

PLEASE SIGN IN IF YOU'RE EXPECTED TO



PGR05 – Place-based policy

Lent Term - WEEK 4

Davide Luca
2025/26
University of Cambridge

A FOLLOW-UP FROM LAST WEEK



The screenshot shows the top section of a journal article page. At the top left is the 'Economic Geography' logo and issue information: 'Volume 95, 2019 - Issue 1'. To the right is a search bar with the placeholder text 'Enter keywords, authors, DOI, e'. Below the journal name are two buttons: 'Submit an article' and 'Journal homepage'. On the left side, there are statistics: '3,958 Views', '103 CrossRef citations to date', and '130 Altmetric'. The main title of the article is 'Toward Economically Dynamic Special Economic Zones in Emerging Countries' by 'Susanne A. Frick, Andrés Rodríguez-Pose & Michael D. Wong'. Below the title, it says 'Pages 30-64 | Published online: 23 May 2018'. There are links for 'Cite this article' and the DOI 'https://doi.org/10.1080/00130095.2018.1467732'. At the bottom of the article preview are several tabs: 'Full Article', 'Figures & data', 'References', 'Citations', 'Metrics', 'Reprints & Permissions', and 'View PDF'.

<https://doi.org/10.1080/00130095.2018.1467732>



Dr Susanne Frick

(she/her)

Teams and roles

Lecturer in Economic Geography
School of Geography and Planning

Contact Details

✉ FrickS@cardiff.ac.uk
☎ +44 29225 12468

- Long-term effects of SEZs are not as clear
- Spatial spillover effects positive but often limited
- Upgrading the value-added of what is produced in the SEZ is key – and difficult
- Country context matters
- Tax incentives are not the key factor attracting firms to SEZs



What is HS2

HS2 is a state-of-the-art, high-speed line critical for the UK's low carbon transport future. It will provide much-needed rail capacity across the country, and is integral to rail projects in the North and Midlands – helping rebalance the UK economy.



(source: <https://www.hs2.org.uk>)



Discover how HS2 will transform your journey, and change the Midlands and North for the better.

Better connections mean growth and jobs

Station cities are already planning for growth and investment off the back of the arrival of high speed services. HS2 growth plans around the country account for around half a million jobs.

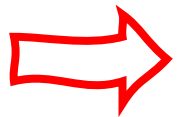
For example, HS2, is already providing the platform for Birmingham to boom. With more new jobs being created, more new businesses being set up and more outside investment coming into the city than anywhere outside of the capital.

(source: <https://www.hs2.org.uk/why/connectivity>)

Estimated Reading Time

6 minutes

Connectivity – catalysing growth and levelling-up the country



By offering better connections HS2 will help spread jobs and opportunity around the country, driving regeneration.

Would have HS2 helped rebalance the UK economy?

What do theory and empirical evidence suggest?



(source: <https://www.hs2.org.uk>)

THE UPS AND DOWNS OF HS2

- The 'eastern leg' of HS2 (Birmingham to Leeds) was scrapped in Nov 2021
- The 'western leg' (Birmingham to Manchester) was scrapped in Oct 2023
- Instead, the transport ministers promised **improvements in regional connectivity (and, later, roads)**

Gill Plimmer and Jim Pickard in London and Andy Bounds in Manchester FEBRUARY 11 2020

The rising cost of HS2

Estimated cost of full network (£bn, converted into 2019 prices*)



*Using ONS data on construction output prices
Sources: FT analysis of data from HS2, DfT; Oakervee report
© FT



Was this a sound decision?

PLAN FOR TODAY

- Discuss **why infrastructure investments are a very popular** regional policy tool
- **Present the economic rationale** for infrastructure as a regional policy tool
- Analyse the regional economic **impact** of infrastructure investment **under different theoretical perspectives**
 - Neoclassical approach
 - New Economic Geography

WHY ARE INFRASTRUCTURES POPULAR?

WHAT ARE INFRASTRUCTURES



- The 'arteries and veins of an economy'
 - The basic physical and organisational structures and facilities that undergird the structure of the economy
- A type of **public good**
 - Everyone benefits from them, but few single persons/firms are willing to provide enough of them

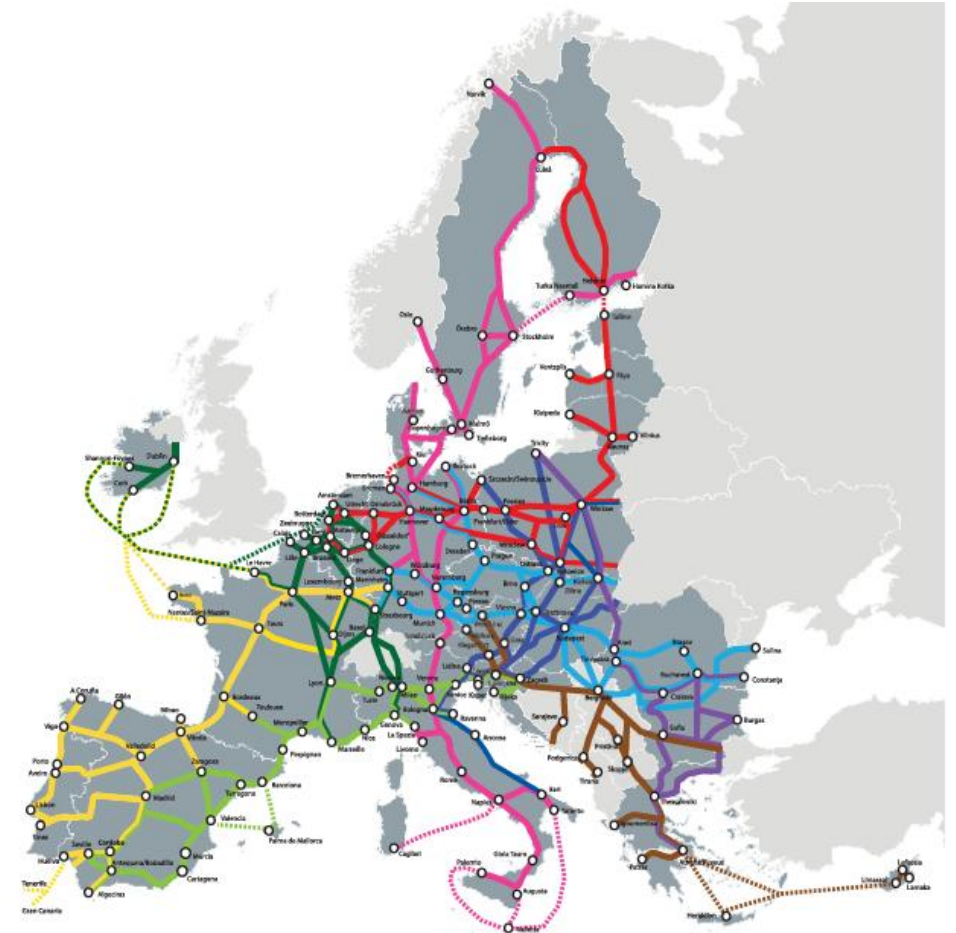
POPULARITY OF INFRASTRUCTURE POLICIES

- **Transport infrastructures are a very popular policy tool for the EU**
- Article 154 of the EU Treaty: “Establishment and development of trans-European networks in the area of transport, telecommunications, and energy infrastructure” as a tool for market integration and economic and social cohesion
- While their share has recently declined, infrastructures represented roughly 50% of all investment in regional development in the early 2000s (Rodriguez-Pose and Fratesi, 2004)

POPULARITY OF INFRASTRUCTURE POLICIES

The EU's Trans-European Transport Network (TEN-T)

- Development of a Europe-wide network of railways, roads, waterways, shipping routes, ports, and airports
- “The ultimate objective is to close gaps, as well as to strengthen social, economic, and territorial cohesion in the EU”



(Source: https://transport.ec.europa.eu/transport-themes/infrastructure-and-investment/trans-european-transport-network-ten-t_en)

REASONS BEHIND POPULARITY

- **Economic reasons**

- Necessary precondition for economic growth
- High economic returns from investment (e.g. Ashauer, 1989)

- **Management reasons**

- Infrastructure projects are generally easy to manage
- Easy to spend large sums of funds relatively quickly

- **Political reasons**

REASONS BEHIND POPULARITY: POLITICS

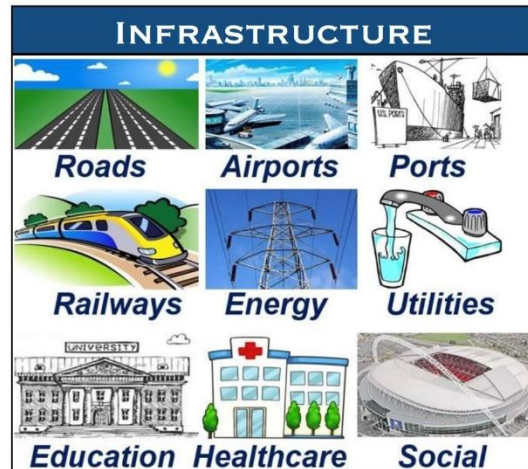


- New infrastructures are **highly visible**: they involve opening ceremonies. Politicians love **ribbon-cutting**
- Usually, strong bi-partisan consensus on their importance
- **Strong support from lobby groups**
- **Distributive politics**: how public resources are distributed to specific groups/regions as a way to 'buy' or convince voters to vote for the incumbents



INFRASTRUCTURE INVESTMENT AND REGIONAL ECONOMIC GROWTH

A 'NEOCLASSICAL' PERSPECTIVE

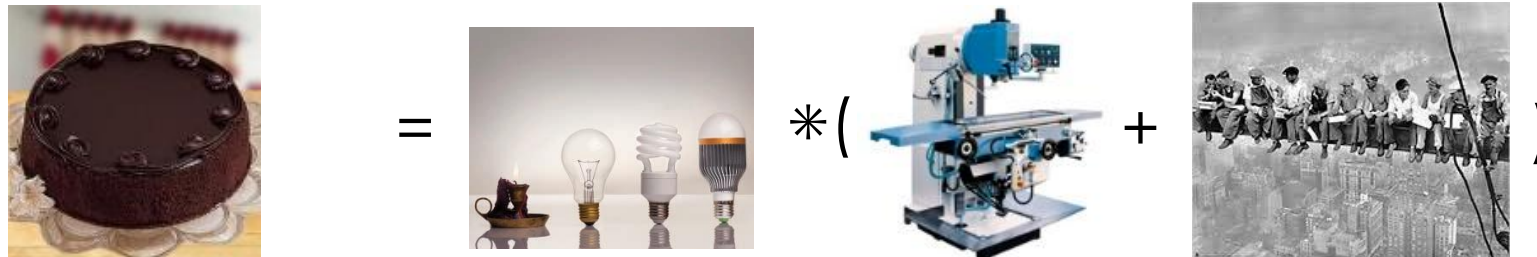


- Aschauer (1989): differences in the stocks of public infrastructure provide an important explanation for differences in levels of economic growth
- Idea: **the higher the stock of public infrastructure, the higher the capital productivity of private firms** and the better the competitive position of the region

THE NEOCLASSICAL PERSPECTIVE

The neo-classical growth framework:

$$Y = A f(K, L)$$

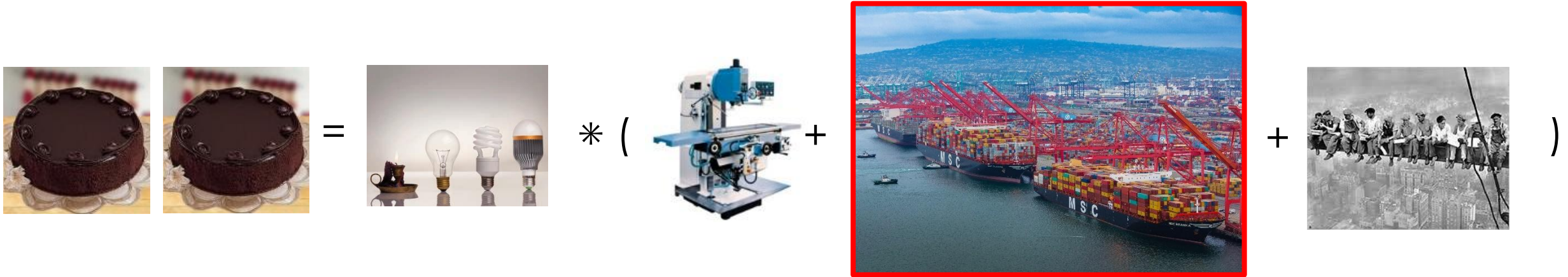


Output per-worker Y can only increase if capital K per worker increases, or because of technological progress A

THE NEOCLASSICAL PERSPECTIVE

- The neoclassical framework augmented to include public infrastructure capital 'G':

$$Y = A f(K, G, L)$$



- **Public capital in infrastructure induces an increase in the rate of return to private capital**
- Which in turn offers an incentive for further private investment, and employment growth

PHYSICAL INFRASTRUCTURE AND ENTREPRENEURSHIP

- Physical infrastructure is a precondition for entrepreneurship to happen
- Especially for types of infrastructures that can increase connectivity and linkages

- **Entrepreneurial ecosystems:**

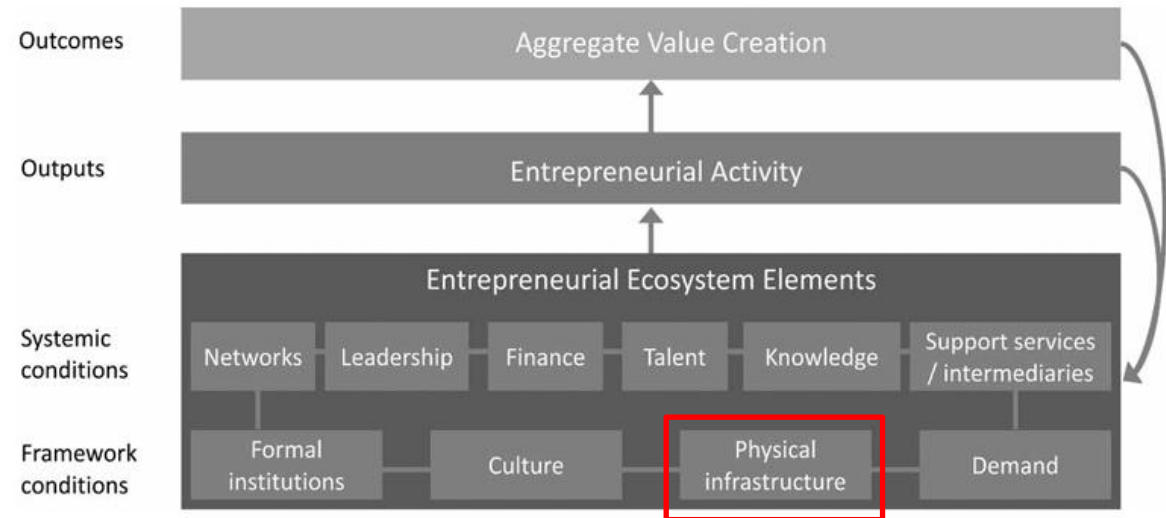


Figure 1. Key elements, outputs and outcomes of the entrepreneurial ecosystem.

(Source: <https://www.tandfonline.com/doi/abs/10.1080/09654313.2015.1061484>)

EVIDENCE FROM NEW LOCAL ROADS CONSTRUCTION

- Many empirical analyses show that local infrastructure provision has a significant and positive local economic impact
- Gibbons et al. (2019) study if **local improvements** in the road network have **positive effects** on local productivity, wages and employment

Table 3
Effect of accessibility improvements on employment and number of establishments: ward-by-year level regressions; all sectors.

	(1)	(2)	(3)	(4)	(5)
<i>Employment</i>					
Log accessibility	0.319* [0.186]	0.431* [0.224]	0.503** [0.230]	0.472** [0.220]	0.317 [0.256]
<i>Establishment counts</i>					
Log accessibility	0.437*** [0.107]	0.435*** [0.118]	0.424*** [0.119]	0.502** [0.117]	0.328*** [0.119]
Observations	38,357	38,357	38,357	53,933	16,654
Wards	3487	3487	3487	4903	1514
Distance band	1–20 km	1–20 km	1–20 km	1–30 km	1–10 km
Year FE	Yes	Yes			
Ward FE	Yes	Yes	Yes	Yes	Yes
Scheme-year FE		Yes	Yes	Yes	Yes
Controls-year FE			Yes	Yes	Yes

Notes: Table reports coefficients from ward-level regressions of log employment or log establishment counts on accessibility. Each coefficient is from a separate regression. Standard errors in brackets (clustered at the ward level). *, **, *** indicate significant at the 10%, 5% and 1% levels, respectively. 'Scheme-year FE' are closest-scheme dummy variables interacted with year dummies. 'Controls-year FE' are year dummies interacted with distance from ward to closest scheme and the initial level of (log) accessibility in 1997.

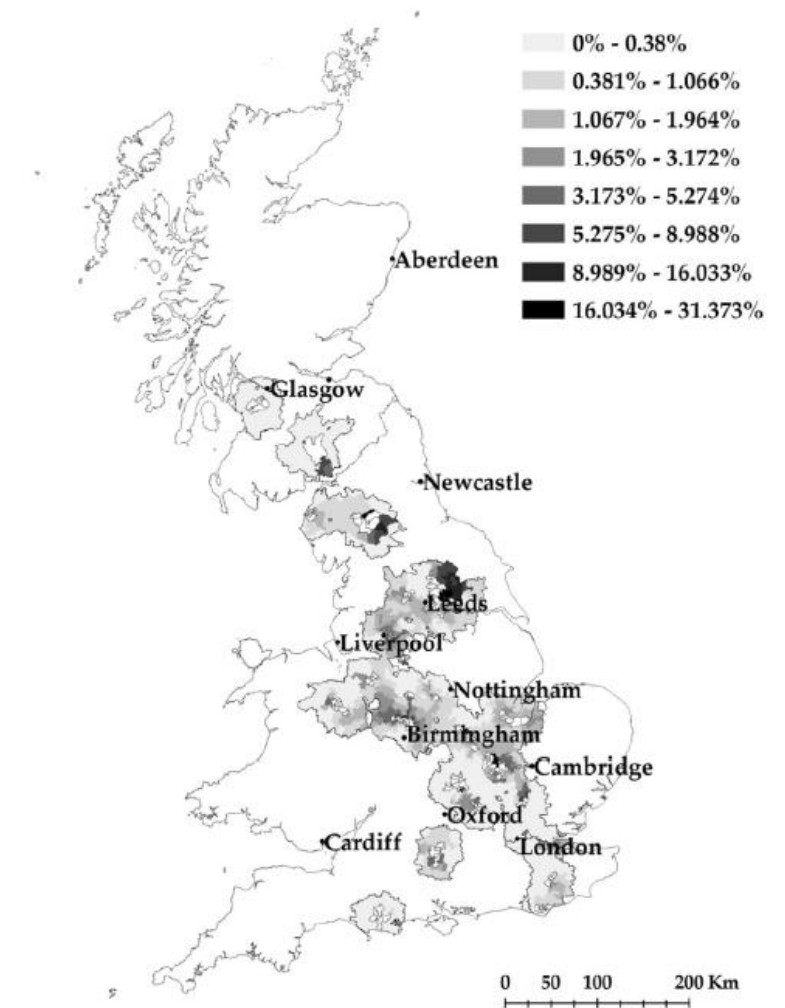


Fig. 2. Changes in log accessibility from 1998 to 2008 – all wards.

(Source: Gibbons et al., 2019)

EVIDENCE FROM 19th CENTURY RAILWAYS EXPANSION

Figure 1: A stage-waggon



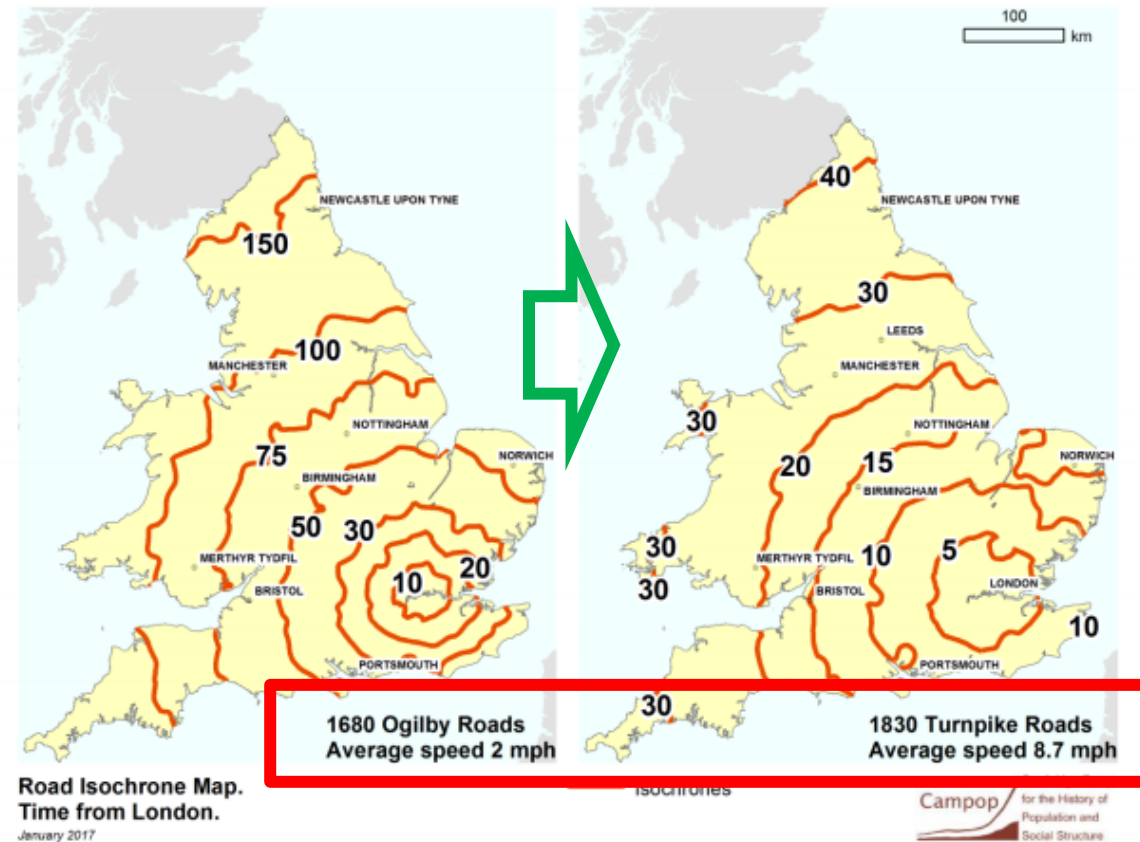
Print, aquatint, coloured, Plate 38 'Waggon' / W.H. Pyne. 'The Costume of Great Britain' engraved and written by W.H. Pyne, 1808. Science Museum Group, The Board of Trustees of the Science Museum, London. This image is released under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 Licence

Figure 2: A stage coach



The 'Tally-Ho' London - Birmingham Stage Coach Passing Whitlington College, Highgate, James Pollard, 1836. Tate Gallery, London. Image released under [Creative Commons CC-BY-NC-ND \(3.0 Unported\)](https://creativecommons.org/licenses/by-nc-nd/3.0/)

Figure 3: Road isochrone maps for England and Wales in 1680 & 1830



(Source: <https://www.campop.geog.cam.ac.uk/research/projects/transport/onlineatlas/railways.pdf>)

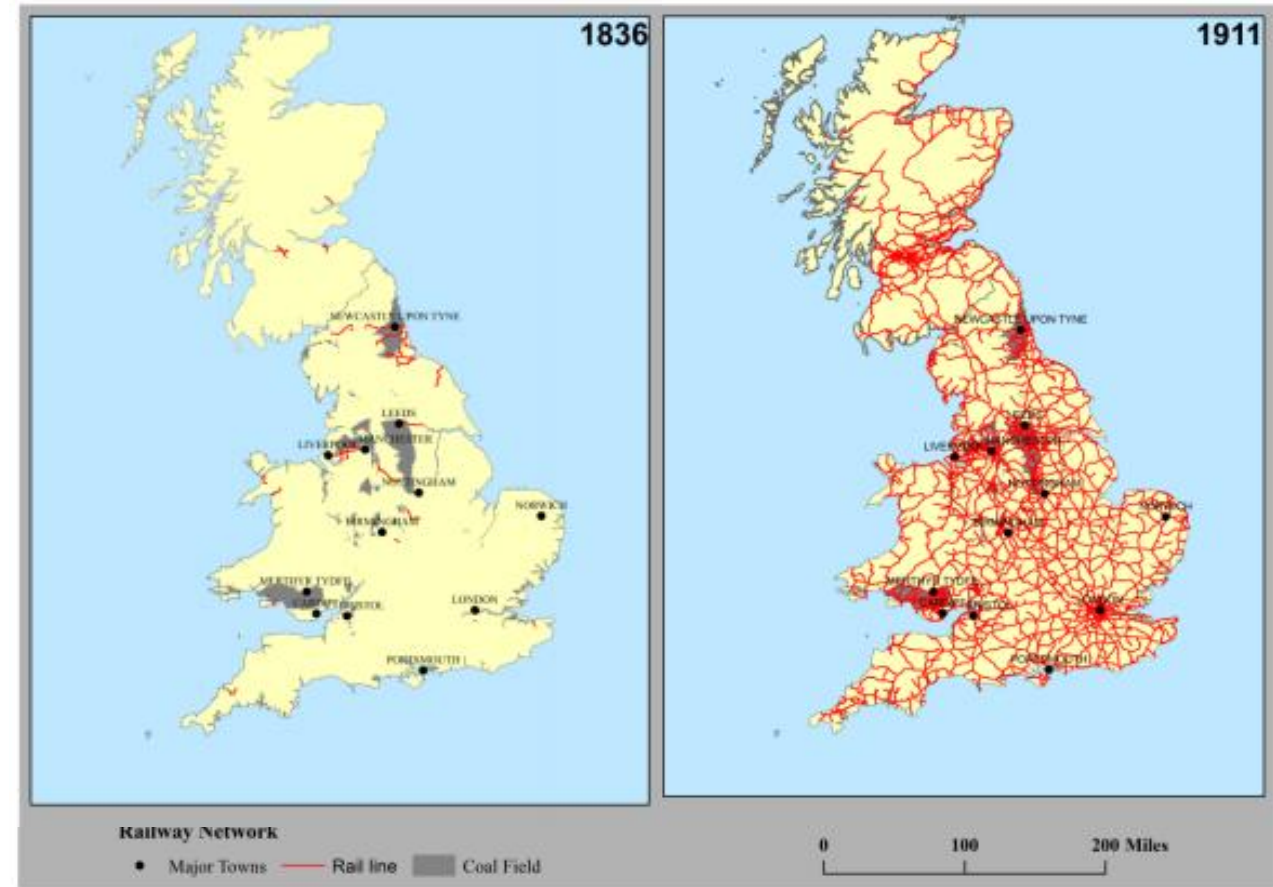
EVIDENCE FROM 19th CENTURY RAILWAYS EXPANSION

In the 1820s, the invention of the steam engine and its application to rails revolutionise transportation

Figure 9: The Rocket crossing Chat Moss in 1831



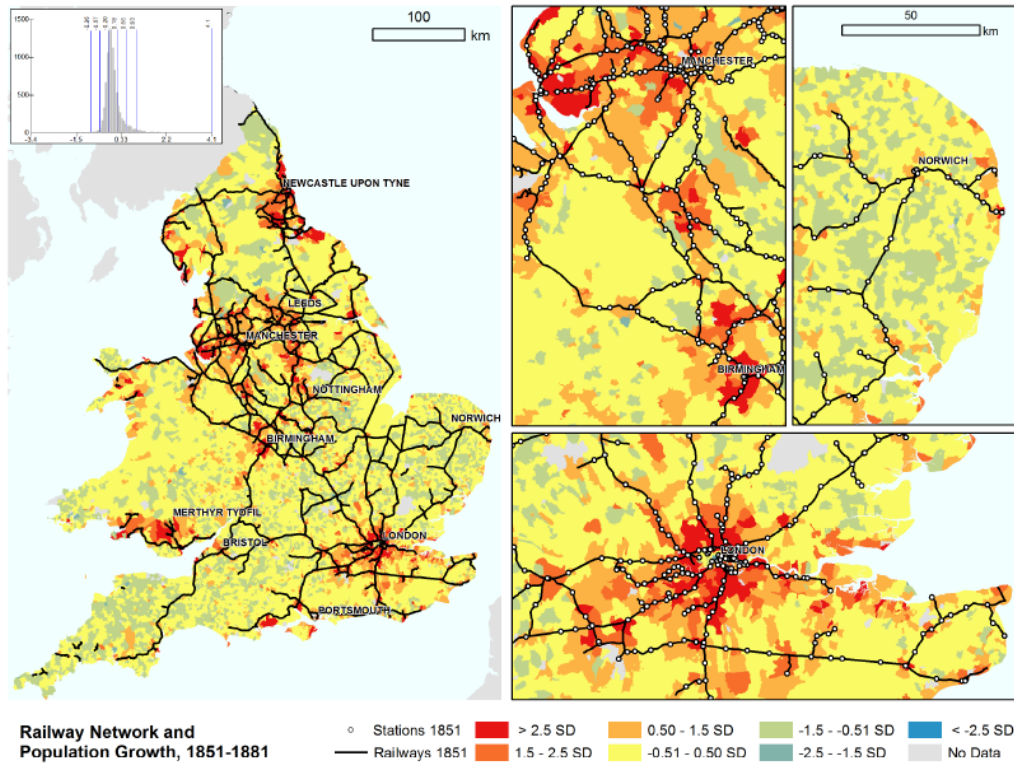
View of the Railway across Chat Moss, 1831. [Henry Pyall](#) - T.T. Bury (revised edition 1833), *Coloured Views on the Liverpool and Manchester Railway*. London: Ackermann & Co; plate 5



(Source: <https://www.campop.geog.cam.ac.uk/research/projects/transport/onlineatlas/railways.pdf>)

EVIDENCE FROM 19th CENTURY RAILWAYS EXPANSION

Figure 4: Railways and parish population growth from 1851 to 1881

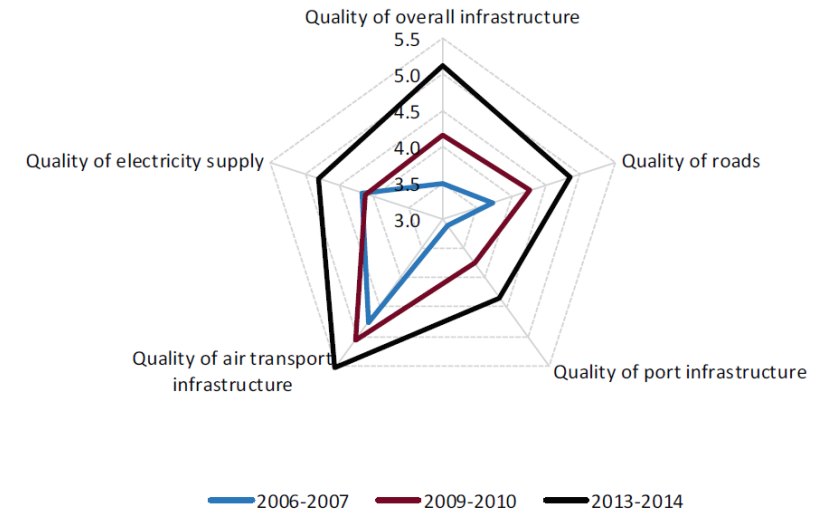


- Bogart et al. (2018) explore how the construction of railway lines in England and Wales affected population and occupation growth in XIX Century Britain
- **New railways had a significant impact in fostering the development of places close to stations** (growth of population and manufacturing employment)
- Railways helped connecting places with international markets

(Source: Bogart et al., 2018)

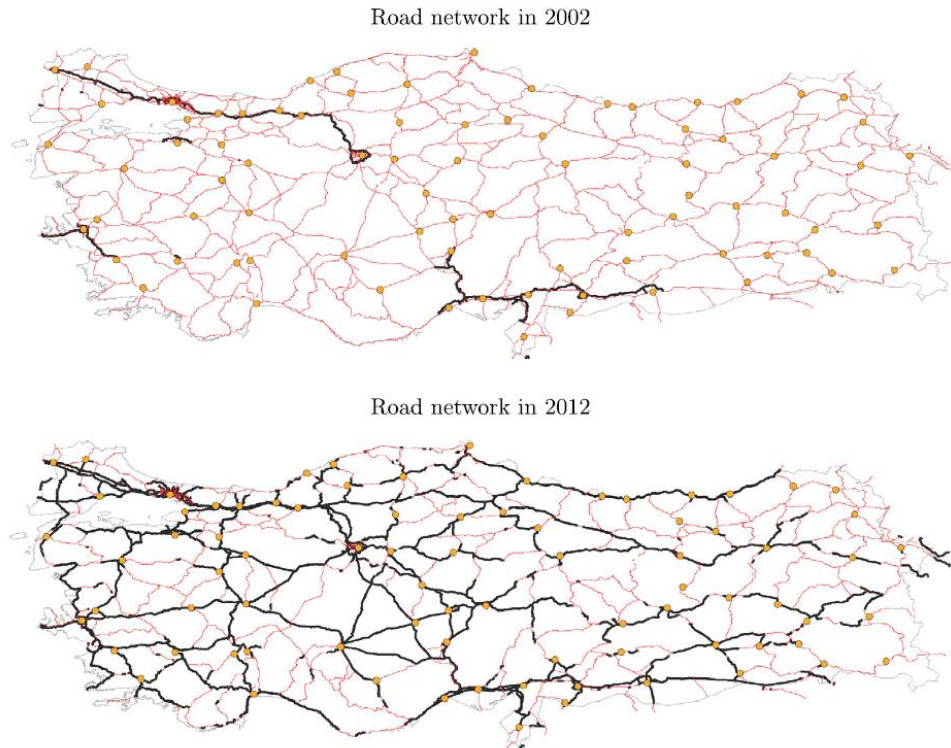
INFRASTRUCTURE INVESTMENT IN EMERGING MARKETS

- **Poor infrastructures are often cited as a key impediment to regional economic growth in emerging economies, where public capital stocks are often insufficient**
- Is there evidence on the role of transport infrastructure in 'levelling up' lagging regions?
- Turkey (upper-middle-income country) is an interesting example



(Source: World Economic Forum, 2014)

INFRASTRUCTURE INVESTMENT IN TURKEY



- Road transport is the primary mode of freight transport in Turkey
- **In 2002, start of a massive investment programme**
- **2003:** 1.714 km motorways, 4.387 km dual lane highways
- **2012:** 2.236 km motorways, 20.017 km dual lane highways

Fig. 1. Turkish provinces and roads. .Notes: The top panel outlines provincial boundaries, provincial centers (orange nodes), and the top five gateway provinces (those labeled and marked with green diamonds). In the second and third panels, red lines are single carriageway roads and black lines are expressways. Geographical data used to plot the roads is downloaded from <http://www.diva-gis.org>.

(Source: Cosar, Demir, 2016)

INFRASTRUCTURE INVESTMENT IN TURKEY

$$\Delta trade_{pg}^f = \delta_p^f + \delta_g^f + \alpha(ers_{pg,2003} - 1) \ln(dist_{pg}) + \epsilon_{pg}^f.$$

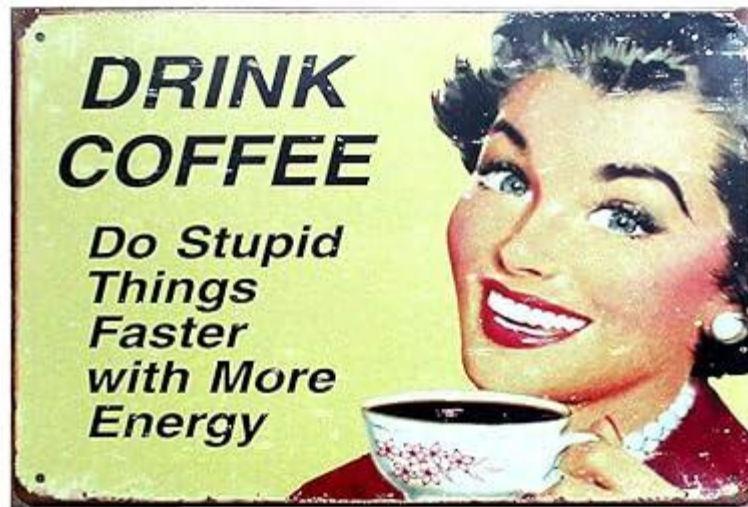
Table 2
Gravity estimation.

	(1)	(2)	(3)	(4)
	$\ln trade_{pg}^f$		$trade_{pg}^f$	
$\ln dist_{pg}$	-1.858*** (0.084)	-1.718*** (0.072)	-1.384*** (0.086)	-1.222*** (0.077)
Regression	OIS	OIS	PPML	PPML
Observations	1376	1859	2686	3180
R ²	0.638	0.657	0.981	0.972
Fixed effects	p-f,g-f	p-f,g-f	p-f,g-f	p-f,g-f
Sample	2003-04	2011-12	2003-04	2011-12

Notes: All regressions are estimated with province-flow (p-f) and gateway-flow (g-f) fixed effects, where flows are exports or imports. Robust standard errors in parentheses. Significance: *10%, **5%, ***1%.

(Source: Cosar, Demir, 2016)

- Does the reduction of 'distance' (i.e. 'trade barriers') increase trade?
- **Expressways particularly improved the foreign market access of remote regions far away from seaports**
- i.e., they helped cities in Anatolia and the poorer East of the country



THE IMPACT OF INFRASTRUCTURE INVESTMENT IN CORE AND PERIPHERAL REGIONS

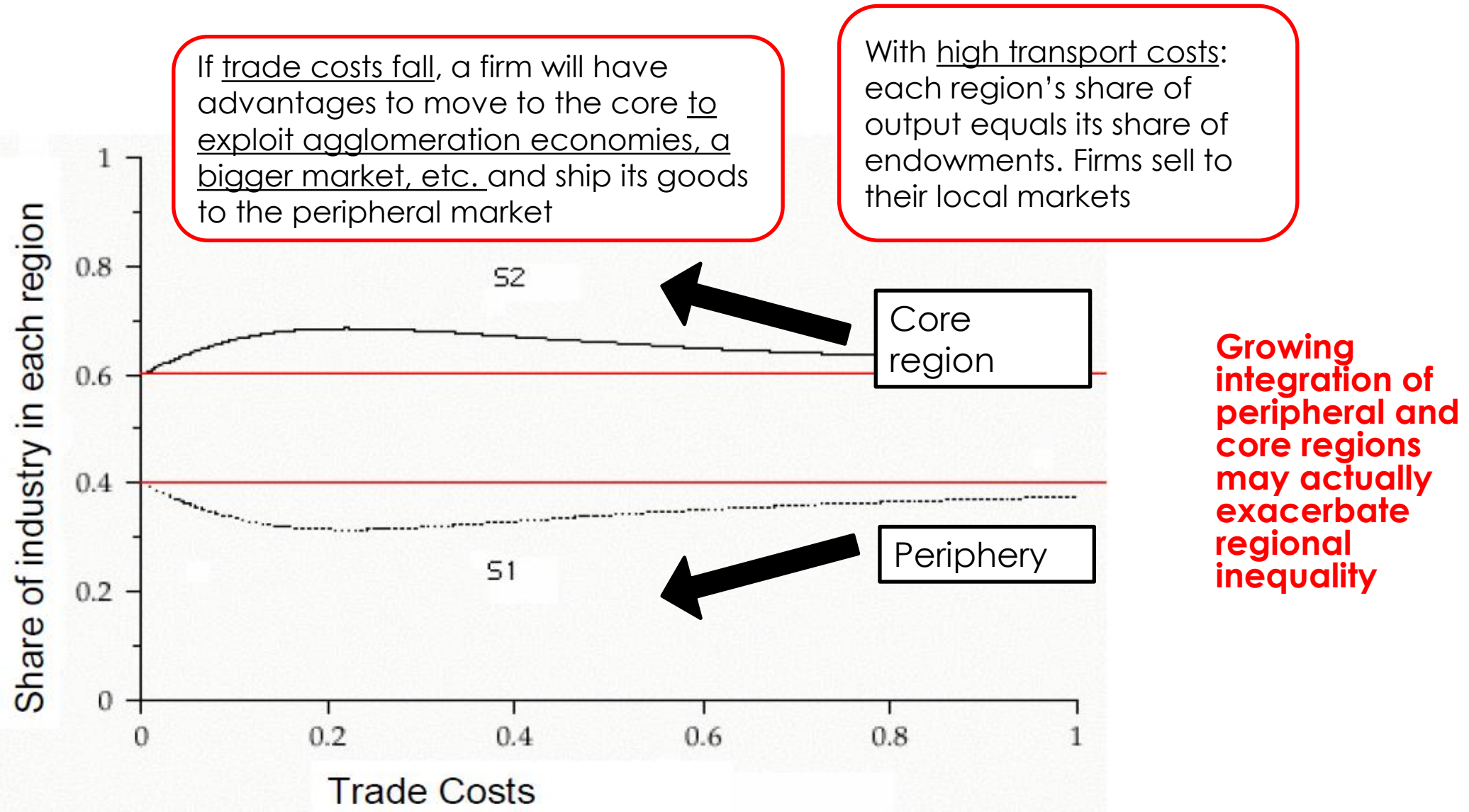
A NEW ECONOMIC GEOGRAPHY PERSPECTIVE

- NEG models have little to say with respect to the two main other areas of regional policy expenditure e.g. firm subsidies
- Yet, **NEG models are particularly appropriate to study the role of transport infrastructure improvements** on regional inequality
- Transport infrastructures not treated as an input into the production process. Instead, infrastructures are analysed in relation to **their effect in altering transport costs and accessibility**

BETTER CONNECTIVITY AND REGIONAL DISPARITIES

- Regional inequality is the outcome of how economic activities cluster/spread across space
- By affecting the balance between dispersion and agglomeration forces, **increase in integration across regions may actually widen regional disparities**
- **'Roads run both ways'**: accessibility leads to market integration, and not all firms have the same capacity to compete (Puga, 2002)
- When improving connectivity between the core and the periphery, **the absence of competitive firms or poor human capital endowments in peripheral regions can put their economic activity at risk**

BETTER CONNECTIVITY AND REGIONAL DISPARITIES



BETTER CONNECTIVITY AND REGIONAL DISPARITIES

Greater connectivity across the EU may have contributed to increasing agglomeration in core regions

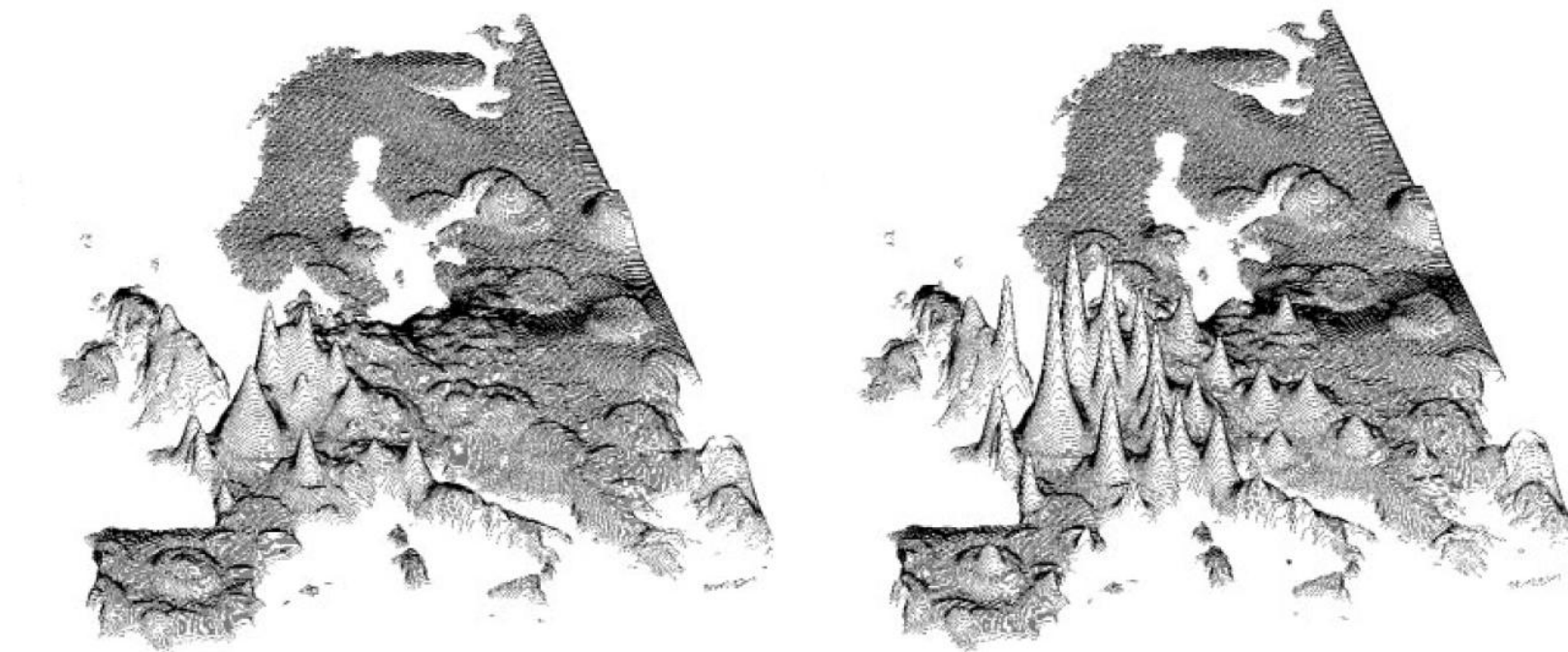


Figure 10. Daily accessibility by rail, 1993 and 2010.

(source: Puga, 2002)

A NATURAL EXPERIMENT: CHINA'S NATIONAL TRUNK HIGHWAY SYSTEM



- Like Turkey, China is another very interesting country to test the effect of roads on regional convergence/divergence
- Up till 1990, intercity roads had at most two lanes, often unpaved
- Almost all goods moved by rail or river. Less than 5% of freight moved by road (30% by 2010)

A NATURAL EXPERIMENT: CHINA'S NATIONAL TRUNK HIGHWAY SYSTEM



- 1992. Chinese State Council approve construction of 7-5 network (7 horizontal, 5 vertical axes)

National Trunk Highway System

- Concluded by end of 2007, with a speed-up after 1998 as part of the government's stimulus spending following the Asian financial crisis
- (After 2004, gov't further pushed for 7-9-18 network system, to connect all cities with pop >200K)



A NATURAL EXPERIMENT: CHINA'S NATIONAL TRUNK HIGHWAY SYSTEM



A NATURAL EXPERIMENT: CHINA'S NATIONAL TRUNK HIGHWAY SYSTEM



FIGURE 1

China's National Trunk Highway System. The figure shows Chinese county boundaries in 1999 in combination with the targeted city nodes and the completed expressway routes of the NTHS in the year 2007.

(source: Faber, 2014)

- Its policy objective was to connect all provincial capitals, cities with pop over 500K, and border crossings on a single network
- **As a side effect, peripheral counties were not targeted by the policy, but many 'randomly' happened to gain connectivity**
- Does gaining connection to a large city improve/decrease growth in peripheral counties?

A NATURAL EXPERIMENT: CHINA'S NATIONAL TRUNK HIGHWAY SYSTEM

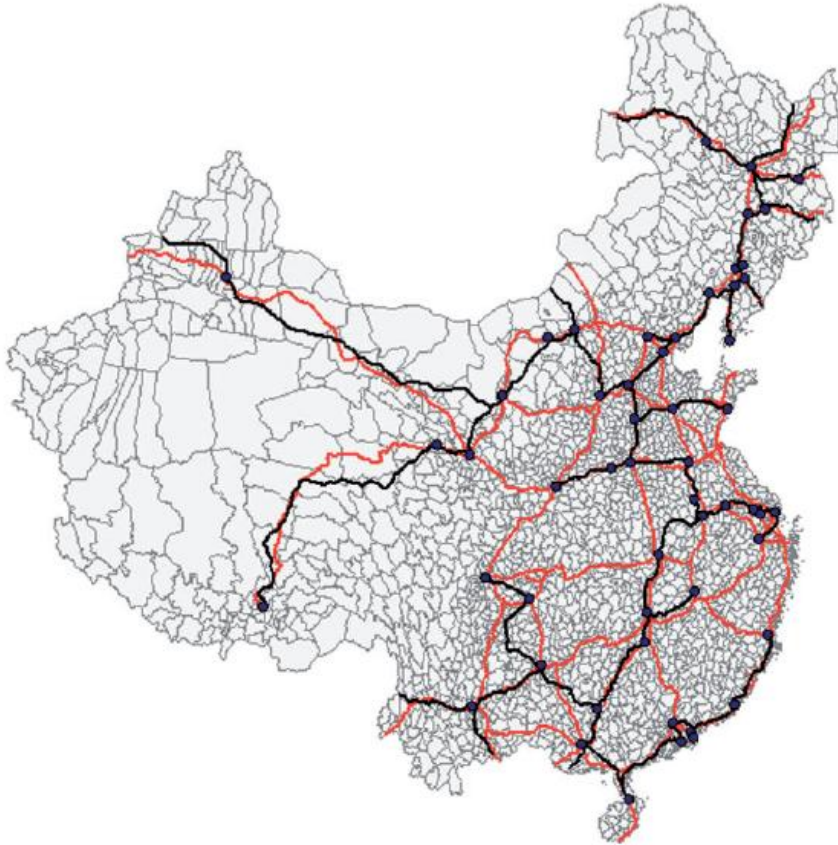


FIGURE 2

Least cost path spanning tree network. The network in red colour depicts the completed NTHS network in 2007. The network in black colour depicts the least cost path spanning tree network. The black routes are the result of a combination of least cost path and minimum spanning tree algorithms. In the first step Dijkstra's (1959) optimal route

- **Highway route is not random** e.g. planners may have targeted areas with higher expected growth potential or with strong politicians able to lobby

How to disentangle causality?

- Empirical idea: **calculate with GIS what would be the optimal (least cost path) route between cities**
- **Use this 'ideal, optimal' network as an instrument** to predict the actual network

(source: Faber, 2014)

A NATURAL EXPERIMENT: CHINA'S NATIONAL TRUNK HIGHWAY SYSTEM



FIGURE 1

China's National Trunk Highway System. The figure shows Chinese county boundaries in 1999 in combination with the targeted city nodes and the completed expressway routes of the NTHS in the year 2007.

(source: Faber, 2014)

- Relative negative effect on the periphery
- **Peripheral marketplaces lying among targeted metropolitan centres experience a relative reduction in industrial output growth and government revenue!**
- No effect on population dynamics
- This is really **a negative effect of trade integration between ex-ante asymmetric regions**

A NATURAL EXPERIMENT: CHINA'S NATIONAL TRUNK HIGHWAY SYSTEM

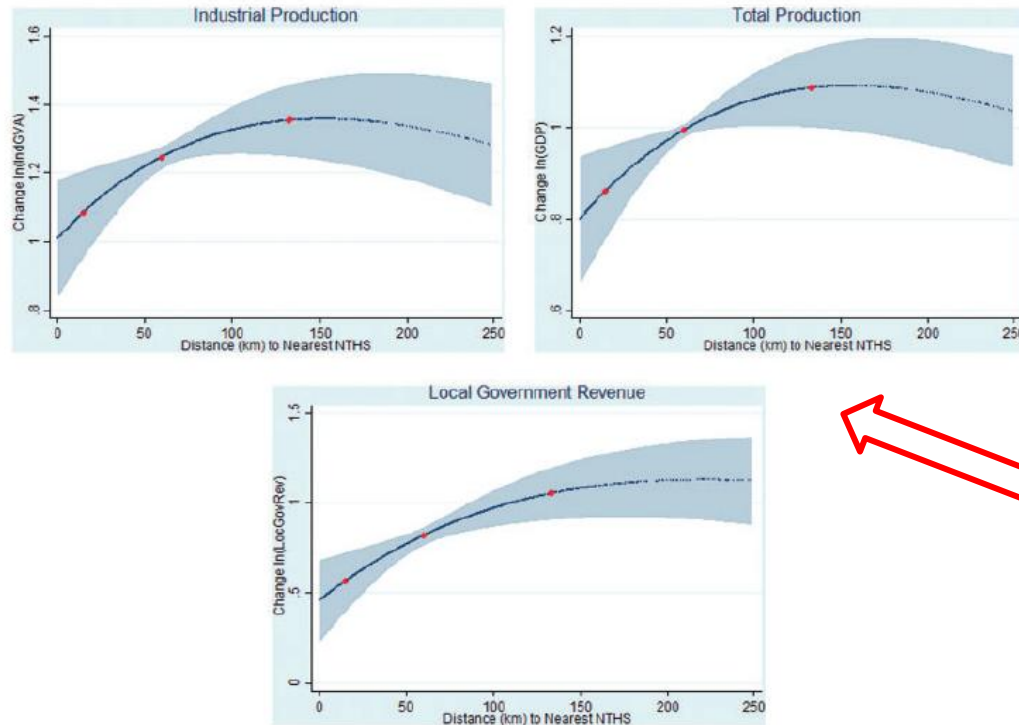


FIGURE 4

Estimated effect of peripheral connections over distance to the nearest NTHS route. The graphs depict the flexibly estimated relationships between distance to the nearest NTHS route and peripheral county growth in industrial value added, total GDP, and local government revenue. The plots correspond to the best fitting polynomial functional form according to the Akaike Information Criterion (AIC). The functions and confidence intervals are based on IV estimates holding covariates at their mean. County distance to the NTHS and its polynomial terms are instrumented with distances to the LCP and Euclidean spanning trees and their polynomials. The red dots indicate median county distances to the nearest NTHS route among connected peripheral counties (left), peripheral counties neighbouring a connected county (centre), and the remaining peripheral counties farther away (right). The shaded areas indicate 90% confidence intervals. Standard errors are clustered at the province level.

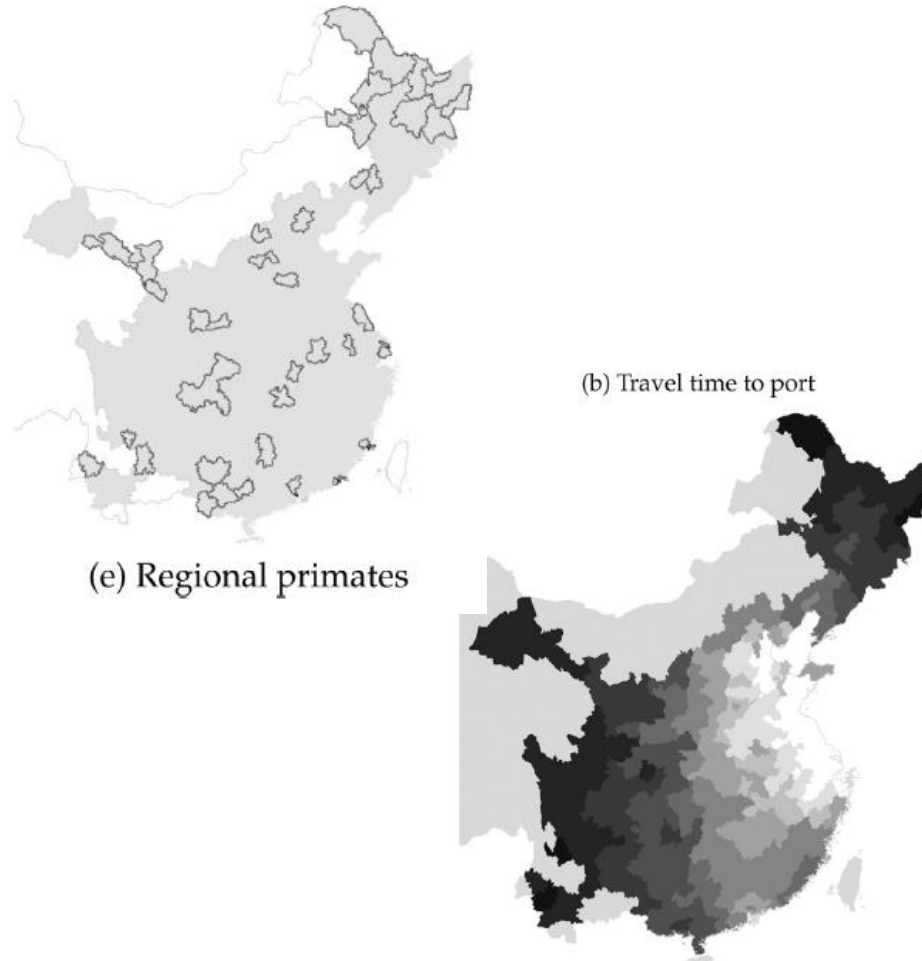
Negative effect strongest in peripheral counties closest to the NTHS system

(red dots on the left) as opposed to peripheral counties farther away (red dots on the right)

NOTE: these are **relative** negative effects! All counties actually experience growth

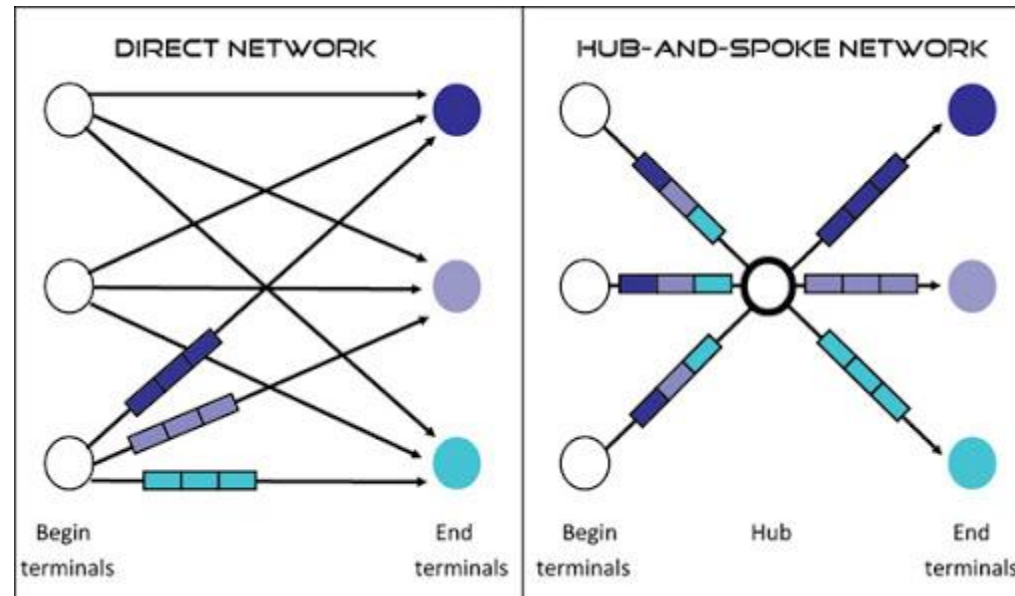
A NATURAL EXPERIMENT: CHINA'S NATIONAL TRUNK HIGHWAY SYSTEM

- ... how to reconcile the results from Turkey with these from China in the previous slides?
- Baum-Snow et al. (2020) distinguish between 2 connections types:
 - **Peripheral prefectures to core prefectures.** These connections lead to core-periphery patterns
 - **Prefectures to coastal ports.** These connections are positive for all prefectures, regardless of their asymmetric power



(source: Baum-Snow et al., 2020)

HUB-AND-SPOKE VS MULTILATERAL CONNECTIONS

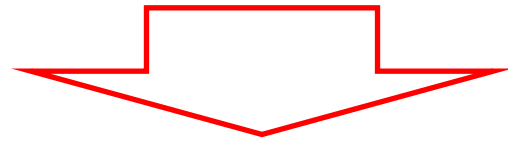


Multilateral connections,
by contrast, may help all
regions

Hub-and-spoke
connections are likely to
favour the core region
(the hub)

INFRASTRUCTURES AND QUALITY OF GOVERNMENTS

- Finally, it's important to build infrastructures when/where they are needed
- Yet, **many times political desires to build 'exemplary' projects or the need to spend funds quickly prevail over sound planning**
- This is **especially true where the quality of local governments is poor**



'White elephants': projects which cost a lot of money but have no useful purpose

INFRASTRUCTURES AND QUALITY OF GOVERNMENTS



Humber Bridge or, also, Ciudad Real Airport in Spain

- Built in the peripheral region of Castilla-La Mancha
- Costed close to €1bn!
- Totally useless

British investors buy Spain's €1bn Don Quixote airport for just £7,000

NEWS WEBSITE OF THE YEAR
The Telegraph

By Guy Hedgecoe
17 July 2015 • 19:49 pm

(Source:

<https://www.telegraph.co.uk/finance/newsbysector/transport/11747577/British-investors-buy-27m-Spanish-airport-for-just-7000.html>)

TO CONCLUDE

- There's compelling evidence on how **transport systems are a precondition** for regional economic prosperity
- **Investment in transport infrastructure can be a sound tool to foster regional development**
- However, improved connectivity between asymmetric regions may widen regional inequality
- It's also **important that new investment is placed in sound projects**, not in 'white elephants'

YOUR WORK

- Read this short blog piece:
- <https://www.bennettinstitute.cam.ac.uk/publications/townscapes-a-universal-basic-infrastructure-for-the-uk/>
- **What are the main policy recommendations?**
- **Do you agree with them?**

YOUR WORK

- Read this policy blog piece:
- https://cepr.org/voxeu/columns/place-based-policies-italian-case-part-2-mind-negative-side-effects?utm_source=dlvr.it&utm_medium=twitter
- **Identify what has not worked in Italy, and what are the policy suggestions of the authors**

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SEE YOU NEXT WEEK