,Paul Drake

This paper considers a joint tactical planning problem for the number of ships, the planned maximum sailing speed, and the liner service schedule in order to simultaneously optimize the expected cost, the service reliability and the shipping emission in the presence of port time uncertainty. The problem is formulated into a stochastic multi-objective optimization problem at the operational level. The relationships between the objectives and the decision variables are established. A simulation-based non-dominated sorting genetic algorithm is then presented to solve this problem. A case study is provided to illustrate the results and the application of the model.

Request selection and exchange approach for carrier collaboration based on auction of a single request

- Transportation Research Part E: Logistics and Transportation Review---2015---Junsong Li,Gang Rong,Yiping Feng

This paper addresses the request selection and exchange problem in the carrier collaboration process with limited sharing of carrier's request information. A framework including two decision makers, carrier and coordinator, is constructed and its collaboration process is described. In this framework, two request selection models for the carriers are established. In addition, a request exchange method for the coordinator is proposed and four profit allocation strategies are discussed. Compared with other four approaches, simulation results show that the proposed approach is effective and efficient.

Liner shipping cargo allocation with service levels and speed optimization

- Transportation Research Part E: Logistics and Transportation Review---2015---Stefan Guericke,Kevin Tierney

The cargo allocation problem is a key strategic problem that determines the profitability of a liner shipping network. We present a novel mixed-integer programming model for this problem that introduces service levels for transit time requirements and optimizes the vessel speed on each leg of a service. These extensions to the cargo allocation problem greatly increase its realism and value for carriers. We evaluate our model on realistic data from the LINER-LIB and perform a sensitivity analysis of transit times versus bunker costs. Furthermore, we show how carriers can use our model to make data driven decisions in their operations.

The impact of lead time compression on demand forecasting risk and production cost: A newsvendor model

- Transportation Research Part E: Logistics and Transportation Review---2015---Ming Jian,Xin

Fang,Liu-qian Jin,Azamat Rajapov

Short lead time reduces the exposure of demand forecasting risk, but an additional production cost is incurred to pay it. To solve this trade-off problem, a model is proposed based on classical newsvendor problem with lead time as a controllable variable. In this model, the demand forecasting process and the production cost structure are assumed as general functions with the amount of compressed lead time, respectively. Our investigation shows that under some circumstances, the trade-off problem can be solved and the proposed model can increase the profitability of enterprise. Finally, some numerical examples are given to illustrate the model.

Optimal allocation of protective resources in urban rail transit networks against intentional attacks

- Transportation Research Part E: Logistics and Transportation Review---2015---Jian Gang Jin,Linjun Lu,Lijun Sun,Jingbo Yin

This paper advances the field of network interdiction analysis by introducing an application to the urban rail transit network, deploying protective resources against intentional attacks. The resource allocation problem for urban rail transit systems is considered as a game between two players, the attacker interdicting certain rail stations to generate greatest disruption impact and the system defender fortifying the network to maximize the system's robustness to external interdictions. This paper introduces a game-theoretic approach for enhancing urban transit networks' robustness to intentional disruptions via optimally allocating protection resources. A tri-level defender-attacker-user game-theoretic model is developed to allocate protective resources among rail stations in the rail transit network. This paper is distinguished with previous studies in that more sophisticated interdiction behaviors by the attacker, such as coordinated attack on multiple locations and various attacking intensities, are specifically considered. Besides, a more complex multi-commodity network flow model is employed to

model the commuter travel pattern in the degraded rail network after interdiction. An effective nested variable neighborhood search method is devised to obtain the solution to the game in an efficient manner. A case study based on the Singapore rail transit system and actual travel demand data is finally carried out to assess the protective resources' effectiveness against intentional attacks.

Railway crew capacity planning problem with connectivity of schedules

- Transportation Research Part E: Logistics and Transportation Review---2015---Ali Çetin Suyabatmaz,Güvenç Şahin

We study a tactical level crew capacity planning problem in railways which determines the minimum required crew size in a region while both feasibility and connectivity of schedules are maintained. We present alternative mathematical formulations which depend on network representations of the problem. A path-based formulation in the form of a set-covering problem along with a column-and-row generation algorithm is proposed. An arc-based formulation of the problem is solved with a commercial linear programming solver. The computational study illustrates the effect of schedule connectivity on crew capacity decisions and shows that arc-based formulation is a viable approach.

Refueling-station location problem under uncertainty

- Transportation Research Part E: Logistics and Transportation Review---2015---Meysam Hosseini,S.A. MirHassani

In this paper, we introduce a two-stage stochastic refueling station location model, where the first stage locates permanent stations and the second locates portable stations. The portable alternative fuel stations are an innovative feature in transportation network. The models are applied to an intercity network for Arizona. Computational results show that the permanent stations locate in and around heavily populated nodes. In addition, the results obtained for the portable stations

can be utilized to set up permanent stations when the investor intends to increase the number of such stations. The computational results of the exact and greedy approach are reported.

Design of limited-stop bus service with capacity constraint and stochastic travel time

- Transportation Research Part E: Logistics and Transportation Review---2015---Jingxu Chen,Zhiyuan Liu,Senlai Zhu,Wei Wang

This paper develops a mathematical model for the optimal stopping design of limited-stop bus service, which allows each bus vehicle to skip some stops. To better reflect the reality, this paper considers the vehicle capacity and stochastic travel time. Also, vehicles are all allowed to skip stops whereas any stop is not allowed to be skipped by two consecutive vehicles. A hybrid artificial bee colony (ABC) and Monte Carlo method is developed to solve the optimal stopping strategy. Finally, the model and solution method are validated by a numerical example, and a sensitivity analysis is performed on the passenger demand.

Design and operation of intermodal transportation network in the Marmara region of Turkey

- Transportation Research Part E: Logistics and Transportation Review---2015---Hamdi G. Resat,Metin Turkey

This paper presents a multi-objective optimization model for integrating different transportation modes in the design and operation of an intermodal transportation network in a geographical region. The problem is formulated as a mixed-integer optimization problem that accounts for time and congestion dependent vehicle speeds. We present modeling approach, data analysis and outline the important characteristics of the mathematical programming problem for minimization of transportation cost and time simultaneously by using the augmented ϵ -constraint method. The proposed approach is illustrated on a real world case using

data from Marmara region where approximately 50% industrial goods and services in Turkey are produced.

Joint planning of berth and yard allocation in transshipment terminals using multi-cluster stacking strategy

- Transportation Research Part E: Logistics and Transportation Review---2015---Yi Tao, Chung-Yee Lee

In this work, a joint planning problem for berth and yard allocation in transshipment terminals is addressed. Multi-cluster stacking strategy is proposed to split each transshipment flow into a number of container clusters and then stack each cluster in different yard blocks. A mixed integer quadratic programming model is formulated to minimize the total distance of exchanging containers between mother vessels and feeders, and the workload imbalance among yard blocks. A novel three-stage heuristic solution approach is developed and extensive numerical experiments are conducted to show the effectiveness of the proposed approach and the benefit of the multi-cluster strategy.

Decentralizing Pareto-efficient network flow/speed patterns with hybrid schemes of speed limit and road pricing

- Transportation Research Part E: Logistics and Transportation Review---2015---Xiaolei Wang, Hongbo Ye, Hai Yang

This paper examines the potential of hybrid schemes of speed limit and road pricing for decentralizing Pareto-efficient flow/speed patterns that minimize total travel time and total emissions simultaneously. Both link flows and speeds are treated as independent variables in our bi-objective formulation. The resulting Pareto frontier is thus weakly dominant to that in previous literature. For any such favorable Pareto-efficient flow and speed pattern, we establish the existence of hybrid schemes of speed limits and non-negative/revenue-neutral tolls, whose set of user equilibrium (UE) solutions contains the Pareto-efficient one, and provide

sufficient conditions under which the Pareto-efficient solution can be certainly obtained.

The two-stage batch ordering strategy of logistics service capacity with demand update

- Transportation Research Part E: Logistics and Transportation Review---2015---Weihua Liu, Xiaoyan Liu, Xiang Li

This paper discusses a logistics service integrator (LSI) orders logistics service capacity from a functional logistics service provider (FLSP) before the selling season with two opportunities. The optimal two-stage batch ordering strategy of LSI with demand update is studied. Standard batch size is introduced into LSI's two-stage capacity ordering strategy model, which is built upon the decision-making sequence and actually observed demand signals between the two ordering instants. The model solution method is designed based on scenario analysis and enumerative algorithm. Sensitivity analysis of the optimal adjustment ordering time point is then carried out and a numerical analysis is presented.

A metaheuristic approach to the reliable location routing problem under disruptions

- Transportation Research Part E: Logistics and Transportation Review---2015---Ying Zhang, Mingyao Qi, Wei-Hua Lin, Lixin Miao

This paper examines a reliable capacitated location-routing problem in which depots are randomly disrupted. Customers whose depots fail must be reinserted into the routes of surviving depots. We present a scenario-based mixed-integer programming model to optimize depot location, outbound delivery routing, and backup plans. We design a metaheuristic algorithm that is based on a maximum-likelihood sampling method, route-reallocation improvement, two-stage neighborhood search and simulated annealing. Numerical tests show that the heuristic is able to generate results that would keep operating costs and failure costs well balanced. Managerial insights on scenario identification, facility deployment and model simplification are drawn.

Modeling downstream petroleum supply chain: The importance of multi-mode transportation to strategic planning

- Transportation Research Part E: Logistics and Transportation Review---2015---Yasaman Kazemi,Joseph Szmerekovsky

This paper proposes a deterministic mixed integer linear programming (MILP) model for downstream petroleum supply chain (PSC) network to determine the optimal distribution center (DC) locations, capacities, transportation modes, and transfer volumes. The model minimizes multi-echelon multi-product cost along the refineries, distribution centers, transportation modes and demand nodes. The relationship between strategic planning and multimodal transportation is further elucidated. A case study was considered with real data from the U.S. petroleum industry and transportation networks within Geographic Information System (GIS). A scenario analysis is also conducted to demonstrate the impact of key parameters on PSC decisions and total cost.

Environmental cost and eco-efficiency from vessel emissions in Las Palmas Port

- Transportation Research Part E: Logistics and Transportation Review---2015---Miluše Tichavska,Beatriz Tovar

This study presents external costs and eco-efficiency parameters associated to exhaust emissions in Las Palmas Port. Emission assessment is based on a vessel emissions inventory obtained from the full bottom-up Ship Traffic Emission Assessment Model and messages transmitted by the Automatic Identification System over 2011. External costs are estimated based on a top-down approach. Results are combined with port operations profiles resulting in eco-efficiency performance towards economic and environmental concerns in Las Palmas Port. Results could also support the valuation of instruments to abate emissions in crowded port-cities that as Las Palmas, host a large population of residents and visitors.

Joint location-inventory problem with differentiated service levels using critical level policy

- Transportation Research Part E: Logistics and Transportation Review---2015---P. Escalona,F. Ordóñez,V. Marianov

This paper analyzes the design of a distribution network for fast-moving items able to provide differentiated service levels in terms of product availability for two demand classes (high and low priority) using a critical level policy. The model is formulated as a MINLP with chance constraints for which we propose a heuristic to solve it. Although the heuristic does not guarantee an optimal solution, our computational experiments have shown that it provides good-quality solutions that are on average 0.8% and at worst 2.7% from the optimal solution.

Empty container exchange among liner carriers

- Transportation Research Part E: Logistics and Transportation Review---2015---Jianfeng Zheng,Zhuo Sun,Ziyu Gao

In an attempt to reduce the empty container repositioning costs, this paper studies an empty container allocation problem considering the coordination among liner carriers. We further measure the perceived values of empty container at different ports. The perceived values of empty container at the surplus (deficit) ports are described by the profits (empty container exchange costs paid) for delivering empty containers. To solve our problems, we propose a two-stage optimization method. In stage I, liner carriers are guided to pursue a centralized optimization solution of empty container allocation for all related liner carriers. In stage II, the inverse optimization technique is used to determine the empty container exchange costs, which are paid to liner carriers for exchanging empty containers and following the centralized optimization solution. The profits at the surplus ports are calculated with respect to the empty container exchange costs at the deficit ports. Finally, numerical experiments on an

Asia–Europe–Oceania shipping service network are discussed.

The optimization model for the location of maritime emergency supplies reserve bases and the configuration of salvage vessels

- Transportation Research Part E: Logistics and Transportation Review---2015---Yun-fei Ai,Jing Lu,Li-li Zhang

This paper studies the location–allocation–configuration problem of emergency resources in a maritime emergency system and it proposes a discrete nonlinear integer-programming model, which integrates the location, allocation and the configuration problem. The model is converted into a two-stage model keeping the calculation logic. It designs a hybrid heuristic algorithm and a genetic algorithm. The test results show that the hybrid heuristic algorithm is more efficient than the genetic algorithm, the sensitivity analysis studies the influence of some parameters to the final solution and the Uncertainty–Sensitivity justification tool is used to evaluate the assumptions.

A scheduling model of logistics service supply chain based on the mass customization service and uncertainty of FLSP’ s operation time

- Transportation Research Part E: Logistics and Transportation Review---2015---Weihua Liu,Qian Wang,Qiaomei Mao,Shuqing Wang,Donglei Zhu

Building on previous research, this paper establishes a new multi-objective program scheduling model of Logistics service supply chain that considers the uncertainty of operation time for functional logistics service providers (FLSPs) in a mass customization service environment. This model aims to minimize total scheduling costs, minimize the difference between the scheduled and actual time of each service process, and maximize the average satisfaction of FLSPs. Considering the differences in target priority, the goal programming method is applied to solve the model hierarchically. In addition, the effects of scheduling parameters on

scheduling objectives are provided after numerical analysis.

An evaluation of departure throughputs before and after the implementation of wake vortex recategorization at Atlanta Hartsfield/Jackson International Airport: A Markov regime-switching approach

- Transportation Research Part E: Logistics and Transportation Review---2015---Tony Diana

This paper utilizes a Markov regime-switching model to decompose airport departures into two regimes and to investigate the change in departure throughputs before and after implementing wake recat at ATL. Although analysts may not always know with certainty which regime prevails and how long it may last, they can compute the transition probabilities and expected duration of each regime. After the implementation, there was a 91% chance that departure throughputs would remain unconstrained (up from 86% before implementation) and a 37% chance that departure throughputs would become constrained (up from 35% before implementation).

The role of perceived acceptability of alternatives in identifying and assessing choice set processing strategies in stated choice settings: The case of road pricing reform

- Transportation Research Part E: Logistics and Transportation Review---2015---David Hensher,Chinh Ho

In designing choice experiments, it is common to present a number of alternatives to a respondent and have them choose the most preferred alternative. However, respondents may ignore one or more alternatives which they deem unacceptable for various reasons. This possibility aligns with the idea of the ‘consideration set’ which influences the choice of an alternative given the choice set of interest. This paper uses an endogenous choice set model to investigate the influence that contextual effects and socioeconomic characteristics

play in explaining variations in the choice sets considered by respondents when they reveal their preferences.

Modelling spillover effects of public transportation means: An intra-modal GVAR approach for Athens

- Transportation Research Part E: Logistics and Transportation Review---2015---Panayotis Michaelides,Konstantinos Konstantakis,Christina Milioti,Matthew G. Karlaftis

In this work, we employ the GVAR model in order to analyze demand aspects of a multimodal public transportation system. The methodology is applied to the Athens region, Greece. GVAR provides a relevant econometric modelling framework for assessing relationships between economic entities, such as transportation modes, by analyzing the relative shocks and channels of transmission mechanisms among them. According to our findings, which are consistent with the existing literature, the system of all public transportation modes in the wider Athens region, is relatively flexible to unexpected – intramodal or macroeconomic – shocks.

A lot-sizing model with backordering under hybrid linked-to-order multiple advance payments and delayed payment

- Transportation Research Part E: Logistics and Transportation Review---2015---Nadia Pourmohammad Zia,Ata Allah Taleizadeh

An economic order quantity model with backordering is investigated under a hybrid payment scheme. The payment scheme, which is also linked to order quantity, involves multiple advance payments as well as delayed payment. Incorporating this payment scheme can efficiently stimulate sales due to applying delayed payment; besides it provides the benefits of advance payment such as controlling the risk of cash flow. The developed model seeks to optimize the order and shortage quantities. Theoretical results are developed to determine the conditions of existence and uniqueness

of the optimal solutions. Numerical examples illustrate the proposed model and solution method.

Carrying capacity procurement of rail and shipping services for automobile delivery with uncertain demand

- Transportation Research Part E: Logistics and Transportation Review---2015---Qiang Meng,Xiuling Hei,Shuaian Wang,Haijun Mao

The determination of the optimal carrying capacity procurement of rail and shipping services in the automobile intermodal network with unique characteristics is essential to save automobile delivery cost. In this research we develop a two-stage stochastic programming model for the tactical-level decision problem arising in the special automobile intermodal network. Furthermore, we improve the sample average approximation algorithmic procedure to solve the model. We apply the model and solution method to a case study associated with the Shanghai Automobile Industry Corporation. We believe that this study deals with an emerging new research topic with practical significance for the automobile industry.

Evolution of the international air transportation country network from 2002 to 2013

- Transportation Research Part E: Logistics and Transportation Review---2015---Sebastian Wandelt,Xiaoqian Sun

In this research, we analyze the evolution of the international air transportation country network from 2002 to 2013 with two perspectives: The network's physical topology and the functional network with traffic information. Our analysis shows that the network is scale-free and has the small-world property. The evolution of triadic properties suggests that the network gears towards symmetric, transitive closure. We find that United States, Great Britain, and France are critical from both perspectives; Surprisingly, South Africa is particularly critical from topological point of view. Furthermore, topological and functional criticality are highly correlated to the GDP of a country.

Slot auction in an airport network with demand uncertainty

- Transportation Research Part E: Logistics and Transportation Review---2015---Dian Sheng,Zhi-Chun Li,Yi-bin Xiao,Xiaowen Fu

This paper investigates the effectiveness of airport slot auction by developing a two-stage model, which distributes slots among competing airlines using an ascending-bid multi-unit auction. Airlines assign different values to slots at peak and off-peak periods, and each carrier has its private (subjective) forecast of future demand. Conditional on the slots available to them, airlines compete in frequency, fare, and aircraft size over a congested airport network. The market outcome under such a scheme is benchmarked to those under an ex ante allocation and an ex post allocation by a social planner. Comparison results suggest that the auction-based scheme is inferior to the other two schemes when there is little fluctuation in demand, whereas the auction-based system is more effective when there is substantial demand uncertainty. Auctioning some grandfathered slots can improve social welfare but the marginal effect may diminish quickly.

Optimal space for storage yard considering yard inventory forecasts and terminal performance

- Transportation Research Part E: Logistics and Transportation Review---2015---Enrique Martin Alcalde,Kap Hwan Kim,Sergi Saurí Marchán

This paper presents a method for forecasting the yard inventory of container terminals over an extended period, and addresses an integrated yard planning problem for determining the optimal storage space utilization by considering the yard congestion effect on terminal performance. A formulation based on random variables and probabilistic functions was developed, which allows prediction of the storage space requirement without requiring fully-integrated simulation models. Then, an integrated cost objective function was defined. Numerical experiments were performed to illustrate how the forecasting model works and to support decision-

making on yard planning and design for both inbound and outbound/transshipment areas.

Robust optimization for United States Department of Agriculture food aid bid allocations

- Transportation Research Part E: Logistics and Transportation Review---2015---Jomon Aliyas Paul,Wang, Xinfang (Jocelyn)

The U.S. Department of Agriculture (USDA) currently uses a bidding system to determine carriers and suppliers that would partner in providing food aid annually in response to global emergencies and famine. We mimic the USDA approach via a robust optimization model featuring box and ellipsoid uncertainty frameworks to account for uncertainties in demand, supplier and carrier bid prices. Through a case study utilizing historical invoice data, we demonstrate our model applicability in improving ocean carrier and food supplier bid pricing strategy and similar supply chain network optimization problems. Through a validation algorithm we demonstrate the value of our robust models.

A maritime container repositioning yield-based optimization model with uncertain upsurge demand

- Transportation Research Part E: Logistics and Transportation Review---2015---Eugene Y.C. Wong,Allen H. Tai,Mardjuki Raman

The role of container repositioning has become more important under the severe cargo shipping environment, affected by world trade growth, trade imbalance, slow steaming strategy and high container manufacturing cost. Low cost, better routing, and supplying equipment to higher yield cargo become the top criteria. A yield-based container repositioning framework is developed, followed by a constrained linear programming optimizing the container repositioning from surplus to deficit locations. The model incorporated change of destinations of empty containers and adjustment factors handling upsurge demand. The model is applied

to optimize daily container repositioning operations with a better route, costs and equipment supply.

A stochastic model predictive control to heterogeneous rail freight car fleet sizing problem

- Transportation Research Part E: Logistics and Transportation Review---2015---Miloš S. Milenković, Nebojša J. Bojović, Libor Švadlenka, Vlastimil Melichar

In this paper a rolling horizon approach is applied for simultaneous optimization of the rail freight car fleet size and allocation problem. Developed dynamic model of loaded and empty rail freight car flows explicitly treats state, control and station capacity constraints in presence of various freight car types under the partial substitutability among them. Demands and traveling times are considered as random variables. Proposed approach is applied to a set of test cases and it shown to be successful, ultimately providing a new managerial tool for more effective and efficient planning and analyzing rail freight car fleets.

Reliable emergency service facility location under facility disruption, en-route congestion and in-facility queuing

- Transportation Research Part E: Logistics and Transportation Review---2015---Shi An, Na Cui, Yun Bai, Weijun Xie, Mingliu Chen, Yanfeng Ouyang

The planning of emergency service facility location, especially for those expecting high demand and severe conditions, requires consideration of victims' en-route travel, in-facility service quality, and reliability of these service facilities themselves. This paper first presents a scenario-based stochastic mixed-integer non-linear program (MINLP) model that integrates facility disruption risks, en-route traffic congestion and in-facility queuing delay into an integrated facility location problem. We derive lower and upper bounds to this highly complex problem by approximating the expected total system costs across the normal and all probabilistic

facility disruption scenarios. This allows us to develop a more tractable approximate MINLP formulation and a Lagrangian Relaxation (LR) based solution approach. The relaxed sub-problem for location and service allocation decisions is further reformulated into a second-order conic program. Numerical experiments show that the approximate model and LR solution approach are capable of overcoming the computational difficulties associated with the problem. Interesting findings and managerial insights are obtained from a series of sensitivity analyses, e.g., regarding the importance of considering in-facility queuing in location design, and the significance of resource pooling on the optimal facility deployment.

Introducing a preliminary consists selection in the locomotive assignment problem

- Transportation Research Part E: Logistics and Transportation Review---2015---F. Piu, V. Prem Kumar, M. Bierlaire, M.G. Speranza

The Locomotive Assignment Problem (LAP) is a class of planning and scheduling problems solved by assigning a fleet of locomotives to a network of trains. In the planning versions of the LAP, the type of consist (a group of linked locomotives) assigned to each train in a given schedule is determined. We introduce an optimization model (called consists selection) that precedes the planning LAP solution and determines the set of consist types. This selection leads to solutions that are characterized by potential savings in terms of overall fueling cost and are easier to handle in the routing phase.

A location-inventory-pricing model in a supply chain distribution network with price-sensitive demands and inventory-capacity constraints

- Transportation Research Part E: Logistics and Transportation Review---2015---Amir Ahmadi-Javid, Pooya Hoseinpour

This paper presents a location-inventory-pricing model for designing the distribution network of a supply chain with price-sensitive demands and inventory-capacity

constraints. The supply chain has market power and uses markup pricing. An efficient Lagrangian relaxation algorithm is proposed to solve the model. Our numerical study shows that by moderately increasing the number of possible values for pricing decisions, the model can be used to find near-optimal solutions of a similar location-inventory-pricing problem with continuous pricing decisions. The approach used here to incorporate pricing decisions can be applied to other supply-chain design and planning problems with price-sensitive demands.

Evaluating airline efficiency: An application of Virtual Frontier Network SBM

- Transportation Research Part E: Logistics and Transportation Review---2015---Ye Li,Yan-zhang Wang,Qiang Cui

In this paper, airline efficiency is divided into three stages: Operations Stage, Services Stage and Sales Stage. The new three-stage strategic operating framework of airline efficiency is a modification of existing models. A new model, Virtual Frontier Network SBM, is proposed to evaluate the efficiency of 22 international airlines from 2008 to 2012. The results demonstrate the following: 1. The new model can apply to a new benchmarking airline such as Scandinavian Airlines. 2. Although passenger traffic, cargo traffic and revenue decreased from 2008 to 2009, most airlines' overall efficiency increased in the period.

Concurrent design of product family and supply chain network considering quality and price

- Transportation Research Part E: Logistics and Transportation Review---2015---Shabnam Reza-pour,Ashkan Hassani,Reza Zanjirani Farahani

We study the problem of concurrent design of a product family and its supply chain (SC) network. Inspired by a real-life case in computer industry, the impact of quality and price in SC demand is investigated. Two different models are proposed, the former maximizes the company's profit with respect to customers' priorities on quality and price; the latter is a bi-objective

programming, which consider two extreme customer groups: for one group quality has the highest priority and for the other price; the intermediate groups falls between these two. The performance of the models is analyzed through a case problem.

Demand clustering in freight logistics networks

- Transportation Research Part E: Logistics and Transportation Review---2015---Rodrigo Mesa-Arango,Satish V. Ukkusuri

Demand clustering in freight logistics networks is an important strategic decision for carriers. It is used to incorporate new business to their networks, detecting potential economies, optimizing their operation, and developing revenue management strategies. A specific example of demand clustering is truckload combinatorial auctions where carriers bundle lanes of demand and price them taking advantage of economies of scope. This research presents a novel approach to cluster lanes of demand. Community detection is used to cluster the emergent network finding profitable collections of demand. Numerical results show the advantages of this method.

A polynomial-time heuristic for the quay crane double-cycling problem with internal-reshuffling operations

- Transportation Research Part E: Logistics and Transportation Review---2015---Ming Liu,Feng Chu,Zizhen Zhang,Chengbin Chu

One of great challenges in seaport management is how to handle containers under reshuffling, called reshuffles. Repositioning reshuffles in a bay (internal reshuffling) can improve the efficiency of quay cranes and help ports to reduce ship turn-around time. This paper studies the quay crane double-cycling problem with internal-reshuffling operations, and presents a fast solution algorithm. To reduce the number of operations necessary to turn around a bay of a vessel, the problem is first formulated as a new integer program. A polynomial-time heuristic is then developed. The analysis is made on the worst-case error bound of the

proposed algorithm. Results are presented for a suite of combinations of problem instances with different bay sizes and workload scenarios. Comparisons are made between our algorithm and the start-of-the-art heuristic. The computational results demonstrate that our model can be solved more efficiently with CPLEX than the model proposed by Meisel and Wichmann (2010), and the proposed algorithm can well solve real-world problem instances within several seconds.

Integrated Berth Allocation and Quay Crane Assignment Problem: Set partitioning models and computational results

- Transportation Research Part E: Logistics and Transportation Review---2015---Çağatay Iris,Dario Pacino,Stefan Ropke,Allan Larsen

Most of the operational problems in container terminals are strongly interconnected. In this paper, we study the integrated Berth Allocation and Quay Crane Assignment Problem in seaport container terminals. We will extend the current state-of-the-art by proposing novel set partitioning models. To improve the performance of the set partitioning formulations, a number of variable reduction techniques are proposed. Furthermore, we analyze the effects of different discretization schemes and the impact of using a time-variant/invariant quay crane allocation policy. Computational experiments show that the proposed models significantly improve the benchmark solutions of the current state-of-art optimal approaches.

Vehicle relocation and staff rebalancing in one-way carsharing systems

- Transportation Research Part E: Logistics and Transportation Review---2015---Mehdi Nourinejad,Sirui Zhu,Sina Bahrami,Matthew J. Roorda

A solution to the imbalance of vehicles in one-way carsharing systems is vehicle relocation which involves staff members to redistribute the vehicles between stations. Vehicle relocation, however, can lead to an imbalance of staff members between stations. Thus,

staff members, themselves, need to be relocated between stations to perform the vehicle relocations. This study addresses the joint optimization of vehicle relocation and staff rebalancing using two integrated multi-traveling salesman formulations. Results show that fleet size is more sensitive to demand than staff size, staff size is inversely related to vehicle cost, and that vehicle relocation time increases with vehicle cost.

Cooperatives for fruits and vegetables in emerging countries: Rationalization and impact of decentralization

- Transportation Research Part E: Logistics and Transportation Review---2015---Omkar D. Palsule-Desai

We develop a (noncooperative) game theoretic model for a decentralized setting wherein fringe farmers compete with a two-tier cooperative network involving network farmers and a coordinator. We examine the roles of the coordinator and profit sharing in allocating costs/benefits of externalities in enhancing network efficiency and stability. Our main finding is that using profit sharing based mechanism the coordinator can overcome inherent inefficiency and instability of decentralization and noncooperative behavior of the network farmers. The roles of the coordinator and profit sharing are particularly important when it is economical for both network and fringe farmers to supply the product.

The impact of low-cost carriers on airport choice in the US: A case study of the Washington–Baltimore region

- Transportation Research Part E: Logistics and Transportation Review---2015---Woohyun Cho,Robert J. Windle,Martin E. Dresner

Previous research has shown that low-cost carriers (LCCs) may stimulate traffic at an airport by offering low fares. Using passenger survey data from the Washington–Baltimore region’ s three airports, we find that the benefits of LCCs to airports extend beyond the traffic generated directly by the LCCs through their low fares. In addition, we find that the mere presence

of an LCC at an airport can attract passengers, even to competing carriers. These “halo effects” from LCC presence increase the significance to airport managers of attracting LCCs in order to generate passenger demand.

Airline passengers’ continuance intention towards online check-in services: The role of personal innovativeness and subjective knowledge

- Transportation Research Part E: Logistics and Transportation Review---2015---Zhibin Lin,Raffaele Filieri

This study integrates the individual psychology constructs (personal innovativeness and subjective knowledge) with the Technology Acceptance Model to develop and test a model of airline passengers’ continuance intention towards online flight check-in services. Predictions were tested with data from a sample of airline passengers in China who have experienced the online check-in service. The findings of this study demonstrate that airline passengers’ innovativeness and subjective knowledge have a direct effect on continuance intention, and an indirect effect through partial mediation of perceived ease of use and perceived usefulness. Theoretical and managerial implications are discussed.

Dynamic supply chain network design with capacity planning and multi-period pricing

- Transportation Research Part E: Logistics and Transportation Review---2015---Mohammad Fattahi,Masoud Mahootchi,Kannan Govindan,Seyed Mohammad Moattar Hussein

This paper addresses a new problem in designing and planning a multi-echelon and multi-product supply chain network over a multi-period horizon in which customer zones have price-sensitive demands. Based on price-demand relationships, a generic method is presented to obtain price levels for products and then, a mixed-integer linear programming model is developed. Due to the problem intractability, a simulated

annealing algorithm that uses some developed linear relaxation-based heuristics for capacity planning and pricing is presented. Numerical results demonstrate the significance of the model as well as the efficiency of the solution algorithm and linear relaxation-based heuristics.

The value of information sharing for truckload shippers

- Transportation Research Part E: Logistics and Transportation Review---2015---Alex Scott

This study explores the potential value to shippers of sharing load offers with carriers and obtaining carriers’ responses in advance of the scheduled pickup date. Using a private transactional dataset from a large national shipper, we find that truckload spot prices increase considerably as the lead time before pickup decreases. As an extension of this empirical analysis, we develop a method to estimate near-real-time market prices, which does not currently exist in the truckload industry. A key insight is that market prices persist through time, meaning that current prices are good predictors of future prices.

Optimization of loading sequence and rehandling strategy for multi-quay crane operations in container terminals

- Transportation Research Part E: Logistics and Transportation Review---2015---Mingjun Ji,Wenwen Guo,Huiling Zhu,Yongzhi Yang

In this paper, we consider the optimization of loading sequence and rehandling strategy in the terminal operation. We present an optimization strategy to minimize the number of rehandles, and establish a mathematical model to integrate the loading sequence and the rehandling strategy under the parallel operation of multi-quay cranes. Furthermore, we give an improved genetic algorithm to solve the model. We show the efficiency of the optimization strategy and algorithm by comparing them with previous strategies and heuristics.

Competition and efficiency in the Italian airport system: new insights from a conditional nonparametric frontier analysis

- Transportation Research Part E: Logistics and Transportation Review---2015---D' Alfonso, Tiziana, Cinzia Daraio, Alberto Nastasi

We analyse the effect of competition on technical efficiency of Italian airports by applying a novel conditional nonparametric frontier analysis for the first time to the airport industry. We find that competition affects mostly the frontier of best performers, whilst airports that are lagging behind are less influenced. A novel two stage approach shows that, on average, competition has a negative impact on technical efficiency. We estimate a measure of pure efficiency, whitened from the main effect of the competition, whose distribution has a bi-modal shape, indicating the existence of two differently managed groups of airports.

Do contractual practices affect technical efficiency? Evidence from public transport operators in China

- Transportation Research Part E: Logistics and Transportation Review---2015---Chunqin Zhang, Zhicai Juan, Guangnian Xiao

This paper presents a discussion on the causal effect of contractual practices on the technical efficiency of Chinese public transport operators. To test this proposition, an original panel data set covering 47 operators over the period 2008–2013 is used, we firstly estimate the technical efficiency based on the stochastic frontier approach in a time-varying form of the trans-log production function, and then consider a propensity score matching approach to assess the causal effect between them. The econometric results corroborate this proposition that gross cost contracts offer more incentives to technical efficiency than net cost contracts and management contracts.

Transportation network reliability in emergency response

- Transportation Research Part E: Logistics and Transportation Review---2015---Ali Edrissi, Mehdi Nourinejad, Matthew J. Roorda

Distribution of humanitarian supplies is vital in saving lives during disasters. Investment in retrofitting critical transportation links reduces casualties as intact links improve flow of relief supplies. In finding critical links, link importance values are derived using the concept of network reliability. A network improvement problem is then solved to minimize death toll. To increase practicality, a heuristic algorithm is proposed to solve real size problems. Results show that initial incremental investments in network improvement are more profound in reducing the death toll than higher budget increments. Moreover, higher relief inventories reduce the death toll when the network is reliable.

A multi-objective healthcare inventory routing problem; a fuzzy possibilistic approach

- Transportation Research Part E: Logistics and Transportation Review---2015---Farzad Nikan, Mohammad Rahimi

This paper presents a new multi-objective mathematical model to address a Healthcare Inventory Routing Problem (HIRP) for medicinal drug distribution to healthcare facilities. The first part of objective function minimizes total inventory and transportation costs, while satisfaction is maximized by minimizing forecast error which caused by product shortage and the amount of expired drugs; Greenhouse Gas (GHG) emissions are also minimized. A demand forecast approach has been integrated into the mathematical model to decrease drug shortage risk. A hybridized possibilistic method is applied to cope with uncertainty and an interactive fuzzy approach is considered to solve an auxiliary crisp multi-objective model and find optimized solutions.

Modeling cascade dynamics of railway networks under inclement weather

- Transportation Research Part E: Logistics and Transportation Review---2015---Dali Wei,Hongchao Liu,Yong Qin

Understanding the cascade dynamics of delay propagation under inclement weather is crucial to proactive railway management. In this paper, we proposed a Switching Max-Plus System (SMPS) to model the delay propagation on railway networks, which extends the conventional MPS by incorporating multiple system matrices to capture the dynamic impacts of inclement weather. An algorithm based on the All-Paired Critical-Path (APCP) graph was developed to solve the SMPS, which calculates secondary delays without backtracking the precedent events. The proposed model and its solution algorithm were validated using discrete-time simulations on both artificial and empirical networks. The robustness of railway services was also analyzed using the concepts of vulnerability and diffusivity.

Minimum cost path problem for Plug-in Hybrid Electric Vehicles

- Transportation Research Part E: Logistics and Transportation Review---2015---Okan Arslan,Bariş Yıldız,Oya Ekin Karaşan

We introduce a practically important and theoretically challenging problem: finding the minimum cost path for PHEVs in a road network with refueling and charging stations. We show that this problem is NP-complete and present a mixed integer quadratically constrained formulation, a discrete approximation dynamic programming heuristic, and a shortest path heuristic as solution methodologies. Practical applications of the problem in transportation and logistics, considering specifically the long-distance trips, are discussed in detail. Through extensive computational experiments, significant insights are provided. In addition to the charging infrastructure availability, a driver's stopping tolerance arises as another critical factor affecting the transportation costs.

Economic and environmental considerations in a continuous review inventory control system with integrated transportation decisions

- Transportation Research Part E: Logistics and Transportation Review---2015---Brian Schaefer,Dinçer Konur

Sustainability throughout supply chains is gaining more importance and re-planning inventory operations can help companies curb emissions. In this study, we present two bi-objective integrated continuous review inventory control and transportation models with less-than-truckload and truckload carriers. Solution methods to approximate the Pareto Frontiers are proposed. Numerical studies illustrate the effects of demand variance and lead time on expected costs and carbon emissions as well as the changes in expected costs and carbon emissions due to sustainability considerations. Sample examples illustrate the use of the methods to compare different carriers in terms of not only economic but also environmental considerations.

Age-based policy for blood transshipment during blood shortage

- Transportation Research Part E: Logistics and Transportation Review---2015---Ke-Ming Wang,Zu-Jun Ma

This paper introduces the properties of inventory structure for both rescue and affected banks during blood shortage. An age-based transshipment model is developed, with two preference selection methods for transshipping blood units being presented. Compared to quantity-based policy, the age-based policy under first-in-first-transship is recommended as it can reduce the expired rate more efficiently. Under simulation operating scenarios with time-varying demand and supply, we analyzed the sensitivity of parameters, which include expected supply period, shelf life and blood shortage period. Additionally, this study reveals that the transshipment decision will increase the expired ratio and the overstock ratio after blood shortage.

How air transport connects the world – A new metric of air connectivity and its evolution between 1990 and 2012

- Transportation Research Part E: Logistics and Transportation Review---2015---Florian Allroggen,Michael D. Wittman,Robert Malina

To understand as to how scheduled air services link a region to other markets, we develop connectivity and hub centrality metrics. These metrics measure the quality of all scheduled air services in terms of frequency, detours, layover time and destination quality using a valuation scale being derived from observed passenger behavior. By computing yearly scores for 1990 to 2012, we analyze the geography of and trends in worldwide connectivity and hub centrality. While we observe significant growth of aggregate connectivity, the trends are heterogeneous with regard to the type of connectivity as well as time and location.

Benders' decomposition for concurrent redesign of forward and closed-loop supply chain network with demand and return uncertainties

- Transportation Research Part E: Logistics and Transportation Review---2015---Maryam Khatami,Masoud Mahootchi,Reza Zanjirani Farahani

This paper attempts to design a reverse supply chain network (SCN), add it to an existing multi-product forward SCN and simultaneously redesign the existing forward supply chain (SC). The problem considers uncertainty on products demand and also returned products in multi-period context. Benders' decomposition is applied to solve the stochastic mixed-integer model to optimality. The scenarios are generated based on the demand distribution function using Cholesky's factorization method to consider correlation among different products' demands. To decrease the computational effort, the number of scenarios is reduced using k-means clustering algorithm. The method is tested on a cell phone SC.

Resilient supplier selection and order allocation under operational and disruption risks

- Transportation Research Part E: Logistics and Transportation Review---2015---S.A. Torabi,M. Baghersad,S.A. Mansouri

This study proposes a bi-objective mixed possibilistic, two-stage stochastic programming model to address supplier selection and order allocation problem to build the resilient supply base under operational and disruption risks. The model accounts for epistemic uncertainty of critical data and applies several proactive strategies such as suppliers' business continuity plans, fortification of suppliers and contracting with backup suppliers to enhance the resilience level of the selected supply base. A five-step method is designed to solve the problem efficiently. The computational results demonstrate the significant impact of considering disruptive events on the selected supply base.

Modelling of dual-cycle strategy for container storage and vehicle scheduling problems at automated container terminals

- Transportation Research Part E: Logistics and Transportation Review---2015---Jiabin Luo,Yue Wu

This study proposes a new approach to determine the dispatching rules of AGVs and container storage locations, considering both unloading and loading processes simultaneously. We formulate this problem as a mixed integer programming model, aiming to minimise the ship's berth time. Optimal solutions can be obtained in small sizes, however, large-sized problems are hard to solve optimally in a reasonable time. Therefore, a heuristic method, i.e. genetic algorithm is designed to solve the problem in large sizes. A series of numerical experiments are carried out to evaluate the effectiveness of the integration approach and algorithm.

Comparison of solution approaches for the train load planning problem in seaport terminals

- Transportation Research Part E: Logistics and Transportation Review---2015---Daniela Am-

In this paper the train load planning problem arising in a seaport container terminal is considered. This problem consists in determining the optimal assignment of containers to wagon slots in order to maximize the train utilization and, at the same time, to minimize unproductive operations in the terminal. Different solution approaches based on a mathematical programming model are compared. The best solution procedure, satisfactory both in terms of quality of the obtained solutions and for the computational times, is identified through extensive experimental tests. This procedure could be included in a planning tool to be used in real seaport terminals.

An inventory-based simulation model for annual-to-daily temporal freight assignment

- Transportation Research Part E: Logistics and Transportation Review---2015---Miyuan Zhao,Joseph Y.J. Chow,Stephen G. Ritchie

In the aggregate freight demand modeling literature, temporal assignment (annual to daily flows) is often oversimplified or neglected altogether. Unlike passenger flows, freight flows over the course of a year are not uniform and can vary significantly as the result of trade-offs between inventory and transportation cost management. We introduce the first temporal assignment model that explicitly considers these trade-offs for aggregate freight forecasting. A two-stage model is proposed that first decomposes aggregate annual zonal flows to firm group annual flows using a supply chain network model, which are then temporally assigned by simulating purchase order transactions throughout supply chains. Lot sizes are estimated with an Economic Order Quantity (EOQ) model and calibrated with monthly inventory data. The result is an aggregate-disaggregate-aggregate model that fits into aggregate freight forecasting models but makes use of more disaggregate logistical data. The model is illustrated with a simple replicable example, followed by a case study conducted with California statewide data to break out the distributed zonal flows into average daily

volumes for network assignment. Calibration results using 2007 IMPLAN data showed a median percentage difference of simulated annual flows from FAF3 data of 2.38%, and a median percentage difference of simulated inventories from IMPLAN data of 4.85%, which suggests an excellent fit. Empirical validation results showed the model outperforms fixed factor approaches in mean value accuracy by 15–31%.

Optimal investment timing in the dry bulk shipping sector

- Transportation Research Part E: Logistics and Transportation Review---2015---Christiana C. Gkochari

The aim of this paper is to illustrate, for the first time, the performance of optimal perfectly competitive investment strategies based on option games in dry bulk shipping. Using a dataset of the Capesize market development over the period January 2000–May 2013 the author derives the stochastic dynamic equilibrium in that market. Moreover, the author examines the effect of newbuildings completion delays and finds that moving from completion delays to no time-to-build reduces the trigger value. The current analysis brings about additional insights and helps explain the existence of boom-and-bust cycles in shipping.

Integrated scheduling of a multi-product multi-factory manufacturing system with maritime transport limits

- Transportation Research Part E: Logistics and Transportation Review---2015---X.T. Sun,S.H. Chung,Felix T.S. Chan

This paper studies a practical multi-factory job allocation and scheduling problem involving inland and maritime transport limits. A new heuristic called Due-date Based Cut-off rule (DBC) is developed to improve the computational efficiency of both exact and genetic algorithms (GA). Except the application of DBC, this proposed GA is guided by a novel fuzzy controller aimed at eliminating the drawbacks other GAs have when dealing with multi-factory models. The tests of

the solution quality and computational efficiency for this GA are carried out. The numerical experiments demonstrate the value of the proposed approach in this practical global supply chain.

Fulfillment source allocation, inventory transshipment, and customer order transfer in e-tailing

- Transportation Research Part E: Logistics and Transportation Review---2015---S.A. Torabi,E. Hassini,M. Jeihoonian

We consider an inventory fulfillment-allocation and transshipment problem in an e-tailing environment. For a typical e-tailer, each customer demand is fulfilled from the closest fulfillment center if there are enough inventories. Otherwise, the e-tailer would transship stock from a nearby facility or transfer the customer order so it is fulfilled from another facility, depending on the economics of transportation. We develop a mixed-integer programming model to help e-tailers optimally fulfill customer orders while minimizing logistics costs. We propose a Benders decomposition-based approach to efficiently find optimal solutions. Our computational results demonstrate the importance of considering inventory transshipments in online deliveries.

Estimating attributes importance for container shipping industry by closing the listening gap with maximum convergent validity

- Transportation Research Part E: Logistics and Transportation Review---2015---Kee-Kuo Chen,Hui-Ping Ho,Ching-Ter Chang

This paper estimates the relationship of attributes importance (AI) to prospect purchase intention by closing the listening gap between customers and managers of container shipping companies. A proposition of minimum cross entropy is proposed to find a solution to the problem with maximum convergent validity, and this proposition is used to estimate AI, in which both opinions about AI of customers and managers of container shipping companies are included. Results indicate that price, discount, personal selling, and word of mouth,

are the most important attributes to prospect purchase intention, within the industry. In addition, managerial implications are also discussed.

Variable neighborhood search heuristic for storage location assignment and storage/retrieval scheduling under shared storage in multi-shuttle automated storage/retrieval systems

- Transportation Research Part E: Logistics and Transportation Review---2015---Peng Yang,Lixin Miao,Zhaojie Xue,Bin Ye

This paper examines the joint optimization of storage location assignment and storage/retrieval scheduling in multi-shuttle automated storage/retrieval systems (AS/RSs) under shared storage, in which the reuse of empty location yielded by retrieval operation is allowed. From the view of analytical model, the advantage of operational mode under shared storage is verified. A variable neighborhood search (VNS) algorithm is developed to solve the large-sized problems. Various numerical experiments are conducted to evaluate the performance of the proposed algorithm and investigate the impact of different parameters on computational efficiency.

Methodology of emergency medical logistics for public health emergencies

- Transportation Research Part E: Logistics and Transportation Review---2015---Yuxuan He,Nan Liu

This work presents a novel model of emergency medical logistics for quick response to public health emergencies. The proposed methodology consists of two recursive mechanisms: (1) the time-varying forecasting of medical relief demand and (2) relief distribution. The medical demand associated with each epidemic area is forecast according to a modified susceptible-exposed-infected-recovered model. A linear programming approach is then applied to facilitate distribution decision-making. The physical and psychological fragility of affected people are discussed. Numerical

studies are conducted. Results show that the consideration of survivor psychology significantly reduces the psychological fragility of affected people, but it barely influences physical fragility.

Generation and design heuristics for zonal express services

- Transportation Research Part E: Logistics and Transportation Review---2015---Homero Larraín,Juan Carlos Muñoz,Ricardo Giesen

A methodology is presented for designing zonal services for a bus corridor, in which buses visit all stops in a route's initial and final segments, skipping all stops in between. Two heuristics are described, one for congested (binding capacity) and other for uncongested cases. An experiment on a bidirectional corridor shows that the heuristics can find savings in social costs of 6.6% and 10.3% when compared to an express-service-only solution. We also show that, in some cases, the zonal service design problem can be solved analytically, outperforming the heuristics. This suggests the two approaches could be employed in tandem.

A novel discrete network design problem formulation and its global optimization solution algorithm

- Transportation Research Part E: Logistics and Transportation Review---2015---David Z.W. Wang,Haoxiang Liu,W.Y. Szeto

Conventional discrete transportation network design problem deals with the optimal decision on new link addition, assuming the capacity of each candidate link addition is predetermined and fixed. In this paper, we address a novel yet general discrete network design problem formulation that aims to determine the optimal new link addition and their optimal capacities simultaneously, which answers the questions on whether a new link should be added or not, and if added, what should be the optimal link capacity. A global optimization method employing linearization, outer approximation and range reduction techniques is developed to solve the formulated model.

Combining service frequency and vehicle routing for managing supplier shipments

- Transportation Research Part E: Logistics and Transportation Review---2015---Zhijie Dong,Mark A. Turnquist

This paper proposes a new approach to designing inbound material collection routes that considers pick-up frequency and spatial design as joint decisions to minimize total logistics (transportation plus inventory) cost. The clustering-based optimization uses an approximation to the actual cost of a routing solution without actual route construction. We show that the problem is analogous to a single-source fixed-charge facility location problem, and near-optimal solutions can be found using an efficient heuristic algorithm. Tests show the effectiveness of how this model is formulated and a case study demonstrates that substantial total cost savings can be achieved in realistic applications.

Multi-objective decision support to enhance environmental sustainability in maritime shipping: A review and future directions

- Transportation Research Part E: Logistics and Transportation Review---2015---S. Afshin Mansouri,Habin Lee,Oluwakayode Aluko

This paper aims to examine the potential of multi-objective optimization (MOO) as a decision support to improving sustainability in maritime shipping. We focus on environmental sustainability and the trade-offs involved with economic and operational objectives. Through a systematic approach, we review the literature on environmental sustainability, decision support and multi-objective optimization in maritime shipping. We identify the gaps and directions for future research. It is expected that the next generation of decision support systems for maritime transport will exploit the theoretical development in MOO to facilitate informed decision making in maritime supply chains considering environmental sustainability and the competing objectives.

Sustainability ranking of the UK major ports: Methodology and case study

- Transportation Research Part E: Logistics and Transportation Review---2015---Nasrin Asgari,Ashkan Hassani,Dylan Jones,Huy Hoang Nguye

Maritime supply chain sustainability has not been widely studied to date. This paper investigates the sustainability performance of five major UK ports. The UK port system is one of the largest and busiest port systems both in Europe and worldwide. The scope of sustainability narrows down to economical and environmental dimensions. A questionnaire is developed to collect data from port managers and logistics experts. The AHP method is utilized to rank the ports using the collected data. Sensitivity analysis is conducted on the obtained data to verify the consistency among data and outcomes.

UK supply chain carbon mitigation strategies using alternative ports and multimodal freight transport operations

- Transportation Research Part E: Logistics and Transportation Review---2015---V. Sanchez Rodrigues,S. Pettit,I. Harris,A. Beresford,M. Piecyk,Z. Yang,A. Ng

In the last few decades, the building evidence that CO₂e emissions lead to climate change has pointed to a need to reduce CO₂e emissions. This research uses five scenarios in the context of UK import trade to assess total CO₂e emissions and costs of import re-routing containers. The overall objective is to assess possible carbon mitigation strategies for UK supply chains by using a combination of alternative ports and revised multimodal strategies. The model adopted includes three elements: port expansion, container handling and freight transport. The alternative scenarios explore different settings modal shift and short sea shipping.

An utility-based decision support sustainability model in slow steaming maritime operations

- Transportation Research Part E: Logistics and Transportation Review---2015---Eugene Y.C. Wong,Allen H. Tai,Henry Y.K. Lau,Mardjuki Raman

This paper analyses slow steaming sustainability initiatives and generalizes the traditional discrete cost-based decision support model into novel continuous utility-based models. Two models based on logarithmic and linear utility functions are developed for risk-averse and risk-neutral decision makers respectively. The models, considering fuel consumption, carbon emission, and on time delivery, are applied to a Trans-pacific trade service route. A sensitivity analysis is conducted on parameters of sailing distance, expected transit time, quantity, and emission policies. The model contributes to ship liners on the optimal speed decisions in continuous utility-based slow steaming operations.

Designing a sustainable maritime supply chain: A hybrid QFD–ANP approach

- Transportation Research Part E: Logistics and Transportation Review---2015---Jasmine Siu Lee Lam

This study aims to design a sustainable maritime supply chain by taking customer requirements as the focus. This is achieved by an analytical approach combining Quality Function Deployment (QFD) and Analytical Network Process (ANP) for guiding shipping companies' design. An analysis of a major container shipping line is conducted to illustrate and validate the approach. The four main customer requirements are: (1) Cost and Price Competitive, (2) Pollution Reduction, (3) Efficient Use of Fuel and Resources, and (4) Health, Safety, and Security. The Use of Green Design Ships, Engines and Machinery is found to be the most important design requirement.

Environmental governance mechanisms in shipping firms and their environmental performance

- Transportation Research Part E: Logistics and Transportation Review---2015---Y.H. Venus Lun, Kee-hung Lai, Christina W.Y. Wong, T.C.E. Cheng

A growing number of shipping firms seek to improve their environmental performance in the hope of developing environmentally sustainable shipping operations. Although environmental governance plays an essential role in leading shipping firms to improve their environmental performance, there is scant knowledge on the relationship between environmental governance and environmental performance in the shipping literature. We propose and empirically validate an integrated model to study how various environmental governance mechanisms (i.e., contractual, relational, and organizational) are enacted by shipping firms and their influence on shipping firms' environmental performance. Our study also examines the mediating roles of the relational and organizational mechanisms on shipping firms' environmental performance.

Stochastic optimization of sustainable hybrid generation bioethanol supply chains

- Transportation Research Part E: Logistics and Transportation Review---2015---Vinay Gonela, Jun Zhang, Atif Osmani, Raphael Onyeaghala

This paper focuses on designing a hybrid generation bioethanol supply chain (HGBSC) that will account for economic, environmental and social aspects of sustainability under various uncertainties. A stochastic mixed integer linear programming model is proposed to design an optimal HGBSC. A case study set in the state of North Dakota in the United States is used as an application of the proposed model. The results suggest that the designs of optimal HGBSC change when different sustainability standards are applied. In addition, sensitivity analysis is conducted to provide deeper understanding of the proposed model.

Developing advanced route choice models for heavy goods vehicles using GPS data

- Transportation Research Part E: Logistics and Transportation Review---2015---Stephane Hess, Mohammed Quddus, Nadine Rieser-Schüssler, Andrew Daly

This paper presents a novel application in route choice modelling using Global Positioning System (GPS) data, focussing on heavy goods vehicles which typically make longer journeys with decisions potentially underpinned by different priorities from those used by car drivers. The scope of the study is larger than many previous ones, using the entire road network of England. Making use of the error components model put forward for route choice by Frejinger and Bierlaire (2007), the work reveals low elasticities in response to changes in travel time, reflecting the limited opportunity for avoiding specific roads on long distance journeys by heavy goods vehicles.

Airport partial and full privatization in a multi-airport region: Focus on pricing and capacity

- Transportation Research Part E: Logistics and Transportation Review---2015---Mohammadhossein Noruzoliaee, Bo Zou, Anming Zhang

This paper studies the capacity and pricing choice of two congestible airports in a multi-airport metropolitan region, under transition from a pure public, centralized airport system to partial or full privatization. We develop analytical models to investigate three privatization scenarios: public-private duopoly, private-private duopoly, and private monopoly. We find that, airports follow the same capacity investment rule as prior to privatization when capacity and pricing decisions are made simultaneously. Pricing rule after privatization becomes more complicated, with additional factors having an upward effect on the privatized airport(s) and a downward effect on the remaining public airport.

A freight transport optimization model for integrated network, service, and policy design

- Transportation Research Part E: Logistics and Transportation Review---2015---M. Zhang,M. Janic,L.A. Tavasszy

This paper presents a freight transport optimization model that simultaneously incorporates multimodal infrastructure, hub-based service network structures, and the various design objectives of multiple actors. The model has been calibrated and validated using real-life data from the case study of hinterland container transport of the Netherlands, where CO2 pricing, terminal network configuration, and hub-service networks are chosen as the design measures. Policy packages combining multiple types of policies show better network performance as compared with the optimal performance resulting from a single policy type. This illustrates the value of incorporating multiple types of policies simultaneously in freight transport optimization.

Optimal bunkering contract in a buyer–seller supply chain under price and consumption uncertainty

- Transportation Research Part E: Logistics and Transportation Review---2015---Giulia Pedrielli,Loo Hay Lee,Szu Hui Ng

Bunker fuel constitutes about three quarters of the operational costs for liners. A strong effort is justified to define operational conditions and management strategies to minimize fuel-related costs, especially if the variability of fuel price is considered. Fuel sellers and liners use contracts to be guaranteed a refuelling quantity and control bunker price. We propose a game theory based approach to examine and optimize the parameters of a realistic bunkering contract. Under the proposed settings, the supplier and the buyer establish the bunker quantity and the price to maximize the expected profit and minimize the expected refuelling cost, respectively.

A selected review on the negative externalities of the freight transportation: Modeling and pricing

- Transportation Research Part E: Logistics and Transportation Review---2015---Emrah Demir,Yuan Huang,Sebastiaan Scholts,Tom van Woensel

The planning of freight transportation activities creates benefits as well as costs. Among those costs, some of them, namely externalities, fall on other people/society that have no direct relevance to the operations of transportation. Such externalities are accrued expenses which should be addressed by actual pricing policies to enable an efficient and sustainable freight transportation system. This paper reviews externalities in quantitative terms, and then provides pricing studies of these costs per unit of freight transported along with the most recent estimations. The associated negative externalities are structured by transportation mode (road, rail, maritime, and air).

Dynamic cost functions and freight transport modal split evolution

- Transportation Research Part E: Logistics and Transportation Review---2015---Paolo Ferrari

The paper studies the characteristics of the evolution over time of modal split for a transport system in which various modes compete with each other and face the freight flow increase in different ways. It is shown that the modal split evolution is constituted by a sequence of time periods, in each of which the dynamic characteristics of the system are different. An equilibrium, stable or unstable, is reached after a transition phase, whose length depends on the characteristics of the system, and in some cases exceeds the length of the period, so that an equilibrium is not reached.

Itinerary provision and pricing in container liner shipping revenue management

- Transportation Research Part E: Logistics and Transportation Review---2015---Shuaian Wang,Hua Wang,Qiang Meng

A shipping line may have more than one itinerary to transport containers from origin to destination. Customers choose which itinerary to use or using other shipping lines' itinerary. We use the logit model to formulate customer's behavior. We find that, on one side, when the freight rates of the itineraries are fixed, providing all itineraries to a customer may not maximize the shipping line's profit. When the market share of the shipping line is low, more itineraries should be provided, and vice versa. On the other hand, when the freight rates of the itineraries could be optimized, all itineraries are provided for maximizing the expected profit. Models and algorithms are developed that determine the optimal subset of itineraries to provide with given freight rates, and the optimal freight rates when they could be adjusted.

Optimization of postal express line network under mixed driving pattern of trucks

- Transportation Research Part E: Logistics and Transportation Review---2015---Li Sun,Lindu Zhao,Jing Hou

Details about the movement of trucks on postal express lines are investigated to improve the performances of mail distribution. A mixed driving pattern of trucks is introduced to minimize the transportation cost of a postal express line network with a service level requirement. We formulate this problem as a mixed p meeting depots location with shipment scheduling problem and build a MINLP model. A two-level tabu search procedure based on shipment grouping method is developed. Through a series of computational experiments and sensitivity analysis on different instances, some managerial insights of the network under mixed driving pattern are revealed.

Infrastructure development for alternative fuel vehicles on a highway road system

- Transportation Research Part E: Logistics and Transportation Review---2015---Seong Wook Hwang,Sang Jin Kweon,Jose A. Ventura

A new mathematical model for positioning alternative

fuel (AF) refueling stations on directed-transportation networks with the objective of maximizing the coverage of path flow volume is proposed. This model is especially designed for developing an AF infrastructure on toll roads and other highways, where vehicles do not need to exit the road network for refueling, some candidate station locations are not located at interchanges, and some stations may only service vehicles on one driving direction. The proposed model is applied to the Pennsylvania Turnpike System using the 2011 truck traffic data and considering different vehicle driving ranges.

The redesign of a warranty distribution network with recovery processes

- Transportation Research Part E: Logistics and Transportation Review---2015---Jalal Ashayeri,Ning Ma,Renata Sotirov

A warranty distribution network provides aftersales warranty services to customers and resembles a closed-loop supply chain network with specific challenges for reverse flows management like recovery, repair, and reflow of refurbished products. We present here a nonlinear and nonconvex mixed integer programming model for the design of the warranty distribution network of a semiconductor company which is operated by an outsourced third party logistics service provider. The application of the model to the real-life case provides an improved distribution network flow and rearranged warehouse and recovery locations, and resulted in weekly cost savings of 3.4% for the considered item.

Robust supply chain strategies for recovering from unanticipated disasters

- Transportation Research Part E: Logistics and Transportation Review---2015---Li-Ming Chen,Yan Emma Liu,Shu-Jung Sunny Yang

Recovering from unanticipated disasters is critical in today's global market. This paper examines the effectiveness of popular recovery strategies used to address unpredictable disasters that derail supply chains. We create a formal model to portray dynamic operational

performance among supply chain firms facing disruptions caused by natural and man-made disasters. Our analysis shows that a supply chain recovers best if member firms adopt a radical, rapid, costly recovery strategy that immediately resolves the disruption. This observation is robust to various resource consumption requirements. We apply our methodology in the case of Taiwan's 2011 food contamination scandal and provide managerial insights.

Departure time choice behavior for hurricane evacuation planning: The case of the understudied medically fragile population

- Transportation Research Part E: Logistics and Transportation Review---2015---ManWo Ng,Rafael Diaz,Joshua Behr

Despite the non-trivial number of (non-institutionalized) residents with special needs – referred to as the medically fragile population in this paper – there is virtually no research available to guide the hurricane evacuation planning for this population group. One area is their evacuation time choice behavior that can have tremendous implications for their safety as well as the logistics of the evacuation process. In this paper, we fundamentally advance our understanding of the evacuation timing behavior of this heavily understudied, and potentially vulnerable, population group. Analysis indicates that key differences exist between the medically fragile and non-medically fragile population.

A novel methodology for designing a household waste collection system for insular zones

- Transportation Research Part E: Logistics and Transportation Review---2015---Pablo A. Miranda,Carola A. Blazquez,Rodrigo Vergara,Sebastian Weitzler

This paper addresses the problem of designing a household waste collection system for rural insular areas using a barge for transportation, based on a novel mixed integer programming model that simultaneously integrates decisions of waste collection sites selection

within the islands to be served, visit schedule for each selected collection site, and multi-period vehicle routing. An application to a real-world instance consisting of small rural islands located in the south of Chile shows the effectiveness and complexity of the model, along with the advantages of using a waste compactor instead of transporting the waste using bins onboard a barge.

Supply chain network competition in price and quality with multiple manufacturers and freight service providers

- Transportation Research Part E: Logistics and Transportation Review---2015---Anna Nagurney,Sara Saberi,Shivani Shukla,Jonas Floden

In this paper, we develop both static and dynamic supply chain network models with multiple manufacturers and freight service providers competing on price and quality. The manufacturers compete with one another in terms of price and quality of the product manufactured, whereas the freight service providers compete on price and quality of the transportation service they provide for multiple modes. Both manufacturers and freight service providers maximize their utilities (profits) while considering the consequences of the competitors' prices and quality levels. Bounds on prices and quality levels are included that have relevant policy-related implications. The governing equilibrium conditions of the static model are formulated as a variational inequality problem. The underlying dynamics are then described, with the stationary point corresponding to the variational inequality solution. An algorithm which provides a discrete-time adjustment process and tracks the evolution of the quality levels and prices over time is proposed, and convergence results given. Numerical examples illustrate how such a supply chain network framework, which is relevant to products ranging from high value to low value ones, can be applied in practice.

Robust and reliable medical services network design under uncertain environment and system disruptions

- Transportation Research Part E: Logistics and Transportation Review---2015---Davood Shishebori,Abolghasem Yousefi Babadi

This paper addresses an efficient mixed integer linear programming model for a robust and reliable medical service (MS) center location network design problem (RR/MSL/NDP), which simultaneously takes uncertain parameters, system disruptions, and investment budget constraint into account. The proposed model is formulated based on an efficient robust optimization approach to protect the network against uncertainty. Furthermore, a mixed integer linear programming model with augmented PR-robust constraints is proposed to control the system reliability under unforeseen situations. A practical case study is presented in detail to illustrate the application of the proposed model.

Optimal commodity price stabilization as a multi-period spatial equilibrium problem: A supernetwork approach with public buffer stocks

- Transportation Research Part E: Logistics and Transportation Review---2015---Janaína Poffo Posamai,Andresa Pescador,Sérgio Fernando Mayerle,João Neiva de Figueiredo

This paper addresses the seasonal agricultural commodity price stabilization problem both with and without price bands using a spatial and temporal supernetwork framework. The problem is formulated as an extension of the classic spatial price equilibrium problem and solved with the gradient projection algorithm. Results from the model support the use of interseasonal storage mechanisms and confirm that the use of price bands is less effective as it lowers total society surplus while providing inaccurate signaling and therefore dampening market perceptions of product scarcity or excess. An illustrative numerical example provides a comparison between policy alternatives.

Flow control in time-varying, random supply chains

- Transportation Research Part E: Logistics and Transportation Review---2015---Ion Matei,Assane Gueye,John S. Baras

This paper focuses on the logistics aspect of supply chain management. It proposes a randomized flow management algorithm for a time-varying, random, supply chain network. A constrained stochastic optimization problem that maximizes the profit function in terms of the long-run, time-average of the flows in the supply chain is formulated. The algorithm is distributed and based on queueing theory and stochastic Lyapunov analysis concepts. The long-run, time averages of the flows generated by the algorithm can get arbitrarily close to the solution of the aforementioned optimization problem. In support of the theoretical results, numerical simulations are also presented.

Production and pricing policies in dual sourcing supply chains

- Transportation Research Part E: Logistics and Transportation Review---2015---Doğan A. Serel

We analyze optimal production and pricing strategies in the single period (newsvendor) dual sourcing problem that entails local and offshore suppliers. The local supplier is used reactively as an emergency source following the realization of random demand. A multiplicative demand model is employed. We show that dual sourcing flexibility may decrease optimal price when emergency supply cost is sufficiently low. We also find that optimizing price for a given stocking factor yields a price which is always higher than the price in the case where both price and stocking factor are selected to be jointly optimal.

Service charge and capacity selection of an inland river port with location-dependent shipping cost and service congestion

- Transportation Research Part E: Logistics and Transportation Review---2015---Zhijia Tan,Wan Li,Xiaoning Zhang,Hai Yang

The inland waterway transportation has attracted a lot of attention worldwide in the last fifteen years. This paper studies the location, service charge and capacity decision of an inland river port to maximize its revenue or profit. The cargo shippers are assumed to be uniformly distributed along the inland river and can be shipped to the junction port via pure road transportation service or transshipment service with the inland river port. The natural heterogeneity of the river's navigational condition is modeled by a location-dependent waterway transportation cost and the service congestion on the port is captured by the M/M/1 queueing model. We analytically investigate the properties of the optimal solutions for various decision problems associated with the inland river port. The effects of the natural heterogeneity and port service congestion of those optimal solutions are investigated. Those theoretical results are carefully examined in the case study of the Yangtze River.

An inventory pooling model for spare units of critical systems that serve multi-companies

- Transportation Research Part E: Logistics and Transportation Review---2015---Wenbin Wang, Shuai Yue

In this paper, we present an inventory pooling model for spare units of critical systems that serve multi-companies. Companies located in the same geographical area can benefit from a coalition to share the storage cost of such spare units, which may be stored as one unit at only one company's location. In our model, we combine the storage cost, replacement costs and downtime cost into a unified cost function, giving the expected cost per company per unit time as our objective function. We use two decision variables: the number of companies in the coalition; and the threshold to determine whether to place an emergency order or not, compared with the remaining ordinary order's arrival time. We obtain an optimal solution with regard to these two decision variables under a certain cost structure. Our simulation method verifies the correctness of the model. A series of sensitivity analyses are also conducted to show which variable has the most

influence on the expected cost.

Planning and managing intermodal transportation of hazardous materials with capacity selection and congestion

- Transportation Research Part E: Logistics and Transportation Review---2015---Ghazal Asadipour, Ginger Y. Ke, Manish Verma

The current literature in the rail-truck intermodal transportation of hazardous materials (hazmat) domain ignores congestion at intermodal yards. We attempt to close that gap by proposing a bi-objective optimization framework for managing hazmat freight that not only considers congestion at intermodal yards, but also determines the appropriate equipment capacity. The proposed framework, i.e., a non-linear MIP and a multi-objective genetic algorithm based solution methodology, is applied to a realistic size problem instance from existing literature. Our analysis indicates that terminal congestion risk is a significant portion of the network risk; and, that policies and tools involving number of cranes, shorter maximum waiting times, and tighter delivery times could have a positive bearing on risk.

Liquidity effects and FFA returns in the international shipping derivatives market

- Transportation Research Part E: Logistics and Transportation Review---2015---Amir H. Alizadeh, Konstantina Kappou, Dimitris Tsouknidis, Ilias Visvikis

The study examines the impact of liquidity risk on freight derivatives returns. The Amihud liquidity ratio and bid-ask spreads are utilized to assess the existence of liquidity risk in the freight derivatives market. Other macroeconomic variables are used to control for market risk. Results indicate that liquidity risk is priced and both liquidity measures have a significant role in determining freight derivatives returns. Consistent with expectations, both liquidity measures are found to have positive and significant effects on the returns of freight derivatives. The results have important implications

for modeling freight derivatives, and consequently, for trading and risk management purposes.

(s,S) policy model for liner shipping refueling and sailing speed optimization problem

- Transportation Research Part E: Logistics and Transportation Review---2015---Xiaoming Sheng, Ek Peng Chew, Loo Hay Lee

This work expounds on implementing an effective dynamic (s,S) policy to solve a liner shipping refueling and speed determination problem under both bunker prices and consumption uncertainties. While solving an optimization model which incorporates a continuous distribution is extremely challenging, we use sample average approximation method to solve it. However, the resulting problem is still a very large-scaled problem. Therefore, we propose two variations of the progressive hedging algorithm to tackle it. Numerical results show that our solution method is efficient and, in addition, our dynamic (s,S) policy model has significant cost reduction potential compared to stationary models.

Regional public support to airlines and airports: An unsolved puzzle

- Transportation Research Part E: Logistics and Transportation Review---2015---Ramón Núñez-Sánchez

This paper proposes a structural model to explain the motivation of regional public authorities to arrange marketing agreements for route and traffic development. Furthermore, using data from Spanish airports, we empirically test this model obtaining the demand function according to the preferences of public authorities. The results show that the public budget, airport's attributes or intermodal competition affect to the demand for aircraft operations of regional public agencies. Finally, we propose an empirical method to determine the market power of airlines within these marketing agreements in a particular airport or route.

Stopover and hub-and-spoke shipment strategies in less-than-truckload carriers

- Transportation Research Part E: Logistics and Transportation Review---2015---Miquel Estrada-Romeu, Francesc Robusté

This paper presents a methodology to identify when freight consolidation strategies are cost-efficient in the less-than-truckload carriers operations. Shipments are assigned based on proximity and cost criteria to build an initial long-haul shipment solution. This initial solution is later improved by the implementation of Tabu Search algorithm. The proximity criterion takes into account the spatial distribution of shipments loads among centers. The results show that the proposed methodology may reduce the transportation cost by 20% compared to the solution of those heuristics only considering cost criterion.

The time constrained multi-commodity network flow problem and its application to liner shipping network design

- Transportation Research Part E: Logistics and Transportation Review---2015---Christian Vad Karsten, David Pisinger, Stefan Ropke, Berit Dangaard Brouer

The multi-commodity network flow problem is an important sub-problem in several heuristics and exact methods for designing route networks for container ships. The sub-problem decides how cargoes should be transported through the network provided by shipping routes. This paper studies the multi-commodity network flow problem with transit time constraints which puts limits on the duration of the transit of the commodities through the network. It is shown that for the particular application it does not increase the solution time to include the transit time constraints and that including the transit time is essential to offer customers a competitive product.

Post-disaster grain supply chain resilience with government aid

- Transportation Research Part E: Logistics and Transportation Review---2015---Yuefeng Yang,Xuerong Xu

Assessing the disruption and resilience of the agricultural grain supply chain is critical to ensure grain supply and stabilize grain price in the final market. This research proposes a quantitative model to analyze how a grain processor regains robustness when supply is disrupted by a natural disaster upstream, and how this disruption affects grain retailers downstream. Two supply chain recovery methods, contingent sourcing and government aid, are considered for grain processor recovery. The results show that (1) a processor prefers timely full recovery, and (2) government aid as an intervention means is indispensable but cannot fully replace the backup supplier.

Demand-responsive transit circulator service network design

- Transportation Research Part E: Logistics and Transportation Review---2015---Yao Yu,Randy B. Machemehl,Chi Xie

Commuter rail systems are being introduced into many urban areas as an alternative mode to automobiles for commuting trips. It is anticipated that the shift from the auto mode to rail mode can greatly help alleviate traffic congestion in urban road networks. However, the right-of-way of many existing commuter rail systems is usually not ideally located. Since the locations of rail systems were typically chosen long ago to serve the needs of freight customers, the majority of current commuter rail passengers have to take a non-walkable connecting trip to reach their final destinations after departing the most conveniently located rail stations. To make rail a more viable commuting option and thus more competitive to the auto mode, a bus feeder or circulator system is proposed for transporting passengers from their departing rail stations to final work destinations in a seamless transfer manner. The key

research question with operating such a bus circulator system is how to optimally determine a bus route and stopping sequence for each circulating tour by using the real-time demand information. In this paper, we name this joint routing and stopping optimization problem the circulator service network design problem, the objective of which is to minimize the total tour cost incurred to bus passengers and operators with respect to minimizing the walk time of each individual bus passenger. A bi-level nonlinear mixed integer programming model is constructed and a tabu search method with different local search strategies and neighborhood evaluation methods is then developed for tackling the circulator service network design problem.

The impact of slow ocean steaming on delivery reliability and fuel consumption

- Transportation Research Part E: Logistics and Transportation Review---2015---Chung-Yee Lee,Hau L. Lee,Jiheng Zhang

With a dominant volume of global transportation being conducted by sea, ocean container transport greatly impacts the global economy. Since sea vessels are drastically more fuel efficient when traveling at lower speeds, slow steaming has become a widely adopted practice to reduce bunker costs. However, this leads to a longer transportation time, which together with the unpredictability of the delay has been a big challenge. We propose a model to quantify the relationship among shipping time, bunker cost and delivery reliability. Our findings lead to a simple and implementable policy with a controlled cost and guaranteed delivery reliability.

Modeling multiple humanitarian objectives in emergency response to large-scale disasters

- Transportation Research Part E: Logistics and Transportation Review---2015---Kai Huang,Yiping Jiang,Yufei Yuan,Lindu Zhao

In this paper, we characterize the humanitarian objectives of emergency resource allocation and distribution in disaster response operations. We formulate

the humanitarian principles as three objective functions, i.e., lifesaving utility, delay cost and fairness. An integrated multi-objective optimization model that combines resource allocation with emergency distribution is developed, where a time space network is used to incorporate the frequent information and decision updates in a rolling horizon approach. The proposed model is shown to be a convex quadratic network flow problem, for which we design an efficient Variational Inequality algorithm. Computational results are reported to illustrate the performance of the proposed model and algorithm.

A stochastic programming approach for floods emergency logistics

- Transportation Research Part E: Logistics and Transportation Review---2015---Rodrigo A. Garrido,Patricio Lamas,Francisco J. Pino

This article presents a model to assist decision makers in the logistics of a flood emergency. The model attempts to optimize inventory levels for emergency supplies as well as vehicles' availability, in order to deliver enough supplies to satisfy demands with a given probability. A spatio-temporal stochastic process represents the flood occurrence. The model is approximately solved with sample average approximation. The article presents a method to quantify the impact of the various intervening logistics parameters. An example is provided and a sensitivity analysis is performed. The studied example shows large differences between the impacts of logistics parameters such as number of products, number of periods, inventory capacity and degree of demand fulfillment on the logistics cost and time. This methodology emerges as a valuable tool to help decision makers to allocate resources both before and after a flood occurs, with the aim of minimizing the undesirable effects of such events.

Liner hub-and-spoke shipping network design

- Transportation Research Part E: Logistics and Transportation Review---2015---Jianfeng Zheng,Qiang Meng,Zhuo Sun

This paper proposes a liner hub-and-spoke shipping network design problem by introducing the concept of a main port, as well as some container shipping constraints such as multi-type container shipment and transit time constraints, which are seldom considered in the previous studies. It develops a mixed-integer programming model with nonconvex multi-linear terms for the proposed problem. An efficient genetic algorithm embedded with a multi-stage decomposition approach is developed to solve the model. Numerical experiments are carried out to assess the effectiveness of the proposed model and the efficiency of the proposed algorithm.

A spatially distributed queuing model considering dispatching policies with server reservation

- Transportation Research Part E: Logistics and Transportation Review---2015---Ana Paula Ianni,Fernando Chiyoshi,Reinaldo Morabito

In this paper we propose a cutoff hypercube queuing model to analyze server-to-customer emergency services operating with server reservation. We are motivated by certain SAMU's (Système d'Aide Médicale Urgente) that give assistance to different classes of emergency requests, including specialized transfer of patients, and use the reservation strategy to improve the probability that ambulances will be available to high priority calls. The aim is to show how this cutoff priority service discipline can be handled by the cutoff hypercube queuing model to evaluate relevant system performance measures, and the main impacts of this policy to the different classes of users.

Multi-period hub location problems in transportation

- Transportation Research Part E: Logistics and Transportation Review---2015---Shahin Gelareh,Rahimeh Neamatian Monemi,Stefan Nickel

Many transport service providers operate on hub-and-spoke network structures. Major operators may have

several dedicated hub facilities that are leased for a time horizon rather than being owned or constructed. For a given discrete planning horizon, service providers must decide on the location of the hub ports (i.e. terminals), the period when the lease contract starts, the period when the existing contracts must be terminated and the flow routing over the entire planning horizon so as to minimize the total operational cost. Thus, we propose a mathematical model for a Multi-period Uncapacitated Multiple Allocation Hub Location Problem with Budget Constraint. The proposed model incorporates several features of practice, particularly from maritime and land transport practices. We also propose a meta-heuristic solution algorithm that produces high-quality solutions in a reasonable amount of time. By exploiting the decomposable structure of the model, we extended a Benders decomposition approach by proposing several improvements. Extensive computational experiments confirm the efficiency of the proposed methods and also show its limitations.

Retail supply chain network design under operational and disruption risks

- Transportation Research Part E: Logistics and Transportation Review---2015---N. Salehi Sadghiani,S.A. Torabi,N. Sahebjamnia

Designing robust and resilient retail networks under operational and disruption risks can create substantial competitive advantage. In this paper, a deterministic multiple set-covering model is first proposed. Then, it is extended to a possibilistic scenario-based robust model by scenario generation and disruption profiling to design a robust and resilient retail network. The developed models are validated through randomly generated examples and a real case study in retailing. Numerical results demonstrate that designing retail chains without considering operational and disruption risks is really misleading. Also, multiple covering of retail stores as the measure of redundancy increases the network's resilience significantly.

Cooperation through capacity sharing between competing forwarders

- Transportation Research Part E: Logistics and Transportation Review---2015---Li Li,Rachel Q. Zhang

In this paper, we consider a shipping system consisting of one carrier and two shipping forwarders who compete on price for businesses from potential shippers. The carrier may quote different prices or a single price to the two shipping forwarders who will then order shipping capacity from the carrier and set the selling prices to the shippers before market uncertainties are revealed. Inspired by cooperation between competing parties in many industries including the maritime shipping industry, we propose a new model under which the shipping forwarders are allowed an opportunity to purchase shipping capacity from each other after they order capacity from the carrier but before they set the selling prices and satisfy demand, referred to as the capacity reservation model. We show analytically that capacity reservation between competing forwarders benefits both the carrier and the forwarders, leading to a win-win situation under various market conditions. Furthermore, capacity reservation can offset the negative effect of a carrier's pricing power which enables the carrier to charge discriminatory shipping prices to squeeze more profits out of the forwarders.

Negotiating truck arrival times among trucking companies and a container terminal

- Transportation Research Part E: Logistics and Transportation Review---2015---Mai-Ha Phan,Kap Hwan Kim

Congestion of trucks in port areas has created serious environmental and traffic problems in many countries. One of main reasons for congestion is the concentrated arrivals of road trucks at peak hours. A negotiation process for smoothing truck arrivals in peak hours among multiple trucking companies and a terminal is addressed. The negotiation process is to be used for the appointment system for road trucks in container

terminals. This paper suggests a mathematical formulation for smoothing the peaks in arrivals considering the inconvenience of trucks from changing their arrival times and the waiting cost of trucks in peak hours. This study proposes a decentralized decision-making model to support the negotiation process between truck companies and the terminal operator. It gives an acceptable solution to every player involved as well as the near optimal solution to the entire system from the global point of view. Numerical experiments are performed to validate the approach in this study.

A humanitarian logistics model for disaster relief operation considering network failure and standard relief time: A case study on San Francisco district

- Transportation Research Part E: Logistics and Transportation Review---2015---Morteza Ahmadi, Abbas Seifi, Behnam Tootooni

We propose a multi-depot location-routing model considering network failure, multiple uses of vehicles, and standard relief time. The model determines the locations of local depots and routing for last mile distribution after an earthquake. The model is extended to a two-stage stochastic program with random travel time to ascertain the locations of distribution centers. Small instances have been solved to optimality in GAMS. A variable neighborhood search algorithm is devised to solve the deterministic model. Computational results of our case study show that the unsatisfied demands can be significantly reduced at the cost of higher number of local depots and vehicles.

Freight transport network design using particle swarm optimisation in supply chain–transport supernetwork equilibrium

- Transportation Research Part E: Logistics and Transportation Review---2015---Tadashi Yamada, Zukhruf Febri

This paper presents a discrete network design problem for optimally designing freight transport network in terms of the efficiency of supply chain. Modelling

is undertaken within the framework of mathematical programmes with equilibrium constraints, which first incorporates both supply chain and transport networks explicitly. The upper level determines the best set of actions for transport network improvement, while the lower-level decision is based on a supply chain–multimodal transport supernetwork equilibrium. New variants of particle swarm optimisation are developed to approximately solve the upper level. Numerical tests reveal their superior performance and the effective freight transport-related actions.

A MIP model for locating slow-charging stations for electric vehicles in urban areas accounting for driver tours

- Transportation Research Part E: Logistics and Transportation Review---2015---Joana Cavadas, Gonçalo Homem de Almeida Correia, João Gouveia

In this paper we propose an improved mathematical model for locating EV charging stations. We consider the successive activities of the travelers, i.e., a person with two main stops during the day should charge the vehicle in just one of the parking spots, hence avoiding double counting the demand. The model is tested for the city of Coimbra (Portugal), where there is a network of nine stations. We conclude that our solution is better than the one that was implemented in reality, moreover we are able to conclude that demand transference has a rather significant impact on the solutions.

Reprint of “Green supply chain decisions – Case-based performance analysis from the food industry”

- Transportation Research Part E: Logistics and Transportation Review---2015---Hanne Ala-Harja, Petri Helo

Environmental impacts, such as GHC emissions, have been introduced to supply chain management as an additional parameter to traditional cost, lead-time and

on-time delivery. Supply chain management represents a significant source of decisions affecting the eco-efficiency of many products. This paper analyses cases from the food industry, mainly order-picking, transportation, warehousing, and distribution aspects from the greening point of view. Three case examples of decisions in supply chain design in the food industry are considered. The results show dependencies between performance measures. Finally, a framework of decisions and their impact on performance is presented.

Reprint of “Planning in feasible region by two-stage target-setting DEA methods: An application in green supply chain management of public transportation service providers”

- Transportation Research Part E: Logistics and Transportation Review---2015---Majid Azadi, Amir Shabani, Mohsen Khodakarami, Reza Farzipoor Saen

To meet green supply chain management's requirements of a company and its transportation service providers (TSPs), it is essential to set clear, achievable, and realistic targets. This paper proposes two data envelopment analysis (DEA) approaches to find targets for two-stage network structures. The objective of proposed approaches is to plan in feasible region. The feasible region specifies bounds to ensure targets are within current operational capacity of TSPs. Applying the approaches to set targets for 24 TSPs lead to different results. However, proposed models ensure that the TSPs would be efficient in their current capacity.

Reprint of “Green Supply Chain Collaboration implementation in China: The mediating role of guanxi”

- Transportation Research Part E: Logistics and Transportation Review---2015---Jun Luo, Alain Yee-Loong Chong, Eric W.T. Ngai, Martin J. Liu

This study aims to understand how buyer-seller relationship, competitive environment and guanxi affect Chinese manufacturers' decision to implement Green

Supply Chain Collaboration (GSCC). We also examine whether guanxi is able to mediate the buyer-seller relationship and GSCC implementation. Data collected from 222 Chinese manufacturing organizations were analyzed using the partial least squares method of structural equation modeling. The result shows that buyer-seller relationship influences Green Supply Chain Collaboration through asset specificity, volume uncertainty, transaction frequency and competitive environment. The results also showed support for our hypotheses that guanxi mediates the effect of asset specificity, volume uncertainty and environmental competition on GSCC.

Greening propensity and performance implications for logistics service providers

- Transportation Research Part E: Logistics and Transportation Review---2015---Y.H. Venus Lun, Kee-hung Lai, Christina W.Y. Wong, T.C.E. Cheng

Stakeholders in the logistics industry have growing concern about the damage caused by logistics operations to the environment. Logistics service providers (LSPs) have taken steps to pursue environmental objectives by involving customers in their operations. This study defines greening propensity (GP) as “involvement of customers to perform logistics activities to achieve environmental performance”. We analyze survey data collected from the logistics industry in Hong Kong to address the following questions: What are the categories of greening capability in LSPs? What are the performance outcomes of LSPs' greening capability? Theoretical contributions and implications of the study results are discussed.

Reprint of “Product architecture modularity implications for operations economy of green supply chains”

- Transportation Research Part E: Logistics and Transportation Review---2015---Yohanes Kristianto, Petri Helo

The role of product architecture modularity is commonly in increasing product reusability and minimizing waste. This paper designs a decision support system to determine optimal product architecture modularity in closed loop supply chains. The objective is to investigate if remanufacturing and modular upgrading is appropriate at certain periods and in modules. The optimization model is tested under several production yield scenarios in order to determine manufacturing and remanufacturing capacity and production line scheduling under process yield uncertainty. The implications of product architecture modularity for operations economy of green supply chains are discussed in terms of their theoretical and managerial aspects.

Reprint of “Integration of logistics and cloud computing service providers: Cost and green benefits in the Chinese context”

- Transportation Research Part E: Logistics and Transportation Review---2015---Nachiappan Subramanian,Muhammad D. Abdulrahman,Xiaolai Zhou

Drawing on the innovation diffusion theory and data from 236 Chinese small and medium-sized logistics service providers (SMLSPs), this study developed and tested a conceptual model for empirically examining the green and cost benefits of integration between cloud service providers and SMLSPs in the Chinese context. The study posits that the perceived green and cost benefits drive the need for cloud computing (CC) adoption by Chinese SMLSPs. The results indicate that Chinese SMLSPs are attracted by CC to reduce cost in a short term and to gain sustainability through green benefits in a long term. The study extends CC capabilities and enterprise integration literature in the context of logistics services.

Reprint of “Supply chain-based barriers for truck-engine remanufacturing in China”

- Transportation Research Part E: Logistics and Transportation Review---2015---Qinghua Zhu,Joseph Sarkis,Kee-hung Lai

This paper introduces a research framework to identify barriers from a remanufacturing supply chain perspective including strategic (governmental) and operational dimensions. Using responses from expert practitioners in a truck engine remanufacturer in China, a grey-based Decision-Making Trial and Evaluation Laboratory (DEMATEL) method is applied to examine the cause-effect relationships among various implementation barriers. The results identify that lack of strong financial support for remanufacturing technologies or equipment updates and innovation are key implementation barriers. Lack of quality standards of remanufactured products, adequate availability of used truck engines, and quality guarantee marketing of remanufactured engines are also major barriers.

Reprint of “Enhancing green supply chain initiatives via empty container reuse”

- Transportation Research Part E: Logistics and Transportation Review---2015---Ling Li,Bin Wang,David P. Cook

In this paper, the maritime industry’s commitment to green supply chain has been analyzed. The objective of this study is to show that the reuse of empty containers not only adds value to a firm, but leads to waste reduction in the supply chain. The novelties of this article include (i) empty and laden containers are treated in accordance with a shipping company’s green effort; (ii) both the volume and weight of containers are introduced to indicate a potential constraint on green effort; (iii) empty container storage costs are included as a value-added component which stem from green effort.

Reprint of “Linking rival and stakeholder pressure to green supply management: Mediating role of top management support”

- Transportation Research Part E: Logistics and Transportation Review---2015---Jing Dai, Frank L. Montabon, David E. Cantor

Drawing upon the Schumpeterian view of competition and stakeholder theory, the purpose of our study is to

examine how issues of rivalry and stakeholder pressure motivate firms to implement green supply management practices. We also consider the role of top management support as an important enabler to how firms react to competitive pressures to pursue green supply management practices. Our model is tested using a sample of supply chain professionals. Our results indicate that environmental pressure from rivals and stakeholders influences green supply management implementation through the mediating role of top management support for environmental initiatives.

Reprint of “Quality management, environmental management maturity, green supply chain practices and green performance of Brazilian companies with ISO 14001 certification: Direct and indirect effects”

- Transportation Research Part E: Logistics and Transportation Review---2015---Ana Beatriz Lopes de Sousa Jabbour, Charbel Jose Chiapetta Jabbour, Hengky Latan, Adriano Alves Teixeira, Jorge Henrique Caldeira de Oliveira

This study aims to test a new conceptual model based on the relationship between quality management (QM), environmental management maturity (EMM), adoption of external practices of green supply chain management (GSCM) (green purchasing and collaboration with customers) and green performance (GP) with data from 95 Brazilian firms with ISO 14001. To our knowledge, such links and relationships are not simultaneously identified and tested in the literature. The results indicate the validation of all of the research hypotheses. This paper highlights that an improvement in green performance will require attention to quality management, environmental management maturity, and green supply chain.

A strategic approach to improve sustainability in transportation service procurement

- Transportation Research Part E: Logistics and Transportation Review---2015---R. Jothi Basu, Ruibin Bai, Pl.K. Palaniappan

This paper focuses on the procurement of full truck-load transportation service with the view to ensuring sustainability in transport logistics. The carrier assignment problem (CAP) involved in truck load contract auction is studied using a complete enumeration method and heuristic approach. Performance of both methods is compared in terms of solution quality and computational time based on the results of sample problems considered. Also, the impact of combinatorial bidding on reducing empty haul in real world case is analyzed and environmental sustainability is achieved through reduction in carbon foot print.

Productivity growth, scale economies, ship size economies and technical progress for the container shipping industry in Taiwan

- Transportation Research Part E: Logistics and Transportation Review---2015---Wei-Ming Wu, Jenn-Rong Lin

Rather than adding up all cost items of ship operation in the traditional vessel-based approach, this paper develops a theoretical model to evaluate and decompose the total factor productivity (TFP) growth of the container shipping industry in Taiwan. The results show that scale economies and ship size economies play the dominant roles in improving TFP growth. Since 2006, the dominance of TFP growth has gradually shifted from scale economies to ship size economies. This finding reconfirms the cost advantage of large vessels. In addition, it indicates that the deployment of large vessels has led to a problem of serious over-capacity.

Long-term evolution of airport networks: Optimization model and its application to the United States

- Transportation Research Part E: Logistics and Transportation Review---2015---Miguel Gueifão Santos, António Pais Antunes

In this article, we introduce an optimization model aimed to assist aviation authorities in their strategic decisions regarding the long-term expansion of a network of airports. The objective is to maximize total

system throughput for a given budget taking into account the capacity of the airports and the impact of travel costs upon demand. The results that can be obtained through the application of the model are first illustrated for a hypothetical small-size network and then in a study regarding the evolution of the network of the principal airports of the United States.

Port connectivity study: An analysis framework from a global container liner shipping network perspective

- Transportation Research Part E: Logistics and Transportation Review---2015---Jianlin Jiang,Loo Hay Lee,Ek Peng Chew,Chee Chun Gan

This paper introduces an analysis framework for port connectivity from a global container liner shipping network perspective: it is defined in terms of the impact on the transportation network when the transshipment service is not available at the evaluated port. Under this framework, two models for port connectivity are introduced from transportation time and capacity. Compared with existing measures, the strength of our framework and models is not only that it provides scientific methods to compute port connectivity, but it is able to capture a global effect on how port connectivity contributes to the overall network for given shipping services.

A bilevel storage pricing model for outbound containers in a dry port system

- Transportation Research Part E: Logistics and Transportation Review---2015---Xuan Qiu,Jasmine Siu Lee Lam,George Q. Huang

Serving as a potential solution for seaport congestion and capacity limitation, dry port development is increasingly popular in the freight transport industry. This paper pioneers the research on dry port operations by modelling the storage pricing problem for outbound containers. The interaction between a dry port and multiple shippers is modelled as a bilevel program. The optimal properties of the proposed model under certain conditions are derived analytically, from

which a closed-form solution is obtained. Contrary to intuition, the increase of container delivery frequency from shippers may lead to the reduction of dry port's profit according to model outcomes.

A bilevel programming model for corporate social responsibility collaboration in sustainable supply chain management

- Transportation Research Part E: Logistics and Transportation Review---2015---Che-Fu Hsueh

This study proposes a bilevel programming model in which the supply chain (SC) director determines optimal performance levels of corporate social responsibility (CSR) and compensation for all SC actors, thus maximizing total SC profits. Given the fixed CSR performance levels, the equilibrium product flows are determined in the lower-level model, in which the profit-maximizing behavior of the individual SC actor is considered and formulated as a variational inequality. The test results show that it is possible to improve not only performance of CSR, but also the profits of both individual SC actors and the whole SC through proper SC collaboration.

Control-based optimization approach for aircraft scheduling in a terminal area with alternative arrival routes

- Transportation Research Part E: Logistics and Transportation Review---2015---Mayara Condé Rocha Murça,Carlos Müller

This paper presents an optimization approach for dynamically scheduling aircraft operations and supporting air traffic controllers in both determining and implementing operationally feasible landing and departure times at an airport. The mixed integer linear programming model proposed incorporates air traffic control infrastructure in terms of route network, introduces the concept of alternative approach routes and is designed to generate an output that can be converted into effective advisories for executable flight commands. It shows reasonable computational times for obtaining the optimal solution and delay reductions of up to 35%

with practical size instances from Sao Paulo/Guarulhos International Airport.

An exact algorithm for the multi-trip vehicle routing and scheduling problem of pickup and delivery of customers to the airport

- Transportation Research Part E: Logistics and Transportation Review---2015---Jiafu Tang, Yang Yu, Jia Li

Door-to-Door service of Pickup and Delivery of Customers to the Airport (D2PDCA) is a new service provided by certain Airline Ticket Sales Agencies (ATSAs) in China. This new service provides an attractive alternative way by picking up customer at this/her specified position and at any time he/she preferred and delivering to the airport more conveniently than airport shuttle and thus earn high customer service quality. Compared with the single-trip mode, the multi-trip mode of D2PDCA (MTM-D2PDCA) service can reduce travel distances, the number of vehicles required and the operating cost. To obtain the exact solution of the MTM-D2PDCA problem, we propose a novel, exact algorithm based on the trip-chain-oriented set-partitioning (TCO-SP) model, where a trip-chain represents multiple trips made by a specific vehicle. In the exact algorithm, we propose an improved label-correcting method to remove infeasible trip-chains quickly and thus speed the search process. Based on the feasible trip-chains, the MTM-D2PDCA problem is formulated as the novel TCO-SP model, which can be solved exactly by the optimization software CPLEX. In addition, we present several mathematical insights into the relationship between the number of trip-chains and the number of local optimal trips that are applicable in both theory and practice. Extensive experiments are conducted to illustrate the application of the model and demonstrate the cost savings of the MTM-D2PDCA mode over the single-trip mode and provide managerial insights into successfully operating a MTM-D2PDCA service.

Endogenous control of service rates in stochastic and dynamic queuing models of airport congestion

- Transportation Research Part E: Logistics and Transportation Review---2015---Alexandre Jacquillat, Amedeo R. Odoni

Airport congestion mitigation requires reliable delay estimates. This paper presents an integrated model of airport congestion that combines a tactical model of capacity utilization into a strategic queuing model. The model quantifies the relationships between flight schedules, airport capacity and flight delays, while accounting for the way arrival and departure service rates can be controlled over the day to maximize operating efficiency. We show that the model estimates the average and variability of the delays observed at New York's airports relatively well. Results suggest that delays can be extremely sensitive to even small changes in flight schedules or airport capacity.

On returns and network configuration in supply chain dynamics

- Transportation Research Part E: Logistics and Transportation Review---2015---Roberto Dominguez, Salvatore Cannella, Jose M. Framinan

This research focuses on how two common modeling assumptions in the Bullwhip Effect (BWE) literature (i.e., assuming the return of the excess of goods and assuming a serial network) may distort the results obtained. We perform a robust design of experiments where the return condition (return vs. no return) and the configuration of the Supply Chain Network (SCN) (serial vs. divergent) are systematically analyzed. We find an important interaction between these assumptions: the impact of returns on the BWE strongly depends on the SCN configuration. This study highlights the importance of accurately modeling SCNs to properly assess SCNs managers.

Tactical berth and yard template design at container transshipment terminals: A column generation based approach

- Transportation Research Part E: Logistics and Transportation Review---2015---Jian Gang Jin,Der-Horng Lee,Hao Hu

Quay-side berthing congestion is an emerging challenging issue that arises in busy container transshipment terminals and calls for effective management of terminal operations. This paper tackles the berthing congestion problem by introducing a proactive management strategy from the terminal's perspective that adjusts the calling schedule of feeder vessels in such a way that the quay-side workload distribution in the temporal dimension can be balanced. Such a schedule template design problem is considered simultaneously with another two tactical level decision problems, berth template design (i.e., determining preferred berthing positions for vessels) and yard template design (i.e., allocating storage yard space to transshipment flows). This highly integrated problem is formulated as a set covering model. Heuristic methods based on column generation are developed to obtain near-optimal solutions in an efficient way. Computational experiments on real-world sized test instances demonstrate the efficiency and effectiveness of the proposed approach.

Uncertainty propagation in a supply chain or supply network

- Transportation Research Part E: Logistics and Transportation Review---2015---Shabnam Rezapour,Janet K. Allen,Farrokh Mistree

A supply chain is characterized by uncertain demands (demand-side uncertainty) and uncertainties associated with the performances of the production facilities (supply-side uncertainty). In this paper, a method is proposed to plan production in a supply chain with a multi-echelon supply process with unreliable production facilities working in markets with uncertain demand. In such a system it is necessary to consider the global and cumulative effects on the performance of the entire supply chain. We introduce the salient

features of uncertainty propagation in supply chains and demonstrate their impact quantitatively using a test problem from the automotive industry.

Warehouse reshuffling: Insights and optimization

- Transportation Research Part E: Logistics and Transportation Review---2015---Jennifer A. Pazzour,Héctor J. Carlo

Warehouse reshuffling is a reorganization strategy that consists of repositioning items by moving them sequentially. This study investigates how to optimize warehouse reshuffling and quantifies the effect of common assumptions. A mathematical programming formulation for the general warehouse reshuffling problem, the complexity of the problem, several heuristics based on the problem structure, a formal proof delimitating instances where double-handling can be a productive move, and managerial insights on the performance of reshuffling policies in various environments are presented. Experimental results suggest that the proposed heuristics improve upon a benchmark heuristic by relaxing how cycles are handled and incorporating double-handling.

Analysis of an imperfectly competitive cellulosic biofuel supply chain

- Transportation Research Part E: Logistics and Transportation Review---2014---Yongxi Huang,Yihsu Chen

We study the strategic behavior in an imperfectly competitive cellulosic biofuel supply chain. An optimization-based supply chain model is used to obtain long-run planning outcomes, based on which we develop market models considering both perfect and imperfect competitions. The equilibrium among stakeholders in the multi-echelon supply chain can be obtained by solving a collection of first-order conditions associated with their profit-maximization problems. For the imperfect competition, the model, additionally, allows firms with significant market share at different segment of the supply chain to exercise market power.

We apply the models to an illustrative case study of California.

Design of a bi-objective reliable healthcare network with finite capacity queue under service covering uncertainty

- Transportation Research Part E: Logistics and Transportation Review---2014---M. Mohammadi,S. Dehbari,Behnam Vahdani

This paper designs a reliable healthcare network. Under limited capacity, queue of patients may deteriorate the condition and leads to risk of death. Consequently, it is vital to investigate a queue system that considers the condition and changes over the time. Besides, treatment units just serve patients that are in their coverage threshold, while this threshold is affected by several factors. This paper considers number of patients and covering threshold under uncertainty. To handle uncertainty, an integrated approach is proposed. Two meta-heuristic algorithms are developed for the given problem. Finally, we carried out experiments to assess proposed model and approaches.

A matheuristic for the liner shipping network design problem

- Transportation Research Part E: Logistics and Transportation Review---2014---Berit Dangaard Brouer,Guy Desaulniers,David Pisinger

We present an integer programming based heuristic, a matheuristic, for the liner shipping network design problem. This problem consists of finding a set of container shipping routes defining a capacitated network for cargo transport. The objective is to maximize the revenue of cargo transport, while minimizing the cost of operating the network. Liner shipping companies publish a set of routes with a time schedule, and it is an industry standard to have a weekly departure at each port call on a route. A weekly frequency is achieved by deploying several vessels to a single route, respecting the available fleet of container vessels. The matheuristic is composed of four main algorithmic components: a construction heuristic, an improvement

heuristic, a reinsertion heuristic, and a perturbation heuristic. The improvement heuristic uses an integer program to select a set of improving port insertions and removals on each service. Computational results are reported for the benchmark suite LINER-LIB 2012 following the industry standard of weekly departures on every schedule. The heuristic shows overall good performance and is able to find high quality solutions within competitive execution times. The matheuristic can also be applied as a decision support tool to improve an existing network by optimizing on a designated subset of the routes. A case study is presented for this approach with very promising results.

A stochastic programming formulation for strategic fleet renewal in shipping

- Transportation Research Part E: Logistics and Transportation Review---2014---Rikard Bakkehaug,Eirik Stamsø Eidem,Kjetil Fagerholt,Lars Magnus Hvattum

Shipping companies repeatedly face the problem of adjusting their vessel fleet to meet uncertain future transportation demands and compensating for aging vessels. In this paper, a new multi-stage stochastic programming formulation for strategic fleet renewal in shipping is proposed. The new formulation explicitly handles uncertainty in parameters such as future demand, freight rates and vessel prices. Extensive computational tests are performed, comparing different discretizations of the uncertain variables and different lengths of the planning horizon. It is shown that significantly better results are obtained when considering the uncertainty of future parameters, compared to using expected values.

The strategic berth template problem

- Transportation Research Part E: Logistics and Transportation Review---2014---Akio Imai,Yukiko Yamakawa,Kuancheng Huang

A marine container terminal operator may have a situation with excessive calling requests to be served especially when some new service contracts are under

consideration. For this situation, we propose a strategic berth template problem (BTPS) that selects the ships among the requesting ones to be served and arrange their berth-windows within a limited planning horizon. The BTPS employs the subgradient optimization procedure, which is an improved version of the procedure that the authors developed for the operational berth allocation problem. A wide variety of numerical experiments indicate the improved subgradient procedure works well for the BTPS.

Multi-objective design of an organ transplant network under uncertainty

- Transportation Research Part E: Logistics and Transportation Review---2014---B. Zahiri,R. Tavakkoli-Moghaddam,M. Mohammadi,P. Jula

We propose a novel multi-period location-allocation model for the design of an organ transplant transportation network under uncertainty. The model consists of a bi-objective mathematical programming model that minimizes total cost and time, including waiting time in the queue for the transplant operation, while considering organs' priorities. A fuzzy multi-objective programming based approach is presented to solve the small and medium size problems to optimality. For larger problems, we propose two meta-heuristics based algorithms. Lower bounds, and several numerical examples with managerial insights are discussed. A real case-study is provided, and the existing and the proposed optimal solutions are compared.

Integration of the cost allocation in the optimization of collaborative bundling

- Transportation Research Part E: Logistics and Transportation Review---2014---Christine Vanovermeire,Kenneth Sörensen

A model is proposed that integrates a cost allocation method – the Shapley value – into the optimization of the synchronized consolidation of transportation orders. By balancing each partner' s delivery date changes (when synchronizing) against its allocated profit, it ensures that the operational plan is acceptable by all

partners. In comparison to a model that first plans and then divides the costs, this model limits expensive delivery date changes and does not systematically favor a company with a slightly higher cost of change.

Heuristic approaches for the flow-based set covering problem with deviation paths

- Transportation Research Part E: Logistics and Transportation Review---2014---Shengyin Li,Yongxi Huang

A multipath refueling location model is developed to take into account the effects of vehicle range and multiple deviation paths. It is formulated as a mixed integer linear program, which is intrinsically difficult to solve with increase in the number of deviation paths and network size. This study is focused on developing heuristic approximation solutions, specifically the greedy-adding and greedy-adding with extension algorithms. These algorithms are shown to be efficient and effective to solve the model for the Sioux Falls network. The heuristics are also applied to locate electric vehicle charging stations in the state of South Carolina.

The clock is ticking: The role of uncertainty, regulatory focus, and level of risk on supply chain disruption decision making behavior

- Transportation Research Part E: Logistics and Transportation Review---2014---David E. Cantor,Jennifer V. Blackhurst,Juan David Cortes

Supply chain employees must make decisions on when and how to react to potential and realized supply chain disruptions. Drawing on regulatory focus theory, we examine how an individual' s regulatory focus, level of risk, as well as the uncertainty of the supply chain disruption affect willingness to pursue a new disruption mitigation strategy. Employing a vignette-based field experiment, we present and discuss findings related to supply chain risk decision making. These findings have implications for future behavioral supply chain risk research.

Optimal solution for a cargo revenue management problem with allotment and spot arrivals

- Transportation Research Part E: Logistics and Transportation Review---2014---Lama Moussawi-Haidar

We consider a single-leg cargo revenue management problem, in which a two-dimensional cargo capacity is sold through allotment contracts and in the spot market. Capacity sold on an allotment basis is guaranteed. We optimally solve the problem of determining how much of the total weight and volume capacity to sell on an allotment basis, by deriving a closed-form expression of the objective function. We provide numerical examples of industry-size problems and perform sensitivity analysis by changing some problem parameters. The sensitivity analysis illustrates the dependency of the optimal decisions on the spot and allotment booking types. The remaining capacity is then sold over a booking horizon in the spot market. Allotment bookings and spot requests can arrive any time over the booking horizon. Since some of the allotment bookings might not show up at departure, cargo carriers tend to overbook the remaining capacity allocated to spot requests. For these requests, we formulate a discrete-time dynamic capacity control model, to decide which of the spot requests to accept, based on the total weight and volume of the allotment show-ups and spot bookings accepted at the time of an arrival. We solve the exact dynamic programming model for medium-size industry problems. Since the booking policy based on critical booking levels or time periods is not optimal, we propose several heuristics to solve large industry problems and derive an upper bound on the value function. We test their performance via simulation against the optimal solution, the upper bound, and the first-come first-served policy, and recommend a heuristic that performs well in a wide variety of numerical cases. Finally, we show via simulation, that our model outperforms the one existing in the literature, for small and medium-size industry problems.

Proactive vehicle routing with inferred demand to solve the bikesharing rebalancing problem

- Transportation Research Part E: Logistics and Transportation Review---2014---Robert Regue,Will Recker

Bikesharing suffers from the effects of fluctuating demand that leads to system inefficiencies. We propose a framework to solve the dynamic bikesharing repositioning problem based on four core models: a demand forecasting model, a station inventory model, a redistribution needs model, and a vehicle-routing model. The approach is proactive instead of reactive, as bike repositioning occurs before inefficiencies are observed. The framework is tested using data from the Hubway Bikesharing system. Simulation results indicate that system performance improvements of 7% are achieved reducing the number of empty and full events by 57% and 76%, respectively, during PM peaks.

Design and planning for green global supply chains under periodic review replenishment policies

- Transportation Research Part E: Logistics and Transportation Review---2014---Ioannis Mallidis,Dimitrios Vlachos,Eleftherios Iakovou,Rommert Dekker

We quantify the impact of jointly optimizing strategic network design and tactical inventory planning on the cost and CO₂ emissions of multi-echelon logistics networks. The obtained insights indicate that longer optimized replenishment cycles reduce a node's transportation cost and CO₂ emissions but increase its inventory costs. Moreover, under a fixed replenishment cycle, a node's service level increases when supplied by a satellite warehouse. Finally: (i) the costs of implementing optimal green network design decisions could be misleading if inventory planning is neglected, (ii) greening of supply chains could become expensive, (iii) current legislative CO₂ ton prices hardly influence logistics networks.

Rescheduling of flights during ground delay programs with consideration of passenger and crew connections

- Transportation Research Part E: Logistics and Transportation Review---2014---Jens O. Brunner

We address the rescheduling problem by an airline when a ground delay program (GDP) is issued with mathematical programming techniques. The objective is to minimize delay measures, cost for crew and passenger misconnections, and cost of flight cancellations subject to several restrictions. We present a new linear integer model that incorporates all objectives. Using real-world and random data we present extensive computations to evaluate the model that is solved with standard software. High quality solutions are found quickly, i.e. within seconds. We show the significant effect of setting cost values for misconnections and cancellations on the new slot assignments.

Drivers of airline loyalty: Evidence from the business travelers in China

- Transportation Research Part E: Logistics and Transportation Review---2014---Ilias Vlachos,Zhibin Lin

This paper examines the key factors that determine business traveler loyalty toward full-service airlines in China. Based on literature review and panel interview, ten airline attributes under three categories were derived: (a) operational factors: safety, punctuality, and aircraft; (b) competitive factors: frequency of flights, schedule, frequent flyer program, ticket price, and reputation; and (c) attractive factors: in flight food & drinks and in flight staff service. We surveyed 2000 Chinese business travelers on domestic flights, obtaining 462 usable questionnaires. Hierarchical regression analysis reveals that reputation, in-flight service, frequent flyer program, and aircraft have the greatest influence in driving airline loyalty.

Corporate social responsibility disclosure: The case of international shipping

- Transportation Research Part E: Logistics and Transportation Review---2014---Wolfgang Drobetz,Andreas Merikas,Anna Merika,Mike Tsionas

Based on practices and legislation in the shipping industry, we construct a corporate social responsibility (CSR) disclosure index for listed shipping companies. We use Markov Chain Monte Carlo (MCMC) techniques for Bayesian inference, and we estimate the marginal effects of firm characteristics on CSR disclosure for each firm. Our results show a positive relationship between CSR disclosure and financial performance for each firm in our international sample. Firm size, financial leverage, and ownership structure are also associated with CSR disclosure. Our findings suggest that a majority of listed shipping companies have integrated CSR practices into their strategic planning and operations.

Vulnerability assessment and re-routing of freight trains under disruptions: A coal supply chain network application

- Transportation Research Part E: Logistics and Transportation Review---2014---Ridvan Gedik,Hugh Medal,Chase Rainwater,Ed A. Pohl,Scott J. Mason

In this paper, we present a two-stage mixed integer programming (MIP) interdiction model in which an interdictor chooses a limited amount of elements to attack first on a given network, and then an operator dispatches trains through the residual network. Our MIP model explicitly incorporates discrete unit flows of trains on the rail network with time-variant capacities. A real coal rail transportation network is used in order to generate scenarios to provide tactical and operational level vulnerability assessment analysis including rerouting decisions, travel and delay costs analysis, and the frequency of interdictions of facilities for the dynamic rail system.

Continuum modeling of park-and-ride services considering travel time reliability and heterogeneous commuters – A linear complementarity system approach

- Transportation Research Part E: Logistics and Transportation Review---2014---Bo Du,David Z.W. Wang

This paper studies the modeling of multimodal choice in a highway/railway system with continuum park-and-ride services along a corridor. Commuter heterogeneity and travel time uncertainty with correlation are considered, while both auto and rail transit are subject to congestion effects. Eventually, the equilibrium multimodal choice is modeled into a linear complementarity system and appropriate solution method is proposed to obtain the spatial equilibrium pattern along the corridor. Computational experiments are conducted to demonstrate the benefits of the proposed formulation and potential applications, such as optimization of park-and-ride facilities, development of land use policies to integrate urban development and transportation planning.

A comprehensive evacuation planning model and genetic solution algorithm

- Transportation Research Part E: Logistics and Transportation Review---2014---Marc Goerigk,Kaouthar Deghdak,Philipp Heßler

We consider the problem of evacuating an urban area. Several planning aspects need to be considered in such a scenario, which are usually considered separately. We propose a macroscopic multi-criteria optimization model that includes several such questions simultaneously, and develop a genetic algorithm to solve the problem heuristically. Its applicability is extended by also considering how to aggregate instance data, and how to generate solutions for the original instance starting from a reduced solution. In computational experiments using real-world data, we demonstrate the effectiveness of our approach and compare different levels of data aggregation.

Green Supply Chain Collaboration implementation in China: The mediating role of guanxi

- Transportation Research Part E: Logistics and Transportation Review---2014---Jun Luo,Alain Yee-Loong Chong,Eric W.T. Ngai,Martin J. Liu

This study aims to understand how buyer–seller relationship, competitive environment and guanxi affect Chinese manufacturers’ decision to implement Green Supply Chain Collaboration (GSCC). We also examine whether guanxi is able to mediate the buyer–seller relationship and GSCC implementation. Data collected from 222 Chinese manufacturing organizations were analyzed using the partial least squares method of structural equation modeling. The result shows that buyer–seller relationship influences Green Supply Chain Collaboration through asset specificity, volume uncertainty, transaction frequency and competitive environment. The results also showed support for our hypotheses that guanxi mediates the effect of asset specificity, volume uncertainty and environmental competition on GSCC.

A heuristic approach for the green vehicle routing problem with multiple technologies and partial recharges

- Transportation Research Part E: Logistics and Transportation Review---2014---Ángel Felipe,M. Teresa Ortuño,Giovanni Righini,Gregorio Tirado

This paper presents several heuristics for a variation of the vehicle routing problem in which the transportation fleet is composed of electric vehicles with limited autonomy in need for recharge during their duties. In addition to the routing plan, the amount of energy recharged and the technology used must also be determined. Constructive and local search heuristics are proposed, which are exploited within a non deterministic Simulated Annealing framework. Extensive computational results on varying instances are reported, evaluating the performance of the proposed algorithms and analyzing the distinctive elements of

the problem (size, geographical configuration, recharge stations, autonomy, technologies, etc.).

Integration of HSR and air transport: Understanding passengers' preferences

- Transportation Research Part E: Logistics and Transportation Review---2014---Concepción Román,Juan Carlos Martín

Different solutions for the integration of high-speed rail (HSR) and air transport could be implemented, ranging from very basic integration to more sophisticated systems which include ticket and handling integration. A discrete choice experiment is conducted to better understand passengers' preferences. We estimate a number of flexible choice models, taking into account the existence of systematic and random taste heterogeneity. We obtain a range of willingness-to-pay values for service quality attributes, finding some important results that can be used to infer policy conclusions about the real attractiveness of the Air-HSR integrated alternative. In this respect, we find that schedule coordination which reduces connecting time will be crucial.

Attributes driving the selection of trucking services and the quantification of the shipper's willingness to pay

- Transportation Research Part E: Logistics and Transportation Review---2014---Rodrigo Mesa-Arango,Satish V. Ukkusuri

This paper investigates the selection of trucking services by shippers that require the movement of truck shipments. A set of pragmatic attributes are postulated to describe trucking services. They are used in a stated choice experiment that collects data and preferences from shippers. A mixed logit model is estimated in order to test the attributes and quantifying the shipper willingness to pay for them. The results are used to provide meaningful negotiation guidance for truck-related shippers and carriers, a significant contribution to literature in transportation, logistics, and supply chain management. A numerical example illustrates the use of the model.

Handling uncertainty in Multi Regional Input-Output models by entropy maximization and fuzzy programming

- Transportation Research Part E: Logistics and Transportation Review---2014---Leonardo Caggiani,Michele Ottomanelli,Dell' Orco, Mauro

Recently, great attention has been paid to the uncertainties associated with Multi Regional Input-Output (MRIO) models related to the available data sources. We propose a new method based on the entropy maximization principle and fuzzy optimization, which takes explicitly into account the uncertainty embedded in available information. It allows to estimate jointly the values of production level, the trade coefficients and the final demand values assuming the availability of incomplete and/or approximate data on some elements of trade coefficients and of final demand of goods. The model, applied to real scale problem, shows good estimation performances and robustness in different scenario.

Linking rival and stakeholder pressure to green supply management: Mediating role of top management support

- Transportation Research Part E: Logistics and Transportation Review---2014---Jing Dai, Frank L. Montabon, David E. Cantor

Drawing upon the Schumpeterian view of competition and stakeholder theory, the purpose of our study is to examine how issues of rivalry and stakeholder pressure motivate firms to implement green supply management practices. We also consider the role of top management support as an important enabler to how firms react to competitive pressures to pursue green supply management practices. Our model is tested using a sample of supply chain professionals. Our results indicate that environmental pressure from rivals and stakeholders influences green supply management implementation through the mediating role of top management support for environmental initiatives.

A multi-paradigm approach to system dynamics modeling of intercity transportation

- Transportation Research Part E: Logistics and Transportation Review---2014---J.-H. Lewe,L.F. Hivin,D.N. Mavris

The complexity of the transportation system calls for a holistic solution approach that employs multiple modeling paradigms such as agent-based modeling and system dynamics. Various techniques for combining these paradigms are explored and logically classified, which helps guide hybrid modeling. A system dynamics model for multimodal intercity transportation is created, which integrates socioeconomic factors, mode performance, aggregated demand and capacity. The model is calibrated against a set of data points from an existing agent-based model. An effective inheritance of the proven predictive power of the agent-based model is demonstrated by reproducing the historic aviation demand with sufficient accuracy.

Designing robust routes for demand-responsive transport systems

- Transportation Research Part E: Logistics and Transportation Review---2014---M.E. Bruni,F. Guerriero,P. Beraldi

In this study, we propose an innovative concept for robust demand-responsive transportation (DRT) systems where vehicles may deviate from the planned route to accept late requests, which are unknown during the planning stage. We propose a new formulation of the problem as a stochastic mixed integer program and describe an efficient heuristic procedure that embeds a tabu search approach in a scheme for merging different scenario solutions. The computational results demonstrate the validity of the heuristic and provide useful managerial insights into DRT systems, thereby showing the value of incorporating uncertainty into the planning process.

Airport–airline cooperation under commercial revenue sharing agreements: A network approach

- Transportation Research Part E: Logistics and Transportation Review---2014---Batari Saraswati,Shinya Hanaoka

This study analyzes airport–airline cooperation where an airport offers to share a proportion of its commercial revenue with airlines in exchange for a fixed payment. We observe the revenue share allocation that maximizes airport profit, subject to airline acceptance, and examine the effects of revenue sharing on downstream competition and social welfare. Methodologically, we employ multi-airport multi-airline non-cooperative games with a network model and find that an airport prefers to share revenue with its dominant airline in order to gain the optimal benefit.

The benefit of advance load information for truckload carriers

- Transportation Research Part E: Logistics and Transportation Review---2014---Hossein Zolfagharinia,Michael Haughton

This paper models and measures the profit improvement trucking companies can achieve by collaborating with their clients to obtain advance load information (ALI). The main approach is to formulate a comprehensive and flexible mixed integer mathematical model and implement it in a dynamic rolling horizon context. The findings illustrate that access to the second and the third day ALI can improve the profit by averages of 22% and 6%, respectively. We also found that the impact of ALI depends on radius of service and trip length but is statistically independent of load density and fleet size.

The determinants of credit spreads changes in global shipping bonds

- Transportation Research Part E: Logistics and Transportation Review---2014---Manolis Kavussanos,Dimitris Tsouknidis

This paper investigates whether bond, issuer, industry and macro-specific variables account for the observed variation of credit spreads' changes of global shipping bond issues before and after the onset of the subprime financial crisis. Results show that conclusions as to the significant variables of spreads depend significantly on whether two-way cluster-adjusted standard errors are utilized, thus rendering results in the extant literature ambiguous. The main determinants of global cargo-carrying companies' shipping bond spreads are found in this paper to be: the liquidity of the bond issue, the stock market's volatility, the bond market's cyclical, freight earnings and the credit rating of the bond issue.

The lead-time reliability paradox and inconsistent value-of-reliability estimates

- Transportation Research Part E: Logistics and Transportation Review---2014---John E. Tyworth, John Saldanha

The value-of-reliability (VOR) reflects the savings in inventory-system costs from more reliable (less variable) lead times. Previous studies have revealed that more reliable, but positively skewed, lead times could actually increase optimal safety inventory when the probability of satisfying all demand during a replenishment cycle drops below 70%. Researchers claim that this paradox affects most firms and that it explains the inconsistent VOR estimates found in the transportation economics literature. Our investigation reveals that firms interested in high product availability may safely ignore the paradox and that less lead-time variability consistently increases VOR, the paradox notwithstanding.

Integration of logistics and cloud computing service providers: Cost and green benefits in the Chinese context

- Transportation Research Part E: Logistics and Transportation Review---2014---Nachiappan Subramanian, Muhammad D. Abdulrahman, Xiaolai Zhou

Drawing on the innovation diffusion theory and data from 236 Chinese small and medium-sized logistics service providers (SMLSPs), this study developed and tested a conceptual model for empirically examining the green and cost benefits of integration between cloud service providers and SMLSPs in the Chinese context. The study posits that the perceived green and cost benefits drive the need for cloud computing (CC) adoption by Chinese SMLSPs. The results indicate that Chinese SMLSPs are attracted by CC to reduce cost in a short term and to gain sustainability through green benefits in a long term. The study extends CC capabilities and enterprise integration literature in the context of logistics services.

Dispatching trucks for drayage operations

- Transportation Research Part E: Logistics and Transportation Review---2014---Nikola Marković, Željko Drobnjak, Paul Schonfeld

We propose a novel model for dispatching trucks given the constraints and sources of uncertainty that arise in drayage operations. The proposed model is designed to minimize the expected cost and is generally applicable to cases including different distributions of random parameters. Numerical examples illustrate this robustness of the model, as well as the potential for reducing the drayage cost by increasing the available storage capacity and permitted number of terminal truck entries. Mathematical results derived within this paper (e.g. expected dwell time) can be used more generally in analyzing transfers in transportation networks under stochastic conditions.

Supply chain network competition in time-sensitive markets

- Transportation Research Part E: Logistics and Transportation Review---2014---Anna Nagurney, Min Yu, Jonas Floden, Ladimer S. Nagurney

We develop a game theory model for supply chain network competition in time-sensitive markets in which consumers respond to the average delivery time associated with the various firms' products. The firms'

behavior is captured, along with the supply chain network topologies, with the governing equilibrium concept being that of Nash equilibrium. We derive the variational inequality formulation of the equilibrium conditions and provide illustrative examples. We also identify special cases for distinct applications. An algorithm is proposed, and the framework further illustrated through a case study in which we explore varying sensitivities to the average time delivery with interesting results.

Product architecture modularity implications for operations economy of green supply chains

- Transportation Research Part E: Logistics and Transportation Review---2014---Yohanes Kristianto,Petri Helo

The role of product architecture modularity is commonly in increasing product reusability and minimizing waste. This paper designs a decision support system to determine optimal product architecture modularity in closed loop supply chains. The objective is to investigate if remanufacturing and modular upgrading is appropriate at certain periods and in modules. The optimization model is tested under several production yield scenarios in order to determine manufacturing and remanufacturing capacity and production line scheduling under process yield uncertainty. The implications of product architecture modularity for operations economy of green supply chains are discussed in terms of their theoretical and managerial aspects.

An option-based hedging mechanism for managing the risk of overbooking in parallel airline alliances

- Transportation Research Part E: Logistics and Transportation Review---2014---Xiaoja Wang,Richard Y.K. Fung

In the context of parallel alliances, this paper proposes and describes an option-based mechanism that allows an airline to transfer bumped passengers to its alliance partner's flight. The objective of this mechanism is to reduce the overbooking risk borne by the allied airlines.

An analytical model is built to calculate the net benefit that can be obtained by the airlines. The simulation results confirm that the proposed mechanism can generate monetary and non-monetary benefits for allied carriers under many practical conditions.

The dynamics of modal split for freight transport

- Transportation Research Part E: Logistics and Transportation Review---2014---Paolo Ferrari

The paper presents a dynamic model of modal split in a multimodal freight transport system, which supposes that the evolution over time of transport demand is accompanied by a corresponding evolution of transport modes, and that users react with delay to cost variations. Starting with these hypotheses, and following the paradigm of random utility, a recursive equation is obtained, whose iterated application furnishes the sequence of the demand fractions on the various transport modes in the successive epochs of the time period during which the evolution of the transport system is studied and enables forecasting the future modal split evolution.

What hurts the dominant airlines at hub airports?

- Transportation Research Part E: Logistics and Transportation Review---2014---Xavier Fageda

This paper estimates a frequency equation to explain the determinants of network airline service levels at their hub airports. Drawing on European data for 2002–2013, we find that network airlines reduce frequencies when the share of low-cost airlines increases both on the route and at the hub airport. On the contrary, frequency choices of network airlines are not affected by competition from low-cost airlines operating in nearby secondary airports. We also find some evidence that mergers in Europe may result in a reorganization of the route structure in favor of the hubs of the larger airline.

Enhancing green supply chain initiatives via empty container reuse

- Transportation Research Part E: Logistics and Transportation Review---2014---Ling Li,Bin Wang,David P. Cook

In this paper, the maritime industry's commitment to green supply chain has been analyzed. The objective of this study is to show that the reuse of empty containers not only adds value to a firm, but leads to waste reduction in the supply chain. The novelties of this article include (i) empty and laden containers are treated in accordance with a shipping company's green effort; (ii) both the volume and weight of containers are introduced to indicate a potential constraint on green effort; (iii) empty container storage costs are included as a value-added component which stem from green effort.

An integrative approach to determine store delivery patterns in grocery retailing

- Transportation Research Part E: Logistics and Transportation Review---2014---Michael G. Sternbeck,Heinrich Kuhn

This article focuses on the tactical problem of selecting delivery patterns according to which grocery stores are repetitively supplied with products from different order segments by retail-owned distribution centers. The research environment considered consists of logistics processes in DCs, transportation and instore logistics. We identify dependencies on the delivery patterns selected and specify the relevant costs. These costs are reflected in the objective function of a binary selection model. Implementing and applying the model to the real case of a major European retail company yields substantial cost savings potential of 5.3%, amounting to tens of millions of euros per annum.

Dynamic supply chain network design for the supply of blood in disasters: A robust model with real world application

- Transportation Research Part E: Logistics and Transportation Review---2014---Armin Jab-

barzadeh,Behnam Fahimnia,Stefan Seuring

This paper presents a robust network design model for the supply of blood during and after disasters. A practical optimization model is developed that can assist in blood facility location and allocation decisions for multiple post-disaster periods. The application of the proposed model is investigated in a case problem where real data is utilized to design a network for emergency supply of blood during potential disasters. Our analysis on the tradeoff between solution robustness and model robustness arrives at important practical insights. The performance of the proposed 'robust optimization' approach is also compared with that of an 'expected value' approach.

New York, New York: Two ways of estimating the delay impact of New York airports

- Transportation Research Part E: Logistics and Transportation Review---2014---Lu Hao,Mark Hansen,Yu Zhang,Joseph Post

High arrival delay at major airports tends to propagate and generate secondary delay through the National Airspace System (NAS). In the United States, it is widely believed that the major culprits for delay throughout the NAS are the three New York commercial airports – Newark (EWR), LaGuardia (LGA), and John F. Kennedy (JFK). Various estimates of the extent to which the New York airports impact the delay in the NAS have been reported over the years. Yet there is no thorough investigation into the mutual relationship between delays at New York and non-New York airports. In this paper, we take two different approaches to quantify the impact of the three New York airports on delay throughout the NAS. First, we estimate and apply an econometric model using a large historical dataset. The other model is the FAA SWAC model that simulates flights and tracks the daily performance of the system. The counterfactual scenarios in these two models are adjusted to be comparable to each other. There is disparity between the results of the two different models, suggesting the simulation model might not capture all the factors that cause arrival delay. Still both results conclude that the portion

of delay in the system caused by New York airports is much less than publicized estimates. Combining economic and simulation models to address questions of this nature appears to be a promising approach.

Simultaneous optimization of schedule coordination and cargo allocation for liner container shipping networks

- Transportation Research Part E: Logistics and Transportation Review---2014---Hua Wang, Shuaian Wang, Qiang Meng

A liner container shipping carrier usually collects immediately-delivered goods that are produced by manufacturers in world factories, and transports the products to worldwide market destination by offering weekly shipping service. In practice, the carrier has to consider extra demurrage cost of containerized cargos incurred from waiting for weekly shipping service at ports. In this paper, we develop a mathematic programming model to maximize the carrier's profitability by simultaneously optimizing the ship route scheduling and interrelated cargo allocation scheme. The nonlinear optimization model is transformed into an equivalent mixed-integer linear program, and its applicability is demonstrated by a case study.

Optimizing a bi-objective inventory model of a three-echelon supply chain using a tuned hybrid bat algorithm

- Transportation Research Part E: Logistics and Transportation Review---2014---Javad Sadeghi, Seyed Mohsen Mousavi, Seyed Taghi Akhavan Niaki, Saeid Sadeghi

This paper presents a bi-objective VMI problem in a single manufacturer-single vendor multi-retailer (SM-SV-MR) supply chain, which a redundancy allocation problem is incorporated. In the hybridized problem, a manufacturer produces a single item using several machines that work in series, and stores it in a warehouse to replenish one vendor who delivers it to several retailers using the shortest possible route. A novel meta-heuristic, called hybrid bat algorithm (HBA),

with calibrated parameters is utilized to find a near-optimum solution. To show the efficiency of HBA, the results are compared to the ones using the traditional BA and a genetic algorithm.

Planning towing processes at airports more efficiently

- Transportation Research Part E: Logistics and Transportation Review---2014---Jia Yan Du, Jens O. Brunner, Rainer Kolisch

This paper addresses the towing process of airplanes as part of the turnaround process. We introduce a VRP based MIP model which assigns different types of towing tractors to jobs with specified service time windows. The objective function minimizes operating costs subject to operational restrictions such as technical compatibility of tractor types with plane types. Our modeling approach allows for multiple depots as well as multiple trips. To solve the model we develop a column generation heuristic. Computational results show the superior behavior of the proposed heuristic compared to the original MIP formulation solved with CPLEX. In a case study we derive insights which support schedulers in their daily work. For this, we identify cost drivers and evaluate the efficiency of manual schedules in retrospect.

Hybrid metaheuristic solutions to inventory location routing problem

- Transportation Research Part E: Logistics and Transportation Review---2014---Ying Zhang, Mingyao Qi, Lixin Miao, Erchao Liu

This paper considers a supply chain network with multiple depots and geographically dispersed customers, each of which faces non-constant demand over a discrete planning horizon. The goal is to determine a set of depots to open, the delivery quantities to customers per period and the sequence in which they are replenished by a vehicle fleet such that the total system-wide cost is minimized. To solve it, first we construct a mixed integer program, and then propose a

hybrid metaheuristic consisting of initialization, intensification and post-optimization. Results show that the proposed heuristic is considerably efficient and effective for many classical instances.

Planning in feasible region by two-stage target-setting DEA methods: An application in green supply chain management of public transportation service providers

- Transportation Research Part E: Logistics and Transportation Review---2014---Majid Azadi, Amir Shabani, Mohsen Khodakarami, Reza Farzipoor Saen

To meet green supply chain management's requirements of a company and its transportation service providers (TSPs), it is essential to set clear, achievable, and realistic targets. This paper proposes two data envelopment analysis (DEA) approaches to find targets for two-stage network structures. The objective of proposed approaches is to plan in feasible region. The feasible region specifies bounds to ensure targets are within current operational capacity of TSPs. Applying the approaches to set targets for 24 TSPs lead to different results. However, proposed models ensure that the TSPs would be efficient in their current capacity.

Assessing the welfare effects of congestion charges in a real world setting

- Transportation Research Part E: Logistics and Transportation Review---2014---Maria Börjesson, Ida Kristoffersson

The standard textbook analysis shows that drivers as a group lose from congestion charges. However, it omits taste heterogeneity, shorter travel times far out in the larger network arising from less blocking back of upstream links and the possibility for drivers to reschedule. Taking account of these factors, using a dynamic scheduling model with heterogeneous users we find that all three add significantly to the benefit of the Stockholm congestion charges and that drivers as a group benefit from these charges even without recycling

of revenues. This paper also provides an update on the consumer benefits of the Stockholm charges.

Robust hub network design problem

- Transportation Research Part E: Logistics and Transportation Review---2014---Mehrdad Shabani, Avinash Unnikrishnan

This paper presents a robust formulation for the uncapacitated single and multiple allocation hub location problem where demand is uncertain and its distribution is not fully specified. The proposed robust model is formulated as a mixed integer nonlinear program and then transformed into a mixed integer conic quadratic program. An efficient linear relaxation strategy is proposed which is found to deliver the optimal solutions for all the cases considered in this paper. Numerical experiments suggest location of more number of hubs when accounting for demand uncertainty using robust optimization compared to the deterministic setting.

Access pricing, infrastructure investment and intermodal competition

- Transportation Research Part E: Logistics and Transportation Review---2014---Ginés de Rus, M. Pilar Socorro

This paper considers the existence of a given transport infrastructure and analyzes the optimal conditions for investing in a complementary or rival new infrastructure. The model allows us to identify some key variables to be considered in cost-benefit analysis and highlights the importance of socially optimal access pricing in relation to investment decisions. The socially optimal conditions for investment depend on, among others, the cross-effects between different modes of transport, the volume of demand, the construction cost of the new infrastructure, and the restrictions faced by the regulator.

Air transport subsidies for resident passengers when carriers have market power

- Transportation Research Part E: Logistics and Transportation Review---2014---Jorge Valido, M.

We consider passengers with different willingness to pay that may live in a given geographical area and, thus, be entitled to a subsidy. The carrier has market power and may increase the ticket price if a subsidy for resident passengers is introduced. First, we find that if the proportion of residents is high enough, non-resident passengers may be expelled from the market. Second, we show that specific (ad valorem) subsidies for resident passengers are better if the proportion of passengers with high willingness to pay is low (high) enough. Finally, we apply these results to the Canary Islands case.

Coordinated inventory replenishment and outsourced transportation operations

- Transportation Research Part E: Logistics and Transportation Review---2014---Ülkü Gürler, Osman Alp, Nasuh Çağdaş Büyükkaramikli

We consider a one-warehouse N retailers supply chain with stochastic demand. Inventory is managed in-house whereas transportation is outsourced to a 3PL provider. We develop analytical expressions for the operating characteristics under both periodic and continuous joint replenishment policies. We identify the settings where a periodic review policy is comparable to a continuous review one. In our numerical test-bed, the periodic policy performed best in larger supply chains operating with larger trucks. We also observed that if the excess utilization charge is less than 25%, outsourcing becomes beneficial even if outsourcing cost is 25% more than the in-house fleet costs.

Network similarity analysis of air navigation route systems

- Transportation Research Part E: Logistics and Transportation Review---2014---Xiaoqian Sun, Sebastian Wandelt

In this research, we propose a new methodology to assess structural similarity of air navigation route systems in 58 countries. We identify functional dependencies

among network metrics through regression analysis. We build a graph for the network metrics, with each metric as a node and a link existing if there is a functional dependency between two metrics. We find that the air navigation route systems in France and Italy are most similar. The air navigation route systems in Oceania ensemble common features of most countries and should be used as representatives for analysis of new air traffic management operational procedures.

A three-stage optimization model for production and outsourcing under China' s export-oriented tax policies

- Transportation Research Part E: Logistics and Transportation Review---2014---Lu Zhen

This paper studies an integrated optimization problem on outsourcing and production decisions in the context of the global supply chain and China' s export-oriented tax policies. A three-stage decision model is proposed for this integrated optimization problem. A cross-entropy-based solution method is also developed to solve the three-stage decision model. Numerical experiments are performed to investigate the effectiveness of the proposed model and the efficiency of the proposed method. Additionally, some managerial insights are drawn from these experiments.

Centralization or decentralization: A comparative analysis of port regulation modes

- Transportation Research Part E: Logistics and Transportation Review---2014---Shiyuan Zheng, Rudy R. Negenborn

This paper studies the comparison of two kinds of port regulation modes – the centralization mode and the decentralization mode – using principal-agent theory and dynamic game theory. The optimal tariffs, port capacities and port efficiency levels under these two regulation modes are determined. The theoretical results are applied to the container terminals in Port of Shanghai in China. Sensitivity analysis and comparative studies show that the tariff, port efficiency level, port service demand and social welfare are higher

under the decentralization mode, while the impact to port capacity and port operator's profit with different port regulation modes is uncertain.

An empirical investigation of the seaport's economic impact: Evidence from major ports in China

- Transportation Research Part E: Logistics and Transportation Review---2014---Jun Shan,Mingzhu Yu,Chung-Yee Lee

In this study, we investigate the impact of the seaport on host city's economic development. Based on data from 41 major port cities in China over the period 2003–2010, our econometric analysis shows that port cargo throughput has a positive effect on the economic growth of the host city. In addition, the competing ports in the neighborhood have an even larger positive association with the local port city. Through examining some of the most dynamic ports in the world, this study provides a renewed understanding of the economic importance of seaports.

Flight delay impact on airfare and flight frequency: A comprehensive assessment

- Transportation Research Part E: Logistics and Transportation Review---2014---Bo Zou,Mark Hansen

This paper presents a comprehensive empirical analysis of flight delay impact on airfare and flight frequency in the US air transportation system. We model airfare and flight frequency as functions of cost and demand characteristics, competition effects, and flight delays at origin, destination, and intermediate hub airports. Estimation results confirm that airlines tend to pass delay cost onto passengers through higher fare, whereas delay has an upward effect on flight frequency. We find that proportionate airport delay reduction across the system can result in annual fare reduction in the order of billion dollars.

A strategic planning model for the railway system accident rescue problem

- Transportation Research Part E: Logistics and Transportation Review---2014---Yung-Hsiang Cheng,Zheng-Xian Liang

The present study examines the location of emergency rescue problems for urban ambulance and railway emergency systems. The proposed model considers probabilistic rescue demand, independent busy fractions of ambulances, and the corresponding risk levels in railway segments. We formulate the proposed model using fuzzy multi-objective programming and solve it using a generic algorithm and a non-dominated sorting genetic algorithm-II. Computation results are analyzed by applying the model to a real-world Taiwan railway system. Analytical results demonstrate that a proper adjustment of the rescue resource location improves rescue effectiveness for railway rescue and urban medical service demand.

Green supply chain decisions – Case-based performance analysis from the food industry

- Transportation Research Part E: Logistics and Transportation Review---2014---Hanne Ala-Harja,Petri Helo

Environmental impacts, such as GHG emissions, have been introduced to supply chain management as an additional parameter to traditional cost, lead-time and on-time delivery. Supply chain management represents a significant source of decisions affecting the eco-efficiency of many products. This paper analyses cases from the food industry, mainly order-picking, transportation, warehousing, and distribution aspects from the greening point of view. Three case examples of decisions in supply chain design in the food industry are considered. The results show dependencies between performance measures. Finally, a framework of decisions and their impact on performance is presented.

Consolidation strategies for the delivery of perishable products

- Transportation Research Part E: Logistics and Transportation Review---2014---Christine Nguyen,Maged Dessouky,Alejandro Toriello

A set of agricultural suppliers with low demands can save on long-haul transportation costs by consolidating their product. We consider a system with stochastic demand and a single consolidation point near the suppliers. We propose a look-ahead heuristic that takes advantage of economies of scale by aiming to ship larger quantities. We experimentally compare the heuristic's performance against other simple policies, a rolling horizon algorithm, and a stochastic dynamic programming model. Our numerical results demonstrate that the heuristic provides solutions that are near the lower bound provided by the dynamic programming model, and that the benefits of consolidating depend on the size of the suppliers' demand. We also propose a proportional cost allocation rule that encourages the suppliers to cooperate with each other instead of operating independently.

Analyzing the impact of intermodal-related risk to the design and management of biofuel supply chain

- Transportation Research Part E: Logistics and Transportation Review---2014---Mohammad Marufuzzaman,Sandra D. Eksioglou,Xiaopeng Li,Jin Wang

This study presents a mathematical model that designs a reliable multi-modal transportation network for a biofuel supply chain system, where intermodal hubs are subject to site-dependent probabilistic disruptions. The disruption probabilities of intermodal hubs are estimated by using a probabilistic model which is developed using real world data. We developed an accelerated Benders decomposition algorithm to solve this challenging NP-hard problem. Numerical analysis show that the model selects to use intermodal hubs located in areas with low disruption probabilities. In

case of a disaster, the reliable solution results in 6.21% savings over the minimum cost solution.

Price dispersion, competition, and the role of online travel agents: Evidence from business routes in the Italian airline market

- Transportation Research Part E: Logistics and Transportation Review---2014---Paolo Roma,Fabio Zambuto,Giovanni Perrone

In this article, using data from the Italian airline market, we study the role of online travel agents (OTAs) in driving price dispersion as compared to the effect of airlines' websites. Specifically, we investigate how distinctive factors between OTAs and airlines' direct channels influence price dispersion. We find that after controlling for OTAs' features related to airline competition, price dispersion should be lower in the OTA channel relative to airlines' direct channels. On the other hand, we also find that OTAs' features related to the presence of airline competition play in favor of higher price dispersion in such indirect channel.

Multi-objective open location-routing model with split delivery for optimized relief distribution in post-earthquake

- Transportation Research Part E: Logistics and Transportation Review---2014---Haijun Wang,Lijing Du,Shihua Ma

The effective distribution of critical relief in post disaster plays a crucial role in post-earthquake rescue operations. The location of distribution centers and vehicle routing in the available transportation network are two of the most challenging issues in emergency logistics. This paper constructs a nonlinear integer open location-routing model for relief distribution problem considering travel time, the total cost, and reliability with split delivery. It proposes the non-dominated sorting genetic algorithm and non-dominated sorting differential evolution algorithm to solve the proposed model. A case study on the Great Sichuan Earthquake in China expounds the application of the proposed models and algorithms in practice.

Solving a static repositioning problem in bike-sharing systems using iterated tabu search

- Transportation Research Part E: Logistics and Transportation Review---2014---Sin C. Ho,W.Y. Szeto

In this paper, we study the static bike repositioning problem where the problem consists of selecting a subset of stations to visit, sequencing them, and determining the pick-up/drop-off quantities (associated with each of the visited stations) under the various operational constraints. The objective is to minimize the total penalties incurred at all the stations. We present an iterated tabu search heuristic to solve the described problem. Experimental results show that this simple heuristic can generate high quality solutions using small computing times.

Container yard template planning under uncertain maritime market

- Transportation Research Part E: Logistics and Transportation Review---2014---Lu Zhen

A yard template determines the assignment of spaces in a yard for arriving vessels. Fluctuation of demand for freight transportation brings new challenges for making a robust yard template when facing uncertain maritime market. A model is proposed for yard template planning considering random numbers of containers that will be loaded onto vessels that visit the port periodically. Traffic congestions and multiple schedule cycle times for vessel arrival patterns are also considered. Moreover, a meta-heuristic method is developed for solving the model in large-scale cases. Numerical experiments are conducted to validate effectiveness and efficiency of the model.

Model and algorithm for an unpaired pickup and delivery vehicle routing problem with split loads

- Transportation Research Part E: Logistics and Transportation Review---2014---Qingfeng Chen,Kunpeng Li,Zhixue Liu

This paper addresses the routing problem with unpaired pickup and delivery with split loads. An interesting factor of our problem is that the quantity and place for pickup and delivery are decision variables in the network. We develop an easy-to-implement heuristic in order to gain an efficient and feasible solution quickly. Then, a local search algorithm based on the variable neighborhood search (VNS) method is developed to improve the performance of the heuristic. Computational results show that the proposed VNS method is able to obtain an optimal or near optimal solution in reasonable time for the formulated problem.

Port service chains and port performance evaluation

- Transportation Research Part E: Logistics and Transportation Review---2014---Wayne K. Talley,ManWo Ng,Erika Marsillac

This paper provides a novel and unique methodology for evaluating the effectiveness performance of a port's individual services by utilizing the concept of a port service chain – a service network utilized by a port's service providers in the provision of the port's services that accounts for the quality-of-service relationships among the services. If such relationships are ignored, the resource allocations by the port's service providers to improve the quality of their port services will either over- or underestimate the amount of resources needed. A cooperative port service chain will always (under certain conditions) be more effective than a non-cooperative port service chain.

Hybrid approaches based on SARIMA and artificial neural networks for inspection time series forecasting

- Transportation Research Part E: Logistics and Transportation Review---2014---J.J. Ruiz-Aguilar,I.J. Turias,M.J. Jiménez-Come

In this paper, the number of goods subject to inspection at European Border Inspections Post are predicted using a hybrid two-step procedure. A hybridization methodology based on integrating the data ob-

tained from autoregressive integrated moving averages (SARIMA) model in the artificial neural network model (ANN) to predict the number of inspections is proposed. Several hybrid approaches are compared and the results indicate that the hybrid models outperform either of the models used separately. This methodology may become a powerful decision-making tool at other inspection facilities of international seaports or airports.

An accelerated Benders decomposition algorithm for sustainable supply chain network design under uncertainty: A case study of medical needle and syringe supply chain

- Transportation Research Part E: Logistics and Transportation Review---2014---M.S. Pishvaei, J. Razmi, S.A. Torabi

This paper proposes a multi-objective possibilistic programming model to design a sustainable medical supply chain network under uncertainty considering conflicting economic, environmental and social objectives. Effective social and environmental life cycle assessment-based methods are incorporated in the model to estimate the relevant environmental and social impacts. An accelerated Benders decomposition algorithm utilizing three efficient acceleration mechanisms is devised to cope with computational complexity of solving the proposed model. Computational analysis is also provided by using a medical industrial case study to present the significance of the proposed model as well as the efficiency of the accelerated Benders decomposition algorithm.

Quality management, environmental management maturity, green supply chain practices and green performance of Brazilian companies with ISO 14001 certification: Direct and indirect effects

- Transportation Research Part E: Logistics and Transportation Review---2014---Ana Beatriz Lopes de Sousa Jabbour, Charbel Jose Chiappetta Jabbour, Hengky Latan, Adriano Alves Teixeira, Jorge Henrique Caldeira de Oliveira

This study aims to test a new conceptual model based on the relationship between quality management (QM), environmental management maturity (EMM), adoption of external practices of green supply chain management (GSCM) (green purchasing and collaboration with customers) and green performance (GP) with data from 95 Brazilian firms with ISO 14001. To our knowledge, such links and relationships are not simultaneously identified and tested in the literature. The results indicate the validation of all of the research hypotheses. This paper highlights that an improvement in green performance will require attention to quality management, environmental management maturity, and green supply chain.

The ship routing and freight assignment problem for daily frequency operation of maritime liner shipping

- Transportation Research Part E: Logistics and Transportation Review---2014---Dung-Ying Lin, Yu-Yun Tsai

To cope with excess capacity and improve service quality, maritime international liner carriers have recently adopted a new operational model known as daily frequency. In this new model, carriers provide daily pickup and delivery service to customers at major ports along the Pacific Rim. We investigate the ship routing and freight assignment problem for daily frequency operation of liner shipping. A solution procedure that incorporates a Lagrangian relaxation technique and local search was proposed. The numerical results show that Shanghai, Hong Kong and Singapore are ports that are ideal for carriers in establishing daily frequency operations along the Pacific Rim.

Nonlinear inverse optimization for parameter estimation of commodity-vehicle-decoupled freight assignment

- Transportation Research Part E: Logistics and Transportation Review---2014---Joseph Y.J. Chow, Stephen G. Ritchie, Kyungsoo Jeong

A systematic approach to estimate parameters from

noisy priors is proposed for traffic assignment problems. It extends inverse optimization theory to non-linear problems, and defines a new class of parameter estimation problems in the transportation literature for networks under congestion. The approach is used to systematically calibrate a new link-based variation of the STAN model which decouples commodity flows and vehicle flows. The models are tested on a small network and then a case study with real data from California statewide implementation. Cross-validation shows 15% CV of the RMSE.

Coordination of a socially responsible supply chain using revenue sharing contract

- Transportation Research Part E: Logistics and Transportation Review---2014---Shibaji Panda

This paper explores coordination of a corporate social responsible (CSR) manufacturer–retailer chain by considering two cases, CSR retailer and CSR manufacturer. In manufacturer-Stackelberg game setting revenue sharing (RS) contract is used to coordinate the channel. It is found that CSR retailer's perfect welfare maximizing motive resolves channel conflict, otherwise RS contract coordinates the channel. Wholesale price of RS contract is higher than marginal production cost above a threshold of CSR in one case and is negative above a threshold of CSR in the other. Also, CSR manufacturer's pure profit is negative above a threshold of CSR.

Supply chain design under quality disruptions and tainted materials delivery

- Transportation Research Part E: Logistics and Transportation Review---2014---AliReza Madadi,Mary E. Kurz,Scott J. Mason,Kevin M. Taaffe

Events such as the 2008 Heparin tragedy, in which patients lost their lives due to tainted pharmaceuticals, highlight the necessity for supply chain designers and planners to consider the risk of even low probability incidents in supply chains. The goal of this research is to design a single-period, single-product supply chain

model with capacitated facilities to hedge against the possibility of sending tainted materials to consumers. Given that our mixed-integer stochastic model is NP-hard, we develop efficient heuristic and metaheuristic algorithms to obtain acceptable solutions. Computational experience is presented and discussed.

Designing a new supply chain for competition against an existing supply chain

- Transportation Research Part E: Logistics and Transportation Review---2014---Shabnam Rezapour,Reza Zanjirani Farahani,Wout Dullaert,Bruno De Borger

We develop a bi-level model for designing an entrant supply chain (SC) in the presence of a pre-existing competing SC where demand is elastic with respect to price and distance. The model assumes dynamic competition between the new and pre-existing SCs in retailers' level and probabilistic customers' behavior. Strategic facility location and flow decisions are made while considering inventory carrying costs incurred on the operational level. We formulate the problem and propose exact and metaheuristic algorithms to solve it. The model is solved using data from a real-life case and also randomly generated test problems to extract managerial insights.

A hybrid two-stock inventory control model for a reverse supply chain

- Transportation Research Part E: Logistics and Transportation Review---2014---Hossein Zolfagharinia,Maryam Hafezi,Reza Zanjirani Farahani,Behnam Fahimnia

This paper develops an inventory control model for a reverse supply chain with separate serviceable and remanufacturable inventory stock points. Return rate is expressed stochastically as a function of product demand. Variation in demand distribution during product life-cycle is modeled using a new order-up-to replenishment policy incorporating five maximum inventory levels corresponding to five product life cycle stages. A near optimum solution to this problem is

sought using a hybrid solution method integrating a discrete event simulation with a meta-heuristic search method. Real data from an Australian case company is utilized to design test experiments for model validation and evaluation.

Incentive approaches to overcome moral hazard in port concession agreements

- Transportation Research Part E: Logistics and Transportation Review---2014---Grace Wang,Athanasios Pallis

This paper provides a game theory foundation for port concession agreements, using the incentive mechanism design. This study identifies the post contractual moral hazard problem, and provides a model involving performance-based concession fees to align successfully the Port Authorities' interests with those of the terminal operators. To match theory and practice, factual information of recent projects in Europe and the US is reviewed. Evidently, to avoid transaction failures in a Greenfield concession, the port authority needs to identify clearly the objectives undertaken. The port should have the ability to enforce the contract and determine the process of quality assurance.

An efficient algorithm for evaluating logistics network reliability subject to distribution cost

- Transportation Research Part E: Logistics and Transportation Review---2014---Yi-Feng Niu,William H.K. Lam,Ziyou Gao

This paper presents a (d, c) -minimal paths based algorithm to evaluate the reliability index $R(d,c)$, defined as the probability that the source distributes a demand d successfully to the destination with the total distribution cost not exceeding budget constraint c . The proposed algorithm employs two schemes to reduce the search space of (d, c) -minimal paths: (1) by proposing some conditions, an improved method for solving (d, c) -minimal paths is developed; (2) an existing decomposition technique is applied to limit the search space. Computational results show a clear advantage of the proposed algorithm in seeking (d, c) -minimal paths.

Drivers explaining the inefficiency of Peruvian and Chilean ports terminals

- Transportation Research Part E: Logistics and Transportation Review---2014---V́ctor Chang,Beatriz Tovar

We measure technical efficiency of port terminals in Peru and Chile to evaluate the influence of certain specific explanatory variables that may contribute to reducing inefficiency; one of them is the structural reform that was implemented in the 1990s in both countries. Chilean terminals were more efficient than the Peruvian ones mainly due to greater agility in the implementation of the reform process. Furthermore, the higher the containerization index, the greater the occupancy rate and the bigger the bulk rate, then the lower the inefficiency in terminals is. Also, the inefficiency is lower when the terminal is under private administration.

A hybrid multi-objective approach to capacitated facility location with flexible store allocation for green logistics modeling

- Transportation Research Part E: Logistics and Transportation Review---2014---Irina Hariris,Christine L. Mumford,Mohamed M. Naim

We propose an efficient evolutionary multi-objective optimization approach to the capacitated facility location-allocation problem (CFLP) for solving large instances that considers flexibility at the allocation level, where financial costs and CO2 emissions are considered simultaneously. Our approach utilizes suitably adapted Lagrangian Relaxation models for dealing with costs and CO2 emissions at the allocation level, within a multi-objective evolutionary framework at the location level. Thus our method assesses the robustness of each location solution with respect to our two objectives for customer allocation. We extend our exploration of selected solutions by considering a range of trade-offs for customer allocation.

Joint production and delivery lot sizing for a make-to-order producer–buyer supply chain with transportation cost

- Transportation Research Part E: Logistics and Transportation Review---2014---Shine-Der Lee,Yen-Chen Fu

An integrated production/delivery quantity model in a make-to-order producer–buyer supply chain is analyzed in this paper. The coordinated policy is achieved by scheduling single setup at the producer with multi-delivery to the buyer. We develop two synchronized cost models that include setup cost at the producer, ordering cost at the buyer, inventory carrying cost, and transportation cost that is a fitted power function of delivery quantity, using actual shipping rate data. The mathematical analysis and computational study have demonstrated that significant cost savings can be realized by implementing the proposed approach into the network optimization process.

A dynamic carsharing decision support system

- Transportation Research Part E: Logistics and Transportation Review---2014---Mehdi Nourinejad,Matthew J. Roorda

This paper proposes a dynamic optimization–simulation model as a decision support system for one-way carsharing organizations. To reduce the vehicle imbalance in one-way systems, a Vehicle Relocation Optimization model is solved successively in a discrete event simulation. Each event is the arrival of a new user. The model is compared to an a priori benchmark model. Autosshare is chosen as a case study. Results show that increasing the reservation time (time between requesting and picking up a vehicle) from 0 to 30min reduces fleet size by 86%. The model captures a tradeoff between vehicle relocation hours and fleet size.

Estimating the consumer welfare effects of de-hubbing: The case of Malév Hungarian Airlines

- Transportation Research Part E: Logistics and Transportation Review---2014---Volodymyr Bilotkach,Juergen Mueller,Adél Németh

We document and analyze events that followed bankruptcy of Malév Hungarian Airlines on February 3, 2012. Most of the new services post-bankruptcy came from low-cost point-to-point carriers. Flight frequency offered by such carriers is lower than what was offered by the network airline. Yet, fares charged by these airlines are presumably also lower. We suggest a methodological approach to analyze the corresponding trade-off, and apply it to our data. We conclude that passengers flying to seven out of eighteen former Malév destinations where point-to-point carriers entered might be worse off despite potentially paying lower prices.

Quantity discount with freight consolidation

- Transportation Research Part E: Logistics and Transportation Review---2014---H.N. Nguyen,C.E. Rainwater,S.J. Mason,E.A. Pohl

We study an integrated quantity discount and vehicle routing problem where truck utilization is increased by building multi-stop routes and increasing order sizes through a purchase incentive. We model the problem and prove it to be NP-hard. Our experiments show that commercial solvers do not effectively solve instances with more than ten buyers. We propose the use of non-compromising route elimination rules and other improvement techniques for a route-based formulation. Our experimentation suggests that a cost savings of 18% can be realized by utilizing our model.

Airfreight forwarder' s shipment planning under uncertainty: A two-stage stochastic programming approach

- Transportation Research Part E: Logistics and Transportation Review---2014---Yer Van Hui,Jia Gao,Lawrence Leung,Stein Wallace

This paper addresses the shipment planning problem with random processing times in intermodal logistics via transfer ports. Shipment activities are divided into two groups according to regional settings. Activity processing times in region A are assumed to be random while those in region B are deterministic. At the beginning (stage 1), the forwarder assigns agents to all job activities (planning decision). In case a shipment delay is observed, an in-process adjustment (recourse decision) is implemented (stage 2). A two-stage stochastic programming model is established and an illustrative example is discussed. Managerial insights are presented in a simulation study.

The impact of hubbing concentration on flight delays within airline networks: An empirical analysis of the US domestic market

- Transportation Research Part E: Logistics and Transportation Review---2014---Patrick Baumgarten,Robert Malina,Anne Lange

This paper explores the relationship between hubbing activities and flight delays in the United States from an airline-specific network perspective. Airline hubbing is measured with the Hubbing Concentration Index. We estimate the impact of hubbing behavior on delays, using three measures of delay, two based on delay against schedule, and the third based on buffer-corrected excess travel times. A significant (and positive) influence of hubbing concentration can only be found for the latter delay indicator. We conclude that airlines use buffer times to mitigate passenger-perceived delays against schedule that would, without buffers, arise from more complex network operations.

An analysis of the determinants of cruise traffic: An empirical application to the Spanish port system

- Transportation Research Part E: Logistics and Transportation Review---2014---José I. Castillo-Manzano,Xavier Fageda,Fernando Gonzalez-Laxe

We study the determinants that affect the capacity of ports to attract cruise ships in Spain. The conclusion

is that the likelihood of having cruise traffic is linked to ports located in populous areas and close to large airports, ports not specialized in container traffic but sharing facilities with ferries traffic and ports having a minimum depth of water. The amount of cruise traffic that a port can generate is also related to the population and the air connections, along with the tourist appeal and the facilities shared with other types of port traffic, namely roll-on roll-off and ferries.

Competitive effects of the airlines-within-airlines strategy – Pricing and route entry patterns

- Transportation Research Part E: Logistics and Transportation Review---2014---Winai Homsombat,Zheng Lei,Xiaowen Fu

This paper investigates the effects of the airlines-within-airlines strategy adopted by Qantas airline group, which simultaneously runs a full-service airline (Qantas Airways) and a low-cost carrier (Jetstar Airways). Our empirical investigation of airline pricing and route entry patterns in the Australian domestic market suggests that Jetstar has been used as a fighting brand against rival low cost carriers. Such a strategy increases group airlines' prices at the expenses of rival airlines. There is preliminary evidence that pricing benefits to Qantas Group come from increased market power as well as service quality improvements.

Enhancing metro network resilience via localized integration with bus services

- Transportation Research Part E: Logistics and Transportation Review---2014---Jian Gang Jin,Loon Ching Tang,Lijun Sun,Der-Horng Lee

This paper advances the field of network disruption analysis by introducing an application to a multi-modal transport network, capitalizing on the redundancies and improved connectivity of an integrated metro-bus network. Metro network resilience to disruptions can be enhanced by leveraging on public bus services. To ensure better acceptance among operators and commuters, we focus on introducing localized integration with bus services instead of designing an entirely new

bus network to achieve the desired resilience to potential disruptions. This is accomplished by increasing the capacity of bus services that run in parallel with affected metro lines as well as those connecting to different metro lines. Our analysis starts with a network representation to model the integrated metro and bus system. A two-stage stochastic programming model is further developed to assess the intrinsic metro network resilience as well as to optimize the localized integration with bus services. The approach is applied to a case study based on the Singapore public transit system and actual travel demand data. The results show that the metro network resilience to disruptions can be enhanced significantly from localized integration with public bus services.

Bounding the inefficiency of atomic splittable selfish traffic equilibria with elastic demands

- Transportation Research Part E: Logistics and Transportation Review---2014---Zengzhe Feng,Ziyou Gao,Huijun Sun

We determine the exact upper bound of the inefficiency of atomic splittable selfish traffic equilibria with elastic travel demand with and without road pricing. In the previous results, only pseudo-approximation bound were obtained for this case. By comparison, we also conclude that the traffic equilibrium with elastic demand may be worse than the corresponding fixed demand case, which implying that the demands' elastic can have a negative effect on the quality of equilibrium solutions. Finally, we propose a road pricing mechanism. We prove that there are optimal tolls in general network, atomic players and elastic travel demand setting.

Lead time variation control using reliable shipment equipment: An incentive scheme for supply chain coordination

- Transportation Research Part E: Logistics and Transportation Review---2014---Jafar Heydari

In this paper, service level coordination is studied in a two-stage supply chain (SC). In the investigated model, a retailer is faced with uncertain lead time (LT)

due to shipping time instability. Reducing lead time fluctuations is used as an incentive scheme to induce the retailer for participation in the coordination plan. Range of LT fluctuation which is acceptable for both parties is extracted. It is shown that using more reliable shipping equipment as an incentive could coordinate SC. Under some circumstances, the proposed model can increase SC profitability more than centralized decision making model.

Corporate governance, financial management decisions and firm performance: Evidence from the maritime industry

- Transportation Research Part E: Logistics and Transportation Review---2014---Panayiotis C. Andreou,Christodoulos Louca,Photis M. Panayides

This study investigates the relation between corporate governance with (i) financial management decisions such as earnings management and sub-optimal investment, and (ii) firm performance in maritime firms. The study reveals that important corporate governance measures, such as insider ownership, board size, presence of corporate governance committees, the percentage of directors serving on the boards of other firms and CEO duality, are associated with financial management decisions and firm performance. The associations revealed can potentially assist in mitigating agency problems and improving financial management decisions and performance in maritime firms.

The trade-off between fixed vehicle costs and time-dependent arrival penalties in a routing problem

- Transportation Research Part E: Logistics and Transportation Review---2014---Narath Bhusiri,Ali Gul Qureshi,Eiichi Taniguchi

This paper introduces the vehicle routing problem with soft time windows (VRPSTW) in which problem definition differs from ones previously defined in literature. Branch-and-price approach is employed, resulting in a set partitioning master problem and its new subproblem. Novel techniques are consequently developed to

solve this new subproblem. Experimental results report the comparisons of these solution techniques under the branch-and-price framework. The VRPSTW solutions have further been compared to the state-of-the-art literature, signifying the superiority of the VRPSTW on this issue.

Determinants of European freight rates: The role of market power and trade imbalance

- Transportation Research Part E: Logistics and Transportation Review---2014---Gabriel Figueiredo De Oliveira

This paper investigates the determinants of freight rates between six European countries and 47 partners. We show that the inward freight rates are, on average, 23% higher than for outward ones, indicating that the cost of repositioning empty containers is mainly carried by European importers. Moreover, we have broken down the freight rates into basic ocean freight and surcharges in order to analyze the impact of each explanatory variable on these two components. It appears that basic ocean freight depends mainly on factors that define the structure of shipping lanes, while surcharges are more time sensitive.

Economic and environmental concerns in planning recyclable waste collection systems

- Transportation Research Part E: Logistics and Transportation Review---2014---Tânia Rodrigues Pereira Ramos, Maria Isabel Gomes, Ana Paula Barbosa-Póvoa

This paper addresses the planning of recyclable waste collection systems while accounting for economic and environmental concerns. Service areas and vehicle routes are defined for logistics networks with multiple depots where different products are collected. The problem is modeled as a multi-product, multi-depot vehicle routing problem with two objective functions: distance and CO2 emissions minimization. A decomposition solution method is developed and applied to a real case study. Six scenarios regarding different service areas and objective functions are studied. Savings

of up to 22% in distance and 27% in CO2 emissions are achieved, exceeding economic and environmental goals.

Importance measures for inland waterway network resilience

- Transportation Research Part E: Logistics and Transportation Review---2014---Hiba Baroud, Kash Barker, Jose E. Ramirez-Marquez, Claudio M. Rocco S.

This work demonstrates a time-dependent paradigm for resilience and associated stochastic metrics in a waterway transportation context. We deploy two stochastic resilience-based component importance measures that highlight the critical waterway links that contribute to waterway network resilience and develop an optimization approach that determines the order in which disrupted links should be recovered for improved resilience. A data-driven case study illustrates these metrics to describe commodity flows along the various links of the US Mississippi River Navigation System.

Selective vehicle routing problems under uncertainty without recourse

- Transportation Research Part E: Logistics and Transportation Review---2014---Mahdiah Allahviranloo, Joseph Y.J. Chow, Will W. Recker

We argue that the selective vehicle routing problem is more appropriate than the conventional VRP in handling uncertainty with limited resources. However, previous formulations of selective VRPs have all been deterministic. Three new formulations are proposed to account for different optimization strategies under uncertain demand (or utility) level: reliable, robust, and fuzzy selective vehicle routing problems. Three parallel genetic algorithms (PGAs) and a classic genetic algorithm are developed and compared to the deterministic solution. PGAs differ based on their communication strategies and diversity in sub-populations. Results show that a PGA, wherein communication between demes, or subpopulations, occurs in every generation

and does not eliminate repeated chromosomes, outperforms other algorithms at the cost of higher computation time. A faster variation of PGA is used to solve the non-convex reliable selective VRP, robust selective VRP and the large-scale fuzzy selective VRP, consisting of 200 nodes. Large scale application demonstrates the value of fuzzy selective vehicle routing problem FSVRP in humanitarian logistics.

Sustainable hub location under mixed uncertainty

- Transportation Research Part E: Logistics and Transportation Review---2014---M. Mohammedi,S.A. Torabi,R. Tavakkoli-Moghaddam

This paper addresses a novel sustainable hub location problem (SHLP) in which two new environmental-based cost functions accounting for air and noise pollution of vehicles are incorporated. To cope with uncertain data incorporated in the model, a mixed possibilistic–stochastic programming approach is proposed to construct the crisp counterpart. A simulated annealing (SA) and an imperialist competitive algorithm (ICA) with a new solution representation are developed to solve real-sized instances whose performances are compared with a proposed lower bound. Finally, some computational experiments are provided to demonstrate the effectiveness of the proposed model and solution approaches.

A three-stage stochastic facility routing model for disaster response planning

- Transportation Research Part E: Logistics and Transportation Review---2014---Sigrid Johansen Rennemo,Kristina Fougner Rø,Lars Magnus Hvatum,Gregorio Tirado

This paper presents a three-stage mixed-integer stochastic programming model for disaster response planning, considering the opening of local distribution facilities, initial allocation of supplies, and last mile distribution of aid. The vehicles available for transportation, the state of the infrastructure and the demand of the potential beneficiaries are considered as stochastic elements.

Extensive computational testing performed on realistic instances shows that the solutions produced by the stochastic programming model are significantly better than those produced by a deterministic expected value approach.

A tabu search heuristic for the local container drayage problem under a new operation mode

- Transportation Research Part E: Logistics and Transportation Review---2014---Zhaojie Xue,Canrong Zhang,Wei-Hua Lin,Lixin Miao,Peng Yang

This paper examines the Local Container Drayage Problem (LCDP) under an operation mode in which a tractor can be detached from its companion trailer and assigned to a new task. We have incorporated a set of temporal constraints into the classical VRP to realize this operation by utilizing the idle time available to tractors and coordinating the empty containers moving between customers. A tabu search algorithm is proposed. Some numerical experiments are conducted to assess the performance of the proposed algorithm, quantify the benefit of the new operation mode, and identify the conditions under which the mode is effective.

Dynamic impact on global supply chains performance of disruptions propagation produced by terrorist acts

- Transportation Research Part E: Logistics and Transportation Review---2014---Alfredo Bueno-Solano,Miguel Gastón Cedillo-Campos

Understanding disruptions and how their effects propagate through the supply chain is critical to promote security and efficient movement of goods. This research proposes a system dynamics model as an effective quantitative approach for analyzing the effects of the materialization and simultaneous propagation of disruptions produced by terrorist acts on global supply chains performance. The article shows that the impact on inventory levels in the supply chain can increase 600% compared to normal operating conditions as a

result of increasing the security measures on international borders. Finally, useful conclusions for designing more resilient supply chains and future research are exposed.

Algebraic connectivity maximization of an air transportation network: The flight routes' addition/deletion problem

- Transportation Research Part E: Logistics and Transportation Review---2014---P. Wei,L. Chen,D. Sun

A common metric to measure the robustness of a network is its algebraic connectivity. This paper introduces the flight routes addition/deletion problem and compares three different methods to analyze and optimize the algebraic connectivity of the air transportation network. The Modified Greedy Perturbation algorithm (MGP) provides a local optimum in an efficient iterative manner. The Weighted Tabu Search (WTS) is developed for the flight routes addition/deletion problem to offer a better optimal solution with longer computation time. The relaxed semidefinite programming (SDP) is used to set a performance upper bound and then three rounding techniques are applied to obtain feasible solutions. The simulation results show the trade-off among the Modified Greedy Perturbation, Weighted Tabu Search and relaxed SDP, with which we can decide the appropriate algorithm to adopt for maximizing the algebraic connectivity of the air transportation networks of different sizes. Finally a real air transportation network of Virgin America is investigated.

Global intermodal liner shipping network design

- Transportation Research Part E: Logistics and Transportation Review---2014---Zhiyuan Liu,Qiang Meng,Shuaian Wang,Zhuo Sun

This paper presents a holistic analysis for the network design problem of the intermodal liner shipping system. Existing methods for liner shipping network design mainly deal with port-to-port demand. However, most of the demand has inland origins and/or destinations. Thus, it is necessary to cope with inland

origin–destination (OD) pairs involving a change in transport mode from inland transportation to maritime shipping. A method is first proposed to convert inland OD demand to port-to-port demand. Then, a framework for global intermodal liner shipping network design is proposed. Finally, the proposed methodology is applied to and numerically verified by a large-scale network example.

A vehicle routing problem with multiple overlapped batches

- Transportation Research Part E: Logistics and Transportation Review---2014---Mingzhu Yu,Xiangtong Qi

This paper considers a vehicle routing problem faced by an express company which tackles complicated operations involving time window constraints, multiple delivery and pick-up customer visits per day, multiple trips per vehicle, and latency cost for each delivery. It is challenging in that it involves multiple delivery and pick-up batches and the time spans of the batches are overlapped. We formally define the problem and develop two tabu search algorithms. By computational experiments, we find one algorithm outperforms the other by getting better solution in much shorter time. Moreover, our approach produces a significant cost saving for the company.

A mathematical model for post-disaster road restoration: Enabling accessibility and evacuation

- Transportation Research Part E: Logistics and Transportation Review---2014---Dilek Tuzun Aksu,Linet Ozdamar

This paper focuses on the planning of road restoration efforts during disaster response and recovery. The primary objective is to maximize network accessibility for all locations in the area during the restoration process so that survivors are evacuated and road side debris is removed as soon as possible. We propose a dynamic path based mathematical model that identifies criticality of blockages and clears them with limited resources.

This model is more efficient than link based models and can solve restoration problems for realistic size networks within reasonable time. Algorithm performance is demonstrated using two instances based on districts in Istanbul.

A latent class choice based model system for railway optimal pricing and seat allocation

- Transportation Research Part E: Logistics and Transportation Review---2014---Pratt Het-rakul,Cinzia Cirillo

In this paper, discrete choice methods in the form of multinomial logit and latent class models are proposed to explain ticket purchase timing of passenger railway. The choice model and demand functions are incorporated into a revenue optimization problem which jointly considers pricing and seat allocation. The framework provides insightful policy implications in term of fare and capacity distribution derived from actual passenger behavior. It shows that accepting short-haul demand provides greater revenue than long-haul demand using the same capacity. Revenue improvement ranges from 16.24% to 24.96% in multinomial logit models and from 13.82% to 21.39% in latent class models respectively.

A bi-level Voronoi diagram-based metaheuristic for a large-scale multi-depot vehicle routing problem

- Transportation Research Part E: Logistics and Transportation Review---2014---Wei Tu,Zhixiang Fang,Qingquan Li,Shih-Lung Shaw,BiYu Chen

In this paper, a bi-level Voronoi diagram-based metaheuristic is introduced to solve the large-scale multi-depot vehicle routing problem (MDVRP). The upper level of the Voronoi diagram, derived from the depots, is used to allocate customers to depots. The lower level of the Voronoi diagram, derived from the customers, limits the search space of reallocating customers among the depots and rearranging the customers among the routes from each depot to its Voronoi neighbors. The results of numerical experiments clearly indicate the

benefits of this proposed bi-level Voronoi diagram approach for solving very large-scale MDVRPs while balancing the solution quality and the computational demand.

Pickup and delivery routing with hub transshipment across flexible time periods for improving dual objectives on workload and waiting time

- Transportation Research Part E: Logistics and Transportation Review---2014---Yon-Chun Chou,Yao-Hung Chen,Hui-Min Chen

In contrast to developing routing algorithms, operational policy design of courier services is addressed in this paper with the objective of reducing both courier workload and customer waiting time. A square root law of tour length is verified, extending the literature. A new policy of hub transshipment across flexible time periods is evaluated by mean-value analysis of stochastic routing. Boundary conditions on arrival rate, territory size and transshipment probability in which the new policy outperforms a traditional periodical routing policy are derived. Finally, the effectiveness of the new policy is demonstrated by applying to a large hospital case.

A supply chain network design model for biomass co-firing in coal-fired power plants

- Transportation Research Part E: Logistics and Transportation Review---2014---Md.S. Roni,Sandra D. Eksioglu,Erin Searcy,Krishna Jha

We propose a framework for designing the supply chain network for biomass co-firing in coal-fired power plants. This framework is inspired by existing practices with products with similar physical characteristics to biomass. We present a hub-and-spoke supply chain network design model for long-haul delivery of biomass. This model is a mixed integer linear program solved using benders decomposition algorithm. Numerical analysis indicates that 100milliontons of biomass are located within 75miles from a coal plant and could be delivered at \$8.53/dry-ton; 60milliontons of biomass

are located beyond 75 miles and could be delivered at \$36/dry-ton.

Braess paradox and robustness of traffic networks under stochastic user equilibrium

- Transportation Research Part E: Logistics and Transportation Review---2014---Chunxue Zhao, Baibai Fu, Tianming Wang

The Braess paradox is an important phenomenon in the traffic network, and the robustness is a characteristic that measures the network system performance under interference. Study of traffic network paradox and its robustness is an important topic of traffic assignment. In this paper, we investigate the traffic network under elastic demand, its robustness and paradox under stochastic user equilibrium. Using the Logit model and Braess' network, we find that paradox occurs when the congestion of a newly added road meets certain criterion. Paradox severity and the ranking of the network components are both affected by the new congestion. This finding can be applied in the planning of urban traffic network.

Modeling and optimizing the integrated problem of closed-loop supply chain network design and disassembly line balancing

- Transportation Research Part E: Logistics and Transportation Review---2014---Eren Özceylan, Turan Paksoy, Tolga Bektaş

This paper describes an integrated model that jointly optimizes the strategic and tactical decisions of a closed-loop supply chain (CLSC). The strategic level decisions relate to the amounts of goods flowing on the forward and reverse chains. The tactical level decisions concern balancing disassembly lines in the reverse chain. The objective is to minimize costs of transportation, purchasing, refurbishing, and operating the disassembly workstations. A nonlinear mixed integer programming formulation is described for the problem. Numerical examples are presented using the proposed model.

A novel hybrid-link-based container routing model

- Transportation Research Part E: Logistics and Transportation Review---2014---Shuaian Wang

Container routing determines how to transport containers from their origins to their destinations in a liner shipping network. Container routing needs to be solved a number of times as a subproblem in tactical-level decision planning of liner shipping operations. Container routing is similar to the multi-commodity flow problem. This research proposes a novel hybrid-link-based model that nests the existing origin-link-based and destination-link-based models as special cases. Moreover, the hybrid-link-based model is at least as compact as the origin-to-destination-link-based, origin-link-based and destination-link-based models in the literature.

Rapid capacity expansions and failure: A trap for new airline entrants?

- Transportation Research Part E: Logistics and Transportation Review---2014---Terence Ping Ching Fan, Alex Tai Loong Tan, Xuesong Geng

This paper investigates whether fast capacity expansions as a means to narrow cost differentials between a de novo airline entrant and established incumbents helps or hinders the survival of the entrant. Evidence from a longitudinal sample of new entrants in the European passenger airline industry showed that these firms exhibited higher failure risks after rapidly expanding capacity. Further, high product market overlap with an established incumbent reduced the probability of new entrants undertaking such expansions, in turn reducing the probability of failure.

The design of coastal shipping services subject to carbon emission reduction targets and state subsidy levels

- Transportation Research Part E: Logistics and Transportation Review---2014---Kang Chen, Zhongzhen Yang, Theo Notteboom

This paper presents a New Coastal Liner Route Design Model (NCLRDM) for coastal intermodal networks based on the user equilibrium assignment model (UE model). The NCLRDM can determine ports of call, call sequence, ship type and service frequency simultaneously with the objective of minimizing state subsidies for coastal shipping operators under a given carbon emission reduction target for the entire intermodal network. A network-topology method (Temporal–Spatial Expansion) captures differences in traffic assignment between waterway and highway networks. A genetic and Frank–Wolfe hybrid algorithm is used to solve the NCLRDM. The model is applied to the Bohai Bay in China.

Mergers and acquisitions in shipping

- Transportation Research Part E: Logistics and Transportation Review---2014---George Alexandrou,Dimitrios Gounopoulos,Hardy M. Thomas

In this comprehensive study of all shipping mergers and acquisitions from 1984 to 2011 we document that the shareholders of both acquirers and targets realise average abnormal gains of 1.2% and 3.3% respectively and both parties gain more from diversifying than focus-increasing deals. Acquirers gain more when paying with stock, in cross-border deals and from taking over public targets. Targets gain more from cross-border and focus-increasing deals. Regulatory interventions, like the EU repeal of exemption from competition and the US Ocean Shipping Reform Act, affect the marginal merger propensity and this propensity differs significantly across regions.

Container drayage problem with flexible orders and its near real-time solution strategies

- Transportation Research Part E: Logistics and Transportation Review---2014---Ruiyou Zhang,Jye-Chyi Lu,Dingwei Wang

This article studies a container drayage problem with flexible orders defined by using requiring and releasing attributes as a unified formulation of various order types. A determined-activities-on-vertex (DAOV)

graph introduces a temporary vertex set to formulate different truck statuses. The problem is formulated as a mixed-integer nonlinear programming model based on the DAOV graph. Four strategies including a window partition based (WPB) strategy are presented and evaluated extensively to solve the problem. Results indicate that the WPB method could solve the problem effectively and efficiently. Furthermore, this method is robust considering the operating time biases compared to other algorithms.

Risk management in liner ship fleet deployment: A joint chance constrained programming model

- Transportation Research Part E: Logistics and Transportation Review---2013---Tingsong Wang,Qiang Meng,Shuaian Wang,Zhijia Tan

This paper provides a tangible methodology to deal with the liner ship fleet deployment problem aiming at minimizing the total cost while maintaining a service level under uncertain container demand. The problem is first formulated as a joint chance constrained programming model, and the sample average approximation method and mixed-integer programming are used to deal with it. Finally, a numerical example of a liner shipping network is carried out to verify the applicability of the proposed model and solution algorithm. It is found that the service level has significant effect on the total cost.

Explaining changes and trends in the airline industry: Economies of density, multiproduct scale, and spatial scope

- Transportation Research Part E: Logistics and Transportation Review---2013---Sergio R. Jara-Díaz,Cristián E. Cortés,Gabriela A. Morales

Changes in the shape and size of airline networks have not been explained clearly from a cost perspective based on the finding of increasing returns to density for given route structures and constant returns to scale for variable network size. We reassessed the estimates of these economies by using new scale and scope indices, finding savings due to changes in route structures and

various types of economies of spatial scope not previously calculated: network size, trunk-local services and domestic-international services. Results contribute new insights on the role of cost incentives in the observed changes and trends in the airline industry.

The value of information on supply risk under random yields

- Transportation Research Part E: Logistics and Transportation Review---2013---Taesu Cheong,Sang Hwa Song

For companies facing challenge of managing unreliable supply sources, one of the operational goals is to increase the overall profit by improving performance of uncertain supply. We here develop stochastic decision frameworks which evaluate necessary information about uncertainties and help newsvendor and suppliers to enhance supply reliability. We first analyze the newsvendor's purchasing decision under supply uncertainty and the derived decision framework is used to identify stochastic dominance conditions. We found that partial supply risk information is sufficient to determine regular ordering quantity, but to improve the overall profit, it is important to gather more information about stochastic dominance conditions.

The international competitiveness of China's shipbuilding industry

- Transportation Research Part E: Logistics and Transportation Review---2013---Liping Jiang,Erik Bastiansen,Siri Strandenes

This paper introduces profit rate as a more relevant measure of international shipbuilding competitiveness. We also develop a model to identify competitiveness factors and their relative importance. Our findings suggest that Chinese competitiveness derives from shipbuilding costs, whereas contract price deviations are the driver for Japan and South Korea. We argue that China became more competitive in building of bulk carriers and tankers than Japan and to a lesser extent than South Korea after year 2000 and that a market trough would further strengthen China's competitiveness.

Our results have broad implications for monitoring industrial performance and formulating competitive strategies for shipyards.

Which factors impact on the presence of incentives for route and traffic development? Econometric evidence from European airports

- Transportation Research Part E: Logistics and Transportation Review---2013---Florian Allroggen,Robert Malina,Ann-Katrin Lenz

In order to attract air traffic, many airports offer discounts and rebates on standard charges through incentives for route and traffic development. In this paper, we employ a probit instrument variable approach to a sample of 194 European airports, so as to study the factors influencing the presence of such incentives. We find that airports decide simultaneously on the standard charges level and the introduction of incentives. Furthermore, airport ownership, regulation and competition, as well as potential passenger demand impact on their presence.

Integrated production and intermodal transportation planning in large scale production-distribution-networks

- Transportation Research Part E: Logistics and Transportation Review---2013---Frank Meisel,Thomas Kirschstein,Christian Bierwirth

We present a model and solution approach for combining production and intermodal transportation planning in a supply network. A close and detailed integration of both decision fields is missing in the literature so far. The model includes relevant decisions regarding production setups and output volumes of plants, cargo consolidation at intermodal terminals, and capacity bookings for road and rail transports. A Branch-and-Cut method and heuristics are designed for solving the problem. A comprehensive case study for a chemical company identified a 6%-cost saving from the integrated planning. At the same time, companies are successfully supported in establishing eco-friendly distribution processes.

A supporting station model for reliable infrastructure location design under interdependent disruptions

- Transportation Research Part E: Logistics and Transportation Review---2013---Xiaopeng Li,Yanfeng Ouyang,Fan Peng

This paper proposes a new modeling method that equivalently transforms interdependent and correlated facility failures in an infrastructure system into only i.i.d. disruptions in a supporting structure. The properties of this structure are examined and a mathematical model is created to solve reliable facility location design problems under correlated facility failure risks. This model is formulated into a compact integer linear program and can be efficiently solved by state-of-the-art solvers. A set of experiments and case studies are conducted to demonstrate the applicability of the proposed model and to draw managerial insights into the optimal system design.

A hybrid implementation mechanism of tradable network permits system which obviates path enumeration: An auction mechanism with day-to-day capacity control

- Transportation Research Part E: Logistics and Transportation Review---2013---Kentaro Wada,Takashi Akamatsu

Akamatsu (2007a,b) proposed a new dynamic traffic congestion control scheme called tradable network permits, and demonstrated its efficiency properties for general road networks. To implement tradable permit markets, this paper proposes a novel auction mechanism with capacity control. This mechanism employs an evolutionary approach to achieve a dynamic system optimal allocation of network permits in a computationally efficient manner. We prove that the proposed mechanism has the following desirable properties: (i) truthful bidding is a dominant strategy for each user on each day and (ii) the permit allocation pattern under the mechanism converges to a dynamic system optimal allocation pattern.

Benefits of in-vehicle consolidation in less than truckload freight transportation operations

- Transportation Research Part E: Logistics and Transportation Review---2013---Rodrigo Mesa-Arango,Satish V. Ukkusuri

Researchers and public agencies have proposed consolidation policies as an alternative to increase truck payload utilization and mitigate externalities produced by freight transportation. Understanding and enhancing the economic mechanisms that lead to freight consolidation can ease the implementation of these strategies, increase profits for shippers and carriers, and reduce freight-related negative externalities. An important mechanism that has recently been studied for cost reduction in the freight industry is combinatorial auctions. In these auctions, a shipper invites a set of carriers to submit bids for freight lane contracts. Carriers can bid for individual lanes or bundles of them according to their operational characteristics. These bids are constructed considering direct shipments (Truckload operations) and several bidding advisory models have been proposed for this purpose. However, there are economies of scale that can be achieved if shipments are consolidated inside vehicles, which have not been explored in the construction of competitive bids. This paper investigates such benefits and provides insights on the competitiveness and challenges associated to the development of consolidated bids (suitable for Less-Than-Truckload operations). Consolidated bids are constructed using a multi-commodity one-to-one pickup-and-delivery vehicle routing problem that is solved using a branch-and-price algorithm. The numerical experiment shows that non-consolidated bids are dominated by consolidated bids, which implies that this type of operation can increase the likelihood of a carrier to win auctioned lanes, while increasing its profits margins over truckload companies (non-consolidated bids), and keeping the reported benefits that combinatorial auctions represent for shippers.

On the estimation of temporal mileage rates

- Transportation Research Part E: Logistics and Transportation Review---2013---R.E. Wilson,J. Anable,S. Cairns,T. Chatterton,S. Notley,J.D. Lees-Miller

Mathematical and computational techniques are developed for the analysis of annual roadworthiness (MOT) test data that the UK Department for Transport has placed in the public domain. This paper develops a new theory to estimate fine-scale temporal (e.g., monthly) variations in vehicle mileage at a population level – derived from coarse-scale (e.g., annual) mileage data at an individual vehicle level. Numerical time-stepping schemes are derived from the theory and are tested on synthetic data to permit comparison with a known ground-truth mileage rate. Finally, we consider first steps in applying the methods directly to the MOT data set.

Rolling horizon approach for aircraft scheduling in the terminal control area of busy airports

- Transportation Research Part E: Logistics and Transportation Review---2013---Marcella Samà,D’ Ariano, Andrea,Dario Pacciarelli

This paper addresses the real-time problem of scheduling aircraft in a terminal control area. We formulate this problem via the alternative graph formulation. A rolling horizon framework is introduced to manage busy traffic situations with a large number of delayed aircraft. As scheduling algorithms, we compare a branch and bound (BB) algorithm with a first come first served (FCFS) rule. The algorithms are evaluated on practical size instances from Roma Fiumicino and Milano Malpensa. Experimental results demonstrate that BB better minimizes aircraft delays and travel times compared to FCFS. BB also requires less frequent changes of aircraft scheduling decisions.

Royalty bargaining in Public–Private Partnership projects: Insights from a theoretic three-stage game auction model

- Transportation Research Part E: Logistics and Transportation Review---2013---Chao-Chung Kang,Tsun-Siou Lee,Szu-Chi Huang

This study presents a transformed first-price sealed-bid auction with independent private values to determine the equilibrium royalties and subsidies in Public–Private Partnerships. The proposed model implies that royalties and subsidies are influenced by the true values bidders assign to a target project and the payoff received by a government from taking up its outside options instead of its bargaining power. In addition, such payoff is vulnerable to collusion. A real case is also detailed to show how reported signals, royalties and subsidies are determined in different cases.

An approach for the optimal planning of electric vehicle infrastructure for highway corridors

- Transportation Research Part E: Logistics and Transportation Review---2013---Nakul Sathaye,Scott Kelley

An approach is presented for the estimation of minimum PEV charging infrastructure needs, and the optimization of infrastructure deployment for highway corridors. We utilize continuous facility location models, which is distinguished from previous research that uses graph theory methods. We aim to obtain the optimal locations of publicly-funded infrastructure, to complement infrastructure provided by private industry, while carefully dealing with demand uncertainty. A case study is presented for highway corridors in the Texas Triangle megaregion. A discussion is provided on demand uncertainty and implementation considerations as well.

Do owner–operators pose a safety risk on the nation’ s highways?

- Transportation Research Part E: Logistics and Transportation Review---2013---David E. Can-

Despite persistent claims in the motor carrier industry of poorer safety performance of owner-operators, there is little empirical work directly comparing owner-operator safety performance to that of employee drivers. This study assesses the statistical significance of differences in the safety performance between owner-operators and employee drivers. This study also expands on previous driver focused safety models by examining how driver and carrier characteristics affect safety performance. Data for this study were derived from the Motor Carrier Management Information System (MCMIS), and the Commercial Driver's License Information System (CDLIS) databases. Study results provide evidence that owner-operators are associated with more driver- and vehicle-out-of-service violations but experience lower crash rates than do employee drivers.

Ferry service network design under demand uncertainty

- Transportation Research Part E: Logistics and Transportation Review---2013---Hong K. Lo, Kun An, Wei-hua Lin

This paper develops a formulation for ferry service network design with stochastic demand via the notion of service reliability (SR). The problem is formulated as a two-phase stochastic program in which the schedule of regular and ad hoc services are derived sequentially. An example is presented to illustrate the formulation. We then apply the proposed method to the case of ferry network design in Hong Kong. In terms of solution quality and computational efficiency, the SR-based approach shows promising results as compared with existing methods. Moreover, the approach leads to substantial cost savings as compared with deterministic methods under demand uncertainty.

A study on pricing and delivery strategy for e-retailing systems

- Transportation Research Part E: Logistics and Transportation Review---2013---Yeu-Shiang Huang, Si-Hen Chen, Jyh-Wen Ho

This study investigates the dynamics between price and lead time for an e-retailing system in which one of its commodities is offered by two duopolistic suppliers. A Stackelberg game is formulated by considering the two suppliers as the leaders and the e-retailer as the follower. The proposed model assists the channel members in getting an equilibrium relationship in a competitive environment. The results suggest that when a supplier chooses a shorter lead time as the competitive strategy, the other supplier should choose a lower price for counteraction, and channel members should understand the characteristics of demand before promoting their commodities.

The Trucking Sector Optimization Model: A tool for predicting carrier and shipper responses to policies aiming to reduce GHG emissions

- Transportation Research Part E: Logistics and Transportation Review---2013---Sebastian E. Guerrero, Samer M. Madanat, Robert C. Leachman

In response to the growing Climate Change problem, governments around the world are seeking to reduce the greenhouse gas (GHG) emissions of trucking. The Trucking Sector Optimization (TSO) model is introduced as a tool for studying the decisions that shippers and carriers make throughout time (focusing on investments in Fuel Saving Technologies), and for evaluating their impact on life-cycle GHG emissions. A case study of fuel taxation in California is used to highlight the importance of (1) modeling the trucking sector comprehensively, (2) modeling the dynamics of the stock of vehicles, and (3) modeling different sources of emissions.

Constraint programming approach to quay crane scheduling problem

- Transportation Research Part E: Logistics and Transportation Review---2013---Ozgur Unsal,Ceyda Oguz

This study presents a constraint programming (CP) model for the quay crane scheduling problem (QCSP), which occurs at container terminals, with realistic constraints such as safety margins, travel times and precedence relations. Next, QCSP with time windows and integrated crane assignment and scheduling problem, are discussed. The performance of the CP model is compared with that of algorithms presented in QCSP literature. The results of the computational experiments indicate that the CP model is able to produce good results while reducing the computational time, and is a robust and flexible alternative for different types of crane scheduling problems.

An origin–destination based road pricing model for static and multi-period traffic assignment problems

- Transportation Research Part E: Logistics and Transportation Review---2013---Anthony E. Ohazulike,Georg Still,Walter Kern,Eric C. van Berkum

To mitigate traffic externalities, we propose an origin–destination (OD) based road pricing model for traffic assignment problems. For elastic demand, we derive explicit optimal tolls for the OD-based pricing scheme. We also extend the model to a multi-period static traffic assignment (MSTA) where we derive analytically the route and OD-dependent tolls based on equilibrium conditions. We present some examples to show that the OD-based tolling scheme could improve the system welfare significantly, compared to the no-toll scenario (user equilibrium – UE).

An integrated novel interval type-2 fuzzy MCDM method to improve customer satisfaction in public transportation for Istanbul

- Transportation Research Part E: Logistics and Transportation Review---2013---Erkan Celik,Ozge Nalan Bilisik,Melike Erdogan,Alev Taskin Gumus,Hayri Baracli

In this paper, the problems of public transportation customers in Istanbul are addressed and their satisfaction levels are evaluated by using customer satisfaction survey and statistical analysis. A novel interval type-2 fuzzy MCDM method is proposed based on TOPSIS and GRA, to evaluate and improve customer satisfaction in Istanbul public transportation. Then, the criteria need to be improved are determined and different improvement suggestions are made for all public transportation firms.

An outer approximation algorithm for the robust shortest path problem

- Transportation Research Part E: Logistics and Transportation Review---2013---Mehrdad Shahabi,Avinash Unnikrishnan,Stephen D. Boyles

This paper describes a new algorithm for the stochastic shortest path problem where path costs are a weighted sum of expected cost and cost standard deviation. We allow correlation between link costs, subject to a regularity condition excluding unbounded solutions. The chief complication in this variant is that path costs are not an additive sum of link costs. In this paper, we reformulate this problem as a conic quadratic program, and develop an outer-approximation algorithm based on this formulation. Numerical experiments show that the outer-approximation algorithm significantly outperforms standard integer programming algorithms implemented in solvers.

Airport quality and productivity changes: A Malmquist index decomposition assessment

- Transportation Research Part E: Logistics and Transportation Review---2013---Arianna De Nicola,Simone Gitto,Paolo Mancuso

This paper analyses the productivity of 20 Italian airports management companies during the period 2006–2008 using a DEA Malmquist index that includes a quality component. The proposed methodology is applied for the first time to the airport industry. In doing so, we directly assess the impact of the quality of services delivered by an airport on its productive performance. The study shows that, while Italian airports possess an acceptable level of quality in terms of their infrastructure, their managerial/administrative procedures must be strengthened in order to better deal with both technological modernization and passenger waiting time at the airports.

Locating multiple types of recharging stations for battery-powered electric vehicle transport

- Transportation Research Part E: Logistics and Transportation Review---2013---Ying-Wei Wang, Chuah-Chih Lin

This study used the concepts of set- and maximum-coverage to formulate capacitated multiple-recharging-station-location models, using a mixed integer programming method, based on a vehicle-refueling logic. The results of the case study demonstrate that the use of mixed stations can achieve the optimal deployment for the planning area, with results that are better than those achieved with a single type of recharging stations. While in some paths the use of slow-recharging stations means that tours are not feasible, the deployment of mixed stations can provide an economical approach which ensures the completion of overall tours on each path.

Vertical collusion between airports and airlines: An empirical test for the European case

- Transportation Research Part E: Logistics and Transportation Review---2013---Cristina Barbot, D'Alfonso, Tiziana, Paolo Malighetti, Renato Redondi

We develop a test for vertical collusion between airports and airlines in the case of two different scenarios. In the first scenario there is one airport and one airline;

this intends to depict the case of airports that do not compete with any other one. In the second, we consider two competing airports and one airline that uses the airport as a base or a hub. In the case of non competing airports we find that gross margins are lower when there is vertical collusion. In the case of competing airports, we find that gross margins are equal when both pairs collude or do not collude. But in the case in which only one pair colludes, a merger between them brings a lower margin. We tested 36 pairs of airports–airlines in the case of non competing airports and we find evidence for vertical collusion with respect to: (i) main national carriers in small airports (ii) low cost carriers in secondary airports.

Limitations of DEA-based approach and alternative methods in the measurement and comparison of social efficiency across firms in different transport modes: An empirical study in Japan

- Transportation Research Part E: Logistics and Transportation Review---2013---Tae Hoon Oum, Somchai Pathomsiri, Yuichiro Yoshida

This paper measures and compares social efficiency of railway firms and airlines in Japan's domestic inter-city travel market. Unlike other efficiency studies, our input and output measures are more comprehensive because we incorporate the life-cycle CO₂ emissions as an undesirable output and travelers' time and government spending on air infrastructure as inputs. We use the nonparametric directional output distance function (DODF) together with the composite social efficiency index to analyze the yearly panel data of the three major railroads and two major airlines during 1999–2007. The results indicate that the railroads are more socially efficient than airlines. Furthermore, we discuss the inability of nonparametric DODF method for comparing the social efficiency of firms across modes.

The application of inventory transshipment modeling to air cargo revenue management

- Transportation Research Part E: Logistics and Transportation Review---2013---Li Zou, Chunyan

This paper applies an inventory transshipment modeling approach to investigate the air cargo revenue management problem for an airline operating in a two-segment network. Building upon an extension of the classic two-location inventory transshipment model, we develop a framework to optimize an airline's cargo overbooking decisions in a two-segment network setting. We find consistent evidence indicating that network-based global optimization always leads to greater expected profits than does local (i.e., market by market) optimization. Further, the magnitude of profit improvement is found to be most significant when local shipments have a relatively higher freight yield compared to flow-through shipments. Finally, our results indicate that global optimization contributes to greater profit improvement as offloading penalty costs become higher.

Transborder demand leakage and the US–Canadian air passenger market

- Transportation Research Part E: Logistics and Transportation Review---2013---Omar Sherif Elwakil,Robert J. Windle,Martin E. Dresner

The US–Canadian air traffic market is one of the largest international markets in the world – estimated at 23million passengers in 2008. The market is currently regulated by an “Open Skies” agreement, which eliminated all restrictions on the frequency of flights, the aircraft flown, and the fares charged on transborder routes. Although there is evidence that consumers have benefited from the Open Skies agreement, there is also evidence that many passengers have chosen to avoid transborder services, and instead fly from airports in US border cities and cross the border by surface transportation. This paper uses a passenger demand model to determine the scope of this “leakage” from transborder routes. In addition, transborder airfares are compared to US domestic airfares to determine whether transborder fares are “excessive”, a potential cause of the leakage. Results show a substantial amount of leakage estimated at over 4.7million passengers for

2008. Furthermore, after controlling for the impact of route-specific variables, such as market concentration, average fares are 28.2% higher in the transborder market. Finally, policy implications and the future of the transborder air passenger market are discussed.

Barriers to entry into European aviation markets revisited: A review and analysis of managerial perceptions

- Transportation Research Part E: Logistics and Transportation Review---2013---Jan Willem Kappes,Rico Merkert

This paper reviews the literature and then investigates the perception of European airline managers (from 58 airlines) with regard to entry barriers to aviation markets. We aim to identify the perceived effectiveness of entry barriers and how the perception differs across management levels, business models and regions. Our results suggest that access to airport slots and competing high-speed rail links are perceived as the most effective entry barriers within the European single market. Other key findings include that particularly regional airlines fear predatory pricing/behaviour and that frequent flyer programs have lost some of their perceived effectiveness.

Determinants of airport cost flexibility in a context of economic recession

- Transportation Research Part E: Logistics and Transportation Review---2013---Juan Carlos Martín,Héctor Rodríguez-Déniz,Augusto Voltes-Dorta

The recent economic downturn led to a significant contraction in the global demand for air travel and cargo. In spite of that, airports' operating costs did not mirror the traffic trends and kept increasing during the same period, showing evident signs of lack of flexibility. With this background, this paper aims at identifying the drivers of airport cost flexibility in a context of economic recession. This is done by estimating a short-run stochastic cost frontier over a balanced pool database of 194 airports worldwide between 2007

and 2009. Using the total change in cost efficiency during the sample period as a proxy for cost flexibility, the impact of variables such as ownership, outsourcing, airline dominance, low-cost traffic, and revenue diversification is tested in a second-stage regression. Contrary to the existing literature, a higher level of outsourcing is shown to reduce cost flexibility. Results also indicate that low-cost traffic, diversification, and corporatization increase the airports' ability to control costs. The negative impact of airline dominance suggests the need for more stringent regulations on slot allocation at congested airports in order to ensure optimal infrastructure usage.

Network competition and the difference in operating cost: Model analysis

- Transportation Research Part E: Logistics and Transportation Review---2013---Mikio Takebayashi

In this paper, we propose a bi-level air transport market model which can handle the shape of network, airfare and service frequency as airline's control variables and passenger's behavior. We apply the model to the simple duopolistic market and observe how airlines change their network shape. We assume two types of airlines, the incumbent and the entrant, having different operating cost and conduct numerical computation. From the results, we discuss the features of network equilibrium considering difference in operating cost and confirm that inviting low cost carriers contributes to improving social welfare.

A study of job stress and turnover tendency among air traffic controllers: The mediating effects of job satisfaction

- Transportation Research Part E: Logistics and Transportation Review---2013---Rong-Chang Jou, Chung-Wei Kuo, Mei-Ling Tang

In recent years, due to the rapid growth rate of Taiwanese aviation traffic volume and the air traffic controllers' (ATCs) unique job characteristics (ATCs is a profession job that involves heavy stress), leading

to a shortage of ATCs. The paper offers an empirical study about the sources of pressure that make ATCs in Taiwan want to leave their jobs. Besides, another contribution of this study is to explore the relationships between turnover tendencies and two important factors, job stress and job satisfaction, among Taiwanese ATCs. We apply a path technique to analyze the proposed relationship model. The empirical results show that job satisfaction has a mediating effect on the relationships between the sources of job stress and turnover tendency. Additionally, the workload of job stressors had the most effect on turnover tendency, followed by family factors and job satisfaction. Work environment and role conflict were found to have indirect rather than direct effects on turnover tendency as mediated by job satisfaction. The results can provide valuable insights into the management of ATCs.

Factors affecting airport access mode choice for elderly air passengers

- Transportation Research Part E: Logistics and Transportation Review---2013---Yu-Chun Chang

This research investigates whether elderly air passengers exhibit different mode choice behavior in regard to airport ground access. Using survey data from a Taiwanese sample, our results show that elderly air passengers prefer to ask family members to drive them to the airport, while general passengers prefer to take a taxi. The results also indicate that "safety" is the most important item in the choice of access mode and "user friendly" and "convenience for storing luggage" as the next most important items for the elderly. Elderly passengers are found to be less likely to use public transport than private transport. Factors such as "possessing a car in their household", "carrying more luggage", "spending more time spent in the vehicle", and "higher ticket prices for public transport" increase the propensity for the elderly to use private transport.

Direct and cross elasticities for freight distribution access charges: Empirical evidence by vehicle class, vehicle kilometres and tonne vehicle kilometres

- Transportation Research Part E: Logistics and Transportation Review---2013---David Hensher,Andrew Collins,John Rose,Nariida C. Smith

This paper uses data collected in Australia in 2010–2011 on alternative access charge regimes for freight transport, obtained from a stated choice experiment, which is used in estimation of mixed logit models calibrated on vehicle market shares, to derive matrices of direct and cross access charging elasticities that represent the relationship between an access charge (defined by combinations of distance, mass, and location), vehicle class choice, total kilometres, and tonne–kilometres carried in the vehicle class segments. The elasticities can be used to estimate the response of heavy vehicle operators (and shippers) to price signals under the different access charging schemes.

The Fleet Size and Mix Vehicle Routing Problem with Backhauls: Formulation and Set Partitioning-based Heuristics

- Transportation Research Part E: Logistics and Transportation Review---2013---Said Salhi,Niaz Wassan,Mutaz Hajarat

In this paper we present a new variant of the classical Vehicle Routing Problem – the Fleet Size and Mix Vehicle Routing Problem with Backhauls (FSMVRPB). An ILP formulation of the FSMVRPB is presented. Optimal solutions for small size instances are produced and upper and lower bounds are generated for larger ones. In this paper we also propose a Set Partitioning Problem (SPP) based heuristic. Three frameworks are developed and tested on a set of new FSMVRPB data instances which we generated. Computational results are presented which can be used for future benchmarking.

Choice modelling with search and sort data from an interactive choice experiment

- Transportation Research Part E: Logistics and Transportation Review---2013---Andrew Collins,Stephane Hess,John Rose

We present a highly structured, online, interactive choice environment containing a large number of alternatives, a search tool that eliminates alternatives that fail specified criteria, and a sort tool. A conceptual framework is developed that links tool usage and preference heterogeneity, and tested in the context of long-haul flight choice. Individuals who sort on price are more price sensitive; individuals who search on certain attributes have a greater marginal (dis)utility for that attribute; and individuals who perform certain non-price searches have a lesser price disutility. The method shows promise as a means for providing a richer picture of preference heterogeneity.

An integrated modeling framework for design of logistics networks with expedited shipment services

- Transportation Research Part E: Logistics and Transportation Review---2013---Xiaopeng Li

This paper studied an integrated logistics network problem that determines optimal supplier locations, assignments of these suppliers to terminal facilities, expedited shipment configurations, and inventory management strategies in an uncertain environment. We studied the problem structure and proposed mathematical models to determine the optimal network design that minimizes the expected total system cost. We developed a customized solution approach based on Lagrangian relaxation that can solve these models efficiently and accurately. Numerical examples are conducted to draw managerial insights into how problem settings and key parameter values affect the optimal design results.

Modelling airline flight cancellation decisions

- Transportation Research Part E: Logistics and Transportation Review---2013---Jing Xiong,Mark Hansen

In order to predict airline responses to Traffic Management Initiatives (TMIs), and reveal the underlying preference structures that shape these responses, we study US domestic airlines' cancellation decisions in response to the Federal Aviation Administration (FAA)'s TMIs, in particular, to Ground Delay Programs (GDPs). By observing the actual flight-cancellation choices made by airline dispatchers, the airlines' cancellation utility functions can be inferred through the use of binary choice models. The model captures how delays to a given flight and potential delay savings to other flights affect flight cancellation decisions. We also find larger, fuller, less frequent, shorter-distance, and spoke-bound flights are less likely to be cancelled, and that there is inter-airline variation in flight cancellation behaviour.

Consistently inconsistent: The role of certainty, acceptability and scale in choice

- Transportation Research Part E: Logistics and Transportation Review---2013---Matthew J. Beck,John Rose,David Hensher

Recently emerging in the stated preference literature as methods for better representing behaviour are choice certainty calibration and alternative acceptability. This paper finds that the amount of idiosyncratic error in the context of automobile choice is significant and can be explained by choice task certainty; which is a function of several respondent characteristics. However, it also finds that no theoretical framework exists for how these techniques should be applied and that econometric differences may be responsible for improvements in model fit, rather than better behavioural representation. Raising several questions about certainty indexing, researchers are advised to apply such methods cautiously.

Multilevel modelling of commercial vehicle inter-arrival duration using GPS data

- Transportation Research Part E: Logistics and Transportation Review---2013---Bryce W. Sharman,Matthew J. Roorda

This study uses truck GPS data to study inter-arrival duration, defined as the time between arrivals at a destination of two successive vehicles operated by the same carrier. Destinations were separated into market segments: (1) frequently-visited destinations, (2) regularly-scheduled destinations, and (3) unscheduled destinations, based on visit frequency and regularity. Inter-arrival duration was modelled using multilevel ordered probit and multilevel multinomial logit models. Market segmentation improved modelling results, and multilevel models performed better than single level models. Results showed a wide variation in shipping behavior of commercial establishments and that many firms do not follow consistent shipping schedules.

An heuristic search for the routing of heterogeneous trucks with single and double container loads

- Transportation Research Part E: Logistics and Transportation Review---2013---Michela Lai,Teodor Gabriel Crainic,Massimo Di Francesco,Paola Zuddas

This paper addresses a new routing problem, where container loads must be shipped from a port to importers and from exporters to the port by trucks carrying one or two containers, without separating trucks and containers during customer service. We describe the problem, formulate an optimization model and propose a metaheuristic. It determines the initial solution by a variant of the Clarke-and-Wright algorithm and improves it by a sequence of local search phases. The comparison of the performance of the solutions yielded by the metaheuristic and that of a carrier's decisions show the validity and interest of the proposed method.

Reducing truck emissions at container terminals in a low carbon economy: Proposal of a queueing-based bi-objective model for optimizing truck arrival pattern

- Transportation Research Part E: Logistics and Transportation Review---2013---Gang Chen,Kannan Govindan,Mihalis M. Golias

This study proposes a methodology to optimize truck arrival patterns to reduce emissions from idling truck engines at marine container terminals. A bi-objective model is developed minimizing both truck waiting times and truck arrival pattern change. The truck waiting time is estimated via a queueing network. Based on the waiting time, truck idling emissions are estimated. The proposed methodology is evaluated with a case study, where truck arrival rates vary over time. We propose a Genetic Algorithm based heuristic to solve the resulting problem. Result shows that, a small shift of truck arrivals can significantly reduce truck emissions, especially at the gate.

Hinterland operations of sea ports do matter: Dry port usage effects on transportation costs and CO2 emissions

- Transportation Research Part E: Logistics and Transportation Review---2013---Lauri Lättilä,Ville Henttu,Olli-Pekka Hilmola

Decreasing carbon dioxide (CO₂) emissions is one of the most important tasks for the society in the 21st century. One possibility to decrease emissions originating from transportation is to utilize more rails instead of relying simply on road transportation. In the dry port concept an inland intermodal terminal is connected to a sea port using railways. This study analyzes impacts of dry ports in a Finnish context. We compare two different configurations: In the first one shippers drive directly to a sea port, while in the second one they use dry ports. The systems are evaluated by using discrete-event simulation. In the systems we are interested in two issues: (1) Level of CO₂ emissions, and (2) Costs to transport the goods in different configurations. We use different scenarios for future energy prices and estimate both the costs and CO₂ emission development in these scenarios. We also compare the results to a situation, where emissions are minimized instead of costs. Implications on larger scale are also discussed, for example in the Baltic Sea and North Sea area, where strict sulfur emission restrictions are seen to harm sea transport and increase concentration on small number of sea ports.

Local sourcing and fashion quick response system: The impacts of carbon footprint tax

- Transportation Research Part E: Logistics and Transportation Review---2013---Tsan-Ming Choi

Quick response (QR) system is a well-established industrial practice in fashion apparel. It aims at enhancing inventory management by reducing lead time. In addition to employing a faster delivery mode, QR can be achieved by local sourcing (instead of offshore sourcing). This paper analytically studies how a properly designed carbon footprint taxation scheme can be imposed on a QR system to enhance environmental sustainability via employing a local manufacturer by offsetting the probable higher total logistics and production costs. By examining both the single-ordering and the dual-ordering QR systems, we illustrate how the carbon footprint taxation scheme affects the optimal choice of sourcing decision. Our analytical findings reveal that a properly designed carbon footprint taxation scheme by governing body not only can successfully entice the fashion retailer to source from a local manufacturer, but it can also lead to a lower level of risk for the fashion retailer. A mean-risk improving scenario hence results and it provides a significant incentive to convince the fashion retailer to support the idea of joining QR when the carbon footprint tax is in place.

The effect of green supply chain management on green performance and firm competitiveness in the context of container shipping in Taiwan

- Transportation Research Part E: Logistics and Transportation Review---2013---Chung-Shan Yang,Chin-Shan Lu,Jane Jing Haider,Peter Bernard Marlow

This study empirically examines the relationships between internal green practices, external green integration, green performance, and firm competitiveness in the container shipping context. We collect data from a survey of 163 container shipping firms in Taiwan, and apply a structural equation model (SEM) to test the research hypotheses. We confirm that internal green practices and external green collaboration have positive

impacts on green performance, which in turn helps to enhance firm competitiveness. The findings show that a firm's green performance and external green collaboration act as mediator variables between internal green practices and firm competitiveness, and they influence firm competitiveness positively. We also discuss in this paper the managerial implications for container shipping firms to improve their green performance and competitiveness.

Shipping design for compliance and the performance contingencies for shipping firms

- Transportation Research Part E: Logistics and Transportation Review---2013---Kee-hung Lai,Christina W.Y. Wong,Y.H. Veus Lun,T.C.E. Cheng

Increasing number of shipping firms adopt green shipping practices that emphasize environmental management throughout their operations. To balance productivity with the environment, the design of shipping activities in compliance with energy saving and resources conservation is an important part of greening efforts by many shipping firms. This study investigates how the green practices on shipping design for compliance (SDC) adopted by shipping firms is related to their financial and service performance with the role of company policy and procedures and shipper cooperation examined. We find that SDC is beneficial for the financial and service performance of shipping firms. Based on the contingency theory, we argue further that company policy and procedure as well as shipper cooperation differentiates the performance outcomes of shipping firms in their SDC for environmental management. Our empirical findings show a positive relationship of SDC with service performance particularly when their company policy and procedure and shipper cooperation are characterized at high than low levels in the process. However, such strengthening effects are not found for the relationship between SDC and the financial performance of shipping firms.

Tradable credit schemes for managing bottleneck congestion and modal split with heterogeneous users

- Transportation Research Part E: Logistics and Transportation Review---2013---Li-Jun Tian,Hai Yang,Hai-Jun Huang

This paper examines the efficiency of a tradable travel credit scheme for managing bottleneck congestion and modal split in a competitive highway/transit network with continuous heterogeneity in the individuals' value of time. Each user is initially endowed with a certain amount of travel credits and can sell or buy additional credits in a free trading market. Time-dependent credit charge is implemented only for usage of the road bottleneck. We show that both the modal split and credit charge at equilibrium are unique, and the scheme is always Pareto-improving when the system optimum is achieved.

Exact and heuristic methods to solve the berth allocation problem in bulk ports

- Transportation Research Part E: Logistics and Transportation Review---2013---Nitish Umang,Michel Bierlaire,Ilaria Vacca

In this paper, we study the dynamic hybrid berth allocation problem in bulk ports with the objective to minimize the total service times of the vessels. We propose two exact methods based on mixed integer programming and generalized set partitioning, and a heuristic method based on squeaky wheel optimization, explicitly considering the cargo type on the vessel. The formulations are compared through extensive numerical experiments based on instances inspired from real bulk port data. The results indicate that the set partitioning method and the heuristic method can be used to obtain near-optimal solutions for even larger problem size.

Mixed fleet dispatching in truckload relay network design optimization

- Transportation Research Part E: Logistics and Transportation Review---2013---Hector A. Vergara,Sarah Root

We propose a mathematical formulation for strategic relay network design and dispatching method selection for full truckload transportation. The proposed model minimizes total transportation and installation costs of a mixed fleet dispatching system combining relay network and point-to-point dispatching. Operational constraints such as maximum driver tour length and load circuitry are considered within the variable definition using predefined templates to generate feasible routes. High quality solutions for largely-sized problem instances are obtained in reasonable times. Computational results are analyzed to develop insights about the mixed fleet dispatching system and quantify its benefits over relay network-only and point-to-point dispatching.

A direct comparison of physical block occupancy versus timed block occupancy in train timetabling formulations

- Transportation Research Part E: Logistics and Transportation Review---2013---Steven Harold, Thomas Schlechte

Two fundamental mathematical formulations for railway timetabling are compared on a common set of sample problems, representing both multiple track high density services in Europe and single track bidirectional operations in North America. One formulation, ACP, enforces against conflicts by constraining time intervals between trains, while the other formulation, RCHF, monitors physical occupation of controlled track segments. The results demonstrate that both ACP and RCHF return comparable solutions in the aggregate, with some significant differences in select instances, and a pattern of significant differences in performance and constraint enforcement overall.

A hybrid population heuristic for the heterogeneous vehicle routing problems

- Transportation Research Part E: Logistics and Transportation Review---2013---Shuguang Liu

The heterogeneous vehicle routing problem (HVRP) plays an important role in supply chain logistics. Two

variants of HVRP are treated in this paper: one with fixed and variable costs (HVRPFD), and the other with only variable cost (HVRPD). A hybrid population heuristic that is able to solve both variants is proposed, in which a population of solutions are progressively evolved by crossovers and local searches. Computational results on a set of eight benchmark test problems from literature show that the proposed heuristic produces excellent solutions in short computing times.

Price, capacity and concession period decisions of Pareto-efficient BOT contracts with demand uncertainty

- Transportation Research Part E: Logistics and Transportation Review---2013---Baozhuang Niu, Jie Zhang

In this paper, we study the impact of demand uncertainty on the build-operate-transfer (BOT) contract design by optimizing a bi-objective problem via three critical decisions: toll, capacity and concession period. We derive the optimums and identify the public and private sector's economic incentives. We find that the optimal length of concession period and the service quality of the infrastructure depend on the two parties' operational costs and negotiation powers. Under mild conditions, we prove that the government will build a larger capacity but charge less than the private sector. Furthermore, the efficiency of BOT contract is improved with demand uncertainty.

Recovery of disruptions in rapid transit networks

- Transportation Research Part E: Logistics and Transportation Review---2013---Luis Cadarso, Ángel Marín, Gábor Maróti

This paper studies the disruption management problem of rapid transit rail networks. Besides optimizing the timetable and the rolling stock schedules, we explicitly deal with the effects of the disruption on the passenger demand.

The planning and real-time adjustment of courier routing and scheduling under stochastic travel times and demands

- Transportation Research Part E: Logistics and Transportation Review---2013---Shangyao Yan,Jenn-Rong Lin,Chun-Wei Lai

This study develops a planning and a real-time adjustment model to plan courier routes and schedules in an urban area and to adjust the planned routes in actual operations. The stochastic travel time aspect of the problem has been addressed at both the planning stage and the operation stage. A heuristic is developed to efficiently solve the stochastic real-time adjustment model and a simulation-based evaluation method is also developed to compare the performance of the proposed models. The test results, related to an international express company's operations, show the good performance of the proposed models.

Bunker consumption optimization methods in shipping: A critical review and extensions

- Transportation Research Part E: Logistics and Transportation Review---2013---Shuaian Wang,Qiang Meng,Zhiyuan Liu

It is crucial nowadays for shipping companies to reduce bunker consumption while maintaining a certain level of shipping service in view of the high bunker price and concerned shipping emissions. After introducing the three bunker consumption optimization contexts: minimization of total operating cost, minimization of emission and collaborative mechanisms between port operators and shipping companies, this paper presents a critical and timely literature review on mathematical solution methods for bunker consumption optimization problems. Several novel bunker consumption optimization methods are subsequently proposed. The applicability, optimality, and efficiency of the existing and newly proposed methods are also analyzed. This paper provides technical guidelines and insights for researchers and practitioners dealing with the bunker consumption issues.

A location-routing problem with disruption risk

- Transportation Research Part E: Logistics and Transportation Review---2013---Amir Ahmadi-Javid,Amir Hossein Seddighi

This paper considers a location-routing problem in a supply-chain network with a set of producer-distributors that produce a single commodity and distribute it to a set of customers. The production capacity of each producer-distributor varies randomly due to a variety of possible disruptions, and the vehicles involved in the distribution system are disrupted randomly. The goal is to determine the location, allocation and routing decisions that minimize the annual cost of location, routing and disruption, under one of the moderate, cautious or pessimistic risk-measurement policies. Exact formulations and an efficient heuristic are presented for the problem.

The role of the reference alternative in the specification of asymmetric discrete choice models

- Transportation Research Part E: Logistics and Transportation Review---2013---Lorenzo Masiero,John Rose

Within the discrete choice modelling literature, there has been growing interest in including reference alternatives within stated choice survey tasks. This paper analyses asymmetric discrete choice models by comparing specifications expressed as deviations from the reference point and specifications expressed in absolute values. The results suggest that the most suitable specification reflects the way the attribute levels are presented to respondents, either in terms of deviations or absolute values. Results further suggest significant differences on the willingness to pay and willingness to accept estimates obtained from the two different specifications proposed.

Liquidity risk premium and asset pricing in US water transportation

- Transportation Research Part E: Logistics and Transportation Review---2013---Photis M.

Panayides, Neophytos Lambertides, Kevin Cullinane

The water transportation of freight has been one of the most important sectors in facilitating international trade and contributing to the growth of the world economy. Bearing in mind the importance of the relation between asset returns and liquidity in water transportation, this paper examines this relation within the context of US traded international water freight transportation firms. Using a Fama–MacBeth analysis, it is shown that the illiquidity risk premium is priced in the water transportation sector beyond the Fama and French and market-wide illiquidity risk factors, indicating higher average returns for stocks with greater illiquidity measures. It is also shown that the market-wide illiquidity factor and the Fama–French SMB and HML risk factors are significant in explaining stock returns. In contrast, market risk is found not to be priced in the water transportation sector. The results are also robust to asset pricing tests over two alternative sub-periods.

Portfolio optimization and index tracking for the shipping stock and freight markets using evolutionary algorithms

- Transportation Research Part E: Logistics and Transportation Review---2013---Kostas Andriosopoulos, Michael Doumpos, Nikos Papapostolou, Panos K. Pouliasis

This paper reproduces the performance of an international market capitalization shipping stock index and two physical shipping indexes by investing only in US stock portfolios. The index-tracking problem is addressed using the differential evolution algorithm and the genetic algorithm. Portfolios are constructed by a subset of stocks picked from the shipping or the Dow Jones Composite Average indexes. To test the performance of the heuristics, three different trading scenarios are examined: annually, quarterly and monthly rebalancing, accounting for transaction costs where necessary. Competing portfolios are also assessed through predictive ability tests. Overall, the proposed investment strategies carry less risk compared to the tracked

benchmark indexes while providing investors the opportunity to efficiently replicate the performance of both the stock and physical shipping indexes in the most cost-effective way.

The time dimension and value of flexibility in resource allocation: The case of the maritime industry

- Transportation Research Part E: Logistics and Transportation Review---2013---Kostas Axaroglou, Ilias Visvikis, Stefanos Zarkos

The study empirically analyses the time-varying properties of the spread between voyage and time-charter rates and presents evidence that these properties are directly related to the business cycle (market demand) of the maritime industry, to the expectations for the future market demand and to market volatility. Using a real options methodology, it is demonstrated that the time-varying properties of the spread is the outcome of the strategic decision to time-commit company resources in the industry. During a market upturn (downturn) managers choose to commit company resources for a short period (long period), and thus, maintain flexibility (commitment) in better exploiting the upcoming business opportunities (protecting company resources from lack of business opportunities). Overall, the fluctuations of the time-varying spread between voyage and time-charter rates offer managerial insights in resource allocation that can better shape up chartering, budgeting and financial management decisions on the time commitment of resources in the maritime industry.

Capital structure decisions of globally-listed shipping companies

- Transportation Research Part E: Logistics and Transportation Review---2013---Wolfgang Drobetz, Dimitrios Gounopoulos, Andreas Merikas, Henning Schröder

Debt capital has traditionally been the most important source of external finance in the shipping industry. The access that shipping companies nowadays have to the

capital markets provides them with a broader range of financing instruments. As such, this study investigates the determinants of capital structure decisions using a sample of 115 exchange-listed shipping companies. We test whether listed shipping companies follow a target capital structure, and we analyze their adjustment dynamics after deviations from this target leverage ratio. When compared with industrial firms from the G7 countries, shipping companies exhibit higher leverage ratios and higher financial risk. Standard capital structure variables exert a significant impact on the cross-sectional variation of leverage ratios in the shipping industry. Asset tangibility is positively related to corporate leverage, and its economic impact is more pronounced than in other industries. Profitability, asset risk, and operating leverage are all inversely related to leverage. There is only weak evidence for market-timing behavior of shipping companies. Because demand and supply in the maritime industry are closely related to the macroeconomic environment, leverage behaves counter-cyclically. Using different dynamic panel estimators, we further document that the speed of adjustment after deviations from the target leverage ratio is lower during economic recessions. On average, however, the capital structure adjustment speed in the maritime industry is higher compared with the G7 benchmark sample. These findings indicate that there are substantial costs of deviation from the target leverage ratio due to high expected costs of financial distress. Our results have implications for shipping companies' risk management activities.

Economic significance of market timing rules in the Forward Freight Agreement markets

- Transportation Research Part E: Logistics and Transportation Review---2013---Nikos K. Nomikos, Kaizad Doctor

Quantitative market timing strategies have been traditionally tested in liquid commodity and financial futures, often with mixed results with respect to their performance. We extend this methodology to a non-storable commodity, freight, where hitherto this analysis has not been carried out. The freight futures market

is mature and increasingly liquid, making it a good case for diversification and trading opportunities. We carry out a comprehensive study of quantitative trading strategies in the FFA (Forward Freight Agreements) market on a wide variety of contracts and maturities with a number of trading rules. We find that in spite of robustness checks, trading rules do outperform the buy-and-hold benchmark in general. We also explore the possibility that illiquidity and a small sample size may impact the results of the tests and therefore offer an intuitive approach to mitigate their effects. A procedure that augments the Hansen (2005) SPA (Superior Predictive Ability) methodology and allows us to use it for smaller sample sizes with increased confidence is also proposed.

Competing risks for train tickets – An empirical investigation of customer behavior and performance in the railway industry

- Transportation Research Part E: Logistics and Transportation Review---2013---J. Piening, T. Ehrmann, B. Meiseberg

Based on a comprehensive data set of German railway customers we analyze consumers' choices and particularly subsequent changes of two-part pricing contracts (loyalty cards). In a competing risks framework, we simultaneously estimate effects on three types of contractual events: cancellations, upgrades, and downgrades. Focusing on customer relationship management (CRM) practices, we find several factors affecting these events, some of which railway companies can influence to their advantage. Intuitively, installing auto-renewal procedures for loyalty cards decreases cancellation hazards. However, automated electronic mailings (e.g., reminders and account statements) and advertising (e.g., ticket offers) can be counterproductive and increase the risk of cancellation.

Scheduling reefer mechanics at container terminals

- Transportation Research Part E: Logistics and Transportation Review---2013---Sönke Hartmann

This paper discusses the scheduling of reefer mechanics at container terminals. Reefer mechanics plug and unplug reefer containers such that due times are met. We outline the resulting scheduling problem and two simple heuristics. Subsequently, we present a simulation model to analyze the scheduling methods and the reefer-related processes in a realistic dynamic framework. Some results from the simulation experiments are also presented. They demonstrate the applicability of the heuristic and the use of the simulation model in practice. The simulation study was carried out for a real container terminal in the port of Hamburg, Germany.

Pricing decisions in a carrier–retailer channel under price-sensitive demand and contract-carriage with common-carriage option

- Transportation Research Part E: Logistics and Transportation Review---2013---Fatih Mutlu,Sıla Çetinkaya

We study a carrier–retailer channel and examine the profitability of the centralized and decentralized channels under price-sensitive demand. In the centralized channel, the problem is to set the retail price that maximizes the total channel profit, whereas in the decentralized channel the individual channel members set their own pricing policy parameters to maximize individual profits in a Stackelberg game. We show that a linear price contract between the carrier and the retailer could lead to channel coordination through a win–win solution. We also show that it is profitable for the retailer to exploit common-carriage complementary to the use of contract carriage.

The impact of reliability on the productivity of railroad companies

- Transportation Research Part E: Logistics and Transportation Review---2013---Megersa Abate,Mark Lijesen,Eric Pels,Adriaan Roeleveld

This paper studies the relationship between reliability (proxied by punctuality) and productivity in passenger

railroad services. Increasing reliability may lower productivity, as it requires inputs, that can't be used to produce outputs. The relationship between reliability and productivity also runs through other factors, in which case a positive relationship may be expected. We apply data envelopment analysis and the Malmquist index approach to a panel of seven European railway systems to explore this relationship. Our empirical results suggest that increasing reliability does not harm the productivity of railway operations and aiming to improve both may be a feasible strategy.

Vertical integration and exclusivities in maritime freight transport

- Transportation Research Part E: Logistics and Transportation Review---2013---Óscar Álvarez-SanJaime,Pedro Cantos-Sánchez,Rafael Moner-Colonques,José Sempere-Monerris,Óscar Álvarez San-Jaime

A key recent theme in maritime freight transport is the involvement of shipping lines in terminal management. Such investments are costly but allow liners to provide better service. Most of these new terminals are dedicated terminals but some are non-exclusive and let rivals access them for a fee. In this paper, we show that a shipping line that builds its own terminal finds it strategically profitable (i) to continue routing part of its cargo through the open port facilities, and (ii) to keep its terminal non-exclusive. In this way, the liner investor pushes part of the rival's freight from the open to the new terminal. Besides, under non-exclusivities, the shipping lines offer a wider variety of services, total freight increases and the resulting equilibrium fares are higher than with a dedicated terminal.

Partial link flow observability in the presence of initial sensors: Solution without path enumeration

- Transportation Research Part E: Logistics and Transportation Review---2013---ManWo Ng

Recently, a new methodology (“synergistic sensor location”) has been introduced to efficiently determine

all link flows in a road network by using only a subset of the link flow measurements. In this paper, we generalize this previous work by solving the following problem: Suppose that one is only interested in a subset of the link flows, and that certain link flows are known a priori. At a minimum, what link flows are needed to be able to uniquely determine the desired link flows? An algorithm is presented that does not require the need for path enumeration.

Competition and horizontal integration in maritime freight transport

- Transportation Research Part E: Logistics and Transportation Review---2013---Óscar Álvarez-SanJaime,Pedro Cantos-Sánchez,Rafael Moner-Colonques,José Sempere-Monerris,Óscar Álvarez San-Jaime

This paper models competition for freight transport between the road and maritime sectors. Operators offer differentiated services and there are economies of scale in the oligopolistic shipping line sector. Two types of integration between shipping lines are considered: in one of them the liners production processes remain separate (like in an alliance); in another economies of scale are further exploited. Typically maritime freight post-merger goes down. However, it may increase if the merger exploits further economies of scale, they are important and transport services are sufficiently differentiated. An empirical application to the routes Valencia–Antwerp and Valencia–Genoa is undertaken to confirm the predictions of the model. It is shown that, for both types of merger, user surplus increases when transport services are weakly differentiated and economies of scale are sufficiently small. These conditions also guarantee that a merger is socially beneficial.

Freight options: Price modelling and empirical analysis

- Transportation Research Part E: Logistics and Transportation Review---2013---Nikos K. Nomikos,Ioannis Kyriakou,Nikos Papapostolou,Panos K. Pouliasis

This paper discusses an extension of the traditional log-normal representation for the risk neutral spot freight rate dynamics to a diffusion model overlaid with jumps of random magnitude and arrival. Then, we develop a valuation framework for options on the average spot freight rate, which are commonly traded in the freight derivatives market. By exploiting the computational efficiency of the proposed pricing scheme, we calibrate the jump diffusion model using market quotes of options on the trip-charter route average Baltic Capesize, Panamax and Supramax Indices. We show that the jump-extended setting yields important model improvements over the basic lognormal setting.

Economies of scale in the US airline industry

- Transportation Research Part E: Logistics and Transportation Review---2013---Ahren Johnston,John Ozment

This study investigates economies of scale in the US airline industry using annual data, from 1987 to 2009, on the largest airlines. The paper estimates both a translog and Cobb–Douglas model of both an economic and transportation definition of economies of scale. The study shows that the results from models based on the two definitions are remarkably similar except during rapid growth in output and that the largest US airlines operate under modest scale economies.

Optimal tanker chartering decisions with spot freight rate dynamics considerations

- Transportation Research Part E: Logistics and Transportation Review---2013---He Wang,Simin Huang,Zhen Liu,Li Zheng

We study a tanker chartering decision problem faced by refinery companies. The decision process is formulated as an optimal stopping problem with geometric Brownian motion for the spot freight rate dynamics and a Poisson type arrival process for the tankers. We show the problem can be solved efficiently by partial differential equations. The study, for the first time, provides innovative techniques for modeling freight rate uncertainty facing refinery companies. An application

of the model to a refinery company in China shows the benefit of our method compared to the company's current tanker-chartering strategy.

A column generation based approach for the Train Network Design Optimization problem

- Transportation Research Part E: Logistics and Transportation Review---2013---Jian Gang Jin,Jun Zhao,Der-Horng Lee

This paper investigates the Train Network Design Optimization problem arising from railroad industry which involves the integration of three inter-related decision sub-problems: train routing which is to identify origin, destination and itinerary for individual trains; block-to-train assignment detailing the block movements with trains and swaps between trains; and crew-to-train assignment specifying the crew services for train routes. A column generation based hierarchical approach with two stages is designed: the first stage generates a pool of promising train routes iteratively based on the crew segments by the column generation technique; and the second stage develops an integer linear programming model for the subsequent decisions including train route selection and block-to-train assignment. Numerical experiments with realistic test instances are conducted and the outcome demonstrates the capability of the proposed approach in solving the Train Network Design Optimization problem competently.

The cell phone effect on truck accidents: A specification error approach

- Transportation Research Part E: Logistics and Transportation Review---2013---Richard Fowles,Peter D. Loeb,Wm. Clarke

This paper examines the impact of cell phone usage on truck accident rates in the United States using econometric models and specification error tests. The models focus on the potential nonlinear effect of cell phones on these accidents. The results indicate that increases in cell phone usage increase truck accident rates, but at a declining rate.

Adoption and loyalty toward low cost carriers: The case of Taipei–Singapore passengers

- Transportation Research Part E: Logistics and Transportation Review---2013---Li-Yen Chang,Shao-Chih Hung

This study explores the determinants for the duration of airline passengers to adopt a low cost carrier (LCC) and their loyalty toward the LCC. The analysis results of travel information on 338 passengers traveling between Taipei and Singapore show that business passengers take longer duration to accept the LCC. Cheaper fares and convenient booking channels can shorten the passenger's duration to adopt the LCC, whereas airline image and safety consideration can increase the duration. Frequent flyer programs and convenient booking channels can increase the passengers' loyalty toward the LCC.

The influence of fleet mix, ownership and LCCs on airports' technical/environmental efficiency

- Transportation Research Part E: Logistics and Transportation Review---2013---Gianmaria Martini,Alessandro Manello,Davide Scotti

This paper analyses the efficiency of 33 Italian airports for the period 2005–2008. In addition to conventional outputs, differently from previous contributions, two environmental externalities are considered: noise and local air pollution. We perform a two-stage analysis. First, we implement a directional distance function (DDF) model and get airports' efficiency scores. Then, we study the factors affecting efficiency using a bootstrapping procedure. We find that the fleet mix significantly affects technical/environmental efficiency. Moreover, we provide evidence that public airports have higher efficiency scores. Last, LCCs have no effect on technical/environmental efficiency.

A memetic algorithm for the open capacitated arc routing problem

- Transportation Research Part E: Logistics and Transportation Review---2013---Richard Y.K. Fung,Ran Liu,Zhibin Jiang

In this paper, an open capacitated arc routing problem (OCARP) is defined and considered. The OCARP seeks to find a set of minimum-cost open routes that can serve the tasks (i.e., required arcs) of a given graph, subject to the vehicle capacity and travel distance. A mathematical programming formulation and a lower bound are established. An effective memetic algorithm is developed for solving the OCARP. Computational experiments demonstrate that the proposed algorithm can produce high quality solutions within a reasonable computational time span, and the proposed memetic algorithm is superior to the classical genetic algorithm in solution quality.

Modelling planner–carrier interactions in road freight transport: Optimisation of road maintenance costs via overloading control

- Transportation Research Part E: Logistics and Transportation Review---2013---Eric Moreno-Quintero,Tony Fowkes,David Watling

A bi-level modelling approach is proposed to represent the interaction between the vehicle loading practices of road freight transport carriers, and the decisions of a road planning authority responsible both for road maintenance and for the enforcement of overloading control. At the lower (reactive) level, the overloading decisions of the carriers impact on road maintenance expenditure, while at the upper (anticipatory) level the planner decides fine and enforcement levels by anticipating the responses of the carriers. A case study using data from Mexico is used to illustrate the method.

Multiple sourcing under supplier failure risk and quantity discount: A genetic algorithm approach

- Transportation Research Part E: Logistics and Transportation Review---2013---P.L. Meena,S.P. Sarmah

This paper investigates an order allocation problem of a manufacturer/buyer among multiple suppliers under the risks of supply disruption. A mixed integer non-linear programming (MINLP) model is developed for order allocation considering different capacity, failure

probability and quantity discounts for each supplier. We have shown that the formulated problem is NP-hard in nature and genetic algorithm (GA) approach is used to solve it. The model is illustrated through a numerical study and the result portrays that the cost of supplier has more influence on order quantity allocation rather than supplier's failure probability.

A hybrid Tabu Search approach for the design of a paper recycling network

- Transportation Research Part E: Logistics and Transportation Review---2013---Katharina Schweiger,Ramin Sahamie

This paper addresses the design of a paper recycling network including external procurement, in-house recycling of paper, technology selection and selling or disposing of co-products. In contrast to the literature, we consider a combined continuous and discrete facility location problem solved by a hybrid Tabu Search approach to enhance candidate facility locations. We provide rules of thumb regarding the length of the tabu list and suggestions regarding runtime boundaries in cases where pre-evaluations are elaborate. The results based on a real-life application case show the potential savings of in-house paper recycling compared to the solely external procurement of recovered paper.

Supply chain coordination through rebate induced contracts

- Transportation Research Part E: Logistics and Transportation Review---2013---Subrata Saha

In this paper three different types of rebate induced contract namely direct-rebate and revenue sharing contract; downward direct rebate contract; direct-rebate and effort sharing contract are proposed for supply chain coordination perspective. Effectiveness and flexibility of proposed contracts under linear and iso-elastic demand are discussed analytically. It is shown that under certain conditions both manufacturer and retailer can gain more profit by means of appropriate coordination contracts. Several important implications are derived analytically to point out relationship among

characteristically different contracts. Results are illustrated with numerical examples.

A heuristic approach to the design of fortified distribution networks

- Transportation Research Part E: Logistics and Transportation Review---2013---Qingwei Li,Alex Savachkin

Lean distribution networks have been increasingly exposed to the risk of unpredicted disruptions causing significant economic forfeitures. At the same time, the existing literature features a limited number of studies which consider fortification of facilities for improving network reliability. In this paper, we develop a reliable uncapacitated fixed-charge location model with fortification to support the design of distribution networks. The model considers heterogeneous facility failure probabilities, one layer of supplier backup, and facility fortification within a finite budget. The problem is formulated as a nonlinear mixed integer programming model which is proved to be NP-hard. We develop a Lagrangian relaxation-based (LR) heuristic solution algorithm and demonstrate its computational efficiency for solving large-scale problems.

Container routing in liner shipping

- Transportation Research Part E: Logistics and Transportation Review---2013---Shuaian Wang,Qiang Meng,Zhuo Sun

Container paths play an important role in liner shipping services with container transshipment operations. In the literature, link-based multi-commodity flow formulations are widely used for container routing. However, they have two deficiencies: the level of service in terms of the origin-to-destination transit time is not incorporated and maritime cabotage may be violated. To overcome these deficiencies, we first present an operational network representation of a liner shipping network. Based on the network, an integer linear programming model is formulated to obtain container paths with minimum cost. Finally, we add constraints to the integer linear programming model, excluding

those paths already obtained, so as to find all the container paths.

A methodology to evaluate the competitiveness of electric delivery trucks

- Transportation Research Part E: Logistics and Transportation Review---2013---Brian A. Davis,Miguel A. Figliozzi

This paper examines the competitiveness of the latest generation of electric delivery trucks. A new model that integrates routing constraints, speed profiles, energy consumption, and vehicle ownership costs is developed. The model is applied to the study the competitiveness of three commercial vehicles: a widely available conventional diesel truck and two brands of electric trucks. Scenarios and breakeven points are calculated and analyzed for a large number parameter combination. The results show that route feasibility, minimum fleet size, distance traveled, battery life, purchase costs, and planning horizon are among the most significant factors affecting commercial electric vehicle competitiveness.

Financial condition, safety investment and accident propensity in the US airline industry: A structural analysis

- Transportation Research Part E: Logistics and Transportation Review---2013---Zuozheng Wang,Christian Hofer,Martin E. Dresner

Previous research has used reduced-form models to determine the impact of financial condition and safety investment on airline accident risk and has found limited statistical evidence. We model safety investment as a mediating variable between the financial health of an airline and its accident propensity and simultaneously account for the reverse effects of accident propensity on safety investment. Compared with prior research, our structural model yields stronger results. Specifically, we find that safety investment reduces accident propensity, while the reverse effect is also significant. However, financial condition does not appear to affect safety investment or accident propensity.

Any port in a storm: Impacts of new port infrastructure on exporter behaviour

- Transportation Research Part E: Logistics and Transportation Review---2013---Richard Fabling, Arthur Grimes, Lynda Sanderson

This paper investigates the impact of port infrastructure on exporter behaviour, focusing on the opening of a competing inland port within Auckland. We model adoption of the new facilities among local firms, and test the impacts of uptake on future export growth. We find that the determinants of uptake are product- and firm-related, rather than location-specific. Firms use the new infrastructure in conjunction with the existing port to mitigate capacity constraints and/or access a greater range of transport options. However, we find no significant effect of the port's introduction on firms' subsequent export performance.

A note on "Berth allocation considering fuel consumption and vessel emissions"

- Transportation Research Part E: Logistics and Transportation Review---2013---Shuaian Wang, Qiang Meng, Zhiyuan Liu

Du et al. [Du, Y., Chen, Q., Quan, X., Long, L., Fung, R.Y.K., 2011. Berth allocation considering fuel consumption and vessel emissions. *Transportation Research Part E* 47, 1021–1037] dealt with a berth allocation problem incorporating ship's fuel consumption minimization. To address the difficulty posed by the power function between fuel consumption rate and sailing speed, they formulated a tractable mixed-integer second-order cone programming model. We propose two quadratic outer approximation approaches that can handle general fuel consumption rate functions more efficiently. In the static quadratic outer approximation approach, the approximation lines are generated a priori. In the dynamic quadratic outer approximation approach, the approximation lines are generated dynamically. Numerical experiments demonstrate the advantages of the two approaches.

A model for the formation of colloidal structures in freight transportation: The case of hinterland terminals

- Transportation Research Part E: Logistics and Transportation Review---2013---David Guillermo Carrillo Murillo, Gernot Liedtke

An approach is presented to model the formation of spontaneously emerging associations of freight transport actors. Those agglomerations of logistics actors could be referred to as colloidal structures. The proposed approach combines insights from physics and economics. Typical logistics decisions are considered to be dynamic choices of consumers and providers resulting in temporally stable-market equilibria. The development of colloidal structures is driven by economies of scale on one hand and the preference for variety on the other hand. A case study with regards to intermodal terminals in Germany shows possible applications of the model for transport-policy analysis and planning.

Cost-stable truck scheduling at a cross-dock facility with unknown truck arrivals: A meta-heuristic approach

- Transportation Research Part E: Logistics and Transportation Review---2013---Dinçer Konur, Mihalis M. Goliass

We study a cross-dock operator's truck scheduling problem at inbound doors in case of unknown truck arrival times. Due to uncertainty of truck arrivals, a scheduling strategy is subject to variations in costs of serving the trucks. A cost-stable scheduling strategy is defined as a schedule with low variation levels. In this paper, we analyze the cross-dock operator's problem of determining a cost-stable scheduling strategy while minimizing the average of total service costs. A bi-objective bi-level optimization problem is formulated and we discuss a genetic algorithm based heuristic to find Pareto efficient schedules. The proposed approach is compared to first-come-first-served policies.

A game theoretical analysis of port competition

- Transportation Research Part E: Logistics and Transportation Review---2013---Masahiro Ishii,Paul Tae-Woo Lee,Koichiro Tezuka,Young-Tae Chang

This paper examines the effect of inter-port competition between two ports by applying a game theoretical approach. We construct a non-cooperative game theoretic model where each port selects port charges strategically in the timing of port capacity investment. We derive the Nash equilibrium and obtain some propositions from the equilibrium. We then apply the propositions to the case of inter-port competition between the ports of Busan and Kobe.

Foldable and standard containers in empty container repositioning

- Transportation Research Part E: Logistics and Transportation Review---2013---Ilkyeong Moon,Anh-Dung Do Ngoc,Rob Konings

Strategies to reposition empty containers are an unabated issue for shipping companies. This study compares the repositioning costs of foldable containers to those of standard containers. Mathematical models are used to minimize the total relevant cost, which includes the folding/unfolding cost, the inventory storage cost, the container purchasing cost, and the repositioning cost. Heuristic algorithms are proposed to solve the mathematical models. Numerical experiments are carried out in several scenarios to demonstrate the economic feasibility of foldable containers. The sensitivity analysis shows that the purchasing cost and the transportation cost affect the use of foldable containers.

The impact of supply chain integration on responsiveness: The moderating effect of using an international supplier network

- Transportation Research Part E: Logistics and Transportation Review---2013---Pamela Danese,Pietro Romano,Marco Formentini

This study reveals that in supply networks both external and internal integration practices have a significant and positive impact on responsiveness. The use of an international supplier network acts as a contingency factor on the relationship between external integration practices and responsiveness, as in an international context the effect on performance is amplified. Conversely, the impact of internal integration on responsiveness is not moderated by the use of international suppliers. These evidences suggest managers how to properly tune the level of adoption of integration practices according to the degree of supplier network internationalization.

Marine container terminal configurations for efficient handling of mega-containerships

- Transportation Research Part E: Logistics and Transportation Review---2013---Akio Imai,Etsuko Nishimura,Stratos Papadimitriou

This paper addresses two innovative design alternatives of marine container terminals for efficient ship handling service in the mega-containership era. They serve a mega-ship from two sides at dedicated berths. One of the key issues for higher utilization is how the dedicated berths serve other ships efficiently when they are idle. For this, we develop efficient heuristics for the berth allocation of the two terminals to identify a more productive terminal among them in terms of the total service time of both ordinary and mega-ships. A wide variety of experiments show the channel terminal is the most preferred.

Returns and the bullwhip effect

- Transportation Research Part E: Logistics and Transportation Review---2013---Dean C. Chatfield,Alan M. Pritchard

An almost universal assumption in the bullwhip effect modeling literature is that excess goods may be returned without restriction. We seek to determine if returns impact the level of bullwhip effect observed in a multi-stage supply chain. We build a hybrid agent/discrete-event simulation model of a supply chain and execute it under various conditions of demand

variance, lead-time variance, information sharing, and return allowance. We find that permitting returns significantly increases the bullwhip effect. As a result, applying models that assume returns are permitted will systematically overestimate the bullwhip effect for supply chains that restrict returns.

Auction pricing of network access for North American railways

- Transportation Research Part E: Logistics and Transportation Review---2013---Steven Harrod

The question of pricing train paths for “open access” railway networks in North America is discussed. An auction process is suggested as necessary to maintain transparency in the contracting process. Multiple random samples of auction pricing for a single track railway line demonstrate that the infrastructure entity will receive approximately 15.6% less than the true value of the contracted train paths. This loss of revenue threatens the objective of reducing government subsidy for the railway network.

The impact of lead time reliability in freight transport: A logistics assessment of transport economics findings

- Transportation Research Part E: Logistics and Transportation Review---2013---Wout Dullaert, Luca Zamparini

This paper considers speed and reliability, measured by the average and variance of the lead time, to examine the relevance of the latter variable on inventory costs. By using a flexible simulation framework, it is shown that reducing variability does not necessarily reduce costs and might in fact increase the costs of safety stock, depending on the shape of the demand distribution during lead time and the targeted service level. This offers a novel explanation for the wide variety of value of reliability figures obtained in empirical transport economics research.

Feeder vessel management at container transshipment terminals

- Transportation Research Part E: Logistics and Transportation Review---2013---Der-Hong Lee, Jian Gang Jin

The feeder vessel management problem consists of designing preferred berthing positions and service time for cyclically visiting feeders, and allocating storage yard space to the transshipment flows between mother vessels and feeders. We consider the above three tactical decision problems simultaneously for a container transshipment terminal with an eye toward the quay-side congestion and the housekeeping cost of container movements. The integrated problem is formulated as a mixed integer programming model and solved by a memetic heuristic approach. A comprehensive computational experiment is conducted to show the effectiveness of the heuristic and the improvement upon real-world terminal operations.

A multi-objective robust optimization model for logistics planning in the earthquake response phase

- Transportation Research Part E: Logistics and Transportation Review---2013---Mehdi Najafi, Kourosh Eshghi, Wout Dullaert

Usually, resources are short in supply when earthquakes occur. In such emergency situations, disaster relief organizations must use these scarce resources efficiently to achieve the best possible emergency relief. This paper therefore proposes a multi-objective, multi-mode, multi-commodity, and multi-period stochastic model to manage the logistics of both commodities and injured people in the earthquake response. Also, a robust approach is developed and used to make sure that the distribution plan performs well under the various situations that can follow an earthquake. Afterwards, it proposes a solution methodology according to hierarchical objective functions and uses it to illustrate the customized robust modeling approach.

Trading volume and volatility in the shipping forward freight market

- Transportation Research Part E: Logistics and Transportation Review---2013---Amir H. Alizadeh

This paper investigates the price volatility and trading volume relationship in the forward freight agreement (FFA) market for dry bulk ships over the period 2007–2011. It is found that FFA price changes have a positive impact on trading volume, suggesting a momentum effect as higher capital gains encourage more transactions. There is also evidence of a contemporaneous and positive relation between trading volume and volatility, which is in line with evidence from financial markets and the Mixture of Distribution Hypothesis. However, increases in price volatility lead to lower future trading activities in the FFA market.

The adoption behaviours of freeway electronic toll collection: A latent class modelling approach

- Transportation Research Part E: Logistics and Transportation Review---2013---Yu-Chiun Chiou, Rong-Chang Jou, Chu-Yun Kao, Chiang Fu

This study develops an electronic toll collection (ETC) disaggregate choice model based on a large-scale questionnaire survey of car drivers in Taiwan. To acknowledge the difference in preferences among car drivers, the latent class logit model is used to classify respondents into different groups without subjective segmentation. The estimation results show that six groups of car drivers are optimally distinguished. The price of an e-pass and the discount for ETC tolls are identified as the two most important factors affecting ETC adoption. The study also finds that significant differences in adoption behaviours exist among groups. Effective marketing strategies for different groups are then proposed accordingly.

Cost adjustment for single item pooling models using a dynamic failure rate: A calculation for the aircraft industry

- Transportation Research Part E: Logistics and Transportation Review---2012---R. Fritzsche

This paper presents an analytical model for cost estimation in a single-item, multi-hub (S-1,S) inventory policy-pooling model for high-value spare parts in the aviation industry. The model extends existing, static pooling models by implementing a dynamic failure rate, using a maintenance free operating period (MFOP) as a measurement technique to increase availability of aircraft components. The gained results through a dynamic failure rate show significant effects for a reduction of total costs of ownership and achieving a better operational stock planning, which is demonstrated in a numerical application.

Capacity and toll choice of an add-on toll road under various ownership regimes

- Transportation Research Part E: Logistics and Transportation Review---2012---Zhijia Tan

This paper considers the problem of how to select the toll and capacity levels of a new toll road added onto an existing network with a single link. The existing network has various ownership regimes: free, public or private owned toll road. The effects of the ownership regime of the existing network on the capacity and toll selections of the add-on toll road, the efficiency of the whole network in the sense of total social benefit, and the investment incentives of the government to develop the new road are investigated when the traffic demand is elastic or inelastic.

Robust schedule design for liner shipping services

- Transportation Research Part E: Logistics and Transportation Review---2012---Shuaian Wang, Qiang Meng

This paper examines the design of liner ship route schedules that can hedge against the uncertainties in port operations, which include the uncertain wait time due to port congestion and uncertain container handling time. The designed schedule is robust in that uncertainties in port operations and schedule recovery by fast steaming are captured endogenously. This problem is formulated as a mixed-integer nonlinear

stochastic programming model. A solution algorithm which incorporates a sample average approximation method, linearization techniques, and a decomposition scheme, is proposed. Extensive numerical experiments demonstrate that the algorithm obtains near-optimal solutions with the stochastic optimality gap less 1.5% within reasonable time.

Hierarchical multimodal hub location problem with time-definite deliveries

- Transportation Research Part E: Logistics and Transportation Review---2012---Sibel A. Alumur,Hande Yaman,Bahar Y. Kara

Hierarchical multimodal hub location problem is a cost-minimizing hub covering problem where two types of hubs and hub links, accounting for ground and air transportation, are to be established, while ensuring time-definite deliveries. We propose a mixed-integer programming formulation and perform a comprehensive sensitivity analysis on the Turkish network. We show that the locations of airport hubs are less sensitive to the cost parameters compared to the locations of ground hubs and it is possible to improve the service quality at not much additional cost in the resulting multimodal networks. Our methodology provides the means for a detailed trade-off analysis.

Congestion, port expansion and spatial competition for US container imports

- Transportation Research Part E: Logistics and Transportation Review---2012---Lei Fan,William Wilson,Bruce Dahl

The purpose of this paper is to analyze spatial competition, congestion and flows of container imports into the United States. An intermodal network flow model is developed and used to analyze congestion in the logistics system for container imports. The results indicate that congestion exists at most ports and its consequences are to raise costs at these nodes, and in some cases to divert traffic to other routes. Finally, if each of the ports expanded, the value of marginal

capacity would converge to nil, and expansion would reduce congestion costs and waiting times.

Product return and logistics knowledge: Influence on performance of the firm

- Transportation Research Part E: Logistics and Transportation Review---2012---Antonio Mihi Ramirez

Survey data on reverse logistics processes from 284 Spanish firms are used to test a structural model that analyzes the importance of returned materials and the creation of logistics knowledge within processes of reverse logistics and their effects on organizational performance. The results show that the cost of reverse logistics and the value of returns were found to be positively related to reverse logistics activities. Further, their proper management and the creation of logistics knowledge that improves organizational performance.

Reliable design of a forward/reverse logistics network under uncertainty: A robust-M/M/c queuing model

- Transportation Research Part E: Logistics and Transportation Review---2012---Behnam Vahdani,Reza Tavakkoli-Moghaddam,Mohammad Modarres,Armand Baboli

This paper presents a novel model for designing a reliable network of facilities in closed-loop supply chain under uncertainty. For this purpose, a bi-objective mathematical programming formulation is developed which minimizes the total costs and the expected transportation costs after failures of facilities of a logistics network. To solve the model, a new hybrid solution methodology is introduced by combining robust optimization approach, queuing theory and fuzzy multi-objective programming. Computational experiments are provided for a number of test problems using a realistic network instance.

Modeling urban commercial vehicle daily tour chaining

- Transportation Research Part E: Logistics and Transportation Review---2012---Minyan Ruan, Lin, Jie (Jane), Kazuya Kawamura

This paper presents a tour-chain-based approach to modeling urban commercial vehicle daily activity patterns. A daily tour chain refers to a sequence of daily tours made by a vehicle. Multinomial logit model results demonstrate that urban daily tour-chain choice is a result of collective decisions based on cost and shipment characteristics. This research has significant contributions to the current literature in filling the gap of understanding such critical logistics decisions as distribution channel and factors affecting tour chaining. Furthermore, the paper presents an innovative use of commercial vehicle travel survey data, and points to the urgent need for better quality data.

A top-down approach and a decision support system for the design and management of logistic networks

- Transportation Research Part E: Logistics and Transportation Review---2012---Riccardo Manzini

This paper presents an original top-down approach, made of original models and solving methods, and a decision support system (DSS) for the execution of the strategic planning, the tactical planning and the operational planning in a multi-echelon multi-stage multi-commodity and multi-period production, distribution and transportation system. The DSS is a software platform useful for the design, management and control of real instances. It can efficiently supports the decision making process of logistic managers and planners of large enterprises as multi-facilities companies and production–distribution networks. A significant case study is illustrated. The results obtained by the application of different problem settings are compared and discussed.

The generalized bin packing problem

- Transportation Research Part E: Logistics and Transportation Review---2012---Mauro Maria Baldi, Teodor Gabriel Crainic, Guido Perboli, Roberto Tadei

In the Generalized Bin Packing Problem (GBPP), given two sets of compulsory and non-compulsory items characterized by volume and profit and a set of bins with given volume and cost, we want to select the subset of profitable non-compulsory items to be loaded together with the compulsory ones into the appropriate bins in order to minimize the total net cost. Lower and upper bounds to the GBPP are given. The results of extensive computational experiments show that the proposed procedures are efficient and the bounds are tight.

Valuation effects of mergers and acquisitions in freight transportation

- Transportation Research Part E: Logistics and Transportation Review---2012---Panayiotis C. Andreou, Christodoulos Louca, Photis M. Panayides

This study investigates valuation effects of mergers and acquisitions in the freight transportation industry. It is found that mergers and acquisitions create synergistic gains, especially tender offers, consistent with the view that freight transportation mergers and acquisitions occur for synergistic reasons rather than management's desire for empire building or perk consumption. Both target's and bidder's shareholders are better-off, but most of the synergistic gains accrue to the target's shareholders. Targets' valuation effects are greater for vertical rather than horizontal mergers, indicating a positive valuation for firms that control and manage a more extensive supply chain. The bidders' wealth effects are greater for friendly mergers. Overall, the findings have important implications for professional practice and the development of the theoretical literature.

Fault tolerance modeling for an e-waste recycling supply chain

- Transportation Research Part E: Logistics and Transportation Review---2012---Yenming J. Chen, Jiuh-Biing Sheu, Taih-Cherng Lirn

This paper applies a fault-tolerant method that addresses the problem of steady fulfillment in an e-waste recycling supply chain. Due to the double-ended fluctuations in this supply chain, conventional, optimization based, model predictive control cannot be applied without proper improvement. This paper contributes to the e-waste management literature in the initiation of prudent demand management. The inventory management problem is investigated for a double-ended fluctuation for the e-waste recycling supply chain. It is found that the risk-sensitive predictive control method allows all members to retain a constant inventory level, for which the control target is unclear and the demand fluctuation is high.

Modeling hazardous materials risks for different train make-up plans

- Transportation Research Part E: Logistics and Transportation Review---2012---Morteza Bagheri, Frank Saccomanno, Liping Fu

This paper is concerned with the problem of how to place hazardous material cars in the train assembly process so that the overall derailment risk can be minimized. The approach considers both the probability of railway cars derailing en route by position as well as the risk associated with additional operations in the rail yard using recent US FRA data. The merits of this car placement model are illustrated through a case study of a railway corridor that connects Los Angeles (CA) to Chicago (IL). The case study demonstrates that the proposed risk minimization strategy could be implemented with minimal rail yard operation cost.

Stochastic programming approach to re-designing a warehouse network under uncertainty

- Transportation Research Part E: Logistics and Transportation Review---2012---Farhad Kiya, Hamid Davoudpour

The warehouse network re-design problem includes integrating or eliminating existing warehouses and establishing new sites. In this paper, we incorporate variability in product demand and operational costs with a two-stage stochastic modeling approach. We use the Sample Average Approximation (SAA) approach together with Benders decomposition to provide a solution method. Our results indicate not only that the stochastic solution is an improvement over the deterministic solution but also that the solutions' differences grow with increasing uncertainty. The stochastic solutions show more robustness than the deterministic solutions. The computational results show that a change in the type of probability distribution of the stochastic parameters does not significantly affect the value of the stochastic solutions.

Optimal distance tolls under congestion pricing and continuously distributed value of time

- Transportation Research Part E: Logistics and Transportation Review---2012---Qiang Meng, Zhiyuan Liu, Shuaian Wang

This paper addresses the optimal distance-based toll design problem for cordon-based congestion pricing schemes. The optimal distance tolls are determined by a positive and non-decreasing toll-charge function with respect to the travel distance. Each feasible toll-charge function is evaluated by a probit-based SUE (Stochastic User Equilibrium) problem with elastic demand, asymmetric link travel time functions, and continuously distributed VOT, solved by a convergent Cost Averaging (CA) method. The toll design problem is formulated as a mixed-integer mathematical programming with equilibrium constraints (MPEC) model, which is solved by a Hybrid GA (Genetic Algo-

rithm)–CA method. Finally, the proposed models and algorithms are assessed by two numerical examples.

The impact of user heterogeneity on road franchising

- Transportation Research Part E: Logistics and Transportation Review---2012---Zhijia Tan,Hai Yang

A model is presented for analyzing Pareto-efficient build-operate-transfer toll road contracts. The formulation simultaneously allows maximizing social welfare and private profit when road users vary in their value-of-time (VOT). The failure rate and mean residual functions of the VOT distribution are used to characterize Pareto-efficient solutions. Service quality, measured in terms of the volume-to-capacity ratio, is shown to be better than, identical to, or lower than the socially optimal level depending on the curvature of the mean residual VOT function. The outcomes of various regulatory regimes are examined as well.

An analysis of an airport–airline relationship under a risk sharing contract

- Transportation Research Part E: Logistics and Transportation Review---2012---Katsuya Hihara

This paper analyzes a risk sharing incomplete contract under which an airline agrees to serve an airport in exchange for payment to/from the airport based on the difference between a realized and a target load factor. The key results are that we specified the relevant conditions on payments and utilities under which the incomplete contract can overcome the under-effort problem and achieve the efficient utility levels. These results are numerically illustrated by showing the impacts of the project prospect deterioration and the uncertainty increases on effort and utility levels.

Vertical relations in the air transport industry: A facility-rivalry game

- Transportation Research Part E: Logistics and Transportation Review---2012---D’ Alfonso, Tiziana,Alberto Nastasi

This paper investigates contracts between airports and airlines, in the context of two competing facilities and three types of agreements. The downstream market consists in a route operated by one leader and $n - 1$ followers competing à la Stackelberg in each facility. We develop a multistage game where each airport and its dominant airline decide whether to enter into a contract and which one to engage in. We find that the airport and its dominant airline have incentives to collude in each facility. Nevertheless, the equilibrium is not efficient in terms of social welfare: there is a misalignment between private and social incentives.

Secondary trading of airport slots as a combinatorial exchange

- Transportation Research Part E: Logistics and Transportation Review---2012---Paola Pellegrini,Lorenzo Castelli,Raffaele Pesenti

In our research we propose a market formalization of secondary trading of airport slots. This proposed market is managed through an individual rational and budget balanced combinatorial slot exchange. The suggested market mechanism allows consideration of en-route sector capacities during the slot allocation process. We quantify the potential advantage of the market by comparing it with current practice. The results show that solutions that appear optimal when neglecting en-route sector capacities can be infeasible when taking capacities into account. Finally, in the proposed market the existence of grandfather rights does not seem to affect airline costs in a significant way.

The role of schedule delays on passengers’ choice of access modes: A case study of Japan’s international hub airports

- Transportation Research Part E: Logistics and Transportation Review---2012---Chikako Keumi,Hideki Murakami

We empirically study passenger modal-choice behavior to access an international hub airport, by using stated preference (SP) data and by constructing a binomial

logit model. We found that passenger modal choice is affected by the service level of the access modes: travel time, travel cost, waiting time, and delay cost. The results also indicate that if passengers choose access mode in advance they consider service frequency: departure timing from home, and the arrival timing at the airport. Moreover, our results indicate that travelers' willingness to pay for saving time differs by time of a day. They are apt to pay more in the morning than in the afternoon. These outcomes must contribute to improve the access flight service from local to hub airports to handle the needs of passengers.

Impact of operational performance on air carrier cost structure: Evidence from US airlines

- Transportation Research Part E: Logistics and Transportation Review---2012---Bo Zou,Mark Hansen

The impact of operational performance on airline cost structure is empirically investigated using an aggregate, statistical cost estimation approach. Two distinct sets of operational performance metrics are developed and incorporated into the airline cost models as arguments. Results from estimating a variety of airline cost models reveal that both delay and schedule buffer are important cost drivers. We also find that flight activity outside schedule windows increases cost, whereas flight inactivity within schedule windows does not. Using the estimated cost models, we predict the cost savings to airlines of "perfect" operational performance, obtaining an estimate in the range of \$7.1–13.5 billion for 2007.

Malmquist financial efficiency analysis for airlines

- Transportation Research Part E: Logistics and Transportation Review---2012---Heloisa Márcia Pires,Elton Fernandes

This article discusses the financial efficiency of 42 airlines from 25 countries, in 2001 (the year of the September 11 terrorist attack in the United States), and their

profitability in the following year. The Malmquist index was used to indicate the airlines' capital structure changes from 2001 to 2002. The results show airline capital structure management and profitability dynamics following the unexpected event of 2001. The main conclusion is that airlines which moved more intensively to reduce their indebtedness showed improved profitability, given their size, fleet and intangible assets.

Environmental benefits of air–rail intermodality: The example of Madrid Barajas

- Transportation Research Part E: Logistics and Transportation Review---2012---Massimiliano Zanin,Ricardo Herranz,Sophie Ladousse

The environmental impact of transport is a growing issue in transport infrastructure planning. The construction of a high-speed rail station at the Madrid Barajas Airport in Spain is an example of the integration of different transportation modes, with expected environmental benefits. We construct a model to assess modal choice and environmental benefits. The results show that with high-speed rail the number of people choosing air travel and the private car is reduced leading to important environmental benefits: a reduction of close to 5kg of CO₂ per passenger, or 10% of all emissions on the corridor. Our results also show that increasing the cost of using the private car is picked up by air transport rather than high-speed rail, leading to an increase in total emissions.

Shelter location and transportation planning under hurricane conditions

- Transportation Research Part E: Logistics and Transportation Review---2012---Anna C.Y. Li,Linda Nozick,Ningxiong Xu,Rachel Davidson

This paper develops a scenario-based bilevel programming model to optimize the selection of shelter locations with explicit consideration of a range of possible hurricane events and the evacuation needs under each of those events. A realistic case study for the state of North Carolina is presented. Through the case study,

we demonstrate (i) the criticality of considering multiple hurricane scenarios in the location of shelters, and; (ii) the importance of considering the transportation demands of all evacuees when selecting locations for public shelters.

An equilibrium price model of spot and forward shipping freight markets

- Transportation Research Part E: Logistics and Transportation Review---2012---Koichiro Tezuka,Masahiro Ishii,Motokazu Ishizaka

We focus on non-storability, a characteristic of shipping freight that leads to an enormous gap between the widely-used no-arbitrage pricing theory and shipping freight derivative markets. Our main contribution is to modify and generalize the Bessembinder and Lemon (2002) model. Equilibrium spot and forward price formulae are derived in a shipping freight market where shipowners, charterers, and speculators are non-homogeneous. From our formulae, we also obtain the properties of the forward risk premium and an optimal hedge ratio. In addition, we use the model to quantify the risk attitude of market participants.

Linkages between customer service, customer satisfaction and performance in the airline industry: Investigation of non-linearities and moderating effects

- Transportation Research Part E: Logistics and Transportation Review---2012---Adams B. Steven,Yan Dong,Martin Dresner

The paper investigates the linkages between customer service, customer satisfaction, and firm performance in the US airline industry. In particular, the moderating effects of market concentration and firm dominance on the service-satisfaction-performance relationship are examined. Our major finding is that market concentration dampens the relationship between customer satisfaction and airline profitability. Although the same moderating relationship was not found for market power, these results, combined, indicate that airlines can increase profits in concentrated markets

without providing for the same, concomitant increases in customer satisfaction as airlines operating in more competitive markets. From a public policy perspective, our results point to the importance of regulators monitoring airline actions, such as mergers and alliances, that serve to increase the concentration of markets, but may result in lower levels of customer satisfaction.

A dynamic demand analysis of the United States air-passenger service

- Transportation Research Part E: Logistics and Transportation Review---2012---Junwook Chi,Jungho Baek

This study examines the short- and long-run effects of various determinants on the demand for US air passenger-services using the Johansen cointegration analysis and a vector error-correction (VEC) model. Results show that, in the long-run, airfare, disposable income and NASDAQ have significant effects on US air travel demand. The combined short-run dynamic effects of disposable income, NASDAQ, population and airfare jointly explain changes in air passenger-miles. Finally, we find that the 9/11 terrorist attacks drop air passenger demand by 5% during 2001:Q3-2002:Q2, which in turn pushes down the seat capacity by 4%. However, it has little impact on airfare.

A supply chain generalized network oligopoly model for pharmaceuticals under brand differentiation and perishability

- Transportation Research Part E: Logistics and Transportation Review---2012---Amir H. Mousumi,Min Yu,Anna Nagurney

In this paper, we construct a generalized network oligopoly model with arc multipliers for supply chains of pharmaceutical products using variational inequality theory. The model captures the Cournot competition among the manufacturers who seek to determine their profit-maximizing product flows, which can be perishable, with the consumers differentiating among the products of the firms, whether branded or generic, and the firms taking into consideration the discarding costs.

The numerical examples demonstrate that a brand pharmaceutical product may lose its dominant market share as a consequence of patent rights expiration and because of generic competition.

Production smoothing in a serial supply chain: A laboratory investigation

- Transportation Research Part E: Logistics and Transportation Review---2012---David E. Cantor,Elena Katok

The purpose of this paper is to examine production smoothing in supply chains. Using the controlled setting of the laboratory, we systematically investigate supply chain features that lead to production smoothing. In contrast to prior laboratory studies of the bullwhip effect, we find that the bullwhip effect disappears in several of our experiments. More importantly, our study shows that when customer demand has a predictable seasonal component, retailers smooth orders. This behavior is more pronounced when changing order levels is costly. The results demonstrate how simplifying the structure of the supply chain leads to production smoothing behavior.

A unit-load warehouse with multiple pickup and deposit points and non-traditional aisles

- Transportation Research Part E: Logistics and Transportation Review---2012---Kevin R. Gue,Goran Ivanović,Russell D. Meller

We show how to configure a cross aisle in a unit-load warehouse to facilitate travel between storage locations and multiple pickup and deposit points on one side. We use our models to investigate designs having two types of cross aisles—those that form a “Flying-V” and those that form an “Inverted-V.” Our numerical results suggest that there is a benefit to using a Flying-V aisle design, but the benefit is more modest than in the case of a single P&D point. Thus, to the extent practicable, pickup and deposit points should be concentrated toward the middle of the warehouse.

Safety performance differences between unionized and non-union motor carriers

- Transportation Research Part E: Logistics and Transportation Review---2012---Thomas M. Corsi,Curtis M. Grimm,David E. Cantor,Dale Sienicki

This paper analyzes the safety performance differences between union and non-union motor carriers. Based primarily on the safety and health provisions of a national agreement between the International Brotherhood of Teamsters and a major unionized motor carrier, a hypothesis is developed that union carriers have a positive safety impact. The hypothesis is tested using safety performance data. Key findings are that union membership has a statistically significant positive impact on both driver and vehicle safety performance. Union membership results in significantly fewer crashes as well.

Modeling closed-loop supply chains in the electronics industry: A retailer collection application

- Transportation Research Part E: Logistics and Transportation Review---2012---I-Hsuan Hong,Jun-Sheng Yeh

This paper proposes a retailer collection model whereby the retailer collects end-of-life products and the manufacturer cooperates with a third-party firm to handle used products, and a non-retailer collection model whereby a third-party firm is subcontracted by the manufacturer for collection work. While the return rate, manufacturer's profits, and channel members' total profits of the retailer collection model are not always superior to those of the non-retailer collection model, we find that the retail collection model analytically outperforms when the third-party firm is a non-profit organization for recycling and disposal.

Comparison of royalty methods for build–operate–transfer projects from a negotiation perspective

- Transportation Research Part E: Logistics and Transportation Review---2012---Chao-Chung Kang,Cheng-Min Feng,Chiu-Yen Kuo

This study constructs a royalty negotiation model for the bi-level programming (BLP) problem and develops a heuristic algorithm for solving the BLP problem. Concession rate, learning effect, and the time value discount rate are integrated into the proposed algorithm to reflect an authentic negotiation process. A case study is employed to simulate the negotiation behavior of two parties and alternative royalty strategies are discussed. Analytical results indicate that the two parties acquire the best negotiation result during the fifth negotiation. The operational revenue-based royalty model is more preferred by governments, while concessionaires favor more the operational output-based royalty model.

Concentrated ownership and corporate performance revisited: The case of shipping

- Transportation Research Part E: Logistics and Transportation Review---2012---Mike Tsionas,Andreas G. Merikas,Anna Merika

This paper addresses the issue of ownership structure and corporate performance. It employs a sample of 107 internationally listed shipping firms (about 60% of the total) and examines their financial data and ownership concentration for the year 2009. Ownership is treated as an endogenous variable and GMM estimation is used incorporating the significant advance provided by Lewbel (1997). Empirical results suggest that concentrated ownership is positively and strongly associated with better firm performance in the shipping industry. Furthermore, this paper offers evidence on ownership concentration and shows that despite the different corporate governance settings, ownership structures are quite similar in shipping.

Mergers and acquisitions in aviation – Management and economic perspectives on the size of airlines

- Transportation Research Part E: Logistics and Transportation Review---2012---Rico Merkert,Peter S. Morrell

This paper reviews literature and management perspectives on airline mergers and acquisitions. We find that M&A/consolidation is seen as a “game-changer” and mandatory to survive in aviation markets. We, therefore, apply DEA models to 66 airlines to evaluate whether big is indeed always beautiful. Our results suggest that the optimal airline size is between 34 and 52bn available seat kilometre capacity and that airlines with more than 200bn ASK are definitely too large to operate efficiently. This also applies when revenues are included in the DEA models, which is central as yield management and ancillary revenues are increasingly important.

Minimizing fuel emissions by optimizing vessel schedules in liner shipping with uncertain port times

- Transportation Research Part E: Logistics and Transportation Review---2012---Xiangtong Qi,Dong-Ping Song

We consider the problem of designing an optimal vessel schedule in the liner shipping route to minimize the total expected fuel consumption (and emissions) considering uncertain port times and frequency requirements on the liner schedule. The general optimal scheduling problem is formulated and tackled by simulation-based stochastic approximation methods. For special cases subject to the constraint of 100% service level, we prove the convexity and continuous differentiability of the objective function. Structural properties of the optimal schedule under certain conditions are obtained with useful managerial insights regarding the impact of port uncertainties. Case studies are given to illustrate the results.

Choosing a port: An analysis of containerized imports into the US

- Transportation Research Part E: Logistics and Transportation Review---2012---Adams B. Steven, Thomas M. Corsi

Using a unique data set of individual shipments, port characteristics, and actual freight charges, we examined potential factors within management controls that affect the attractiveness of a port for containerized shipments. We hypothesized that the importance placed on each factor varies by the size of the shipper. We find support for our hypotheses that large shippers emphasize the factors affecting speed of delivery more than the freight charges compared to small shippers. These findings have managerial implications because investments in port development would pay off depending on the fit between the type of investment and the customers' needs.

Vector network equilibrium problems with capacity constraints of arcs

- Transportation Research Part E: Logistics and Transportation Review---2012---Y.D. Xu, S.J. Li, K.L. Teo

In this paper, we study a (weak) vector equilibrium principle with capacity constraints of arcs and common arcs in some different paths. We obtain some necessary and sufficient conditions for a (weak) vector minimum cost flow. By virtue of a (weak) Δ -equilibrium principle, we also derive some necessary and sufficient conditions for a weak vector equilibrium flow.

Collaboration decisions on disruption recovery service in urban public tram systems

- Transportation Research Part E: Logistics and Transportation Review---2012---Amy Z. Zeng, Christian F. Durach, Yan Fang

This research focuses on the decisions on recovery services to deal with short-term disruptions in public tram systems. The disruption recovery approach used in Munich, Germany – the best service acclaimed by

the public, is adopted as the basis to examine whether to collaborate with a taxi company to provide the recovery service and how to price to compensate the service. The two involving parties' decision functions with the taxi's average arrival time as the leading decision variable are formulated and analyzed. Both theoretical and numerical sensitivity analyses are conducted to shed lights on the critical factors affecting the decisions.

A hierarchical clustering and routing procedure for large scale disaster relief logistics planning

- Transportation Research Part E: Logistics and Transportation Review---2012---Linet Özdamar, Onur Demir

We describe a hierarchical cluster and route procedure (HOGCR) for coordinating vehicle routing in large-scale post-disaster distribution and evacuation activities. The HOGCR is a multi-level clustering algorithm that groups demand nodes into smaller clusters at each planning level, enabling the optimal solution of cluster routing problems. The routing problems are represented as capacitated network flow models that are solved optimally and independently by CPLEX on a parallel computing platform. The HOGCR preserves the consistency among parent and child cluster solutions obtained at consecutive levels. We assess the performance of the algorithm by using large scale scenarios and find satisfactory results.

Performance assessment of UK airports: Evidence from a Bayesian dynamic frontier model

- Transportation Research Part E: Logistics and Transportation Review---2012---A. George Asaf, David Gillen, Carlos Barros

This paper analyzes the cost efficiency of UK airports over the period 1998–2008, using a Bayesian dynamic frontier model. This model provides a more structural explanation for the variation in airports inefficiency than has been presented by previous models, and also

allows for cost inefficiency effects. On average, the dynamic frontier results, estimated via the Markov Chain Monte-Carlo simulation, indicate that UK airports improved their efficiency over time. Factors found to be important determinants of cost efficiency include airport size, price regulation, price cap variations and airport competition. Policy implications of the results are derived.

The time dependent vehicle routing problem with time windows: Benchmark problems, an efficient solution algorithm, and solution characteristics

- Transportation Research Part E: Logistics and Transportation Review---2012---Miguel Andres Figliozzi

An algorithm that can tackle time dependent vehicle routing problems with hard or soft time windows without any alteration in its structure is presented. Analytical and experimental results indicate that average computational time increases proportionally to the number of customers squared. New replicable test problems that capture the typical speed variations of congested urban settings are proposed. Solution quality, time window perturbations, and computational time results are discussed as well as a method to study the impact of perturbations by problem type. The algorithm efficiency and simplicity is well suited for urban areas where fast running times may be required.

Airlines-within-airlines strategies and existence of low-cost carriers

- Transportation Research Part E: Logistics and Transportation Review---2012---Ming Hsin Lin

This paper investigates hub carriers' airlines-within-airlines (AinA) strategies, intended to establish low-cost divisions offering nonstop flights on rim routes. An initial hub-spoke network is optimal if passenger differentiation between one-stop and nonstop services and via-hub time cost are small. If differentiation is substantial, a mixed one-stop and nonstop (point-to-point) network under AinA is optimal when via-hub time cost is small (large). Low-cost rivals on rim routes

weaken AinA adoption and enhance welfare from a monopoly mixed network. In a perfect-substitute case, hub carriers may have excessive incentive to adopt AinA from a welfare viewpoint, especially, when low-cost rivals exist.

Throughput time distribution analysis for a one-block warehouse

- Transportation Research Part E: Logistics and Transportation Review---2012---Marc Schleyer, Kevin Gue

We develop discrete time models for the throughput time distribution of orders arriving to a one-block warehouse. The models accommodate single- or multi-line orders, and we show how to use them to determine the optimal batch size, given a desired probability of on-time order fulfillment. Experiments suggest that the optimal batch size is slightly higher than one would choose if minimizing average throughput time.

Handling uncertainties in vehicle routing problems through data preprocessing

- Transportation Research Part E: Logistics and Transportation Review---2012---Matthieu Chardy, Olivier Klopfenstein

This paper presents a global preprocessing methodology for handling uncertainties in operations management. Beyond theoretical considerations on solution feasibility, the methodology provides practitioners with a Monte Carlo simulation-based framework for effective risk management. The main strength of this methodology is being easily applicable to almost any decision problem. Application field of the paper is a real-life workforce management problem for which we propose several mixed integer formulations as well as dedicated solution algorithms. Extensive numerical tests on real-life instances assess the benefit from preprocessing schemes when performed as recommended by our approach, and thus prove its practical relevance.

Buffering in evacuation management for optimal traffic demand distribution

- Transportation Research Part E: Logistics and Transportation Review---2012---Jun Du-anmu,Mashrur Chowdhury,Kevin Taafe,Craig Jordan

This paper presents a new framework for managing congestion during emergency evacuations. The algorithm allows a long link of the network to be used as a buffer to keep the traffic flow moving in. Concurrently, a detour trigger time is estimated to keep the traffic under-saturated in the buffer zone and minimize the total travel time. The integration algorithm presented in this paper is an efficient mathematical solution for travel time cost calculation. A case study is presented to demonstrate the efficacy of the traffic demand buffering strategy developed in this research for managing the evacuation flow.

Sailing speed optimization for container ships in a liner shipping network

- Transportation Research Part E: Logistics and Transportation Review---2012---Shuaian Wang,Qiang Meng

This paper first calibrates the bunker consumption – sailing speed relation for container ships using historical operating data from a global liner shipping company. It proceeds to investigate the optimal sailing speed of container ships on each leg of each ship route in a liner shipping network while considering transshipment and container routing. This problem is formulated as a mixed-integer nonlinear programming model. In view of the convexity, non-negativity, and univariate properties of the bunker consumption function, an efficient outer-approximation method is proposed to obtain an ϵ -optimal solution with a predetermined optimality tolerance level ϵ . The proposed model and algorithm is applied to a real case study for a global liner shipping company.

The co-opetitive strategy of a closed-loop supply chain with remanufacturing

- Transportation Research Part E: Logistics and Transportation Review---2012---Jen-Ming Chen,Chia-I Chang

This paper deals with a strategic issue of closed-loop supply chains with remanufacturing by developing analytic models under cooperative and competitive settings. The primary goal behind analytic formulation is to investigate under what conditions an original equipment manufacturer (OEM) may take a cooperative approach by participating in remanufacturing. In contrast, the OEM may take a competitive approach by letting the third-party firm remanufacture the returned cores and remarket in the secondary market that competes with the new product. Our analysis reveals that the strategic decision depends critically on the costs of remanufacturing and the competition intensity between the two versions.

A supply chain network design considering transportation cost discounts

- Transportation Research Part E: Logistics and Transportation Review---2012---Yu-Chung Tsao,Jye-Chyi Lu

This study addresses an integrated facility location and inventory allocation problem considering transportation cost discounts. Specifically, this article considers two types of transportation discounts simultaneously: quantity discounts for inbound transportation cost and distance discounts for outbound transportation cost. This study uses an approximation procedure to simplify DC distance calculation details, and develops an algorithm to solve the aforementioned supply chain management (SCM) problems using nonlinear optimization techniques. Numerical studies illustrate the solution procedures and the effects of the model parameters on the SCM decisions and total costs. Results of this study serve as a reference for business managers and administrators.

Route-based data envelopment analysis models

- Transportation Research Part E: Logistics and Transportation Review---2012---Yu-Chiun Chiou, Lawrence W. Lan, Barbara T.H. Yen

This paper proposes two novel route-based data envelopment analysis (DEA) models that jointly measure the route-level and company-level efficiencies amongst transport carriers. The core logics comprise a three-stage procedure that determines company efficiency, route efficiency and optimal allocation ratios for the common inputs. We prove that the ranking order of company performance determined by the route-based DEA model is identical to that determined by the company-based DEA model. An empirical case demonstrates the superiority of the proposed models in identifying the less efficient routes/companies as well as in reducing the input slacks without subjective conjectures.

Tradable travel credits for congestion management with heterogeneous users

- Transportation Research Part E: Logistics and Transportation Review---2012---Xiaolei Wang, Hai Yang, Daoli Zhu, Changmin Li

This paper carries on the recent work of Yang and Wang (2011) on tradable credit schemes by considering heterogeneous users with different value of time (VOT). Given a tradable credit scheme, the user equilibrium (UE) and market equilibrium (ME) conditions with heterogeneous users are formulated into a variational inequalities (VI) problem. Sufficient conditions for uniqueness of the aggregate UE link flows and then the ME credit price are established. Appropriate tradable credit schemes are developed to decentralize system optimal and Pareto-improving network flow patterns. Extension is made to the elastic demand case.

Stochastic optimization models for the airport gate assignment problem

- Transportation Research Part E: Logistics and Transportation Review---2012---Merve Şeker, Nilay Noyan

Uncertainties inherent in the airport traffic may lead to the unavailability of gates for accommodating scheduled flights. Incorporating random disruptions is crucial in constructing effective flight-gate assignments. We consider the gate assignment problem under uncertainty in flight arrival and departure times and develop stochastic programming models incorporating robustness measures based on the number of conflicting flights, idle and buffer times. The proposed models are formulated as large-scale mixed-integer programming problems and tabu search algorithms are implemented to obtain assignments of reasonable quality. We conduct a computational study to analyze the proposed alternate models and show the effectiveness of the solution methods.

The impact of flight delays on passenger demand and societal welfare

- Transportation Research Part E: Logistics and Transportation Review---2012---Rodrigo Britto, Martin Dresner, Augusto Voltes

US airline passengers increasingly have access to flight delay information from online sources. As a result, air passenger travel decisions can be expected to be influenced by delay information. In addition, delays affect airline operations, resulting in increased block times on routes and, in general, higher carrier costs and airfares. This paper examines the impact of flight delays on both passenger demand and airfares. Delays are calculated against scheduled block times as well as against more idealized feasible flight times. Based on econometric estimations, welfare impacts of flight delays are calculated. We find that flight delays on a route reduce passenger demand and raise airfares, producing significant decreases in both consumer and producer welfare. Since producer welfare effects are estimated to be three times as large as consumer welfare effects, we conclude that from an economic efficiency rationale, airlines should be required to pay for the bulk of flight delay remediation efforts.

Liner ship fleet deployment with container transshipment operations

- Transportation Research Part E: Logistics and Transportation Review---2012---Shuaian Wang,Qiang Meng

This paper proposes a liner ship fleet deployment (LSFD) problem with container transshipment operations. The proposed problem is formulated as a mixed-integer linear programming model which allows container transshipment operations at any port, any number of times, without explicitly defining the container transshipment variables. Experiments on the Asia–Europe–Oceania shipping network of a global liner shipping company show that more than one third (17–22 ports) of the total of 46 ports have transshipment throughputs. Computational studies based on randomly generated large-scale shipping networks demonstrate that the proposed model can be solved efficiently by CPLEX.

A location-inventory model for large three-level supply chains

- Transportation Research Part E: Logistics and Transportation Review---2012---Jean-Sébastien Tancr ez,Jean-Charles Lange,Pierre Semal

We study the location-inventory problem in three-level supply networks. Our model integrates three decisions: the distribution centers location, flows allocation, and shipment sizes. We propose a nonlinear continuous formulation, including transportation, fixed, handling and holding costs, which decomposes into a closed-form equation and a linear program when the DC flows are fixed. We thus develop an iterative heuristic that estimates the DC flows a priori, solves the linear program, and then improves the DC flow estimations. Extensive numerical experiments show that the approach can design large supply networks both effectively and efficiently, and a case study is discussed.

The application of stochastic frontier panel models in economic regulation: Experience from the European rail sector

- Transportation Research Part E: Logistics and Transportation Review---2012---Andrew S.J. Smith

This paper shows how stochastic frontier panel techniques can be used by economic regulators to benchmark regulated firms against international best practice. We utilise a unique, panel dataset of European rail infrastructure managers (1996–2006). A time-varying inefficiency model, with firm-specific time paths for inefficiency, is adopted. The results were used in the 2008 regulatory review of the British infrastructure manager, Network Rail, and showed that the company faced an efficiency gap of around 40% against European best practice – in line with engineering-based evidence. More widely, the paper highlights the advantages of the inefficiency specification adopted for use in economic regulation.

Terminal and yard allocation problem for a container transshipment hub with multiple terminals

- Transportation Research Part E: Logistics and Transportation Review---2012---Der-Horng Lee,Jian Gang Jin,Jiang Hang Chen

This paper presents an integer programming model for the terminal and yard allocation problem in a large container transshipment hub with multiple terminals. The model integrates two decisions: terminal allocation for vessels and yard allocation for transshipment container movements within a terminal as well as between terminals. The objective function aims to minimize the total inter-terminal and intra-terminal handling costs generated by transshipment flows. To solve the problem, we develop a 2-level heuristic algorithm to obtain high quality solutions in an efficient way. Computational experiments show the effectiveness of the proposed approach.

The effects of corporate governance on airline performance: Production and marketing efficiency perspectives

- Transportation Research Part E: Logistics and Transportation Review---2012---Wen-Min Lu,Wei-Kang Wang,Shiu-Wan Hung,En-Tzu Lu

This study explores the relationship between operating performance and corporate governance in 30 airline companies operating in the US. First, this study applies a two-stage Data Envelopment Analysis (DEA) to evaluate the production efficiency and marketing efficiency of the airlines. Our findings indicate that, in general, there is not as much dispersion in the relative productive efficiencies of the airlines as there is in their marketing efficiencies. The low-cost airlines, on average, are more efficient carriers than the full-service ones, but less efficient marketers. Secondly, truncated regression is used to explore whether the characteristics of corporate governance affect airline performance. The results demonstrate that corporate governance influences firm performance significantly. Finally, we address the managerial decision-making matrix and make suggestions to help airline managers improve performance.

Latent class nested logit model for analyzing high-speed rail access mode choice

- Transportation Research Part E: Logistics and Transportation Review---2012---Chieh-Hua Wen,Wei-Chung Wang,Chiang Fu

This paper explores access mode choice behavior, using a survey data collected in Taiwan. The latent class nested logit model is used to capture flexible substitution patterns among alternatives and preference heterogeneity across individuals while simultaneously identifying the number, sizes, and characteristics of market segments. The results indicate that a four-segment latent class nested logit model with individual characteristics in segment membership functions is the most preferred specification. Most high-speed rail travelers were cost-sensitive to access modes, and thus

strategies that reduce the access costs can be more effective than reducing the access times.

Multimarket contact, alliance membership, and prices in international airline markets

- Transportation Research Part E: Logistics and Transportation Review---2012---Li Zou,Chunyan Yu,Martin Dresner

This paper tests the mutual forbearance view in the context of airline alliances in the international air travel market. Using passenger booking and airfare data on transpacific routes, we find consistent evidence for the positive association between multimarket contact and airfares. Our results also suggest that multimarket contact between non-aligned airlines is associated with higher airfares, whereas multimarket contact between airlines in the same alliance has no additional upward impact on airfares. Moreover, it is shown that higher airfares tend to exist when airlines have greater multimarket contact on open-skies routes. In restrictive (non-liberal) international markets, however, multimarket contact may not affect airfare.

Models for relief routing: Equity, efficiency and efficacy

- Transportation Research Part E: Logistics and Transportation Review---2012---Michael Huang,Karen Smilowitz,Burcu Balcik

In humanitarian relief operations, vehicle routing and supply allocation decisions are critically important. Similar routing and allocation decisions are studied for commercial settings where efficiency, in terms of minimizing cost, is the primary objective. Humanitarian relief is complicated by the presence of multiple objectives beyond minimizing cost. Routing and allocation decisions should result in quick and sufficient distribution of relief supplies, with a focus on equitable service to all aid recipients. However, quantifying such goals can be challenging. In this paper, we define and formulate performance metrics in relief distribution. We focus on efficacy (i.e., the extent to which the goals of quick and sufficient distribution are met) and equity

(i.e., the extent to which all recipients receive comparable service). We explore how efficiency, efficacy, and equity influence the structure of vehicle routes and the distribution of resources. We identify trends and routing principles for humanitarian relief based on the analytical properties of the resulting problems and a series of computational tests.

Coordinated aviation network resource allocation under uncertainty

- Transportation Research Part E: Logistics and Transportation Review---2012---Andrew M. Churchill,David J. Lovell

Congestion in the air traffic system, both recurrent and non-recurrent, is typically handled by rationing access rights to individual resources such as airports or important parts of the airspace. Under the planning paradigm employed in the US, this rationing process occurs independently at each resource. The stochastic integer programming model proposed in this paper brings coordination to this process while considering capacity uncertainty. Results of a case study suggest that the model is tractable, and generates capacity allocations that improve efficiency and enable greater responsiveness to changing capacity conditions.

Optimal route decision with a geometric ground-airborne hybrid model under weather uncertainty

- Transportation Research Part E: Logistics and Transportation Review---2012---Yoonjin Yoon,Mark Hansen,Michael O. Ball

Adverse weather is the dominant cause of delays in the National Airspace System (NAS). Since the future weather condition is only predictable with a certain degree of accuracy, managing traffic in the weather-affected airspace is a challenging task. In this paper, we propose a geometric model to generate an optimal combination of ground delay and route choice to hedge against weather risk. The geometric recourse model (GRM) is a strategic Probabilistic Air Traffic Management (PATM) model that generates optimal route

choice, incorporating route hedging and en-route recourse to respond to weather change: hedged routes are routes other than the nominal or the detour one, and recourse occurs when the weather restricted airspace becomes flyable and aircraft are re-routed to fly direct to the destination. Among several variations of the GRM, we focus on the hybrid Dual Recourse Model (DRM), which allows ground delay as well as route hedging and recourses, when the weather clearance time follows a uniform distribution. The formulation of the hybrid DRM involves two decision variables – ground delay and route choice – and four parameters: storm location, storm size, maximum storm duration time, and ground-airborne cost ratio. The objective function has two components: expected total ground delay cost and expected total airborne cost. We propose a solution algorithm that guarantees to find the global optimum of the hybrid-DRM. Based on the numerical analysis, we find that ground-holding is effective only when combined with the nominal route. Otherwise, it is optimal to fly on the route determined by the DRM without ground delay. We also find the formula of the threshold ground-airborne cost ratio, which we call the Critical Cost Ratio (CCR), that determines the efficacy of ground delay: the higher the CCR, the more effective the strategies involving ground delay. We conclude that both ground delay and route hedging should be considered together to produce the best ATM decisions.

Design of a rail transit line for profit maximization in a linear transportation corridor

- Transportation Research Part E: Logistics and Transportation Review---2012---Zhi-Chun Li,William H.K. Lam,S.C. Wong,A. Sumalee

This paper addresses the design problem of a rail transit line located in a linear urban transportation corridor. The service variables designed are a combination of rail line length, number and locations of stations, headway and fare. Two profit maximization models, which account for the effects of different transit pricing structures (flat and distance-based fare regimes), are proposed. In the proposed models, the effects of passen-

ger demand elasticity and population density along the urban corridor are explicitly considered. The solution properties of the proposed models are explored and compared analytically, and the indifference condition for the two fare regimes in terms of the operator's net profit is identified. A heuristic solution algorithm to solve the proposed models is presented. Numerical examples are provided to show the effects of the fare regimes, rail capital cost and urban configuration (in terms of urban population distribution and corridor length) on the design of the rail transit line and the profitability of the rail transit operations.

Optimal inter-area coordination of train rescheduling decisions

- Transportation Research Part E: Logistics and Transportation Review---2012---F. Corman,D' Ariano, A.,D. Pacciarelli,M. Pranzo

Railway dispatchers reschedule trains in real-time in order to limit the propagation of disturbances and to regulate traffic in their respective dispatching areas by minimizing the deviation from the off-line timetable. However, the decisions taken in one area may influence the quality and even the feasibility of train schedules in the other areas. Regional control centers coordinate the dispatchers' work for multiple areas in order to regulate traffic at the global level and to avoid situations of global infeasibility. Differently from the dispatcher problem, the coordination activity of regional control centers is still underinvestigated, even if this activity is a key factor for effective traffic management.

Dynamics and equilibria of ecological predator-prey networks as nature's supply chains

- Transportation Research Part E: Logistics and Transportation Review---2012---Anna Nagurney,Ladimer S. Nagurney

In this paper, we develop a dynamic network model of ecological food webs and prove that the set of stationary points of the projected dynamical system coincides

with the set of solutions of a variational inequality governing the equilibrium of predator-prey networks. We also establish the equivalence between the ecological models and supply chain network equilibrium models and highlight the connections to spatial price equilibrium problems. We propose an algorithmic scheme, provide convergence results, and apply it to a food web drawn from a fisheries application.

A Green Vehicle Routing Problem

- Transportation Research Part E: Logistics and Transportation Review---2012---Sevgi Erdoğan,Elise Miller-Hooks

A Green Vehicle Routing Problem (G-VRP) is formulated and solution techniques are developed to aid organizations with alternative fuel-powered vehicle fleets in overcoming difficulties that exist as a result of limited vehicle driving range in conjunction with limited refueling infrastructure. The G-VRP is formulated as a mixed integer linear program. Two construction heuristics, the Modified Clarke and Wright Savings heuristic and the Density-Based Clustering Algorithm, and a customized improvement technique, are developed. Results of numerical experiments show that the heuristics perform well. Moreover, problem feasibility depends on customer and station location configurations. Implications of technology adoption on operations are discussed.

Game theory-based identification of facility use restrictions for the movement of hazardous materials under terrorist threat

- Transportation Research Part E: Logistics and Transportation Review---2012---Allison Reilly,Linda Nozick,Ningxiong Xu,Dean Jones

Government agencies can determine which specific facilities in a transportation network to restrict for each class of material and for which times of the day and/or week to stem the consequences of a terrorist event. To guide in making these determinations, this paper develops a three-player game of the interactions among a government agency, a carrier, and a terrorist. It also

develops an effective solution procedure for this game and illustrates the use of that procedure on a realistic case study based on the freight rail network in the continental United States.

A bi-objective model for planning and managing rail-truck intermodal transportation of hazardous materials

- Transportation Research Part E: Logistics and Transportation Review---2012---Manish Verma,Vedat Verter,Nicolas Zufferey

We propose a bi-objective optimization framework for routing rail-truck intermodal shipments with hazardous materials, when shippers and receivers have access to alternate intermodal terminals. A tabu-search based solution methodology is developed, which together with the optimization framework is applied to realistic size problem instances to gain managerial insights. Our analysis indicates that drayage accounts for a significant portion of transport risk and that it can be reduced by scheduling direct and faster trains; and, that the mix of intermodal trains depends on the interest of the decision-makers, where the resulting traffic can facilitate planning emergency response systems.

Bioethanol supply chain system planning under supply and demand uncertainties

- Transportation Research Part E: Logistics and Transportation Review---2012---Chien-Wei Chen,Yueyue Fan

A mixed integer stochastic programming model is established to support strategic planning of bioenergy supply chain systems and optimal feedstock resource allocation in an uncertain decision environment. The two-stage stochastic programming model, together with a Lagrange relaxation based decomposition solution algorithm, was implemented in a real-world case study in California to explore the potential of waste-based bioethanol production. The model results show that biowaste-based ethanol can be a viable part of sustainable energy solution for the future.

External organizational commitment among organizational implants: The case of logistics service providers

- Transportation Research Part E: Logistics and Transportation Review---2012---Scott J. Grawe,Patricia J. Daugherty,James C. McElroy

Using the concept of external organizational commitment (EOC), survey data from 312 logistics service provider (LSP) implants are used to test a model of the determinants of implant level of commitment to their host firm and the consequences of such commitment to the LSP. The results show that both inter-organizational outcome and task interdependence affect implant perceptions of the degree to which they are supported by their host organization. Perceived organizational support by the host organization, in turn, was found to be positively related to implant commitment to their host organization, which was positively related to LSP operation-level performance.

The dark side of logistics outsourcing – Unraveling the potential risks leading to failed relationships

- Transportation Research Part E: Logistics and Transportation Review---2012---Ming-Chih Tsai,Kee-hung Lai,Alison E. Lloyd,Hung-Ju Lin

We identify and empirically examine the potential risk factors and their structural relationships that can cause a logistics outsourcing relationship to fail. Specifically, we investigate how the relationship risk as perceived by apparel wholesalers as user firms influence their evaluation on the asset and competence entrusted with their logistics service providers, which are logistics outsourcing risk factors considered important by the former in determining continued relationships with the latter. The results highlight the need for relationship management by user firms to mitigate the risks in asset and competence specifically invested in logistics service providers for their outsourced activities.

Scheduling commercial vehicle queues at a Canada–US border crossing

- Transportation Research Part E: Logistics and Transportation Review---2012---Michael Haughton,K.P. Sapna Isotupa

Using the context of queue operations at a major Canada–US commercial border crossing for truck-borne trade flows, we report on a computer simulation study to predict the likely impacts of smoothing those flows. We quantify the operational and resource efficiencies of smoothing for trans-border trucking companies and their trans-border supply chain partners as well as for government authorities with regulatory jurisdiction at border crossings. Our study's major conclusion is that smoothing can achieve queue performance levels that, in the absence of smoothing, would require significant investment in truck processing capacity at border crossings.

Revenue management policies for the truck rental industry

- Transportation Research Part E: Logistics and Transportation Review---2012---Francesca Guerriero,Giovanna Miglionico,Filomena Olivito

In this paper, we consider the problem of managing a fleet of trucks with different capacity to serve the requests of different customers that arise randomly over time. The problem is formulated via dynamic programming. Linear programming approximations of the problem are presented and their solutions are exploited to develop partitioned booking limits and bid prices policies. The numerical experiments show that the proposed policies can be profitably used in supporting the decision maker.

Analysis of an integrated maximum covering and patrol routing problem

- Transportation Research Part E: Logistics and Transportation Review---2012---Burcu B. Keskink,Li, Shirley (Rong),Dana Steil,Sarah Spiller

In this paper, we address the problem of determining the patrol routes of state troopers for maximum coverage of highway spots with high frequencies of crashes (hot spots). We develop a specific mixed integer linear programming model for this problem under time feasibility and budget limitation. We solve this model using local and tabu-search based heuristics. Via extensive computational experiments using randomly generated data, we test the validity of our solution approaches. Furthermore, using real data from the state of Alabama, we provide recommendations for (i) critical levels of coverage; (ii) factors influencing the service measures; and (iii) dynamic changes in routes.

Optimization approach to depot location and trip selection in one-way carsharing systems

- Transportation Research Part E: Logistics and Transportation Review---2012---Gonçalo Homem de Almeida Correia,António Pais Antunes

In this paper, we present an optimization approach to depot location in one-way carsharing systems where vehicle stock imbalance issues are addressed under three trip selection schemes. The approach is based on mixed-integer programming models whose objective is to maximize the profits of a carsharing organization considering all the revenues and costs involved. The practical usefulness of the approach is illustrated with a case study involving the municipality of Lisbon, Portugal. The results we have obtained from this study provided a clear insight into the impact of depot location and trip selection schemes on the profitability of such systems.

A spatiotemporal partitioning approach for large-scale vehicle routing problems with time windows

- Transportation Research Part E: Logistics and Transportation Review---2012---Mingyao Qi,Wei-Hua Lin,Nan Li,Lixin Miao

For VRP with time windows (VRPTW) solved by conventional cluster-first and route-second approach, temporal information is usually considered with vehicle

routing but ignored in the process of clustering. We propose an alternative approach based on spatiotemporal partitioning to solving a large-scale VRPTW, considering jointly the temporal and spatial information for vehicle routing. A spatiotemporal representation for the VRPTW is presented that measures the spatiotemporal distance between two customers. The resulting formulation is then solved by a genetic algorithm developed for k-medoid clustering of large-scale customers based on the spatiotemporal distance. The proposed approach showed promise in handling large scale networks.

The economic importance of the Straits of Malacca and Singapore: An extreme-scenario analysis

- Transportation Research Part E: Logistics and Transportation Review---2012---Xiaobo Qu,Qiang Meng

This paper proposes a decision tree model to estimate the loss to global economy on the hypothesis of an extreme scenario of blockade of the Straits of Malacca and Singapore. The insurance surcharges, inventory costs and the time values of cargoes, and Time Charter Equivalent rate are used to estimate the psychological loss, the loss to industries, and the loss to carriers, respectively. Interestingly, there is a pseudo-paradoxical phenomenon with respect to the loss to carriers. An illustrative example is also provided to explain the “Malacca Paradox” .

A combinatorial benders’ cuts algorithm for the quayside operation problem at container terminals

- Transportation Research Part E: Logistics and Transportation Review---2012---Jiang Hang Chen,Der-Horng Lee,Jin Xin Cao

The quayside operation problem is one of the key components in the management system for a container terminal. In this paper, the integrated models proposed in the previous studies to address the quayside

operation problem are examined and one of the potential frameworks is identified. A new method called combinatorial benders’ cuts algorithm is developed to solve the berth-level model in the framework. The computational experiment conducted in this research shows that the proposed approach is more efficient than the branch and cut algorithm embedded in CPLEX.

US shipping initial public offerings: Do prospectus and market information matter?

- Transportation Research Part E: Logistics and Transportation Review---2012---Costas Th. Grammenos,Nikos Papapostolou

This paper examines the extent that public information, available prior to the initial public offering of shipping companies, is only partially incorporated in the final offer price. The sample includes shipping US initial public offerings that took place in the period 1987–2008, and the analysis employs a set of IPO, market, and firm specific characteristics. Our findings have both theoretical and empirical implications for shipping IPOs, and indicate that there is no asymmetry of information between participants in shipping IPOs. On the theoretical part, the partial adjustment theory of Benveniste and Spindt (1989) is supported, whereas the winner’ s curse theory of Rock (1986) is rejected. On the empirical side, the probability of underpricing can be predicted by employing variables available to all IPO participants prior to the issue.

Estimating flow times for containerized imports from Asia to the United States through the Western rail network

- Transportation Research Part E: Logistics and Transportation Review---2012---Robert C. Leachman,Payman Jula

Queuing models are introduced for estimating container dwell times at rail intermodal terminals and transit times through rail line-haul corridors. These models are statistically calibrated on industry data. The intent of these models is to estimate changes in container flow times stemming from changes in infrastructure,

staffing levels at terminals, or import volumes passing through given infrastructure. Flow times estimated for individual line segments are aggregated to provide estimates of the total transit time from West Coast rail ramps to inland destination ramps for imports moving from Asia to the Continental United States in marine as well as domestic containers.

In-transit perishable product inspection

- Transportation Research Part E: Logistics and Transportation Review---2012---Chelsea C. White,Taesu Cheong

We determine the value of monitoring perishable freight in-transit for a single vehicle traveling from an origin to a destination. We develop a computationally practical approach for determining the optimal expected cost function and an optimal policy, based on an infinite horizon partially observed Markov decision process model. Structural properties of the optimal expected cost function and optimal policy are determined. These results can lend insight when deciding whether to acquire the capacity to monitor freight status in transit and what actions to take, based on the data from the in-transit monitoring, that optimally increase expected supply chain productivity.

Dissecting preference heterogeneity in consumer stated choices

- Transportation Research Part E: Logistics and Transportation Review---2012---Edoardo Mar-
cucci,Valerio Gatta

This paper investigates alternative methods to account for preference heterogeneity in choice experiments. Heterogeneity can be explained by assuming its influence to impact the systematic component of utility, the stochastic one or both. Seven different models were estimated to search for heterogeneity along the three dimensions described. The comparison based on model performance and willingness to pay measures shows that methods to search for heterogeneity are not independent one from the other and might produce sub-

stantially different results giving rise to different policy implications.

Product, operation, and demand relationships between manufacturers and retailers

- Transportation Research Part E: Logistics and Transportation Review---2012---Peter F. Wanke

This paper presents a framework for identifying the most adequate distribution structure between manufacturing and retailers, considering different characteristics of product, operation, and demand. Based on the random generation of different scenarios, it is indicated the adequacy of direct, echeloned, and mixed distribution structures to a given set of demand uncertainty, lead time variability, holding costs, and transportation costs. Sensitivity analyses are also performed to address managerial issues, such as the mission of a Local DC and the convenience of lead time demand pooling. Findings suggest an increase of mixed distribution structures to the detriment of purely direct/echeloned ones.

Dynamic routing of time-sensitive air cargo using real-time information

- Transportation Research Part E: Logistics and Transportation Review---2012---Farshid Aza-
dian,Alper E. Murat,Ratna Babu Chinnam

The route planning of time-sensitive air-cargo is becoming more important with the growing air-network congestion and delays. We consider a freight forwarder's routing of a time-sensitive air-cargo in the presence of real-time and historical information regarding flight availability, departure delays and travel times. A departure delay estimation model is developed to account for real-time information inaccuracy. A novel Markov decision model is formulated and solved with online backward induction. Through synthetic experiments and case studies, we demonstrate that dynamic routing with real-time information can improve delivery reliability and reduce expected cost.

Competitive multi-facility location games with non-identical firms and convex traffic congestion costs

- Transportation Research Part E: Logistics and Transportation Review---2012---Dinger Konur,Joseph Geunes

This paper studies a set of heterogeneous competitive firms simultaneously locating facilities at a set of locations to serve a set of markets. Firms incur firm-specific transportation, congestion, and location costs, and market price is linear and decreasing in the amount shipped to the market by all firms. First, firms' market-supply decisions for given facility locations are characterized using a variational inequality formulation. Then, firms' location decisions are analyzed. A heuristic method is provided for finding equilibrium locations, and its computational efficiency is compared to a random search method.

Greening transportation fleets: Insights from a two-stage game theoretic model

- Transportation Research Part E: Logistics and Transportation Review---2011---Sang Hoo Bae,Joseph Sarkis,Chung Sik Yoo

The greening of organizational transportation fleets, especially trucks and automobiles, has gained increasing attention by companies in a variety of industrial sectors. The reasons for this concern and attention are due to regulatory and competitive pressures, but also increasing costs of fossil-fuels. Surprisingly the amount of research and modeling for fleet management overall has been rather limited, with the focus on managing green vehicle investments virtually non-existent. In this study we develop a two-stage game theoretic model that helps evaluate, from both policy and organizational perspectives, the implications of greening of transportation fleets. Various parameters are evaluated including factors such as innovations in green vehicle technology, levels of service differences, cost of fuel, adjusting tax policy, regulatory compliance requirements, and adaptation costs. This evaluation provides practical insights into actions that could be

considered by regulators and organizations to encourage environmental investments.

Evaluating green supply chain management among Chinese manufacturers from the ecological modernization perspective

- Transportation Research Part E: Logistics and Transportation Review---2011---Qinghua Zhu,Yong Geng,Joseph Sarkis,Kee-hung Lai

Green supply chain management (GSCM) has become an emergent ecological modernization tool amongst Chinese manufacturers to balance environmental performance with productivity and business performance gains. Ecological modernization at the society level is influenced by restructuring policies and regulations. Some of these policies and regulations in China are focusing on enhancing energy savings and pollution reduction (ESPR). Based on a survey of 376 responses, we investigate whether different Chinese manufacturer clusters varying in their extent of implementing GSCM exist from this ecological modernization perspective. We also examine if Chinese manufacturers' awareness of domestic and international environmental ESPR-oriented compliance is related to GSCM implementation and whether a mediating effect of regulatory pressure plays a significant role. The results highlight the varying pace of Chinese manufacturers to ecologically modernize with GSCM practices and the significance of regulatory pressure to diffuse the practices adoption by Chinese manufacturing industry. Implications of this research go beyond the manufacturers investigated in this study where similar occurrence of these relationships may exist in other regions.

The influence of greening the suppliers and green innovation on environmental performance and competitive advantage in Taiwan

- Transportation Research Part E: Logistics and Transportation Review---2011---Tzu-Yun Chiou,Hing Kai Chan,Fiona Lettice,Sai Ho Chung

Recently, many companies have recognized the concepts of green supply chain management or supply

chain environmental management. However, relatively little research attention has been devoted to the consideration of relations between greening the supply chain, green innovation, environmental performance and competitive advantage. Hence, this paper aims to bridge this gap by providing empirical evidence to encourage companies to implement green supply chain and green innovation in order to improve their environmental performance, and to enhance their competitive advantage in the global market. A model is constructed to link the aforementioned constructs. Data were collected through a questionnaire-based survey across 124 companies from eight industry sectors in Taiwan. The data are analyzed using Structural Equation Modeling and the results from the final measurement model are used to evaluate the structural model that verifies the significance of the proposed relationships. A prominent result of this study is that greening the supplier through green innovation contributes significant benefits to the environmental performance and competitive advantage of the firm.

Inter-organizational relationships and knowledge sharing in green supply chains—Moderating by relational benefits and guanxi

- Transportation Research Part E: Logistics and Transportation Review---2011---Jao-Hong Cheng

This paper presents a new research model to examine the factors influencing the knowledge sharing and implementation in inter-organizational relationships. In this study, we examine how relational risk affects the willingness to share knowledge and how this association is affected by the tangible relational value (relational benefits) and intangible relational value (guanxi). Data are collected from 436 green manufacturing firms that are among the top 1000 Taiwanese manufacturing firms of 2008 listed by Business Weekly. Relational risk is found to be negatively associated with willingness to share knowledge. Our results show that relational benefits and guanxi between partners improve the negative effect of relational risk on knowledge sharing. The findings of the study provide useful insights into how green supply chain members should reinforce their relational

benefits and guanxi activities that would improve their value-based relationships, in order to enhance the environmentally knowledge sharing for the green supply chain as a whole.

The influence of green practices on supply chain performance: A case study approach

- Transportation Research Part E: Logistics and Transportation Review---2011---Susana G. Azevedo, Helena Carvalho, V. Cruz Machado

The main objective of this exploratory paper is to investigate the relationships between green practices of supply chain management and supply chain performance. This relationship is investigated in the context of the automotive industry. Five research propositions are suggested and tested with empirical data derived from five case studies taken from the Portuguese automotive supply chain. The data analysis identifies the most important green practices considered by managers, as well as the performance measures that are most appropriate and most widely used as means to evaluate the influence of green practices on supply chain performance. A conceptual model was derived from the data analysis and it can be used to assess the influence of green practices on supply chain performance. This model provides evidence as to which green practices have positive effects on quality, customer satisfaction and efficiency. It also identifies the practices which have negative effects on supply chain performance.

A resource-based view of green supply management

- Transportation Research Part E: Logistics and Transportation Review---2011---Iuri Gavronski, Robert D. Klassen, Stephan Vachon, Luis Felipe Machado do Nascimento

Companies are being increasingly pressured to consider environmental concerns in their manufacturing activities and, more recently, with regard to their supply bases. Despite the broad range of literature that links performance to both green manufacturing capabilities such as pollution prevention and green supply

management (GSM), managers are having difficulties developing a greener supply chain. The objective of this paper is to provide a model for development of GSM capabilities. Using the resource-based view of the firm (RBV) as the theoretical background, we postulate that plant resources are positively related to green manufacturing capabilities, which in turn are positively related to GSM capabilities. The data from a survey of a sample of manufacturing plants indicates that a managerial philosophy that includes external knowledge exchange directly supports both greener process management and environmental collaboration with suppliers. However, this managerial philosophy is only indirectly related to supplier selection and monitoring. The managerial implications of these findings are twofold: managers seeking to implement GSM need to view internal investment in green process management as a step toward environmental management of their external supply chains. They also must realize that green process management requires the support of other resources, such as environmental investments and top management commitment.

A supply chain-transport supernetwork equilibrium model with the behaviour of freight carriers

- Transportation Research Part E: Logistics and Transportation Review---2011---Tadashi Yamada,Koji Imai,Takamasa Nakamura,Eiichi Taniguchi

This paper presents a supernetwork equilibrium model integrating supply chain networks with a transport network, namely, a supply chain-transport supernetwork equilibrium model. The model takes into account the behaviour of freight carriers and transport network users to endogenously determine the transport costs generated in the supply chain networks. The interaction between transport network and supply chain networks can also be examined. Results of the numerical tests reveal that the improvement of transport network could enhance the efficiency of supply chain networks. The paper makes contributions to modelling of supply chain networks as well as to that of transport

networks.

Existence and efficiency of oligopoly equilibrium under toll and capacity competition

- Transportation Research Part E: Logistics and Transportation Review---2011---Tian-Liang Liu,Jian Chen,Hai-Jun Huang

This paper studies the existence and efficiency of oligopoly equilibrium under simultaneous toll and capacity competition in a parallel-link network subject to congestion. We establish sufficient conditions for the existence of a pure-strategy oligopoly equilibrium and then derive upper bounds on the efficiency loss of the oligopoly equilibrium over the social optimum under different inverse demand function assumptions, respectively. Furthermore, we show that these bounds are demand-function free and only dependent upon the number of competitive roads.

Valuation of freight transportation contracts under uncertainty

- Transportation Research Part E: Logistics and Transportation Review---2011---Mei-Ting Tsai,Jean-Daniel Saphores,Amelia Regan

This paper applies concepts from the theory of Real Options to hedge uncertainty in transportation capacity and cost using derivative contracts, called truckload options. We make three contributions. First, we provide a closed-form pricing formula for basic truckload options when the truckload spot price on a given lane follows a simple mean-reverting process. Second, since only monthly statistics about truckload spot prices are currently available, we provide an approach to estimate the parameters needed to value truckload options. Finally, a numerical illustration based on real data shows that truckload options could be valuable to both shippers and carriers.

A less-than-truckload carrier collaboration planning problem under dynamic capacities

- Transportation Research Part E: Logistics and Transportation Review---2011---Salvador Hernán-

This paper addresses the deterministic dynamic single carrier collaboration problem for the small- to medium-sized less-than-truckload (LTL) industry. It is formulated as a binary (0–1) multi-commodity minimum cost flow problem and solved using a branch-and-cut algorithm. Its inherent network structure is exploited to generate the lower bounds to the branch-and-cut algorithm using the network simplex method and by relaxing the integrality constraints. Results from numerical experiments indicate inherent trade-offs at the higher degrees of collaboration between waiting for more affordable collaborative capacity and incurring higher holding costs. They also suggest that collaborating LTL carriers experience increased capacity utilization.

Fleet deployment, network design and hub location of liner shipping companies

- Transportation Research Part E: Logistics and Transportation Review---2011---Shahin Gelareh,David Pisinger

A mixed integer linear programming formulation is proposed for the simultaneous design of network and fleet deployment of a deep-sea liner service provider. The underlying network design problem is based on a 4-index (5-index by considering capacity type) formulation of the hub location problem which are known for their tightness. The demand is elastic in the sense that the service provider can accept any fraction of the origin–destination demand. We then propose a primal decomposition method to solve instances of the problem to optimality. Numerical results confirm superiority of our approach in comparison with a general-purpose mixed integer programming solver.

Using time-varying tolls to optimize truck arrivals at ports

- Transportation Research Part E: Logistics and Transportation Review---2011---Xiaoming Chen,Xuesong Zhou,George F. List

An analytical point-wise stationary approximation model is proposed to analyze time-dependent truck

queuing processes with stochastic service time distributions at gates and yards of a port terminal. A convex nonlinear programming model is developed which minimizes the total truck turn time and discomfort due to shifted arrival times. A two-phase optimization approach is used to first compute a system-optimal truck arrival pattern, and then find a desirable pattern of time-varying tolls that leads to the optimal arrival pattern. Numerical experiments are conducted to test the computational efficiency and accuracy of the proposed optimization models.

The dynamics between freight volatility and fleet size growth in dry bulk shipping markets

- Transportation Research Part E: Logistics and Transportation Review---2011---Jane Jing Xu,Tsz Leung Yip,Peter B. Marlow

This paper studies the relationship between the time-varying volatility of dry bulk freight rates and the change of the supply of fleet trading in dry bulk markets. An abundance of research has been done to understand the time-varying characteristics of freight rate volatility, yet few have discussed the determinants of freight volatility. We therefore examine freight volatility against the changes in fleet size and other shipping market variables over January 1973–October 2010. The study employs a two-step model specification. The first step is the measurement of freight rate volatility through an AR-GARCH model; the second step is the analysis of the relationship between freight rate volatility and fleet size growth through a GMM regression. We confirm similar findings in the literature that freight rate volatility is time varying. Furthermore, the results reveal that the change in fleet size positively affects freight rate volatility, while the spot rate volatility of Capesize dry bulk exhibits a stronger reaction to the change in fleet size. The results of this study contribute in a general sense to understanding the systematic risk of shipping markets.

Congestion analysis of waterborne, containerized imports from Asia to the United States

- Transportation Research Part E: Logistics and Transportation Review---2011---Robert C. Leachman, Payman Jula

A queuing model is introduced for estimating container flow times through port terminals as a function of infrastructure, staffing, and import volume. The model is statistically calibrated on industry data. Flow-time estimates of the model are aggregated with estimates from models previously developed for rail networks to develop estimates of the total container flow times from West Coast ports to inland distribution centers. Integrated with a supply-chain optimization model, the queuing formulas are used to predict import flows by port and landside channel in scenarios of total import growth, varying all-water rates, and a higher import share for nation-wide importers.

Heuristics for quay crane scheduling at indented berth

- Transportation Research Part E: Logistics and Transportation Review---2011---Jiang Hang Chen, Der-Hong Lee, Jin Xin Cao

This paper discusses the quay crane scheduling problem at indented berth, an extension to the current quay crane scheduling problem in the field of container terminal operation. A mixed integer programming model by considering the unique features of the quay crane scheduling problem at indented berth is formulated. For solution, decomposition heuristic framework is developed and enhanced by Tabu search. To evaluate the performance of the proposed heuristic framework, a comprehensive numerical test is carried out and its results show the good quality of the proposed heuristic framework.

Berth allocation considering fuel consumption and vessel emissions

- Transportation Research Part E: Logistics and Transportation Review---2011---Yuquan

Du, Qiushuang Chen, Xiongwen Quan, Lei
Long, Richard Y.K. Fung

We propose a more elaborate model on berth allocation considering fuel consumption than before, and overcome the nonlinear complexity by casting it as a mixed integer second order cone programming model. Furthermore, we conduct the vessel emission (in sailing periods) calculation with the widely-used emission factors. Besides, vessel emissions in mooring periods are also analyzed through a post-optimization phase on waiting time. Experimental results demonstrate that the new berth allocation strategy, reflected by the proposed model, is competent to significantly reduce fuel consumption and vessel emissions, while simultaneously retaining the service level of the terminal.

Space allocating strategies for improving import yard performance at marine terminals

- Transportation Research Part E: Logistics and Transportation Review---2011---S. Saurí, E. Martín

This paper focuses on the organization of the import storage yard at container port terminals. Three new stacking strategies are introduced which take into account the containers' arrival and departure rates and the storage yard characteristics. A mathematical model based on probabilistic distribution functions is developed to estimate the number of rehandles required to manage an import container yard. The model is applied to the three proposed stacking strategies. Results show that the optimal strategy depends on stacking height and the relationship between vessel headway and container dwell time.

Sourcing decisions under risks of catastrophic event disruptions

- Transportation Research Part E: Logistics and Transportation Review---2011---P.L. Meena, S.P. Sarmah, A. Sarkar

In this paper, a supplier selection problem is studied under risks of supplier failure due to the catastrophic events disruption. An analytical model is developed to

determine the optimal number of suppliers considering different failure probability, capacity, and compensation. An algorithm is designed to find the optimal solution and numerical study is carried out to illustrate the model. Results of numerical study and sensitivity analysis provide useful guidelines for managers to select the optimal number of suppliers under the risks of supply disruption.

Vehicle routing optimization with soft time windows in a fuzzy random environment

- Transportation Research Part E: Logistics and Transportation Review---2011---Jiuping Xu,Fang Yan,Steven Li

This paper is concerned with a vehicle routing problem with soft time windows (VRPSTW) in a fuzzy random environment. Two objectives are considered: (1) minimize the total travel cost and (2) maximize the average satisfaction level of all customers. After setting up the model for the VRPSTW in a fuzzy random environment, the fuzzy random expected value concept is used to deal with the constraints and its equivalent crisp model is derived. The global-local-neighbor particle swarm optimization with exchangeable particles (GLNPSO-ep) is employed to solve the equivalent crisp model. A case study is also presented to illustrate the effectiveness of the proposed approach.

Hub location problems in transportation networks

- Transportation Research Part E: Logistics and Transportation Review---2011---Shahin Gelareh,Stefan Nickel

In this paper we propose a 4-index formulation for the uncapacitated multiple allocation hub location problem tailored for urban transport and liner shipping network design. This formulation is very tight and most of the tractable instances for MIP solvers are optimally solvable at the root node. While the existing state-of-the-art MIP solvers fail to solve even small size instances of problem, our accelerated and efficient primal (Benders) decomposition solves larger ones. In

addition, a very efficient greedy heuristic, proven to be capable of obtaining high quality solutions, is proposed. We also introduce fixed cost values for Australian Post (AP) dataset.

A passenger demand model for air transportation in a hub-and-spoke network

- Transportation Research Part E: Logistics and Transportation Review---2011---Chieh-Yu Hsiao,Mark Hansen

This paper develops an air passenger model that deals with city-pair demand generation and demand assignment in a single framework. Using publicly available and regularly collected panel data, the model captures both time series and cross-sectional variation of air travel demand. The empirical analysis finds that pattern of correlations among alternatives can be described by a three-level nested logit model. Fare, frequency, flight time, direct routing, on-time performance, income, and market distance have significant effects on air demand. Correcting for the problem of endogenous air fares using instrumental variables yields more plausible estimates of price sensitivity and value of time.

Random and fuzzy utility models for road route choice

- Transportation Research Part E: Logistics and Transportation Review---2011---Agata Quattrone,Antonino Vitetta

The objective of this work is the specification, calibration and validation of a route choice model distinguishing the phases of set perception and route choice among the alternatives belonging to the chosen set. Route generation is performed with a selective multi-criteria approach; route choice is performed using random and fuzzy utility models. As regards the fuzzy utility models, a new specification of a fuzzy model is introduced. Random and fuzzy utility models are compared and applied on a test road network and were specified and calibrated for national road freight transport on a real Italy-wide network.

Performance measurement of a transportation network with a downtown space reservation system: A network-DEA approach

- Transportation Research Part E: Logistics and Transportation Review---2011---Y. Zhao,K. Triantis,P. Murray-Tuite,P. Edara

We propose an evaluation approach for a novel travel demand management strategy known as the downtown space reservation system (DSRS). This approach takes into account three perspectives, i.e., transportation service provider's, the user's, and the community's and is based on network-Data Envelopment Analysis (DEA) where the perspectives are inter-related through intermediate inputs/outputs. Two types of network-DEA models (radial and slacks-based models) are considered. An example is provided using data propagated from a microscopic traffic simulation model of the DSRS. The results show that individual node performance can drive network DEA performance and that this information can inform future designs of the DSRS.

Improving the efficiency of metropolitan area transit by joint analysis of its multiple providers

- Transportation Research Part E: Logistics and Transportation Review---2011---Darold T. Barnum,Matthew G. Karlaftis,Sonali Tandon

Public transportation in a metropolitan area often is supplied by multiple types of transit. This paper develops and illustrates a DEA-based procedure for estimating: overall efficiency of an area's public transportation; technical efficiencies of the individual transit types; effect of each type on overall efficiency; and efficiency of the allocation of resources among types and an algorithm for improving it. The paper concludes that the overall efficiency of an urban area's public transportation can be validly estimated only if the technical efficiency of each major transport type and the efficiency in allocating resources among them are taken into consideration.

A novel interval-valued fuzzy MCDM method for improving airlines' service quality in Chinese cross-strait airlines

- Transportation Research Part E: Logistics and Transportation Review---2011---Ming-Shin Kuo

This paper presents an effective approach based on combining VIKOR, GRA, and interval-valued fuzzy sets to evaluate service quality of Chinese cross-strait passenger airlines via customer surveys. The proposed approach can enable decision-makers to understand the gaps between alternatives and aspired levels. An empirical study is used to establish a complete service quality evaluation framework for reducing the gaps to achieve the aspired level. Based on the gaps in priorities, it can help an airline to identify its own strengths and weaknesses in specific areas of passenger service to further improve service quality.

Spare parts demand: Linking forecasting to equipment maintenance

- Transportation Research Part E: Logistics and Transportation Review---2011---Wenbin Wang,Aris A. Syntetos

Demand for spare parts is typically intermittent and forecasting the relevant requirements constitutes a very challenging exercise. Why is the demand for spare parts intermittent and how can we use models developed in maintenance research to forecast such demand? We attempt to answer these questions; we present a novel idea to forecast demand that relies upon the very sources of the demand generation process and we compare it with a well-known time-series method. We conclude that maintenance driven models are associated with a better performance under certain conditions. We also outline an inter-disciplinary agenda for further research in this area.

Work unit incivility, job satisfaction, and total quality management among transportation employees

- Transportation Research Part E: Logistics and Transportation Review---2011---Paula C. Mor-

Survey results from 1381 employees working in a state department of transportation tested the idea that uncivil work environments bear undesirable consequences for job satisfaction and diminish the effectiveness of quality management practices. Results demonstrated that incivility does not have to be personally experienced to have deleterious effects, merely witnessed. Perceived workplace incivility was found to adversely affect job satisfaction and the effectiveness of quality programs aimed at teamwork, customer focus and continuous improvement, even after controlling for race, gender and prior experience of harassment. Managers are advised to broaden their consideration of incivility to include its effects on observers.

Tactical crew planning in railways

- Transportation Research Part E: Logistics and Transportation Review---2011---Güvenç Şahin,Birol Yüceoğlu

Tactical crew capacity planning problem in railways involves finding the minimum number of crews in a region required to operate a predetermined set of train duties satisfying the strict day-off requirement for crew. For the single-region problem, we develop two solution approaches based on a space-time network representation: the sequential approach and the integrated approach. We also study the multi-regional capacity planning problem where we minimize total system-wide capacity by simultaneously considering multiple regions within a neighborhood search algorithm based on our solution methods for the single-region problem. We present the computational study on problem instances from Turkish State Railways.

Bargaining framework for competitive green supply chains under governmental financial intervention

- Transportation Research Part E: Logistics and Transportation Review---2011---Jiuh-Biing Sheu

This work investigates the problem of negotiations between producers and reverse-logistics (RL) suppliers for

cooperative agreements under government intervention. Utilizing the asymmetrical Nash bargaining game with uncertainties, this work seeks equilibrium negotiation solutions to player agendas. Analytical results indicate that financial intervention by a government generates a significant effect on the relative bargaining power of green supply chain members in negotiations. Over intervention by a government may result in adverse effects on chain members' profits and social welfare. Furthermore, a bargaining framework underlying the duopoly-oligopoly context may contribute to a negotiation outcome most profitable for green supply chain members.

Long- and Short-Run supply-chain optimization models for the allocation and congestion management of containerized imports from Asia to the United States

- Transportation Research Part E: Logistics and Transportation Review---2011---Payman Jula,Robert C. Leachman

Analytical models are introduced for predicting the allocation to ports and transportation channels of containerized goods imported from Asia to the USA. Assuming fixed distributions for container flow-times, the Long-Run Model heuristically solves a mixed integer non-linear program to determine the least-cost supply-chain strategies for importers. The Short-Run Model uses estimates of the flow times as a function of traffic volumes on fixed infrastructure to iteratively develop the best near-term strategies. Minimum volume requirements and capacities for ports and landside channels are considered. The models are applied to predict the effects of container fees at the San Pedro Bay ports.

A supply-chain optimization model of the allocation of containerized imports from Asia to the United States

- Transportation Research Part E: Logistics and Transportation Review---2011---Payman Jula,Robert C. Leachman

This article proposes a mixed integer non-linear programming model for the optimizing supply chains of importers of waterborne containerized goods from Asia to the USA. This model determines the least-cost strategy for an importer, in terms of ports and landside transportation modes to be used, where costs considered include costs for transportation and handling, pipeline inventory, and safety-stock. We introduce a heuristic algorithm to quickly solve the mathematical model to near optimality. We assess the proposed heuristic compared to use of a commercial solver, and provide general recommendations for efficient supply-chain strategies as a function of the value of imported goods.

A single-level mixed integer linear formulation for a bi-level discrete network design problem

- Transportation Research Part E: Logistics and Transportation Review---2011---Hamid Farvareh,Mohammad Mehdi Sepehri

Discrete network design problem (DNDP) is generally formulated as a bi-level programming. In this paper, a single-level mixed integer linear programming (SL-MILP) formulation for bi-level DNDP is presented. To cope with the dependency of node-link adjacency matrix on new links, travel time function is appropriately modified. The nonlinearity of the travel time function is also removed by means of a convex-combination based linear approximation which takes advantage of a unimodular structure. Two valid inequalities is developed which shorten computation time significantly. The validity of the proposed formulation is examined by two test problems. SL-MILP is able to provide optimal solution.

Reaching a destination earlier by starting later: Revisited

- Transportation Research Part E: Logistics and Transportation Review---2011---Chen Qian,Ching-Yuen Chan,Kai-Leung Yung

This paper simulates a dynamic traffic network by embedding an extra nonlinear delay function to represent

traffic lights (or a similar regular delay) in each arc (or link), and it was shown that a late start driver may catch up with one who started earlier, subject only to the condition that they pick the same path (or the same shortest path), and overtaking will never be made. Moreover, a theoretical lower bound value to guarantee the sustainability of the FIFO principle in a dynamic traffic network was also derived.

The period vehicle routing problem: New heuristics and real-world variants

- Transportation Research Part E: Logistics and Transportation Review---2011---Damon Gulczynski,Bruce Golden,Edward Wasil

We develop a heuristic for the period vehicle routing problem that uses an integer program and the record-to-record travel algorithm. Our heuristic produces very high-quality results on standard benchmark instances. We extend our heuristic to handle real-world routing considerations that involve reassigning customers to new routes and balancing the workload among drivers across routes. We demonstrate how these new variants can be used by managers to generate effective routes in practice.

Scheduling operations at system choke points with sequence-dependent delays and processing times

- Transportation Research Part E: Logistics and Transportation Review---2011---L. Douglas Smith,Robert M. Nauss,Dirk Christian Matfeld,Jian Li,Jan F. Ehmke,M. Reindl

Transportation service facilities often form system choke points with service rendered to entities from multiple queues that require staging for processing. With an MIP model that accommodates sequence-dependent setup times and processing times, we demonstrate how scheduling can be improved relative to simple rules that impose equity (such as FIFO) or efficiency (such as fastest processing time). Using an efficient heuristic scheduler for problems of this type, we then demonstrate, with simulation, the benefits that can occur

from employing the refined scheduling procedure at a series of choke points in a transportation system subject to highly variable seasonal traffic.

The relative efficiency of shipping companies

- Transportation Research Part E: Logistics and Transportation Review---2011---Photis M. Panayides, Neophytos Lambertides, Christos Savva

This paper contributes to the maritime transport literature by examining the relative efficiency of firms in the three key sectors of the shipping industry, i.e. dry, wet and container shipping. Two relative efficiency models are developed to assess relative market and relative operating performance efficiency. The theoretical framework of fundamental analysis is adopted to derive the inputs and outputs in the efficiency models which are assessed using data envelopment and stochastic frontier analysis. Shipping companies were found to exhibit average market efficiency. Market and operating performance efficiency of maritime firms is not consistent. Tanker companies are more market efficient whereas container shipping firms are found to have high operating performance efficiency but were market inefficient. Dry bulk firms were found to have the lowest ratings of market efficiency.

Liner shipping service network design with empty container repositioning

- Transportation Research Part E: Logistics and Transportation Review---2011---Qiang Meng, Shuaian Wang

This paper proposes a liner shipping service network design problem with combined hub-and-spoke and multi-port-calling operations and empty container repositioning. It first introduces a novel concept - segment - defined as a pair of ordered ports served by one shipping line and subsequently develops a mixed-integer linear programming model for the proposed problem. Extensive numerical experiments based on realistic Asia-Europe-Oceania shipping operations show that the proposed model can be efficiently solved by CPLEX

for real-case problems. They also demonstrate the potential for large cost-savings over pure hub-and-spoke or pure multi-port-calling network, or network without considering empty container repositioning.

A gam assessment of quality premia in the dry bulk time-charter market

- Transportation Research Part E: Logistics and Transportation Review---2011---Sebastian Köhn, Helen Thanopoulou

This paper revisits the hypothesis of a quality segmented charter market using dry bulk-Panamax time-charter rates from the shipping boom period of 2003-2007. Through generalized additive models (GAMs) the authors assess whether increasing awareness and regulation over time has brought about a change in charterers' perceptions. The results suggest that freight differentiation has become visible in booming markets with high freight rates. Controlling for contract specific effects such as place of delivery, charter length and number of days forward to delivery, as well as for vessel size and consumption, the paper quantifies quality related differences in physical dry bulk charter rates.

Interdependent impacts of inoperability at multi-modal transportation container terminals

- Transportation Research Part E: Logistics and Transportation Review---2011---Raghav Pant, Kash Barker, F. Hank Grant, Thomas L. Landers

This work describes the interdependent adverse effects of disruptive events on inter-regional commodity flows resulting from disruptions at an inland port terminal. To do so we integrate the risk-based Multi-Regional Inoperability Input-Output Model, which measures the cascading regional effects of disruptions to interconnected industries, with models, which simulate port operations such as commodity arrival, unloading, sorting, and distributing. Such models capture three disruption scenarios at the port and provide measures of impact to industries that use the inland port terminal

facility. A case study highlights the disruptive effects of a closure of the Port of Catoosa in Oklahoma.

Locating short-term empty-container storage facilities to support port operations: A user optimal approach

- Transportation Research Part E: Logistics and Transportation Review---2011---Ting L. Lei,Richard L. Church

This paper presents three strategic-level models for locating away-from-port storage yards for empty shipping containers. The main objective is to reduce the mileage involved in repositioning empty containers. The models presented attempt to capture the greedy behavior of individual trucking companies and provide for the first time a "user" optimal modeling approach for empty container management. An application to the port complexes of Los Angeles and Long Beach demonstrates that savings associated with storage yards could be easily overestimated when neglecting the perspective of the individual trucking companies. Strategies to encourage system optimal behavior are proposed.

Non-aviation revenues and their implications for airport regulation

- Transportation Research Part E: Logistics and Transportation Review---2011---Uwe Kratzsch,Gernot Sieg

This paper analyzes a non-congested private airport that possesses market power in providing aeronautical services. We find that the profit-maximizing landing fee decreases in the degree of complementarity of aviation and non-aviation. Furthermore, our model implies that airports will not take advantage of their market power if non-aviation revenues, or the degree of complementarity of aviation and non-aviation, exceed a critical threshold. In this case, a dual-till regulation will be unnecessary. A single-till regulation, on the other hand, will always result in lower landing fees than laissez-faire.

Dynamic planning for urban drayage operations

- Transportation Research Part E: Logistics and Transportation Review---2011---Guangming Zhang,Karen Smilowitz,Alan Erera

This paper develops approaches for incorporating informational and operational dynamics within models for intermodal drayage operations with flexible tasks. Tasks with flexible origins or destinations create an important complexity. We develop models to minimize the cost of drayage moves when flexibility exists. The solution approach generates plans at several decision epochs during the day. The optimization problem at each epoch is a complex multistage stochastic optimization problem; we find good solutions using a two-stage approximation. We show that with such a model, a drayage firm can find high-quality plans even when many tasks are not known initially.

A supplement to "A generalized algebraic model for optimizing inventory decisions in a centralized or decentralized multi-stage multi-firm supply chain"

- Transportation Research Part E: Logistics and Transportation Review---2011---Kit Nam Francis Leung

In this supplement, a number of integrated models under the integer multiplier coordination mechanism is generalized by allowing complete backorders penalized by not only linear but also fixed costs for some/all retailers. The optimal solution to such a three-stage generalized model is algebraically derived, from which optimal expressions for some well-known models are deduced. In addition, an expression for sharing the coordination benefits is modified, and a numerical example for illustrative purposes is presented. A ready future research work involving extension of the generalized model is suggested to conclude the supplement.

A scenario-based dynamic programming model for multi-period liner ship fleet planning

- Transportation Research Part E: Logistics and Transportation Review---2011---Qiang

This paper proposes a more realistic multi-period liner ship fleet planning problem for a liner container shipping company than has been studied in previous literature. The proposed problem is formulated as a scenario-based dynamic programming model consisting of a number of integer linear programming formulations for each single planning period, and the model can be solved efficiently by a shortest path algorithm on an acyclic network. A numerical example is carried out to illustrate the applicability of the proposed model and solution method. The numerical results show that chartering in ships may not always be a better policy for a long-term planning horizon though it is much cheaper than buying ships in the short-term. Purchasing ships seems to be a more profitable investment in the long run.

Combined ship allocation, routing and freight assignment in tramp shipping

- Transportation Research Part E: Logistics and Transportation Review---2011---Dung-Ying Lin,Hui-Yen Liu

In this paper, we consider the ship routing problem of tramp shipping (SRPTP) and propose a combined mathematical model that simultaneously takes into account the ship allocation, freight assignment and ship routing problems of SRPTP. To solve this problem, we investigate the practical operational issues of SRPTP and develop a genetic algorithm. The empirical studies demonstrate the applicability of the proposed solution scheme for solving real-world problems that are beyond the reach of a widely used commercial optimization package. The technical, computational, practical and calibration issues involved in this unique tramp shipping problem are discussed in detail in this paper.

Evaluating advanced quay cranes in container terminals

- Transportation Research Part E: Logistics and Transportation Review---2011---Shih-Liang Chao,Yu- Lin

Choosing a suitable advanced quay crane (Q/C) is a complex problem for terminal operators because numerous factors must be considered simultaneously. A two-phased method is developed in this study to deal with this problem. The first phase identifies the determinants influencing selection of advanced Q/Cs by applying exploratory factor analysis (EFA) and thereby constructs a hierarchical structure. The second phase applies fuzzy analytic hierarchy process (AHP) to compare alternatives in terms of the structure established in the first phase. The case of the newest terminal at Kaohsiung port is studied empirically and the 40-foot twin-lift Q/C is chosen as the most suitable alternative.

The importance of the inland leg of containerised maritime shipments: An analysis of modal choice determinants in Spain

- Transportation Research Part E: Logistics and Transportation Review---2011---María Feo-Valero,Leandro García-Menéndez,Lorena Sáez-Carramolino,Salvador Furió-Pruñonosa

While most of the studies that address competition between road and rail transport focus on national or international non-maritime shipments, there is practically no empirical evidence on the modal choice determinants of the inland leg of maritime shipments. This paper intends to fill that gap by estimating a modal choice model between road and rail transport on the inland leg of Spanish containerised maritime freight shipments, using a mixed logit model and stated preference techniques. The results obtained confirm the vital role that frequency plays in the relative competitiveness of rail transport and also provide subjective values of transport attributes that are deemed essential for an accurate cost-benefit analysis.

Models for the discrete berth allocation problem: A computational comparison

- Transportation Research Part E: Logistics and Transportation Review---2011---Katja Buhrkal,Sara Zuglian,Stefan Ropke,Jesper Larsen,Richard Lusby

In this paper we consider the problem of allocating arriving ships to discrete berth locations at container terminals. This problem is recognized as one of the most important processes for any container terminal. We review and describe three main models of the discrete dynamic berth allocation problem, improve the performance of one model, and, through extensive numerical tests, compare all models from a computational perspective. The results indicate that a generalized set-partitioning model outperforms all other existing models.

Modal freight transport required for production of US goods and services

- Transportation Research Part E: Logistics and Transportation Review---2011---Rachael Nealer, Christopher L. Weber, Chris Hendrickson, H. Scott Matthews

In this paper we develop a model which approximates the upstream supply chains for embodied transportation in products. The sector with the largest embodied freight transportation in consumption is petroleum products followed by government services, construction, and food products. Overall, pipeline contributes 7% to the total embodied freight movement per sector, air transport is generally under 1%, water is 5%, and rail and truck transportation are the most dominant modes (14% each) for domestic freight transportation for the average sector. International water is the largest mode (60%) even compared to domestic modes, and international air contributes less than 1%.

Strategic fit in the general freight motor carrier industry

- Transportation Research Part E: Logistics and Transportation Review---2011---Carl A. Scheraga

This study investigates the impact of choosing a particular strategic focus or foci on operational productivity by means of the Malmquist Productivity Index as applied to a consistent sample (for the period 1999-2003) of 69 general freight motor carriers. The results show that general freight motor carriers, regardless

of the strategic focus or foci pursued, did not link these strategic positions to an operational posture that reflected both operating efficiency and technological change. An interesting bifurcation is found with regard to the strategic foci of the LTL market niche and firm size growth, with the former of these two strategic foci having a positive impact on operating efficiency and the latter having a positive impact on technological change.

Deploying effective service strategy in the operations stage of high-speed rail

- Transportation Research Part E: Logistics and Transportation Review---2011---Jui-Sheng Chou, Changwan Kim, Yao-Chen Kuo, Nai-Chi Ou

This paper utilizes a confirmatory passenger continuance behavior model to appraise high-speed rail service quality and performance. Surveys are administered for Taiwan High-Speed Rail (THSR) and Korea Train eXpress (KTX) corporations to gain an understanding of passengers' perceptions of the operational performance using a proposed satisfaction index. A modified importance-performance analysis is employed to enable elaboration of strategic service management decisions. The empirical study concludes that level of access to THSR station and personal space on KTX train are the top-priority quality indicators that need to be addressed to improve customer satisfaction and corporate profits.

A scenario decomposition-genetic algorithm method for solving stochastic air cargo container loading problems

- Transportation Research Part E: Logistics and Transportation Review---2011---Ching-Hui Tang

In this study, we develop a solution method for solving air express cargo loading problems under stochastic demands. The method is designed by combining the scenario decomposition and genetic algorithm (GA) techniques. Numerical tests are performed to evaluate the performance of the solution method using data for the Asian operations of an international express

carrier. The results show that the solutions obtained from our method are very close to the optimal solutions. Furthermore, our method has an advantage in terms of computation time over the CPLEX optimization algorithm.

Operational and environmental performance measures in a multi-product closed-loop supply chain

- Transportation Research Part E: Logistics and Transportation Review---2011---Turan Paksoy,Tolga Bektas,Eren Özceylan

This paper investigates a number of operational and environmental performance measures, in particular those related to transportation operations, within a closed-loop supply chain. A mathematical model in the form of a linear programming formulation is used to model the problem, which captures the trade-offs between various costs, including those of emissions and of transporting commodities within the chain. Computational results are presented for a number of scenarios, using a realistic network instance.

An analysis of third-party logistics performance and service provision

- Transportation Research Part E: Logistics and Transportation Review---2011---Chiung-Lin Liu,Andrew C. Lyons

The aim of the research described in this paper is to evaluate the relationship between the service capabilities and performance of UK and Taiwanese third-party logistics (3PL) providers. A study is presented based on a recent survey. The results identify the most important services offered by 3PLs and the most important aspects of 3PL operational performance. The results also suggest that excellence in operations is more important than wide-ranging service provision. Furthermore, the research suggests that the range of service provision offered by 3PLs does not directly influence the 3PLs' financial performance. However, 3PL providers with service capabilities that correspond to the key priorities of customers will gain superior financial performance

through a better operational performance. Similarities and differences between logistics practices in the UK and Taiwan are highlighted.

Retraction notice to "The vehicle routing problem with uncertain demand at nodes" [Transport. Res. Part E 45(4) (2009) 517-524]

- Transportation Research Part E: Logistics and Transportation Review---2011---Chang-Shi Liu,Ming-Yong Lai

2011

Special issue of selected papers from the 13th ATRS Conference, Abu Dhabi, 2009

- Transportation Research Part E: Logistics and Transportation Review---2011---Sveinn Gudmundsson,Paul Hooper,Tae Hoon Oum

2011

Effects of transport service differentiation in the US domestic airline market

- Transportation Research Part E: Logistics and Transportation Review---2011---Xiaowen Fu,Martin Dresner,Tae H. Oum

This study proposes a framework to identify and measure the extent of product differentiation among services provided by transportation firms, and applies it to the US domestic airline markets. By formulating and estimating an Almost Ideal Demand System and a set of price response equations for competing carriers, we investigate empirically the degree of substitutability between the services provided by Full Service Airlines (FSAs) and Low Cost Carriers (LCCs). Our results indicate that there is a significant differentiation in services provided by FSAs and LCCs. As a result, the presence of LCCs alone will not ensure healthy competition in a market. Therefore, it is important for public policy makers to attempt to maintain competition between FSAs even in the markets where LCCs have substantial market shares.

Time effect of low-cost carrier entry and social welfare in US large air markets

- Transportation Research Part E: Logistics and Transportation Review---2011---Hideki Murakami

In this study we empirically analyzed the airfare level at which most low-cost carriers (LCCs) entered the market, what impacts LCCs had on the airfares of incumbent carriers, whether the impacts differed depending on how many LCCs existed in a market and on whether LCC(s) entered a full-service carrier (FSC)'s hub airport or an adjacent airport, whether the low-airfare impact continued for the years following entry, and finally what are the welfare implication of LCCs' entries. We modeled and estimated the simultaneous demand and price (pseudo-supply) equation to derive these four economic impacts of LCCs' entries by using published data of 1998. Our main findings are that the impact of LCCs' entries did not differ between the entry year and the second year and the social welfare gains are substantial, and 90% of welfare gains come from the gain in consumers surplus.

Assessing the price effects of airline alliances on complementary routes

- Transportation Research Part E: Logistics and Transportation Review---2011---Li Zou,Tae H. Oum,Chunyan Yu

This paper investigates the impacts of complementary alliance on airfares. The conventional wisdom argues that complementary airline alliances reduce airfares for passengers on the flow-through routes as a result of the elimination of double marginalization and efficiency gain. On the other hand, since complementary alliances help improve connecting services through one-stop check-in, better schedule coordination, etc., passengers are willing to pay higher prices for the enhanced services. That is, complementary alliances have both positive and negative effects on airfares for flow-through tickets that counteract each other. The net impact, therefore, is uncertain, a priori. Our theoretical model shows that the overall effects of complementary alliances on airfares depend on the relative strengths of

the airfare reducing effects due to cooperative pricing setting and the increased willingness to pay for services improvements. Our empirical analysis based on data from the North trans-Pacific markets in October 2007 finds that member airlines of Star Alliance and Skyteam Alliance appear to charge significantly higher prices for through-tickets than the sum of segment fares on complementary routes, whereas for oneworld Alliance members, the upward and downward effects on airfares seem to counterbalance each other. Moreover, the price markup for through ticket is higher for business passengers than for leisure passengers.

A dynamic programming algorithm based on expected revenue approximation for the network revenue management problem

- Transportation Research Part E: Logistics and Transportation Review---2011---Kuancheng Huang,Yu-Tung Liang

Since American Airlines successfully applied revenue management (RM) to raise its revenue, RM has become a common technique in the airline industry. Due to the current hub-and-spoke operation of the airline industry, the focus of RM research has shifted from the traditional single-leg problem to the network-type problem. The mainstream approaches, bid price and virtual nesting, are faced with some limitations such as inaccuracy due to their suboptimal nature and operation interruption caused by the required updates. This study developed an algorithm to generate a seat control policy by approximating the expected revenue function in a dynamic programming (DP) model. In order to deal with the issue of dimensionality for the DP model in a network context, this study used a suitable parameterized function and a sampling concept to achieve the approximation. In the numerical experiment, the objective function value of the developed algorithm was very close to the one achieved by the optimal control. We believe that this approach can serve as an alternative to the current mainstream approaches for the network RM problem for airlines and will provide an inspiring concept for other types of multi-resource RM problems.

Analysis on bargaining about global climate change mitigation in international aviation sector

- Transportation Research Part E: Logistics and Transportation Review---2011---Katsuya Hihara

Understanding the basic interaction mechanism among nations surrounding the CO₂ emissions is critically important for the policy formulation analysis in aviation sector at present, especially for market-based measures such as emission allowance trading. We performed simulation analysis of the effects on pricing of emission allowances by including major players such as China and India into the hypothetical global CO₂ emission trading scheme according to non-cooperative game framework. In the presence of a negative public good, i.e., CO₂, we extended the Lindahl-Bowen-Samuelson condition to include a class of uncertainty typical in climate change policy into utility. By using the result, we explained, with some numerical examples, the welfare effects caused by the changes of factors, such as level of uncertainty, degree of risk averse, asymmetric utility structure, initial allocation among players, based on our model surrounding the bargaining of CO₂ emissions allocation games.

Value determinants in the aviation industry

- Transportation Research Part E: Logistics and Transportation Review---2011---Paolo Malighetti,Michele Meoli,Stefano Paleari,Renato Redondi

This paper analyses the value determinants for both airports and airlines. The analysis is based on a sample of 24 airport operators and 87 airlines, listed on international financial markets on 31 December 2007. We analyse the value drivers for both airlines and airports by studying the determinants of the Tobin's Q. On average the market valuation of airport operators is higher than that of carriers. On the whole we show that ownership concentration has a positive impact, while size and state ownership are, on average, detrimental for the market valuation. Further, other industry-specific variables are statistically significant. Airport valuation is positively influenced by size, return on assets and

the growth in terms of number of passengers. Airlines valuation is statistically higher for low-cost companies, while age and route number have a negative impact on market valuation.

Airport ground access mode choice behavior after the introduction of a new mode: A case study of Taoyuan International Airport in Taiwan

- Transportation Research Part E: Logistics and Transportation Review---2011---Rong-Chang Jou,David Hensher,Tzu-Lan Hsu

To improve airport ground access at Taoyuan International Airport (TIA) in Taiwan, the government of Taiwan is constructing a mass rapid transit system (TIA MRT) to connect the airport and important traffic hubs such as the Taipei train station and the Taoyuan High Speed Rail station. Using revealed and stated preference data, we investigate the airport ground access mode choice behavior of air passengers who are traveling overseas from Taiwan. A mixed logit model is estimated to identify the preferences of air passengers for the new mode. The results indicate that while out-of-vehicle travel time and in-vehicle travel time are two important factors in affecting outbound travelers' choice of airport access mode, the amount of overall time-savings and the user-friendly nature of the modal offers are also crucial attributes. We show the extent to which travel time improvements associated with public transportation reduces the market share of private transportation and taxi.

The dilemma between capacity expansions and multi-airport systems: Empirical evidence from the industry's cost function

- Transportation Research Part E: Logistics and Transportation Review---2011---Juan Carlos Martín,Augusto Voltes-Dorta

This paper explores the problematic of airport capacity expansions from the perspective of the airport financial management, using the operating costs as the variable of interest. The objective is to provide empirical evidence on the financial advantages of expanding

capacity against the operation of multi-airport systems (MAS) under the presence of significant returns to scale in airport operations. This is done by comparing the actual operating costs of the MAS with the predicted costs that correspond to the aggregated level of output and input prices. Predictions are obtained from a multi-output specification of the industry's cost function, estimated with a broad database of international airports. The results indicate the presence of non-exhausted scale economies at the current levels of production. Hence, the atomization of air traffic always increases operating costs at a system level. In the last section, the degree of economic inefficiency of five European MAS is calculated. These results also provide revealing conclusions about the size of the industry's minimum efficient scale. Furthermore, the use of data on American MAS allows us to separate the inefficiency costs derived from the atomization of air traffic from those related to the individual airports' inefficient behavior.

The runway capacity constraint and airlines' behavior: Choice of aircraft size and network design

- Transportation Research Part E: Logistics and Transportation Review---2011---Mikio Takebayashi

This paper proposes an air transport market model dealing with airline network design strategy using service frequency and aircraft size. The main purpose of the research was to reveal the relation between the runway capacity constraint at the hub airport and airline behavior. We extend the existing bi-level market model by allowing choice of aircraft size and service frequency. We apply the model to the case of runway capacity expansion at Haneda Airport. The results suggest that aircraft a downsizing strategy is not always adopted when the runway capacity is expanded. Furthermore, runway capacity expansion improves the benefit of passengers who travel between urban areas but not the benefit of local passengers. Finally, a runway capacity expansion tends to improve the affected airlines' profitability.

The adoption and utilization of online auctions by supply chain managers

- Transportation Research Part E: Logistics and Transportation Review---2011---John F. Kros,S. Scott Nadler,Haozhe Chen

This study contributes to the online auction literature by empirically examining the differences across three groups (current users, past users, and nonusers) in terms of their emphasis on supplier collaboration, cost management, and sales revenue and profit enhancement. The paper further compares the online auction usages for maintenance/repair/operations and shipping and transportation services across high and low groups in supplier collaboration and cost management. A survey of supply chain professionals coupled with appropriate statistical analysis was employed to investigate adoption and utilization of online auctions. Study findings indicate significant differences between users and nonusers. Study findings specifically indicate that current online auction users have a greater belief in the auctions as a cost containment tool than past or nonusers. It was also found that nonusers place a greater level of importance on supplier collaboration and sales revenue and profit enhancement than either current or past users.

Coordinating pricing and inventory decisions in a multi-level supply chain: A game-theoretic approach

- Transportation Research Part E: Logistics and Transportation Review---2011---Yun Huang,George Q. Huang,Stephen T. Newman

This paper concerns coordination of enterprise decisions such as suppliers and components selection, pricing and inventory in a multi-level supply chain composed of multiple suppliers, a single manufacturer and multiple retailers. The problem is modeled as a three-level dynamic non-cooperative game. Analytical and computational methods are developed to determine the Nash equilibrium of the game. Finally, a numerical study in computer industry is conducted to understand the influence of the market scale parameter and the

components selection strategy on the optimal decisions and profits of the supply chain as well as its constituent members. Several research findings have been obtained.

Performance evaluation of logistics systems under cost and reliability considerations

- Transportation Research Part E: Logistics and Transportation Review---2011---Chin-Chia Jane

In this article, both distribution cost and delivery reliability are integrated into performance index $R\$b,d$ of logistics systems. The total distribution cost is not to exceed budget $\$b$, the delivery reliability is the probability that the source distributes a demand d successfully to the destination. A major contribution is that we present a hybrid approach for straightforward computation of the $R\$b,d$. As of now, it is the only algorithm that can compute $R\$b,d$ directly and practically. A real logistics system illustrates the proposed algorithm. In addition, computational results indicate that our algorithm outperforms existing algorithms.

Taste heterogeneity and market segmentation in freight shippers' mode choice behaviour

- Transportation Research Part E: Logistics and Transportation Review---2011---Kriangkrai Arunotayanun, John W. Polak

This paper investigates the prevalence of observed and unobserved taste heterogeneity influencing shippers' mode choice behaviour. The study is based on stated preference data collected in Java, Indonesia. The data were analysed using a mixed logit model, capable of accommodating random taste heterogeneity and panel effects associated with stated preference replications. The results indicate the presence of significant levels of taste heterogeneity, only some of which can be accounted for by conventional commodity-type based segmentations. The analysis goes on to apply latent class methods to identify behaviourally homogeneous segments, which also turn out to not depend on commodity types.

Influence of 3PL service offerings on client performance in India

- Transportation Research Part E: Logistics and Transportation Review---2011---R. Rajesh, S. Pugazhendhi, K. Ganesh, C. Muralidharan, R. Sathiamoorthy

This paper examines, in the context of outsourcing, the effects of improving the performance indicators of a client to the services offered by a 3PL provider. A research model has been developed and four research hypotheses are analyzed empirically using multiple regression analysis. The results point out that there is a positive influence in the performance indicators for clients who are in association with a 3PL provider. It is proved that the clients distinguish a 3PL provider as providing them with a potential pathway to a more innovative business model. The theoretical, managerial and research implications are also highlighted.

An ant colony optimization model: The period vehicle routing problem with time windows

- Transportation Research Part E: Logistics and Transportation Review---2011---Bin Yu, Zhong Zhen Yang

This paper proposes an improved ant colony optimization (IACO) to solve period vehicle routing problem with time windows (PVRPTW), in which the planning period is extended to several days and each customer must be served within a specified time window. Multi-dimension pheromone matrix is used to accumulate heuristic information on different days. Two-crossover operations are introduced to improve the performance of the algorithm. The effectiveness of IACO is evaluated using a set of well-known benchmarks. Some of the results are better than the best-known solutions. Results also show the IACO seems to be a powerful tool for PVRPTW.

Preferences for alternative short sea shipping opportunities

- Transportation Research Part E: Logistics and Transportation Review---2011---Sean M. Puck-

This paper investigates the role of preference and scale heterogeneity in the mode choice process of shippers in the Atlantic Canada-US eastern seaboard market. The generalised mixed logit model is estimated to account for heterogeneity in preferences for frequency of departure of freight transport services, along with heterogeneity in scale across respondents. The contributions of the paper to the literature are: the revelation of significant preference and scale heterogeneity in the sample; the estimated distribution of shippers' willingness-to-pay for gains in service frequency; and the confirmation that there is merit in accounting for scale heterogeneity in future and revisited choice studies.

The impact of landbridge on the market shares of Asian ports

- Transportation Research Part E: Logistics and Transportation Review---2011---Xinchang Wang,Qiang Meng

This paper develops a mathematical model to quantify the market share of a given port. A Monte Carlo simulation based algorithm is proposed to estimate the port market share. A study is subsequently conducted to explore the characteristics of the landbridge system in China and Southeast Asia, and the impact of the landbridge system on the market shares of Asian ports is evaluated using the proposed approach for three scenarios. The competitiveness of the Malacca and Singapore Straits is also illustrated by analyzing the changes in the market share of Singapore port with respect to value of time.

Economically-efficient port expansion strategies: An optimal control approach

- Transportation Research Part E: Logistics and Transportation Review---2011---Sander Dekker,Robert Verhaeghe,Bart Wiegmans

This paper proposes an analytical model with a control approach to obtain an optimal port expansion strategy

by balancing investment costs for the port and congestion costs for its users. Starting point is the optimality condition that marginal investment costs should balance marginal benefits. Particularly the scale effect in investment costs is considered; the consequence that the investment will be made in different stages is included in the solution. By relaxing some assumptions in the model, a numerical optimization algorithm is proposed which is applied to show how the approach can be used to deal with a practical expansion problem.

Assessing capacity and improving utilization of anchorages

- Transportation Research Part E: Logistics and Transportation Review---2011---Shell Ying Huang,Wen Jing Hsu,Yuxiong He

Anchorage are important resources for certain hub ports, and they are increasingly in demand during peak periods. We evaluate the capacity of multiple anchorages by reproducing realistic mix of arriving vessels, dwelling time and the current practices in choosing anchoring spots within an anchorage. The model is validated by using historical data. We also propose methods for improving space utilization of anchorages. Our experiments with four real anchorages show that the space utilization is improved by 6-10% with MHDF and WALLPACK_MHDF algorithms. This finding opens up possibilities of designating vessel anchoring spots for improved utilizations in the future.

Productivity of airline carriers and its relation to deregulation, privatisation and membership in strategic alliances

- Transportation Research Part E: Logistics and Transportation Review---2011---Stefan Sjögren,Magnus Söderberg

This study looks at how deregulation, privatisation and the formation of strategic alliances have affected the productivity of international airlines. We evaluate all three factors simultaneously and disaggregate the carriers' operations into production and sales and allow for unobserved firm-level heterogeneity through

random parameters. Estimations of stochastic frontier models reveal that on the aggregate level, deregulation increases productivity, membership in alliances has an ambiguous effect and state ownership has no significant effect. Disaggregating the carriers' operations confirms the productivity gains from deregulation, and that state ownership and alliances have contradictory effects.

Scale economies and marginal costs in Spanish airports

- Transportation Research Part E: Logistics and Transportation Review---2011---Juan Carlos Martín, Concepción Román, Augusto Voltes-Dorta

In this paper, we estimate alternative specifications of the Spanish airports' cost function with the objective to provide a comparative analysis on several technological features such as output-specific marginal costs, economies of scale, and the Allen elasticities of substitution. We found evidence of significant and unexhausted scale economies as well as technological development in the Spanish airport industry. The results suggest that traffic consolidation in multi-airport areas such as the Basque Country or Catalonia will result in lower costs for the public operator.

A structural model of safety and safety regulation in the truckload trucking industry

- Transportation Research Part E: Logistics and Transportation Review---2011---Ian Savage

This paper models public policies to improve safety within a structural model of the truckload trucking industry. The policies are designed to ameliorate the market failures associated with the myopic ignoring of crash costs by some trucking firms, and institutional constraints that prevent full internalization of the costs of crashes. The paper compares two alternative public policies: (1) levying post-crash fines and making shippers bear secondary liability for damages incurred in crashes, and (2) imposition of a minimum safety standard, in conjunction with a requirement to hold

insurance, and assessing penalties for non-compliance with the standard.

Equitable apportionment of railcars within a pooling agreement for shipping automobiles

- Transportation Research Part E: Logistics and Transportation Review---2011---Hanif D. Sherali, Brian J. Lunday

This paper examines the problem of apportioning a railcar fleet to car manufacturers and railroads within a pooling agreement for shipping automobiles. We demonstrate the potential inequities in the presently implemented allocation procedure in the industry, and we propose four alternative schemes to apportion railcars to manufacturers and an alternative railroad allocation scheme. We test the combinations of current and proposed techniques on realistic instances derived from representative data of the current business environment, and illustrate their impact relative to the existing methodology.

Strategic design of public bicycle sharing systems with service level constraints

- Transportation Research Part E: Logistics and Transportation Review---2011---Jenn-Rong Lin, Ta-Hui Yang

This study addresses the strategic planning of public bicycle sharing systems with service level considerations. In considering the interests of both users and investors, the proposed model attempts to determine the number and locations of bike stations, the network structure of bike paths connected between the stations, and the travel paths for users between each pair of origins and destinations. A small example is created to illustrate the proposed model. Sensitivity analysis is also performed to gain better insights into knowing how several important parameters affect the design of the system.

Analysis of traffic congestion costs in a competitive supply chain

- Transportation Research Part E: Logistics and Transportation Review---2011---Dinger Konur,Joseph Geunes

We study a competitive facility location problem with identical suppliers competing in multiple markets subject to distribution network congestion. We first analyze the solution of a symmetric competitive location game and discuss the firms' facility location and equilibrium market supply decisions. Then, we utilize the model to provide analytical characterization of the effects of traffic congestion costs on equilibrium distribution flows. These analytical results permit qualitative characterization of how changes in congestion levels and costs affect equilibrium location and distribution decisions. The results of extensive numerical studies serve to further illustrate the effects of traffic congestion costs on location, market supply quantity, and distribution decisions.

Strategic alliance in freight consolidation

- Transportation Research Part E: Logistics and Transportation Review---2011---Guanghui Zhou,Yer Van Hui,Liang Liang

The utilization of unfilled space in dispatching trucks requires collaboration among aligned partners. We consider two collaboration modes: strategic alliance and full collaboration, where outbound shipments could be reassigned among the partnering agents in freight consolidation with shipment delivery deadline. The effects of partnership are studied in an economic model where the product substitutability in price setting and discount offer are introduced. We adopt a simulation approach to find the optimal shipment dispatching plan in collaborative freight consolidation. A comprehensive analysis is presented to identify those factors which affect profit performance and collaboration decisions.

Air-cargo capacity allocation for multiple freight forwarders

- Transportation Research Part E: Logistics and Transportation Review---2011---Kannapha Amaruchkul,Vichit Lorchirachoonkul

We consider a single air-cargo carrier, which wants to allocate cargo capacity to multiple forwarders before a booking horizon starts. A contribution that the carrier earns from each forwarder is based on the actual allotment usage at the end of the horizon. The airline's problem is to choose the allotments that maximize the expected total contribution. We derive a probability distribution of the actual usage by using a discrete Markov chain and solve the problem by using a dynamic programming method. Two heuristics for a large-scale allocation problem are also proposed, and their performances are tested via numerical experiments.

Aircraft replacement scheduling: A dynamic programming approach

- Transportation Research Part E: Logistics and Transportation Review---2011---Chaug-Ing Hsu,Hui-Chieh Li,Su-Miao Liu,Ching-Cheng Chao

This study developed a stochastic dynamic programming model to optimize airline decisions regarding purchasing, leasing, or disposing of aircraft over time. Grey topological models with Markov-chain were employed to forecast passenger traffic and capture the randomness of the demand. The results show that severe demand fluctuations would drive the airline to lease rather than to purchase its aircrafts. This would allow greater flexibility in fleet management and allows for matching short-term variations in the demand. The results of this study provide a useful reference for airlines in their replacement decision-making procedure by taking into consideration the fluctuations in the market demand and the status of the aircraft.

The impact of lateness and reliability on passenger rail demand

- Transportation Research Part E: Logistics and Transportation Review---2011---Richard Batley, Joyce Dargay, Mark Wardman

To date, forecasts of the demand impacts of lateness and reliability have been derived largely from individual-level models taken at a snapshot in time. The contribution of this paper is to develop a dynamic model of rail demand at the market-level, yielding short and long-run elasticities with respect to lateness. Whereas individual-level models have suggested a high valuation of lateness and reliability, our market-level models indicate a relatively muted demand response. Reconciling these findings, we reason that, whilst rail travellers show considerable disdain for experiences of lateness, such experiences will not necessarily dissuade them from travelling by train.

Applying price and time differentiation to modeling cabin choice in high-speed rail

- Transportation Research Part E: Logistics and Transportation Review---2011---Chih-Wen Yang, Cheng-Chih Chang

This paper applies price differentiation of time segment, service class, and advance purchase to modeling cabin choice behavior. The proposed model was constructed with combining revealed-preference and stated-preference and validated by the case of reserved and unreserved-seat cabins in Taiwan high-speed rail. Furthermore, this study also investigates the effect of seat uncertainty in order to estimate its monetary value. The empirical results reveal that time discount and seat available definitely act as important roles on cabin choice behavior as well as fare level. Scenario analysis suggests cabin allocation should vary with time segment and trip characteristics.

Decision support for yard capacity, fleet composition, truck substitutability, and scalability issues at seaport container terminals

- Transportation Research Part E: Logistics and Transportation Review---2011---Matthew E.H. Petering

This paper presents the results of nine independent studies that link a seaport container terminal's long-run average quay crane rate to various strategic and tactical decisions made by the terminal operating company. New numerical results on yard capacity, fleet composition, truck substitutability, and terminal scalability issues are obtained using a fully-integrated, discrete event simulation model of a vessel-to-vessel transshipment terminal that is designed to reproduce the microscopic, stochastic, real-time environment at a multiple-berth facility. These are the first such studies to be conducted using a fully-integrated simulation model of a non-automated container terminal.

Erratum to "Container port efficiency in emerging and more advanced markets" [Transportation Research Part E 46 (6) (2010) 1030-1042]

- Transportation Research Part E: Logistics and Transportation Review---2011---Yen-Chun Jim Wu, Mark Goh

2011

The impact of item substitutions on production-distribution networks for supply chains

- Transportation Research Part E: Logistics and Transportation Review---2010---Hung-Yi Chen

This study investigates the effects of various factors relevant to item substitution strategy on two-echelon production-distribution networks in decentralized supply chains. The item substitution strategy replaces pre-set items with alternatives to fulfill customer demands. The independent factors for the substitution strategy include substitution scope and available options. The

moderators for the strategy include the dual sourcing strategy, substitution amount, and the echelons of the production-distribution network. The results of the experiment show that the item substitution strategy modulated by three moderators improved supply chain profit compared to cases where the strategy was not used.

Multistage optimization of the supply chains of biofuels

- Transportation Research Part E: Logistics and Transportation Review---2010---Yongxi Huang,Chien-Wei Chen,Yueyue Fan

In this study, a mathematical model that integrates spatial and temporal dimensions is developed for strategic planning of future bioethanol supply chain systems. The planning objective is to minimize the cost of the entire supply chain of biofuel from biowaste feedstock fields to end users over the entire planning horizon, simultaneously satisfying demand, resource, and technology constraints. This model is used to evaluate the economic potential and infrastructure requirements for bioethanol production from eight waste biomass resources in California as a case study. It is found that, through careful supply chain design, biowaste-based ethanol production can be sustained at a compatible cost around \$1.1 per gallon.

Channel coordination under consignment and vendor-managed inventory in a distribution system

- Transportation Research Part E: Logistics and Transportation Review---2010---Jen-Ming Chen,I-Chen Lin,Hung-Liang Cheng

This paper deals with the problem of coordinating a vertically separated distribution system under vendor-managed inventory and consignment arrangements. We formulate the profit-maximization problem and carry out equilibrium analysis under cooperative and non-cooperative settings. In addition, a revenue-sharing scheme joint with a side-payment is proposed, which

leads to Pareto improvements among channel participants. Our analysis reveals that the non-cooperative decentralization tends to price higher and stock less, which leads to a lower channel-wide profit. The consistent bias can be rectified by the dominant, cooperative wholesaler or by using the proposed two-part revenue-sharing mechanism.

An integrated model for stock replenishment and shipment scheduling under common carrier dispatch costs

- Transportation Research Part E: Logistics and Transportation Review---2010---Fatih Mutlu,Sila Çetinkaya

We examine a joint inventory replenishment and shipment scheduling problem that arises in the context of a vendor-managed inventory (VMI) arrangement. Since a temporal shipment consolidation policy is being implemented, the inventory requirements at the vendor are affected by the timing and quantity of shipment release. The vendor's problem is to determine an integrated policy for inventory replenishment and shipment release and to set its parameters. We develop analytical models for computing such integrated policies where it is economical to use common carriage for outbound transportation. We propose algorithmic approaches to set the optimal policy parameter values.

Evolutionary variational inequalities and applications to complex dynamic multi-level models

- Transportation Research Part E: Logistics and Transportation Review---2010---Patrizia Daniele

In this paper we consider a supply chain network model with three tiers of decision-makers (manufacturers, retailers, and consumers) in the case when prices and shipments are evolving on time. Moreover, we assume that excesses of production and excesses of demand of the commodity are present. For such a framework we furnish, using the infinite dimensional duality theory, the equilibrium conditions for the representatives of each tier of the supernetwork, the time-dependent

variational formulation governing the complete supply chain supernetwork, and we provide some existence theorems and a numerical example.

Coordination with a backup supplier through buy-back contract under supply disruption

- Transportation Research Part E: Logistics and Transportation Review---2010---Jing Hou,Amy Z. Zeng,Lindu Zhao

This paper studies a buy-back contract between a buyer and a backup supplier when the buyer's main supplier experiences disruptions. The expected profit functions and the optimal decisions of the contract players are derived through a sequential optimization process. The common properties of the contract as well as the differences under the demand uncertainty and the main supplier's recurrent supply uncertainty are explored through comparative studies and numerical examples. The study contributes to the literature by providing a better understanding of the impacts of demand and supply uncertainties and by shedding insights on the value of a backup supply.

A generalized algebraic model for optimizing inventory decisions in a centralized or decentralized multi-stage multi-firm supply chain

- Transportation Research Part E: Logistics and Transportation Review---2010---Kit Nam Francis Leung

First of all, a number of integrated models with/without lot streaming under the integer multiplier coordination mechanism is generalized by allowing lot streaming and three types of inspection for some/all upstream firms. Secondly, the optimal solutions to the three- and four-stage models are individually derived, both using the perfect squares method, which is a simple algebraic approach so that ordinary readers unfamiliar with differential calculus can easily understand how to obtain the optimal solution procedures. Thirdly, optimal expressions for some well-known models are deduced. Fourthly, expressions for sharing the coordination benefits based on Goyal's (1976) scheme

are derived, and a further sharing scheme is introduced. Fifthly, two numerical examples for illustrative purposes are presented. Finally, some future research works involving extension or modification of the generalized model are suggested.

Integration of inventory and transportation decisions in a logistics system

- Transportation Research Part E: Logistics and Transportation Review---2010---Qiu hong Zhao,Shuang Chen,Stephen C.H. Leung,K.K. Lai

This paper addresses some of the challenges faced by a company which is responsible for delivering coal to its four subsidiaries situated along a river, through river hired or self-owned vessels. We propose to adopt a vendor managed inventory concept that involves establishment of a central warehouse at the port, and apply the Markov Decision Process (MDP) to formulate both ordering and delivery problems, considering different transportation modes, costs, and inventory issues. An efficient algorithm is developed for solving the MDP models. Our computational tests show that the proposed strategy can significantly reduce the overall system costs while maintaining smooth Just-in-Time supplies of coal to the subsidiaries.

Intermodal logistics: The interplay of financial, operational and service issues

- Transportation Research Part E: Logistics and Transportation Review---2010---Rafay Ishfaq,Charles R. Sox

This research addresses strategic planning for an interregional, hub based, intermodal logistics network operated by a logistics service provider. A tabu search meta-heuristic is used to solve a mathematical optimization model that extends the p-hub median model for interacting hub location-allocation problems to the domain of intermodal logistics. An empirical study based on a subset of US freight flows shows that intermodal logistics networks differ significantly from traditional over-the-road logistics networks in their hub locations, network structure, and their use of direct and inter-hub

shipments. Furthermore, intermodal logistics networks are more sensitive to changes in service requirements and costs.

The moderating roles of risk and efficiency on the relationship between logistics performance and customer loyalty in e-commerce

- Transportation Research Part E: Logistics and Transportation Review---2010---Ramakrishnan Ramanathan

Using data from online customer ratings, we explore how the relationships between logistics performance and customer loyalty are affected by risk characteristics of products and efficiencies of the websites. Risk is defined in terms of price and ambiguity of products. Efficiency is interpreted as the ability of the websites to achieve good ratings in terms of operational factors (such as satisfaction of customers with product specifications, refunds/returns, prices, management accessibility, etc.) and also achieve good ratings in terms of customer loyalty. Our results show that efficiency, but not risk, is a significant moderator of the impact of logistics performance on customer loyalty.

An integrated vendor-buyer model with stock-dependent demand

- Transportation Research Part E: Logistics and Transportation Review---2010---Mohsen S. Sajadieh, Anders Thorstenson, Mohammad R. Akbari Jokar

We develop an integrated vendor-buyer model for a two-stage supply chain. The vendor manufactures the product and delivers it in a number of equal-sized batches to the buyer. The items delivered are presented to the end customers in a display area. Demand is assumed to be positively dependent on the amount of items displayed. The objective is to maximize total supply chain profit. The numerical analysis shows that buyer-vendor coordination is more profitable in situations when demand is more stock dependent. It also shows that the effect of double marginalization

provides a link between the non-coordinated and the coordinated case.

Integrating berth allocation and quay crane assignments

- Transportation Research Part E: Logistics and Transportation Review---2010---Daofang Chang, Zuhua Jiang, Wei Yan, Junliang He

In this study, a dynamic allocation model using objective programming for berth allocation and quay crane assignments was preliminarily developed based on rolling-horizon approach. Afterwards, a hybrid parallel genetic algorithm (HPGA), which combined parallel genetic algorithm (PGA) and heuristic algorithm, was employed to resolve the proposed model. Furthermore, a simulation was conducted to evaluate the HPGA and to execute relevant gene repair techniques. Eventually, the numerical experiments on a specific container terminal were applied to illustrate the proposed models and algorithms. In so doing, the effectiveness of the proposed approach was verified.

Liner shipping hub network design in a competitive environment

- Transportation Research Part E: Logistics and Transportation Review---2010---Shahin Gelareh, Stefan Nickel, David Pisinger

A mixed integer programming formulation is proposed for hub-and-spoke network design in a competitive environment. It addresses the competition between a newcomer liner service provider and an existing dominating operator, both operating on hub-and-spoke networks. The newcomer company maximizes its market share--which depends on the service time and transportation cost--by locating a predefined number of hubs at candidate ports and designing its network. While general-purpose solvers do not solve instances of even small size, an accelerated Lagrangian method combined with a primal heuristic obtains promising bounds. Our computational experiments on real instances of practical size indicate superiority of our approach.

Determining fixed crane areas in rail-rail transshipment yards

- Transportation Research Part E: Logistics and Transportation Review---2010---Nils Boysen, Malte Fliedner, Michael Kellner

To enable rapid container transshipment between freight trains in modern rail-rail transshipment yards efficient computerized scheduling procedures are indispensable. This paper proposes a dynamic programming approach, which determines yard areas for gantry cranes, so that the workload is evenly spread among cranes and, thus, train processing is accelerated. In a straightforward simulation of transshipment yard operations, the effect of optimal crane areas vs. equally sized areas is studied, the latter being a common real-world policy. The results indicate a remarkable speed-up of train processing if optimal crane areas are applied.

The continuous Berth Allocation Problem: A Greedy Randomized Adaptive Search Solution

- Transportation Research Part E: Logistics and Transportation Review---2010---Der-Horng Lee, Jiang Hang Chen, Jin Xin Cao

In this research, continuous and dynamic Berth Allocation Problem (BAP) is studied to minimize the total weighted flow time. Different from previous studies on continuous BAP, an efficient method is proposed to address the problem to identify the possible locations for next vessel in the Time-space diagram. Then two versions of Greedy Randomized Adaptive Search Procedure (GRASP) are developed to search for near optimal solutions. Both small and large scale numerical experiments are tested to examine the effectiveness of the proposed GRASPs by comparison with CPLEX and stochastic beam search, respectively.

Container port efficiency in emerging and more advanced markets

- Transportation Research Part E: Logistics and Transportation Review---2010---Yen-Chun Jim Wu, Mark Goh

The literature on container port efficiency has typically centered on ports in advanced markets or comparisons within regions. This study compares the efficiency of port operations in emerging markets (BRIC and the Next-11) with the more advanced markets (G7). We use data envelopment analysis to evaluate the container ports based on the import and export cargo volumes in 2005. Our results suggest that none of the ports in the advanced markets are role models for the field. This study provides a first step towards gaining insights into port efficiency in emerging markets.

An empirical test of modal choice and allocative efficiency: Evidence from US coal transportation

- Transportation Research Part E: Logistics and Transportation Review---2010---NurulHuda Mohd Satar, James Peoples

A generalized shipper transportation cost function is estimated to test whether coal shippers achieve allocative efficiency with respect to market prices when facing limited access to the full range of transportation services. Findings indicate that allocative efficiency with respect to market prices is achieved when shippers have access to all major transportation modes. In contrast, the condition for allocative efficiency is not met with respect to market prices when shippers' modal choices are limited to trucking and rail services. Findings for the sample of shippers who face limited shipping choices is interpreted as suggesting an over-use of trucks relative to the use of trains due to price distortions of transportation services.

Freight train scheduling with elastic demand

- Transportation Research Part E: Logistics and Transportation Review---2010---April Kuo, Elise Miller-Hooks, Hani S. Mahmassani

A train slot selection model based on multicommodity network flow concepts is developed for determining freight train timetables for scheduling rail services along multiple interconnected routes. The model seeks to minimize operating costs incurred by carriers and delays incurred by shippers while ensuring that the

schedules and demand levels are mutually consistent. A column generation-based methodology is proposed for train slot selection to meet frequency requirements. This methodology is embedded in a simulation-based iterative framework, where demand for rail services is re-computed in accordance with the train schedule obtained by solving the freight train scheduling problem.

Task selection and routing problems in collaborative truckload transportation

- Transportation Research Part E: Logistics and Transportation Review---2010---Ran Liu,Zhibin Jiang,Xiao Liu,Feng Chen

This paper introduces the task selection and routing problem in collaborative transportation in which a truckload carrier receives tasks from shippers and other partners and makes a selection between a private vehicle and an external carrier to serve each task. The objective is to minimize the variable and fixed costs for operating the private fleet plus the total costs charged by the external carrier. The mathematical formulation and the lower bound are established. A memetic algorithm is developed to solve the problem. The computational results show that the proposed algorithm is effective and efficient.

Reliable evacuation planning via demand inflation and supply deflation

- Transportation Research Part E: Logistics and Transportation Review---2010---ManWo Ng,S. Travis Waller

This paper presents an evacuation route planning model that both accounts for demand uncertainty (i.e. the number of evacuees) as well as capacity uncertainty (i.e. the road capacities). To ensure reliability, the model plans for more evacuees (i.e. demand inflation) and less road capacity (i.e. supply deflation). A major contribution is that we provide a framework to determine the amount of demand inflation/supply deflation necessary to ensure a user-specified reliability level. The model is shown to be a natural generalization of previously proposed evacuation models. A small

numerical case study reveals the key characteristics of the model.

Efficiency of the plate-number-based traffic rationing in general networks

- Transportation Research Part E: Logistics and Transportation Review---2010---Deren Han,Hai Yang,Xiaolei Wang

Road space rationing based on vehicle plate numbers restricts vehicle access to a network based upon the license number on pre-established days. It has been used in some large cities especially when there are some major events. This paper analyzes the efficiency of road space rationing schemes by establishing the bounds of the reduction in the system cost associated with the restricted flow pattern at user equilibrium in comparison with the system cost at the original user equilibrium. The bounds are established under the general traffic equilibrium model formulated as variational inequalities and illustrated with a simple example.

An adaptive memory programming metaheuristic for the heterogeneous fixed fleet vehicle routing problem

- Transportation Research Part E: Logistics and Transportation Review---2010---Xiangyong Li,Peng Tian,Y.P. Aneja

This paper studies the heterogeneous fixed fleet vehicle routing problem (HFFVRP), in which the fleet is composed of a fixed number of vehicles with different capacities, fixed costs, and variable costs. Given the fleet composition, the HFFVRP is to determine a vehicle scheduling strategy with the objective of minimizing the total transportation cost. We propose a multistart adaptive memory programming (MAMP) and path relinking algorithm to solve this problem. Through the search memory, MAMP at each iteration constructs multiple provisional solutions, which are further improved by a modified tabu search. As an intensification strategy, path relinking is integrated to enhance the performance of MAMP. We conduct a

series of experiments to evaluate and demonstrate the effectiveness of the proposed algorithm.

The impact of control strategies on the management of returnable transport items

- Transportation Research Part E: Logistics and Transportation Review---2010---Daniel Hellström,Ola Johansson

This research examines the impact of different control strategies on the management of returnable transport items (RTIs) in closed-loop supply chains. A simulation model is developed based on an empirical case and is used to explore different scenarios. The results suggest that the choice of control strategy has a significant impact on investments and operating costs, and that RTI shrinkage can be controlled either through the use of tracking systems, or choice of control strategy. Moreover, a simulation-based method for estimating the fleet size required to operate the system for the different strategies is presented.

The cell phone effect on motor vehicle fatality rates: A Bayesian and classical econometric evaluation

- Transportation Research Part E: Logistics and Transportation Review---2010---Richard Fowles,Peter Loeb,Wm. A. Clarke

This paper examines the potential effect of cell phones on motor vehicle fatality rates normalized for other driving related and socioeconomic factors. The model used is non-linear so as to address both life-taking and life-saving attributes of cell phones. The model is evaluated using classical methods along with Bayesian Extreme Bounds Analysis (EBA). The use of both classical and Bayesian methods diminishes the model and parameter uncertainties which afflict more conventional modeling methods which rely on only one of the two methods. The results indicate the presence of both life-taking and life-saving attributes of cell phones on motor vehicle fatality rates depending on the volume of cell phone subscribers in existence.

Restating modal investment priority with an improved model for public transport analysis

- Transportation Research Part E: Logistics and Transportation Review---2010---Alejandro Tirachini,David Hensher,Sergio R. Jara-Díaz

We compare analytically and numerically the optimised performance of different urban public transport modes for three objectives: total cost minimisation, profit maximisation, and welfare maximisation. We find that under optimal operation, buses provide lower waiting time and operator costs, therefore the only possible advantage for rail is providing a lower in-vehicle time cost if trains are faster. Using Australian data, we found that bus rapid transit provides a lower total cost, higher profit and welfare, up to their capacity. Introducing passengers dislike of crowding and train-specific attraction elements might make Heavy Rail the most cost effective mode for high levels of demand.

Managing uncertainty in on-demand air travel

- Transportation Research Part E: Logistics and Transportation Review---2010---Wei Yang,Itir Z. Karaesmen,Pinar Keskinocak

Fractional management companies (FMCs) that provide on-demand air travel services experience frequent changes in aircraft availability and flight requests. We propose scheduling heuristics which are both cost-effective and persistent (i.e., close to the original schedule) to address the uncertainty. The heuristics include pro-actively enforcing idleness of aircraft in creating the original schedule, strategically repositioning aircraft to serve yet-unknown demand and dense scheduling. Computational experiments are conducted in a simulator that mimics FMCs' daily operations. Simulation results quantify the value of each heuristic, which can be easily incorporated into existing computational methods used in FMCs for static scheduling problems.

A three-level supply chain network design model with risk-pooling and lead times

- Transportation Research Part E: Logistics and Transportation Review---2010---Sukun Park,Tae-

This paper considers a single-sourcing network design problem for a three-level supply chain consisting of suppliers, distribution centers (DC's) and retailers, where risk-pooling strategy and DC-to-supplier dependent lead times are considered. The objective is to determine the number and locations of suppliers and DC's, the assignment of each location-fixed DC to a supplier and that of each retailer to a DC, which minimizes the system-wide location, transportation, and inventory costs. The problem is formulated as a nonlinear integer programming model, for which a two-phase heuristic solution algorithm is derived based on the Lagrangian relaxation approach. Numerical experiments show that the proposed heuristic is effective and also efficient.

Incorporating location, routing and inventory decisions in supply chain network design

- Transportation Research Part E: Logistics and Transportation Review---2010---Amir Ahmadi Javid, Nader Azad

This paper for the first time presents a novel model to simultaneously optimize location, allocation, capacity, inventory, and routing decisions in a stochastic supply chain system. Each customer's demand is uncertain and follows a normal distribution, and each distribution center maintains a certain amount of safety stock. To solve the model, first we present an exact solution method by casting the problem as a mixed integer convex program, and then we establish a heuristic method based on a hybridization of Tabu Search and Simulated Annealing. The results show that the proposed heuristic is considerably efficient and effective for a broad range of problem sizes.

A modified ant colony optimization algorithm for multi-item inventory routing problems with demand uncertainty

- Transportation Research Part E: Logistics and Transportation Review---2010---Shan-Huen Huang, Pei-Chun Lin

This paper addresses an integrated model that schedules multi-item replenishment with uncertain demand to determine delivery routes and truck loads, where the actual replenishment quantity only becomes known upon arrival at a demand location. This paper departs from the conventional ant colony optimization (ACO) algorithm, which minimizes total travel length, and incorporates the attraction of pheromone values that indicate the stockout costs on nodes. The contributions of the paper to the literature are made both in terms of modeling this combined multi-item inventory management with the vehicle-routing problem and in introducing a modified ACO for the inventory routing problem.

The split delivery vehicle routing problem with minimum delivery amounts

- Transportation Research Part E: Logistics and Transportation Review---2010---Damon Gulczynski, Bruce Golden, Edward Wasil

In the vehicle routing problem, a fleet of vehicles must service the demands of customers in a least-cost way. By allowing multiple vehicles to service the same customer (i.e., splitting deliveries), substantial savings in travel costs are possible. However, split deliveries are often an inconvenience to the customer who would prefer to have demand serviced in a single visit. We consider the vehicle routing problem in which split deliveries are allowed only if a minimum fraction of a customer's demand is serviced by a vehicle. We develop a heuristic method for solving this problem and report computational results on a wide range of problem sets.

Solutions to the request reassignment problem in collaborative carrier networks

- Transportation Research Part E: Logistics and Transportation Review---2010---Susanne Berger, Christian Bierwirth

The paper considers an arrangement for exchanging transportation requests to facilitate collaboration among independent carriers. The goal is to maximize the total profit without decreasing the individual profit

of the carriers. Two solution approaches are developed for this problem involving decentralized control and auction based exchange mechanisms. The results are compared with those obtained without collaboration and by a centralized control. They indicate that horizontal collaboration pays off even in highly competitive environments.

The decline of the traditional travel agent model

- Transportation Research Part E: Logistics and Transportation Review---2010---José I. Castillo-Manzano,Lourdes López-Valpuesta

This article analyzes the struggle between traditional travel agencies and airlines to gain control of the Spanish airline services market. Also analyzed is the strong emergence of a third player, online travel portals that act as online travel agencies. We use a multinomial logit model to study the influence of 27 socio-economic factors and trip attributes on passenger purchase channel choice. The results show that the profile of a passenger who has a greater likelihood of making his/her bookings online is that of a young person, a student or educated to a high level, a habitual traveler, booking a simple journey and using an LCC. The factors linked to an increased likelihood of making purchases by phone include: being male, middle-aged, on a business or short trip, and the passengers usually use a travel agency. Finally, passengers who are over 65 years of age, with a lower academic level, who use a travel agency and are going to make a more complicated journey, are more likely to purchase their tickets in-store.

Scheduling trucks in cross-docking systems: A robust meta-heuristics approach

- Transportation Research Part E: Logistics and Transportation Review---2010---Roya Soltani,Seyed Jafar Sadjadi

In a cross-docking system, trucks must be scheduled to minimize the total flow time of the system. This problem is NP-hard, and this study proposes two hybrid meta-heuristics--hybrid simulated annealing and hybrid variable neighborhood search--to solve it by

achieving the best sequence of truck pairs. The Taguchi method serves to reveal the best robustness of these algorithms. To demonstrate the effectiveness of the proposed methods, especially for large-sized problems, this study solves various test problems, and the computational results clearly reveal that the proposed methods outperform previous approaches.

Estimating and benchmarking

Less-than-Truckload market rates

- Transportation Research Part E: Logistics and Transportation Review---2010---Evren Özkaya,Pinar Keskinocak,V. Roshan Joseph,Ryan Weight

In this paper, we present a regression-based methodology that can estimate the Less-than-Truckload (LTL) market rates with high reliability using an extensive database of historical shipments from continental United States. Our model successfully combines the quantitative data with qualitative market knowledge to produce better LTL market rate estimates which can be used in benchmarking studies allowing carriers and shippers to identify cost saving opportunities. We identify the main drivers of LTL pricing and reveal the effects of certain industry practices on the final market rates.

A driver focused truck crash prediction model

- Transportation Research Part E: Logistics and Transportation Review---2010---David E. Cantor,Thomas M. Corsi,Curtis Grimm,Koray Özpolat

This paper advances a driver focused truck crash prediction model. The model investigates the contribution of driver factors on the number of state reportable crashes in which the driver was involved. The findings suggest that the following factors are significantly related to the likelihood of a crash occurrence: driver age, weight, height, gender, and employment stability as well as previous driver and vehicle violations and past crashes. The results have significance regard-

ing the Federal Motor Carrier Safety Administration imperative to improve safety.

Efficiency and patterns of service mix in airport companies: An input distance function approach

- Transportation Research Part E: Logistics and Transportation Review---2010---Graziano Abrate,Fabrizio Erbetta

In this paper an input distance function approach is used to evaluate efficiency and technological characteristics of Italian airport companies for the period 2000-2005. This approach is robust to deviations from neoclassical paradigm in terms of cost-minimizing behavior. Duality relationship between the input distance function and the shadow cost function is exploited to derive cost complementarities among outputs. Empirical findings are used to discuss the economic implications connected to changes in airport organization, involving in particular outsourcing of handling operations and development of commercial activities.

A Multi-Objective Goal Programming airport selection model for low-cost carriers' networks

- Transportation Research Part E: Logistics and Transportation Review---2010---Yu-Chun Chang,Ning Lee

This paper examines the practicability and validity of the Multi-Objective Goal Programming (MOGP) model in designing a point-to-point airline network. The MOGP mathematical model is used in this study to identify and select a best central airport and its connecting airports providing the best overall optimal performance. By using the proposed model in the selection process, one can expect to achieve the following objectives: (1) an airline network designed at less cost, (2) an airline network that generates more revenues, and (3) an airline network that serves more passengers. Route data from Taipei to the Southeast Asian region were selected for this experiment to validate the model's practicability.

Multi-level inventory management decisions with transportation cost consideration

- Transportation Research Part E: Logistics and Transportation Review---2010---Alireza Madadi,Mary E. Kurz,Jalal Ashayeri

In this article we address specific inventory management decisions with transportation cost consideration in a multi-level environment consisting of a supplier-warehouse-retailers. We develop two models - namely, decentralized ordering model and centralized ordering model to investigate the effect of collective ordering by retailers on the total inventory cost of the system. A numerical study shows that the proposed model is robust and generates reasonable cost savings. The models have potential in several multi-level applications such as fresh or frozen food delivery to stores of different supermarkets or the supply of medicine to a number of hospitals from a wholesaler.

Optimal network flows for containerized imports to the United States

- Transportation Research Part E: Logistics and Transportation Review---2010---Lei Fan,William Wilson,Denver Tolliver

This paper analyzes the intermodal transportation network of containerized imports to the United States. An optimization model is developed that integrates international and North America inland transport networks. The results indicate optimal ship size, route, port, and interior shipping corridor and are highly reflective of observed shipments. Sensitivity analyzes were performed to evaluate impacts of congestion on capacity constraints as well as the prospective impacts of the alternative routes that are emerging. Results indicate that Prince Rupert is highly competitive for shipments to some markets, but the expansion of the Panama Canal would have lesser impacts on container flows.

The impact of foldable containers on container fleet management costs in hinterland transport

- Transportation Research Part E: Logistics and Transportation Review---2010---Koichi Shin-tani,Rob Konings,Akio Imai

This paper analyzes the possibility to save container fleet management costs in repositioning empty containers through the use of foldable containers. We model this entire empty container flow as an integer programming problem with different strategies in empty container flow itinerary. The model is used to carry out numerical experiments that optimize the empty container repositioning in the hinterland, where there are serious empty container repositioning problems caused by extremely imbalanced trades. The study finds that foldable containers can substantially save on repositioning costs compared to the use of standard containers.

How different is carrier choice for third party logistics companies?

- Transportation Research Part E: Logistics and Transportation Review---2010---Zachary Patterson,Gordon O. Ewing,Murtaza Haider

The purpose of this paper is to test whether third party logistics companies (3PLs) are different from other end-shippers with respect to how they choose their carriers. The results of carrier choice models developed in this paper suggest that 3PLs are more biased against intermodal shipping than other end-shippers. The principal conclusions are as follows: mode and carrier choice modeling needs to take into consideration differences between 3PLs and other end-shippers; and with the increasing role of 3PLs in choosing carriers, their stronger bias against intermodal shipping will present further challenges to increasing freight rail mode share.

What shapes local public transportation in Europe? Economics, mobility, institutions, and geography

- Transportation Research Part E: Logistics and Transportation Review---2010---Daniel Albalade,

ate,Germà Bel

This paper analyzes factors explaining supply and demand of local public transportation. Together with variables related to traditional economic factors and mobility, we consider variables reflecting institutional characteristics and geographical patterns. Being a political capital increases supply and demand of local public transportation, inequality is associated with higher supply, and contracting out reduces supply. Furthermore, our regional analysis allows us capturing the effect of geographical characteristics and different traditions of government intervention. In all, we provide first evidence on the role played by institutional and regional characteristics useful to achieve a better understanding of local public transportation supply and demand.

Locating passenger vehicle refueling stations

- Transportation Research Part E: Logistics and Transportation Review---2010---Ying-Wei Wang,Chuan-Ren Wang

The study follows the concept of set cover and vehicle refueling logics to propose a hybrid model with dual objectives, using a mixed integer programming method, to economically site refueling stations to simultaneously serve intercity and intra-city travel. The model can be applied to plan a network of refueling stations for the emerging and/or monopolistic automotive market of alternative fuel vehicles. From a real-life case study, the factors of vehicle range and coverage distance are identified as playing important roles in any solution. Based on the non-inferior solutions, decision makers can thus better formulate viable station-deployment plans.

Selected papers from the Second National Urban Freight Conference

- Transportation Research Part E: Logistics and Transportation Review---2010---Anastasios Chasiakos,Maged Dessouky,Petros Ioannou

2010

A delay estimation technique for single and double-track railroads

- Transportation Research Part E: Logistics and Transportation Review---2010---Pavankumar Murali,Maged Dessouky,Fernando Ordóñez,Kurt Palmer

To route and schedule trains over a large complex network can be computationally intensive. One way to reduce complexity could be to "aggregate" suitable sections of a network. In this paper, we present a simulation-based technique to generate delay estimates over track segments as a function of traffic conditions, as well as network topology. We test our technique by comparing the delay estimates obtained for a network in Los Angeles with the delays obtained from the simulation model developed by Lu et al. [Lu, Q., Dessouky, M.M., Leachman, R.C., 2004. Modeling of train movements through complex networks. ACM Transactions on Modeling and Computer Simulation 14, 48-75], which has been shown to be representative of the real-world delay values. Railway dispatchers could route and schedule freight trains over large networks by using our technique to estimate delay across aggregated network sections.

The impacts of congestion on commercial vehicle tour characteristics and costs

- Transportation Research Part E: Logistics and Transportation Review---2010---Miguel Andres Figliozzi

Analytical modeling and insights, numerical experiments, and real-world tour data are used to understand the impact of congestion on urban tour characteristics, carriers' costs, and distance/time traveled. This paper categorizes tours into three classes based on their tour efficiency and variable costs structure. Travel time/distance between customers and depot is found to be a crucial factor that exacerbates the negative impacts of congestion. Travel time variability is a significant factor only when travel time between depot and customers is considerable in relation to the maximum tour duration. For each customer, it is possible

to define a dimensionless coefficient that provides an indication of the relative impact of congestion on routing constraints. Congestion also affects carriers' cost structure, as congestion worsens the relative weight of wages and overtime escalates and the relative weight of distance related costs decrease.

Long haul freight network design using shipper-carrier freight flow prediction: A California network improvement case study

- Transportation Research Part E: Logistics and Transportation Review---2010---Pruttipong Apivatanagul,Amelia C. Regan

Transportation network design is a method for analyzing the interactive benefits of transportation projects applied to a network. In this paper, a network design model is developed for long haul freight movements which are represented by relationships between shippers and carriers. Additionally, an explicit capacity constraint is used to divert traffic volume from congested links. A case study based on the California transportation network is implemented to examine the effectiveness of this model when applied to a large network. A geographic information system is used to facilitate data management and analysis of the results.

On the formulation and solution of the convoy routing problem

- Transportation Research Part E: Logistics and Transportation Review---2010---Darin Goldstein,Tariq Shehab,Juan Casse,Hsiu-Chin Lin

In this work, we will identify important variables that contribute to vehicular movement in an emergency environment. In particular, we formulate and pose the convoy routing problem. We suggest a method for modeling the problem and formulate a precise problem statement that significantly reduces the number of variables under consideration relative to similar previous work; even so, we prove that the decision version of this problem is NP-complete. After devising an algorithm using artificial intelligence techniques, we then empirically analyze this model (via software simulation) to

get computational results on a single instance of the problem.

From waste to hydrogen: An optimal design of energy production and distribution network

- Transportation Research Part E: Logistics and Transportation Review---2010---Nathan Parker,Yueyue Fan,Joan Ogden

This paper focuses on evaluating the economic potential and infrastructure requirements of hydrogen production from agricultural residues, a representative green energy pathway. A mixed-integer nonlinear programming model is constructed for finding the most efficient and economical configuration of the whole pathway. Using northern California case studies, we found that hydrogen from agricultural wastes can be delivered at costs similar to producing hydrogen from natural gas, a non-renewable energy source. The potential impact of this energy pathway on local freight transport is also discussed depending on the choice of hydrogen delivery mode.

Evaluating impacts of institutional reforms on port efficiency changes: Ownership, corporate structure, and total factor productivity changes of world container ports

- Transportation Research Part E: Logistics and Transportation Review---2010---SangHyun Cheon,David E. Dowall,Dong-Wook Song

This paper evaluates how port institutional reforms influenced efficiency gains between 1991 and 2004. We constructed a panel data for port ownership, corporate structure, and port inputs and outputs for 98 major world ports, and we implemented the Malmquist Productivity Index (MPI) model. The MPI provides efficiency measures for input combinations that allow for obtaining the outputs in the presence of institutional reforms, ownership changes, main agent problems, technological progress, efficient scale growth, and many other reasons for efficiency and the lack of it. The results illustrate that ownership restructuring contributed to total factor productivity gains.

The restructuring induced optimized operation of container terminals, especially for large ports, as it allowed specialized private entities to concentrate on terminal operation and cargo handling services.

Supply chain network design under profit maximization and oligopolistic competition

- Transportation Research Part E: Logistics and Transportation Review---2010---Anna Nagurney

In this paper, we model the supply chain network design problem with oligopolistic firms who are involved in the competitive production, storage, and distribution of a homogeneous product to multiple demand markets. The profit-maximizing firms select both the capacities associated with the various supply chain network activities as well as the product quantities. We formulate the governing Nash-Cournot equilibrium conditions as a variational inequality problem and identify several special cases of the model, notably, a generalization of a spatial oligopoly and a classical oligopoly problem to include design capacity variables. The proposed computational approach, which is based on projected dynamical systems, fully exploits the network structure of the problems and yields closed form solutions at each iteration. In order to illustrate the modeling framework and the algorithm, we also provide solutions to a spectrum of numerical supply chain network oligopoly design examples. This paper makes a contribution to game theoretic modeling of competitive supply chain network design problems in an oligopolistic setting.

A dynamic evacuation network optimization problem with lane reversal and crossing elimination strategies

- Transportation Research Part E: Logistics and Transportation Review---2010---Chi Xie,Dung-Ying Lin,S. Travis Waller

This paper discusses a dynamic evacuation network optimization problem that incorporates lane reversal and crossing elimination strategies. These two lane-based planning strategies complement one another by increasing capacity in specific directions through the evacua-

tion network. A bi-level network optimization model is formulated, in which the upper level aims at optimizing the network evacuation performance subject to the lane-reversal and crossing-elimination constraints and the lower level conveys a cell transmission-based dynamic traffic assignment problem. An integrated Lagrangian relaxation and tabu search method is devised for approximating optimal problem solutions through an iterative optimization-evaluation process. The numerical results of implementing the developed modeling and solution approach to a synthetic network and a real-world example application justify its theoretical and practical value.

The broader effects of transportation infrastructure: Spatial econometrics and productivity approaches

- Transportation Research Part E: Logistics and Transportation Review---2010---Jeffrey Cohen

The importance of "broader" economic effects of transportation infrastructure has recently become apparent. "Broader" refers to impacts beyond the geographic boundaries within which the infrastructure investments are undertaken. Approaches to estimate "broader" impacts in production and cost function models are evaluated. A contribution of this paper is the empirical demonstration with a cross-section of US states' manufacturing data that ignoring broader effects of a spatially lagged dependent variable can lead to misstatements of the overall productive impacts of public infrastructure. These inaccuracies can arise because of missing indirect effects and from specification bias that may directly impact the infrastructure elasticity.

The impact of truck arrival information on container terminal rehandling

- Transportation Research Part E: Logistics and Transportation Review---2010---Wenjuan Zhao, Anne V. Goodchild

This paper uses simulation to evaluate the use of truck arrival information to reduce container rehandles during the import container retrieval process by improv-

ing terminal operations. A variety of scenarios with different levels of truck information and various container bay configurations are modeled to explore how the information quality and bay configuration affect the magnitude of benefit. The results demonstrate that a complete arrival sequence is not required to substantially reduce rehandles, significant benefit can be obtained under small amounts of information, the benefits grow with the bay size, and that updating information in real time significantly lowers information requirements.

The integrated yard truck and yard crane scheduling problem: Benders' decomposition-based methods

- Transportation Research Part E: Logistics and Transportation Review---2010---Jin Xin Cao, Der-Hong Lee, Jiang Hang Chen, Qixin Shi

This paper proposes a novel integrated model for yard truck and yard crane scheduling problems for loading operations in container terminal. The problem is formulated as a mixed-integer programming model. Due to the computational intractability, two efficient solution methods, based on Benders' decomposition, are developed for problem solution; namely, the general Benders' cut-based method and the combinatorial Benders' cut-based method. Computational experiments are conducted to evaluate the effectiveness of the proposed solution methods.

An uncertainty-aware AGV assignment algorithm for automated container terminals

- Transportation Research Part E: Logistics and Transportation Review---2010---Panagiotis Angeloudis, Michael G.H. Bell

This paper studies job assignments for automated guided in container terminal settings under various conditions of uncertainty. An introduction to their operation is provided, along with a flexible dispatching algorithm, suitable for real-time control of AGVs. Using these concepts a new AGV dispatching approach is developed, capable of operating under uncertain

conditions within a detailed container terminal model. Several performance indicators are presented, focused on generic features of vehicle operations as well the assessment of uncertainty levels inside the terminal. From the results of the simulation experiments, it is found that the proposed technique outperforms well known heuristics and alternative algorithms.

Routing design for less-than-truckload motor carriers using Ant Colony Optimization

- Transportation Research Part E: Logistics and Transportation Review---2010---L. Barcos,V. Rodríguez,M.J. Álvarez,F. Robusté

One of the most important challenges that confronts less-than-truckload carriers serving many-to-many distribution networks consists of determining how to consolidate flows of small shipments. The objective is to determine a route for each origin-destination pair that minimizes the cost while still guaranteeing a certain level of service. This research studies different aspects of the problem and provides a metaheuristic algorithm (based on Ant Colony Optimization techniques) capable of solving real-life problems in a reasonable computational time. The viability of the approach has been tested with a real case in Spain and encouraging results have been obtained.

Willingness to pay for travel time reliability in passenger transport: A review and some new empirical evidence

- Transportation Research Part E: Logistics and Transportation Review---2010---Zheng Li,David Hensher,John Rose

This paper reviews and critiques the modelling frameworks and empirical measurement paradigms used to obtain willingness to pay (WTP) for improved travel time reliability, suggesting new directions for ongoing research. We also estimate models to derive values of reliability, scheduling costs and reliability ratios in the context of Australian toll roads and use the new evidence to highlight the important influence of the

way that trip time variability is included in stated preference studies in deriving WTP estimates of reliability in absolute terms, and relative to the value of travel time savings.

Determinants of passenger transfer waiting time at multi-modal connecting stations

- Transportation Research Part E: Logistics and Transportation Review---2010---Spring C. Hsu

This paper formulates a model to represent the transfer waiting time for a connecting service at multi-modal stations, where waiting time considers the characteristics of both the connecting service and its feeder services. Numerical simulation results show that transfer waiting time is mainly affected by the capacities and headways of the connecting and feeder services. Simulations also show that compared with the effects of connecting service variables, the corresponding variables of the feeder service usually have greater influences on transfer waiting time. In general, simulation results suggest that multi-modal operations, transfer waiting time cannot be improved without operational coordination with the feeder service.

Operational workforce planning for check-in counters at airports

- Transportation Research Part E: Logistics and Transportation Review---2010---Raik Stolletz

This paper addresses operation models for workforce planning for check-in systems at airports. We characterize different tasks of the hierarchical workforce planning problem with time-dependent demand. A binary linear programming formulation is developed for the fortnightly tour scheduling problem with flexible employee contracts. This binary programming model is solved for optimality by CPLEX for real-world demand scenarios with different workforce sizes. The numerical study analyzes the impact of the degree of flexibility and economies of scale. The model formulation is extended to generate convenient tours with regard to employee preferences.

An approximate algorithm for the two-dimensional air cargo revenue management problem

- Transportation Research Part E: Logistics and Transportation Review---2010---Kuancheng Huang,Ko-chen Chang

For the air cargo revenue management problem, this study developed a solution algorithm based on approximating the expected revenue function in the dynamic programming (DP) model while taking into account the stochastic volume and weight of shipments. In order to alleviate the computational load, the approximation was achieved by computing only a limited number of points in the DP state space. In the simulation experiment, the developed algorithm was compared with a recent heuristic algorithm based on de-coupling the relationship between weight and volume. It was found that the approach of this study can generate higher revenue than the de-coupling control for most of the cases.

A nonparametric efficiency analysis of German public transport companies

- Transportation Research Part E: Logistics and Transportation Review---2010---Christian von Hirschhausen,Astrid Cullmann

In this paper, we present a nonparametric comparative efficiency analysis of 179 communal public transport bus companies in Germany (1990-2004). We apply both deterministic data envelopment analysis (DEA) and bootstrapping to test the robustness of our estimates and to test the hypothesis of global and individual constant returns to scale. We find that the average technical efficiency of German bus companies is relatively low. We observe that the industry appears to be characterized by increasing returns to scale for smaller companies. These results would imply increasing pressure on bus companies to restructure.

Optimizing bus stop spacing in urban areas

- Transportation Research Part E: Logistics and Transportation Review---2010---Ángel

Ibeas,dell'Olio, Luigi,Borja Alonso,Olivia Sainz

This work develops a bi-level optimization model for locating bus stops to minimize the social cost of the overall transport system. The work takes into account possible changes in demand due to different bus stop locations considering congestion on buses, interaction with private traffic, operational variables (fleet, frequency, operator budgets), and the socio-demographic characteristics of each zone in the urban area. Finally, the technique is applied to a real case and a sensitivity analysis is performed to check how the different variables analysed influence the solution provided by the model.

Outsourcing distribution and logistics services within the automotive supplier industry

- Transportation Research Part E: Logistics and Transportation Review---2010---Kingsley A. Reeves,Fethullah Caliskan,Ozan Ozcan

This paper reports on an empirical study that examined a suite of distribution and logistics services commonly used to manage inbound materials en route to plants. The sourcing decision is examined through the lenses of transaction cost economics and the resource-based view of the firm and the results lend limited support for both theories in the context of such services. Results further indicate that there is little evidence supporting differences between internal versus external decision-makers.

The capacitated plant location problem with customers and suppliers matching

- Transportation Research Part E: Logistics and Transportation Review---2010---Zhanguo Zhu,Feng Chu,Linyan Sun

This paper introduces a new problem called the capacitated plant location problem with customer and supplier matching (CLCSM). The product distribution from plants to customers and the material supply from suppliers to plants are considered together. We merge a distribution trip and a supply trip into one triangular

trip for saving allocation cost. Vehicles from plants visit a customer and a supplier for each trip. We provide a heuristic solution procedure based on Lagrangian relaxation. Computational results indicate that the proposed heuristic solution procedure is shown to be efficient yielding optimal or near-optimal solutions for randomly generated instances.

Special issue of selected papers from the 12th ATRS Conference, Athens, Greece, 2008

- Transportation Research Part E: Logistics and Transportation Review---2010---Sveinn Gudmundsson,Tae Hoon Oum,Andreas Papatheodorou

2010

Network structure and capacity requirement: The case of China

- Transportation Research Part E: Logistics and Transportation Review---2010---Yimin Zhang

This paper analyzes capacity requirement by alternative network structures. Based on a simple model, it is concluded that the capacity required under a hub-and-spoke network would be more than twice as large as the capacity required under a fully connected network. In recent years, China has experienced unprecedented growth in the demand for air travel, which has put continuous pressure on the expansion in airport capacity. Still as a developing country, China suffers from insufficient investment in infrastructure. Therefore, given scarce capacity, it may be more efficient for the major air carriers not to adopt the hub-and-spoke network in Chinese domestic markets.

A comparative study of airport connectivity in China, Europe and US: Which network provides the best service to passengers?

- Transportation Research Part E: Logistics and Transportation Review---2010---Stefano Paleari,Renato Redondi,Paolo Malighetti

This paper investigates the connectivity of the airport networks in China, Europe and US. Our aim is to analyze which network is most beneficial to final passengers in terms of travel time and which of the network features lead to such a result. A time-dependent minimum path approach is employed to calculate the minimum travel time between each pair of airports in the three networks, inclusive of flight times and waiting times in intermediate airports. We evaluate each fastest indirect connection in terms of waiting times and routing factors to consider the effect of the hubs' coordination and locations. The Chinese network provides the quickest travels for passengers, but this performance is explained by a small number of airports per inhabitant. The US network is the most coordinated when considering indirect connections. The EU network provides the most homogeneous level of service when comparing airports of different sizes.

Latent class models of international air carrier choice

- Transportation Research Part E: Logistics and Transportation Review---2010---Chieh-Hua Wen,Shan-Ching Lai

This paper uses a market segmentation approach to identify airline passengers' potential segments and preferences toward international air carriers. The modeling approaches consist of the stated preference method and the latent class model. The stated choice experiments were designed based on service attributes in the international airline choice context. Empirical data was collected from airline passengers who have flown from Taipei to Tokyo or from Taipei to Hong Kong. The latent class model accommodating preference heterogeneity outperforms the multinomial logit model as indication of a better approach to analyze airline choice behavior. The latent class model with individual socioeconomic and trip characteristics in segment membership functions also improved model fit relative to the corresponding latent class model without individual characteristics. The values of willingness to pay for service attribute improvements vary across international air routes and segments. Passengers are

willing to pay more for better service quality. In order to develop effective marketing and operational strategies for the international air travel market, this study highlights the importance of exploring airline choice behaviors by routes and segments.

Structuring critical success factors of airline safety management system using a hybrid model

- Transportation Research Part E: Logistics and Transportation Review---2010---Yueh-Ling Hsu,Wen-Chin Li,Kuang-Wei Chen

With the global trend of legal requirement for a performance-based Safety Management System (SMS), to develop and implement an SMS to deliver services has become the most important goal within the airline industry. Yet there found some discrepancies concerning the use and the manner that SMS was being explained and taught. Therefore, this research aims to develop a quantitative evaluation model, which identifies the key components of airline SMS and considers the interaction between key components. To explore the core value of SMS, an extensive review regarding SMS components are firstly conducted and summarized from major aviation organizations and authorities, and then Grey Relational Analysis is used to group and select key components. After the critical components are derived, Decision Making Trial Evaluation Laboratory and Analytic Network Process are employed to analyze and map out all kinds of interactions among critical components and dimensions systematically. An empirical study is presented to illustrate the application of the proposed methods. From the results of the combined approaches, Organization is the most important dimension in SMS, which begins with Policies that convey to all staff the top managers' vision on safety.

The welfare effects of the allocation of airlines to different terminals

- Transportation Research Part E: Logistics and Transportation Review---2010---M. Pilar Socorro,Ofelia Betancor

Many airports around the world have recently built,

rebuilt or are in the process of constructing new terminals. Incumbent airlines and new entrants must be allocated to the new and old facilities. When spaces at airport terminals are directly allocated, the allocation should be done by taking into account the implications for airlines' competition and social welfare, given the airlines' network configuration. We use a theoretical model in which two airlines compete in prices with differentiated products for a given network structure. The model shows that, in general, if airlines are allocated to different terminals, the level of competition is reduced, the ticket prices are higher and the consumer surplus and social welfare are lower. Only in some routes, and under certain conditions on the market size, ticket prices may be lower.

Technical efficiency and productivity changes in Spanish airports: A parametric distance functions approach

- Transportation Research Part E: Logistics and Transportation Review---2010---Beatriz To-var,Roberto Rendeiro Martín-Cejas

This paper contributes to the airport benchmarking literature in two ways. To our knowledge, this is the first attempt at using a stochastic distance function to measure airports' productivity changes while considering multiple outputs. Secondly, we calculate the evolution and decomposition of the Total Factor Productivity (TFP) for Spanish airports. The average rate of productivity showed a slight annual improvement of 0.9%, and the core engine of this was 3% increase in technical progress rather than through efficiency. Results, by airport, identify those needing improvement, to be more attractive in the Spanish airport restructuring program.

Air transport demand and economic growth in Brazil: A time series analysis

- Transportation Research Part E: Logistics and Transportation Review---2010---Marcial Marazzo,Rafael Scherre,Elton Fernandes

We investigate the relationship between air transport

demand (passenger-kilometer: PAX) and economic growth (GDP) between 1966 and 2006 in Brazil. Special attention is paid to stationary features and the existence of a long-run equilibrium between variables to work in a vector autoregressive environment. Our findings suggest that GDP and PAX are co-integrated. Impulse-response analysis indicates a strong positive reaction of PAX due to a positive change in GDP. However, GDP reacts to a change in PAX in a slower and moderated way. We interpret these findings as an empirical evidence of air transport multiplier effects in the economy.

Airline competition in the British Isles

- Transportation Research Part E: Logistics and Transportation Review---2010---Alberto Gaggero, Claudio Piga

We study the relationship between pricing and market structure on the routes connecting the UK and the Republic of Ireland. Because in 2007 the European Commission prohibited the takeover of Aer Lingus by Ryanair, the analysis focuses on their pricing strategies in particular. We use an original dataset of fares posted on-line, which allows to control for the fares' inter-temporal pattern for each specific flight and each carrier's specific yield management system. Our evidence supports the European Commission's view that the elimination of a competitor in the Irish airline market is likely to have harmful consequences for consumers.

Dynamic relief-demand management for emergency logistics operations under large-scale disasters

- Transportation Research Part E: Logistics and Transportation Review---2010---Jiuh-Bing Sheu

This paper presents a dynamic relief-demand management model for emergency logistics operations under imperfect information conditions in large-scale natural disasters. The proposed methodology consists of three steps: (1) data fusion to forecast relief demand in multiple areas, (2) fuzzy clustering to classify affected area

into groups, and (3) multi-criteria decision making to rank the order of priority of groups. The results of tests accounting for different experimental scenarios indicate that the overall forecast errors are lower than 10% inferring the proposed method's capability of dynamic relief-demand forecasting and allocation with imperfect information to facilitate emergency logistics operations.

A conceptual framework for agent-based modelling of logistics services

- Transportation Research Part E: Logistics and Transportation Review---2010---Matthew J. Roroda, Rinaldo Cavalcante, Stephanie McCabe, Helen Kwan

This paper presents an agent-based microsimulation framework that represents the diversity of roles and functions of actors in the freight system, how they interact through markets and how interactions between actors are established in markets through contracts. The framework provides sensitivity to technology trends, business trends, and policy scenarios. Logistics costs, outsourcing of logistics services to third party logistics firms, growth or retraction of various industry sectors, and the impact of new supply channels are explicitly represented. Data sources available in Toronto, Canada and new data collection efforts required for model estimation are described.

An integrated production-inventory system in a multi-stage multi-firm supply chain

- Transportation Research Part E: Logistics and Transportation Review---2010---Kit Nam Francis Leung

We first generalize a number of integrated models with/without lot streaming and with/without complete backorders under the integer-multiplier coordination mechanism, and then individually derive the optimal solution to the three- and four-stage model, using algebraic methods of complete squares and perfect squares. We subsequently deduce optimal expressions for some well-known models. For our model, we check that the

optimal solution, which is algebraically derived, is a global one. We present three numerical examples for illustrative purposes. We finally suggest some future research work involving extension or modification of the generalized model.

A stochastic programming winner determination model for truckload procurement under shipment uncertainty

- Transportation Research Part E: Logistics and Transportation Review---2010---Zhong Ma,Roy H. Kwon,Chi-Guhn Lee

We propose a two-stage stochastic integer programming model for the winner determination problem (WDP) in combinatorial auctions to hedge the shipper's risk under shipment uncertainty. The shipper allows bids on combinations of lanes and solves the WDP to determine which carriers are to be awarded lanes. In addition, many other important comprehensive business side constraints are included in the model. We demonstrate the value of the stochastic solution over one obtained by a deterministic model based on using average shipment volumes. Computational results are given that indicate that moderately sized realistic instances can be solved by commercial branch and bound solvers in reasonable time.

A consolidated model of trip distribution

- Transportation Research Part E: Logistics and Transportation Review---2010---Louis de Grange,Enrique Fernández,Joaquín de Cea

This work analyzes and compares various trip distribution models with spatial aggregation within a common theoretical framework for formulating and solving multi-objective optimization problems. A new model is designed that incorporates the main characteristics of existing ones. These models are then calibrated with a single database at different spatial aggregation levels using maximum likelihood. The results show that with aggregated data the various models differ little, but with disaggregated data the differences are considerable. It is also demonstrated that changing

the level of data aggregation can significantly alter the models' parameter values.

A novel modeling approach for the fleet deployment problem within a short-term planning horizon

- Transportation Research Part E: Logistics and Transportation Review---2010---Shahin Gelareh,Qiang Meng

This paper is concerned with model development for a short-term fleet deployment problem of liner shipping operations. We first present a mixed integer nonlinear programming model in which the optimal vessel speeds for different vessel types on different routes are interpreted as their realistic optimal travel times. We then linearize the proposed nonlinear model and obtain a mixed integer linear programming (MILP) model that can be efficiently solved by a standard mixed integer programming solver such as CPLEX. The MILP model determines the optimal route service frequency pattern and take into account the time window constraints of shipping services. Finally, we report our numerical results and performance of CPLEX on randomly generated instances.

Bounding the efficiency of road pricing

- Transportation Research Part E: Logistics and Transportation Review---2010---Hai Yang,Wei Xu,Benjamin Heydecker

This paper deals with the following question associated with congestion pricing in a general network with either fixed or elastic travel demand: what is the maximum efficiency loss of a general second-best pricing scheme due to inexact marginal-cost pricing in comparison with the first-best pricing or system optimum case? A formal answer to this question is provided by establishing an inefficiency bound associated with a given road pricing scheme. An application of the methods is provided for the practical trial-and-error implementation of marginal-cost pricing with unknown demand functions.

Investigating the effects of economies of scope on firms' pricing behavior: Empirical evidence from the US domestic airline industry

- Transportation Research Part E: Logistics and Transportation Review---2010---Christian Hofer,Cuneyt Eroglu

This study investigates to what extent cross-product (belly cargo) output affects (passenger ticket) prices in the US domestic airline industry. The empirical analysis indicates that greater cargo volumes generally result in lower air fares, presumably as a result of the airlines' realization of economies of scope. This magnitude of this price effect, however, depends on certain firm and route market characteristics. The findings of this study add to extant research on economies of scope, multi-product yield management and airline pricing and provide important insights for policy makers and airline managers alike.

Optimizing the block size in container yards

- Transportation Research Part E: Logistics and Transportation Review---2010---Byung Kwon Lee,Kap Hwan Kim

A block is the basic unit of storage space in container terminals. This study proposes two methods for optimizing the block size, by considering the throughput requirements of yard cranes (YCs) and the block storage requirements. To estimate the YC performance, cycle-time models of various handling operations of YCs are analytically derived. Two types of container yards are examined: those with blocks that are laid out parallel to the quay and those laid out vertical to the quay.

A hybrid parallel genetic algorithm for yard crane scheduling

- Transportation Research Part E: Logistics and Transportation Review---2010---Junliang He,Daofang Chang,Weijian Mi,Wei Yan

This paper aims at postulating a novel strategy in terms of yard crane scheduling. In this study, a dy-

namic scheduling model using objective programming for yard cranes is initially developed based on rolling-horizon approach. To resolve the NP-complete problem regarding the yard crane scheduling, a hybrid algorithm, which employs heuristic rules and parallel genetic algorithm (PGA), is then employed. Then a simulation model is developed for evaluating this approach. Finally, numerical experiments on a specific container terminal yard are used for system illustration. Computational results suggest that the proposed method is able to solve the problem efficiently.

A decomposition scheme for large-scale Service Network Design with asset management

- Transportation Research Part E: Logistics and Transportation Review---2010---Nicolas Tey-paz,Susann Schrenk, Van-Dat Cung

In this paper, we address a large-scale freight transportation problem for maximizing the profit of a carrier. We propose two solving algorithms using a decomposition of the problem into three main steps: construction of the network, filling vehicles with commodities and construction of the vehicle plannings. The resolution of these steps involves heuristic schemes, Mixed Integer Programming and Constraint Programming techniques. To evaluate the model and the solution algorithms, we produce instances based on a study of real-life data. The results show that the methods without transshipment provide solutions with a good computation time/quality trade-off.

Comparing heuristic algorithms of the planar storage location assignment problem

- Transportation Research Part E: Logistics and Transportation Review---2010---Changkyu Park,Junyong Seo

This paper discusses the newly defined planar storage location assignment problem (PSLAP). We develop a mathematical programming model and GA-based and dynamic PSLAP heuristic algorithms for the solving procedure. Using the testing set, we compare the performance of GA-based and dynamic PSLAP heuristic

algorithms. The mathematical programming model is utilized as a comparison criterion. The comparison results demonstrate that the dynamic PSLAP heuristic algorithm performs better than the other solving procedures. In addition, we describe simulation experiments conducted to investigate the effects of stock yard layout and production schedule instability on the operation of the block stock yard.