

An Analytical Evaluation of the Hardison Framework for Addressing U.S. Trade Imbalances

I. Introduction

A. The Persistent Challenge of U.S. Trade Imbalances

The United States has experienced persistent trade deficits for several decades, a phenomenon that has attracted significant political and economic attention.¹ Since the mid-1970s, the U.S. has consistently imported more goods and services than it has exported, with only rare exceptions.¹ Recent data underscores the scale of this imbalance. In the fourth quarter of 2024, the U.S. current-account deficit, a broad measure including trade in goods and services as well as income flows, stood at \$303.9 billion.² For the full year 2024, the overall goods and services trade deficit reached \$918.4 billion, equivalent to approximately 3.1 percent of Gross Domestic Product (GDP).⁴ The deficit in goods trade is typically larger, recorded at \$1.2 trillion in 2024, partially offset by a surplus in services trade.⁵ The monthly goods and services deficit figure for February 2025 was reported at \$122.7 billion.⁷

These persistent deficits have fueled concerns regarding their potential economic consequences. Critics argue that chronic trade imbalances lead to a transfer of national wealth and assets abroad, as the U.S. effectively finances excess consumption by selling domestic assets or incurring debt.⁹ Some analyses link trade deficits to negative impacts on domestic manufacturing employment and overall economic growth, viewing the deficit as a drag on GDP.¹ The political salience of the trade deficit has grown, making its reduction a stated policy priority for various administrations.¹

However, the mainstream view within economics posits that aggregate trade deficits are primarily determined by macroeconomic factors, specifically the balance between national saving and investment, rather than by trade policies per se.¹ According to this perspective, a country runs a trade deficit when its total domestic spending (consumption plus investment plus government spending) exceeds its domestic production, with the difference financed by net inflows of foreign capital. Factors such as the national saving rate, domestic investment opportunities, government fiscal policy (budget deficits reduce national saving), and the international role of the U.S. dollar are considered key drivers.¹ From this viewpoint, trade policies like tariffs may affect bilateral trade balances or the composition of trade but have limited impact on the overall trade deficit unless they induce changes in aggregate saving or

investment.¹

B. Overview of Professor Hardison's Proposed Framework

Against this backdrop of persistent deficits and ongoing debate about their causes and consequences, Professor Arion Hardison's lecture, titled "Integrating Federal Agencies, Import Certificates, and the Moneyball-Buffett Model: A Mathematical Framework for Addressing U.S. Trade Imbalances," proposes a novel approach. The framework, as suggested by its title, seeks to synthesize several distinct elements into a cohesive strategy for managing U.S. trade imbalances.

The core components appear to be:

1. **Import Certificates (ICs):** A market-based mechanism inspired by Warren Buffett's 2003 proposal, designed to automatically balance trade by linking import permissions to export performance.⁹
2. **Federal Agency Integration:** Leveraging the capabilities and mandates of existing U.S. trade-related agencies, specifically the U.S. Trade and Development Agency (USTDA) and the U.S. International Trade Commission (USITC).
3. **"Moneyball-Buffett Model":** Implying the application of sophisticated data analytics and quantitative methods ("Moneyball" approach) to the operation, monitoring, or optimization of the Buffett-inspired IC system or related trade strategies.
4. **Mathematical Framework:** An underlying formal structure, presumably involving economic modeling, intended to represent the interactions between these components and predict their effects on the economy.

The overarching goal of the Hardison framework seems to be the creation of a structured, analytically grounded, and potentially more effective system for addressing the U.S. trade deficit than traditional policy tools like tariffs.

C. Report Objective and Structure

This report provides a rigorous, expert-level analysis and critical evaluation of the framework proposed by Professor Hardison. The objective is to assess the framework's internal coherence, potential effectiveness in achieving its stated goal of addressing trade imbalances, its practical feasibility, and its inherent limitations. The evaluation draws upon established economic theory, empirical evidence concerning U.S. trade patterns and relevant institutions, and policy analysis principles, informed by the provided research materials.

The report proceeds as follows: Section II deconstructs the individual components of the framework – the roles of USTDA and USITC, the mechanics and economics of the Import Certificate proposal, the interpretation of the "Moneyball-Buffett Model" concept, and the potential nature of the underlying mathematical framework. Section III evaluates the integrated framework, assessing its coherence, potential effectiveness, feasibility, and robustness. Section IV concludes with a summary assessment and recommendations for further research or refinement.

II. Deconstructing the Framework Components

A. The Role of Federal Agencies (USTDA, USITC)

Professor Hardison's framework explicitly incorporates two U.S. federal agencies: the U.S. Trade and Development Agency (USTDA) and the U.S. International Trade Commission (USITC). Understanding their existing mandates and capabilities is crucial for evaluating their potential roles within the proposed system.

1. U.S. Trade and Development Agency (USTDA)

- **Mission and Functions:** USTDA is an independent federal agency with a unique dual mandate: advancing economic development in emerging economies while simultaneously promoting U.S. commercial interests through exports.¹⁶ Its primary mechanism is providing grant funding to overseas project sponsors for project preparation activities, such as feasibility studies and technical assistance, particularly for priority infrastructure projects.¹⁶ USTDA links U.S. businesses, including small and medium-sized enterprises (SMEs)¹⁹, to these export opportunities at critical early stages when project designs and technology choices are being made.¹⁶ It also facilitates connections through reverse trade missions (bringing foreign buyers to the U.S.), conferences, and workshops.¹⁶ The agency emphasizes sectors like energy, digital infrastructure, transportation, and healthcare.¹⁶ Its activities aim to create U.S. jobs through exports and counter unfair foreign competition.¹⁶ USTDA reports significant leverage, generating substantial U.S. export value for every dollar programmed.¹⁹
- **Potential Role in Hardison's Framework:** USTDA's core mission of promoting U.S. exports¹⁶ aligns conceptually with the generation of Import Certificates (ICs), which are earned directly by U.S. exporters under the Buffett proposal.⁹ USTDA's existing programs, such as funding feasibility studies or technical assistance for overseas projects using U.S. goods and services¹⁶, could indirectly contribute to IC generation. Furthermore, USTDA's experience in connecting U.S. exporters, particularly SMEs¹⁹, with international opportunities could potentially be adapted to help firms navigate and benefit from an IC market. Its function of helping U.S.

firms "level the playing field" against foreign competitors offering incentives ²¹ might find a parallel in assisting firms to maximize the value derived from ICs.

- **Alignment and Scope Considerations:** A significant consideration arises from the specific scope of USTDA's current operations compared to the universality of the proposed IC system. USTDA's mandate directs its activities towards promoting U.S. exports specifically for *priority infrastructure projects in emerging economies*.¹⁶ In contrast, Warren Buffett's IC proposal envisions certificates being generated by *all* U.S. exports of goods and services, regardless of destination or sector.⁹ This mismatch implies that USTDA, under its current legislative mandate and operational focus, would only engage with a relatively small subset of the export activity relevant to a universal IC system. Integrating USTDA meaningfully would likely necessitate either a substantial expansion of its statutory authority and operational scope beyond emerging market infrastructure projects, or assigning it a more specialized, niche role within the broader IC framework – perhaps focusing on assisting exporters in specific sectors or target markets where its expertise lies. Without such changes, its direct contribution to managing a universal IC system appears limited by its specialized focus.

2. U.S. International Trade Commission (USITC)

- **Mission and Functions:** The USITC is an independent, nonpartisan, quasi-judicial federal agency.²⁶ Its mission encompasses three main areas: (1) Adjudication: Investigating and making determinations in proceedings involving imports claimed to injure domestic industries (e.g., antidumping/countervailing duty (AD/CVD) cases under Title VII) or violate U.S. intellectual property rights (Section 337 investigations).²⁶ (2) Research and Analysis: Providing independent analysis and information on tariffs, trade, competitiveness, and the economic effects of trade policies and agreements to the President and Congress (often through Section 332 fact-finding investigations).²⁶ (3) Maintaining the Harmonized Tariff Schedule (HTS) of the United States.²⁶ It employs a professional staff of economists, lawyers, analysts, and investigators.²⁶
- **Potential Role in Hardison's Framework:** The USITC's established analytical capabilities appear highly relevant to the Hardison framework. Its experience in conducting Section 332 investigations to assess the likely economic impact of trade agreements or policy changes ²⁷ could be directly applied to evaluate the effects of implementing an IC system on various sectors, consumers, and the overall economy. This analytical function would be essential for the "Moneyball" aspect, providing data-driven assessments. The USITC's quasi-judicial role in handling trade disputes ²⁶ might also be adaptable. An IC system could generate new types of disputes concerning certificate eligibility, valuation, trading

practices, or potential market manipulation. The USITC's administrative law judges and investigative processes ²⁸ could potentially provide a forum for resolving such conflicts, although this would likely require new statutory authority. Finally, the USITC's responsibility for maintaining the detailed HTS classification system ²⁶ provides a crucial link. Since ICs are generated by exports and required for imports, tracking their flow would likely necessitate linking them to specific goods classified under the HTS.

- **Potential for a New Mandate:** The introduction of a market for Import Certificates, intended to be liquid and freely traded ⁹, represents the creation of a new type of financial or quasi-financial instrument. Such markets typically require oversight to ensure stability, prevent manipulation, and maintain fairness.³⁴ While the USITC currently investigates *unfair trade practices* related to the import of goods ²⁷, overseeing the functioning and integrity of the IC market itself would constitute a significant expansion of its mandate. This potential role would require the USITC to develop expertise and regulatory frameworks more akin to those used by financial market regulators, moving beyond its traditional focus on trade remedies and economic analysis. Concerns about potential IC price instability ³⁴ further underscore the potential need for such oversight.
- **Data Infrastructure Synergy:** The "Moneyball" component of Hardison's framework inherently relies on robust data and analytics. The USITC's role in maintaining the HTS ²⁶ and its extensive activities in collecting and analyzing international trade data ²⁶ position it as a potential cornerstone for the data infrastructure needed to support an IC system. Linking IC transactions to specific HTS codes would allow for detailed tracking of which exports generate certificates and which imports consume them. This granular data would be essential for any sophisticated analytical ("Moneyball") monitoring or evaluation of the system's impact across different sectors and products.

B. The Import Certificate (IC) Mechanism

Central to the Hardison framework is the Import Certificate mechanism, derived from a proposal articulated by Warren Buffett in 2003.⁴

1. Core Mechanics (Buffett's Proposal)

- **System Operation:** The fundamental concept is straightforward: any U.S. entity exporting goods or services would receive Import Certificates (ICs) equivalent to the dollar value of those exports.⁹ To import goods into the U.S., an importer (either domestic or foreign) would be required to purchase and surrender ICs matching the value of the imported goods.⁹ Crucially, these ICs would be freely

transferable and traded in an open, liquid market.⁹

- **Intended Outcome:** The system is designed to create an automatic link between the value of exports and the value of imports. Since imports cannot exceed the value for which ICs are available, and ICs are only generated by exports, the total value of imports would be capped by the total value of exports, thereby forcing the trade account into balance.⁹ Buffett described it as "a tariff by another name," but one intended to be more market-driven and less distortionary than traditional tariffs.⁹
- **Rationale:** Buffett proposed ICs out of concern over the persistent U.S. trade deficit, which he viewed as resulting in an alarming transfer of U.S. assets and national net worth to foreign owners.⁴ He argued that continuing deficits meant the U.S. was essentially selling off its companies, farmland, and equity to finance current consumption of imported goods.¹¹ He believed tariffs were a blunt and potentially dangerous tool due to their market distortions and potential for geopolitical conflict.⁹ ICs were presented as an alternative that could achieve trade balance while retaining "most free-market virtues," avoiding protection for specific industries or punishment of specific countries, and potentially reducing the risk of trade wars.⁹

2. Economic Effects (Theoretical and Modeled)

- **Price Impacts:** A key consequence, acknowledged by Buffett himself, is that the IC system would raise the prices of imported goods for U.S. consumers.⁹ Importers would need to buy ICs, and this cost would likely be passed on, in whole or in part, to the final price.²⁵ Prices of domestically produced goods that compete with imports might also rise.²⁵ Modeling by the Levy Institute estimated that the plan could raise U.S. import prices by approximately 9 percent, contributing to a short-term increase in overall inflation.²⁴ Buffett viewed this potential price increase as a necessary trade-off to prevent the long-term erosion of U.S. asset ownership.¹¹
- **Exporter Benefits:** U.S. exporters would gain an additional revenue stream from selling the ICs they earn.⁹ This effectively acts as a subsidy to exports, potentially increasing exporter profitability or allowing them to lower their prices in foreign markets to become more competitive.⁹ Levy Institute modeling suggested exporter net profits could rise significantly, potentially by an amount equivalent to 1.2% of GDP.²⁴
- **Trade Balance Impact:** By its very design, the mechanism forces a balance between the value of exports and imports.⁹ Modeling suggested the plan could rapidly reduce the U.S. current account deficit, perhaps to around 2 percent of GDP (residual deficit likely reflecting components not covered by the ICs, like oil

imports in the modeled scenario).³⁴

- **GDP and Employment:** The effects on overall economic output are complex. The boost to exporter profits and potential increase in domestic production (due to higher import costs and export incentives) could stimulate GDP and job creation, as proponents suggest.¹⁰ However, the drag from higher consumer prices and potential disruptions could counteract this. Levy Institute modeling indicated an initial rise in GDP followed by a potential dip below the baseline path.²⁴
- **IC Market Dynamics:** Since the U.S. runs a trade deficit, the demand for ICs (by importers) would exceed the supply generated by current export levels. This imbalance would cause ICs to trade at a premium above their face value in the open market.²⁴ The size of this premium would reflect the magnitude of the underlying trade deficit. However, concerns have been raised about the potential for significant volatility in the price of these certificates, which could create uncertainty for businesses.³⁴

3. Critiques and Challenges

- **WTO Compliance:** A major hurdle is the likely incompatibility of the IC system with World Trade Organization (WTO) rules.²⁵ The requirement for importers to purchase certificates acts as a restriction on imports and discriminates against foreign goods relative to domestic ones. Critics argue this would likely violate core WTO principles, such as those found in GATT Article III (National Treatment) and Article XI (General Elimination of Quantitative Restrictions), as well as potentially the Agreement on Trade-Related Investment Measures (TRIMs).²⁵ Implementation would almost certainly invite legal challenges within the WTO system.
- **Risk of Retaliation:** Despite Buffett's assertion that the plan would not encourage trade wars⁹, many analysts disagree.²⁵ Trading partners negatively affected by the increased cost of exporting to the U.S. market would likely view the IC system as a protectionist measure and could respond with retaliatory tariffs or other barriers against U.S. exports.²⁴ Such retaliation could undermine the benefits intended for U.S. exporters and escalate trade tensions.³⁴
- **Economic Policy Concerns:** Beyond the price increases for consumers⁹ and potential inflationary impact²⁴, critics label it as potentially "bad economic policy".²⁵ The potential for instability in the IC market price could discourage investment and create broader economic uncertainty.³⁴ Furthermore, practical implementation details raise questions. Legislative proposals based on Buffett's idea, such as the Balanced Trade Restoration Act of 2006¹⁵, faced critiques regarding the exclusion or inclusion of specific goods (like oil or scarce minerals) and the need for self-funding mechanisms.¹⁵
- **Alternative (Levy Institute):** Recognizing some of these drawbacks, particularly

the risk of retaliation and the impact on consumers, researchers at the Levy Institute proposed an alternative.³⁴ Instead of granting ICs to exporters, the government would auction them off. The revenue generated could then be used to finance cuts in payroll taxes (like FICA). This modification aimed to make the policy revenue-neutral, provide a stimulus to U.S. industry by cutting costs, and help consumers cope with higher import prices, potentially reducing the likelihood of foreign retaliation.³⁴

- **Mechanism vs. Macroeconomic Forces:** A fundamental question surrounding the IC proposal is its ability to genuinely eliminate the trade deficit when faced with powerful underlying macroeconomic forces. The trade deficit is intrinsically linked to the national savings-investment balance; if a nation invests more than it saves domestically, it must import capital from abroad, which corresponds to a current account deficit.⁶ If these macroeconomic fundamentals (e.g., a large government budget deficit contributing to low national saving) remain unchanged, the pressure for a trade deficit persists. Under an IC system, this persistent excess demand for imports over exports would manifest as a high market price for ICs.²⁴ If the IC price becomes excessively high, it functions like a steep and potentially volatile tariff, risking significant inflation and economic disruption.²⁴ Alternatively, market forces might lead to an appreciation of the real exchange rate to counteract the IC's effect on relative prices, thereby preserving the underlying trade imbalance dictated by the savings-investment gap. Thus, the IC mechanism's capacity to *force* sustained trade balance without addressing the root macroeconomic causes remains uncertain.
- **Distributional Consequences:** While designed to be neutral across specific industries⁹, the IC system would inevitably create winners and losers within the economy. Exporters stand to gain from the additional revenue stream provided by selling ICs.⁹ Domestic industries competing with imports might also benefit from the increased cost of foreign goods.²⁵ Conversely, consumers would face higher prices for imported goods and potentially some domestic substitutes.⁹ Industries heavily reliant on imported inputs would also experience increased costs. Assessing the net impact on overall economic welfare and the distribution of gains and losses across different income groups and sectors requires sophisticated analysis, likely using economy-wide models like CGE or DSGE that can capture inter-sectoral linkages and household impacts.³⁵ The Levy Institute's auction variant, using revenue for payroll tax cuts, explicitly attempted to address these distributional concerns by providing broad-based relief.³⁴

C. The "Moneyball-Buffett Model" Concept

The term "Moneyball-Buffett Model" within the Hardison framework suggests the application of data-driven, analytical techniques – reminiscent of the "Moneyball" approach popularized in baseball – to the implementation and management of the Buffett-inspired Import Certificate system. This implies a shift towards a more dynamic, evidence-based approach to trade policy administration, potentially leveraging modern computational and statistical tools.

1. Interpretation

The core idea appears to be using quantitative analysis to inform decisions related to the IC system. This could range from monitoring market performance and economic impacts to potentially optimizing certain parameters of the system or forecasting future trends. It signals an intention to manage the trade balance mechanism with analytical rigor, moving beyond static rules.

2. Potential Analytical Approaches

Several quantitative methodologies could fall under the "Moneyball" umbrella in this context:

- **Advanced Econometrics and Statistical Analysis:** Standard tools of economic analysis could be employed. Time-series analysis might track IC price movements and their correlation with trade flows or macroeconomic variables.³⁷ Regression models could estimate the impact of ICs on specific industry outputs, employment, or consumer prices.³⁷ Structural econometric models, potentially embedded within larger CGE or DSGE frameworks³⁵, could attempt to quantify the system's overall economic effects and estimate key parameters like trade elasticities. Methods for quantifying job creation impacts, such as those using multipliers or input-output analysis, could also be relevant.³⁸
- **Artificial Intelligence (AI) and Machine Learning (ML):** More advanced techniques could be envisioned. ML algorithms might be used for predictive analytics, such as forecasting IC price volatility or identifying sectors likely to benefit most (or least) from the system.³⁷ Pattern recognition could analyze complex transaction data within the IC market to detect anomalies or potential manipulation.⁴⁴ Neural networks, capable of modeling complex non-linear relationships, might be applied to trade flow prediction or understanding the intricate factors influencing IC prices.⁴³ Optimization algorithms, potentially guided by AI, could explore optimal policy design, perhaps related to phase-in schedules or specific rules.⁴³ Reinforcement learning (RL) offers a more dynamic possibility, where algorithms could learn optimal strategies for managing the system or even simulate the adaptive behavior of firms operating under the IC

regime.⁵³

- **Composite Indicators and Multi-Criteria Decision Analysis (MCDA):** Given the multiple potential objectives (deficit reduction, export promotion, job creation, minimizing consumer harm), composite indicators might be developed to provide a summary measure of the IC system's performance.⁶⁰ These indicators synthesize various sub-indicators into a single metric, though their construction involves methodological choices regarding weighting and aggregation that can be contentious.⁶² MCDA offers a structured framework for evaluating the IC system against multiple, potentially conflicting criteria, explicitly incorporating stakeholder preferences or policy priorities through weighting schemes.⁶⁶ Concepts mentioned in the research like "Sector Prioritization Score"⁶⁸ or assessing "Deficit Reduction Potential"⁶⁹ could potentially be operationalized within an MCDA framework, although their specific definitions and academic grounding appear limited based on the provided materials.

3. Feasibility and Challenges

Implementing a "Moneyball" approach faces significant hurdles:

- **Data Requirements:** These analytical methods are data-hungry. Effective implementation would require comprehensive, high-quality, granular, and timely data on international trade flows (potentially at the transaction level), firm-level export and import activities, IC market transactions (prices, volumes, participants), and linkages to broader economic indicators.⁴⁵ Issues of data availability, accuracy, consistency, privacy, and governance represent major obstacles.⁴⁴
- **Model Complexity and Transparency:** Advanced models, particularly AI/ML techniques like deep neural networks, often function as "black boxes".⁴⁹ While they may generate accurate predictions, the underlying reasoning can be opaque even to experts.⁸³ This lack of explainability poses serious challenges for policy applications, hindering validation, debugging, accountability, and public trust.⁷⁹ Ensuring the robustness and reliability of these complex models is also paramount.⁷⁹
- **Algorithmic Bias:** AI/ML systems learn from data, and if that data reflects existing societal biases, the algorithms can perpetuate or even amplify them.⁴³ In a policy context, biased algorithms could lead to unfair targeting of enforcement, inequitable distribution of benefits, or discriminatory outcomes. Careful auditing and mitigation strategies are necessary.⁴³
- **Computational Resources and Expertise:** Developing, training, and deploying sophisticated analytical models, especially large-scale AI systems, requires

substantial computational power and highly specialized expertise in data science, econometrics, and AI/ML ⁷⁵, which may be scarce within government agencies. ⁸²

- **Potential Conflict with Simplicity:** The application of complex "Moneyball" analytics and potential AI-driven optimization introduces a layer of intricacy that may contrast with the elegance and market-driven simplicity envisioned in Buffett's original IC proposal. ⁹ Buffett emphasized a system where trade balances automatically without government bureaucracy or complex regulation. ¹⁰ Introducing sophisticated algorithms for monitoring, prediction, or dynamic policy adjustment could potentially reintroduce elements of central management or opacity (the "black box" problem ⁴⁹) that the initial concept sought to avoid. This raises a question about whether the pursuit of analytical optimization might undermine the philosophical appeal of a simple, transparent, market-based mechanism.
- **Potential for Enhanced Monitoring:** Despite the complexities, a significant potential benefit of the "Moneyball" approach lies in enabling near real-time monitoring of the IC system's performance. Traditional economic indicators often have considerable reporting lags (e.g., quarterly GDP ², monthly trade data ⁷). AI and ML techniques are adept at processing high-frequency data streams. ⁴³ An active IC market would generate a wealth of such data (prices, volumes, participants). Applying advanced analytics could allow policymakers to track market dynamics, identify emerging instability ³⁴, detect potential manipulation, or assess impacts much more rapidly than conventional methods permit. This faster feedback loop could enable more timely and informed policy adjustments or interventions if necessary.

D. The Mathematical Framework

The reference to a "Mathematical Framework" suggests that Professor Hardison's proposal is underpinned by a formal quantitative model designed to represent the system's components and their interactions.

1. Likely Requirements

A comprehensive mathematical framework for the Hardison proposal would need to capture several key elements:

- **Core IC Mechanism:** Equations defining the issuance of ICs based on export values, the requirement for importers to surrender ICs, and the market-clearing process determining the IC price based on supply (from exporters) and demand (from importers).
- **Agent Behavior:** Models of how exporting and importing firms make decisions in

response to the IC system and the IC price, potentially including optimization of production, trade, and IC trading strategies. It would also need to represent consumer responses to changes in import prices.

- **Agency Roles:** If the actions of USTDA or USITC are considered integral and active parts of the system (e.g., market monitoring, analysis influencing policy), the framework might need to model their behavior or decision rules, potentially endogenously.
- **"Moneyball" Analytics:** Incorporating the outputs or processes of the data-driven analytical component, perhaps through forecasting modules, optimization routines, or feedback loops influencing policy parameters.
- **Macroeconomic Linkages:** Connecting the IC system and its direct effects to broader macroeconomic variables like GDP, employment, inflation, the overall trade balance, and the exchange rate, capturing economy-wide repercussions.

2. Potential Modeling Approaches

Several established economic modeling paradigms could potentially be adapted or combined to construct such a framework:

- **Computable General Equilibrium (CGE) Models:** CGE models simulate the entire economy, focusing on interactions between different sectors and factors of production to find a general equilibrium set of prices and quantities.⁹⁰ They are commonly used to analyze the long-run, economy-wide impacts of trade policies like tariffs and quotas.³⁵ CGE models typically incorporate imperfect substitution between domestic and imported goods (the Armington assumption⁹⁷) and can be adapted to model systems involving tradable permits or quotas.⁹⁸ Their strength lies in capturing detailed sectoral linkages and resource reallocation effects.³⁵ However, they are often static or comparative-static, may rely on strong assumptions about market clearing and perfect competition, can be sensitive to assumed elasticity values, and may struggle to capture dynamic adjustments and expectations realistically.⁹⁰
- **Dynamic Stochastic General Equilibrium (DSGE) Models:** DSGE models are built on microeconomic foundations of optimizing agents (households, firms) and explicitly incorporate dynamics, expectations, and uncertainty (stochastic shocks).³⁵ They are widely used in modern macroeconomics for analyzing monetary and fiscal policy and the transmission of shocks.¹⁰³ DSGE models can incorporate features like nominal rigidities (sticky prices/wages), financial frictions, and international capital flows.³⁵ Modeling trade policies like tariffs or an IC system within a DSGE framework is feasible but adds considerable complexity.³⁵ Their strength is in capturing dynamic responses and the role of

expectations. Weaknesses include often having less sectoral detail than CGE models, complexity in construction and solution, and sensitivity to calibration or estimation choices.¹⁰⁶

- **Agent-Based Models (ABM):** ABMs simulate the economy from the bottom up, modeling the behavior and interactions of numerous heterogeneous agents (e.g., individual firms, traders, households) according to specified rules.¹⁰⁹ This approach can capture emergent phenomena, complex interactions, and learning behavior that may not be easily represented in traditional equilibrium models. An ABM could potentially simulate the dynamics of the IC market, including strategic behavior or the emergence of price volatility.¹⁰⁹ Strengths include handling heterogeneity and non-equilibrium dynamics. Weaknesses involve challenges in calibrating agent behavior rules and validating model results against aggregate data.
- **Optimization Models (Multi-Objective):** If the framework emphasizes optimizing policy design or balancing conflicting objectives identified by the "Moneyball" analysis, multi-objective optimization techniques could be employed.⁵¹ These methods aim to find solutions that represent the best possible trade-offs between competing goals (e.g., minimizing the trade deficit while maximizing consumer welfare or minimizing job losses), subject to various constraints (e.g., budget limits, IC market stability).⁵¹ Such models often generate a set of Pareto-optimal solutions, requiring a subsequent decision process (perhaps informed by stakeholder preferences elicited via MCDA) to select a final policy.¹¹⁰ These techniques can be integrated with AI/RL for finding solutions.⁵¹ Strengths lie in explicitly handling trade-offs. Weaknesses include the potential subjectivity in defining objectives and weights⁶⁶ and computational complexity.¹¹³
- **Hybrid Models:** It is also possible to combine elements from different approaches. For example, linking a detailed CGE model for sectoral analysis with a DSGE model for macroeconomic dynamics³⁵, or using ML techniques to inform parameterization or analyze outputs of traditional models.⁵⁷

3. Key Modeling Challenges

Constructing a comprehensive mathematical framework for the Hardison proposal faces several significant challenges:

- **Modeling the IC Market:** Accurately representing the proposed market for Import Certificates is non-trivial. Standard models of tariffs or quotas may not fully capture the dynamics of a tradable permit system, including price discovery, the potential for high volatility³⁴, speculative behavior, or strategic interactions among market participants. Modeling approaches used for emissions trading

markets might offer some parallels.¹¹⁹

- **Integrating Agency Roles:** If the framework assumes active roles for USTDA and USITC beyond passive administration, modeling their decision-making processes and impacts adds complexity. For instance, if USITC analysis ("Moneyball") feeds back into adjustments of IC rules, this creates an endogenous policy loop that standard models often abstract from.
- **Data Calibration and Estimation:** All quantitative models require extensive data for calibration or estimation. Key parameters, such as Armington elasticities (measuring substitutability between domestic and imported goods ⁹⁷), supply and demand elasticities, or parameters governing agent behavior (e.g., risk aversion, adjustment costs ¹⁰⁶), strongly influence model outcomes.¹⁰⁰ Obtaining reliable estimates for these parameters, especially for a novel policy like ICs, is challenging.¹⁰²
- **Computational Tractability:** Solving large-scale general equilibrium models (CGE, DSGE) or complex optimization problems can be computationally demanding, requiring significant resources and specialized software.¹¹³ Incorporating AI/ML components can further increase computational costs.
- **Treatment of Policy Endogeneity:** A sophisticated representation of the Hardison framework, particularly the interplay between the "Moneyball" analytics and agency actions, might necessitate treating policy itself as endogenous – meaning policy rules or agency interventions could adapt based on the observed state of the economy or the IC market. While standard CGE and DSGE models typically assume fixed policy rules ⁹⁰, modeling endogenous policy responses requires more advanced techniques, potentially drawing from game theory or frameworks like two-level reinforcement learning where a planner optimizes policy while agents adapt.⁵³ This significantly increases the complexity of the mathematical framework.
- **Influence of Model Choice:** The selection of a specific modeling approach (CGE, DSGE, ABM, etc.) is not merely a technical decision; it embeds fundamental theoretical assumptions about how the economy functions. CGE models, for example, emphasize long-run equilibrium, market clearing, and detailed sectoral interactions, making them well-suited to analyzing resource reallocation effects.³⁵ DSGE models prioritize dynamics, expectations, and the role of frictions or rigidities, making them more suitable for analyzing short-to-medium term responses and interactions with monetary policy.¹⁰³ ABMs focus on heterogeneity and emergent behavior.¹⁰⁹ Consequently, the choice of framework will inevitably shape the types of questions that can be addressed and the nature of the results obtained. A robust presentation of the Hardison framework should explicitly justify its chosen mathematical approach and acknowledge the inherent

assumptions and limitations.³⁵

III. Evaluating the Integrated Framework

Having deconstructed the individual components, this section evaluates the coherence, potential effectiveness, feasibility, and robustness of Professor Hardison's integrated framework.

A. Coherence and Synergy

The framework proposes integrating a market mechanism (ICs), existing federal agencies (USTDA, USITC), data analytics ("Moneyball"), and a mathematical structure. A key question is whether these components fit together logically and synergistically.

The core IC mechanism, aimed at balancing trade through market forces, provides the central policy instrument. The involvement of USITC seems logical for its analytical capabilities (evaluating impacts, supporting "Moneyball") and potentially for dispute resolution or market oversight, leveraging its quasi-judicial functions and data infrastructure.²⁶ The role of USTDA is less clear-cut due to its specific mandate focusing on emerging market infrastructure projects¹⁶; its direct synergy with a universal IC system appears limited without a significant mandate expansion.

The "Moneyball" concept provides the analytical engine, potentially enhancing monitoring, prediction, and even optimization of the system. The mathematical framework is intended to provide the underlying structure connecting these parts.

However, potential points of friction exist. As noted previously, the complexity and potential opacity introduced by sophisticated "Moneyball" analytics, especially AI/ML, might clash with the intended simplicity and transparency of the market-driven IC mechanism.⁹ Overly active management based on analytics could undermine the market-based nature of the proposal.

Furthermore, integrating two distinct agencies like USTDA and USITC into the operational management of a new, complex system like ICs presents significant bureaucratic challenges. These agencies possess different mandates, expertise, and operational cultures.²⁰ The new functions required by an IC system – such as certificate issuance and tracking, market platform operation, real-time monitoring, exporter/importer support across all sectors, and dispute resolution specific to ICs – do not align perfectly with the current responsibilities of either agency. Without extremely clear delineation of roles, responsibilities, and potentially new legislative authority, there is a substantial risk of jurisdictional ambiguity, overlapping functions,

or inter-agency conflict, which could hinder the framework's coherence and operational effectiveness.

The mathematical framework's role is crucial for coherence. If it successfully integrates the IC market dynamics, agent behavior, agency actions (if relevant), and macroeconomic linkages, it can provide a unified basis for understanding the system. However, if it primarily models the IC mechanism in isolation, its ability to capture the synergies and conflicts within the *integrated* framework will be limited. The choice of modeling paradigm (CGE, DSGE, etc.) will also influence which aspects of the integration are emphasized or neglected.³⁵

B. Potential Effectiveness in Addressing Trade Imbalances

The central promise of the framework, inherited from the Buffett proposal, is its potential to directly address and eliminate the trade deficit by mechanically linking imports to exports.⁹ Quantitative modeling, such as the Levy Institute study, suggests that implementing an IC system could indeed lead to a substantial and rapid reduction in the U.S. current account deficit.³⁴ Table 1 summarizes key findings from such modeling exercises.

Table 1: Modeled Economic Impacts of Import Certificate Proposals

| Study/Source | Model Type | Estimated IC Price (% Premium) | Est. Impact on Import Prices | Est. Impact on Inflation (Short-term) | Est. Impact on GDP | Est. Impact on Current Account Deficit | Key Assumptions/Comments |
|--|----------------------------|--------------------------------|------------------------------|---------------------------------------|---|--|---|
| Papadimitriou et al. (2008) ³⁴ | Levy Institute Macro Model | Approx. 9% | +9% | + Approx. 4 p.p. | Initial rise (approx. +1.2% ²⁴), then lower | Reduced to approx. 2% of GDP | Assumed no retaliation (Buffett view), immediate implementation |

| | | | | | | | |
|--|--------------------------|-------------------|---------------------|---------------------|---|----------------------------|---|
| Dorgan/ Feingold Bill (2006) ²⁴ | (Based on Buffett) | Perhaps 10-20% | Implied increase | Implied increase | Potential stimulus via exporter profits (+1.2% GDP) | Gradual eliminati on | Propose d gradual phase-in , potential for retaliatio n noted |
|--|--------------------------|-------------------|---------------------|---------------------|---|----------------------------|---|

Note: Data points synthesized from cited sources. Direct comparability may be limited by model differences and specific scenarios analyzed.

However, the effectiveness of the framework in achieving sustained trade balance must be critically evaluated in light of the dominant macroeconomic drivers of trade deficits.¹ As discussed (Insight 4), if the underlying imbalance between national saving and investment persists, the IC mechanism might struggle to eliminate the deficit without causing severe side effects. The IC price could be forced to extremely high levels, generating significant inflation and economic distortion ²⁴, or the real exchange rate could adjust to offset the mechanism's impact, leaving the overall deficit largely unchanged. Therefore, while the framework might effectively *force* a balance in the specific accounts covered by ICs, its ability to sustainably eliminate the *overall* current account deficit without complementary macroeconomic policy adjustments (e.g., fiscal consolidation to raise national saving ¹) is questionable.

Compared to other policy tools, the IC mechanism offers potential advantages over traditional tariffs, which are widely seen as ineffective in reducing overall deficits and often harmful due to distortions, retaliation, and consumer costs.¹ Tariffs tend to shift deficits between trading partners rather than eliminating the aggregate imbalance.⁶ Policies directly targeting the savings-investment balance, such as fiscal consolidation, or influencing the exchange rate are generally considered more potent tools for managing the overall trade deficit.¹ Some analyses also emphasize addressing currency manipulation by trading partners as a key lever.¹³

Considering these factors, the Hardison framework, centered on ICs, might be more effective at altering the *composition* and direction of trade flows – by providing a broad-based incentive for exports and a disincentive for imports – rather than guaranteeing the elimination of the overall trade balance, particularly if macroeconomic conditions remain unfavorable. Its success might therefore be better judged by its impact on export competitiveness, domestic production in import-competing sectors, or related job creation ¹⁰, rather than solely by the

aggregate deficit number. The framework's effectiveness hinges significantly on the interaction between the IC mechanism and broader economic forces.

C. Feasibility and Implementation Challenges

Beyond theoretical coherence and potential effectiveness, the practical feasibility of implementing the Hardison framework faces substantial hurdles.

- **Political Feasibility:** Gaining domestic political consensus for such a radical shift in trade policy would be difficult. The anticipated rise in consumer prices ⁹ would likely face strong opposition. While exporters and import-competing industries might support the proposal, industries reliant on imports and consumer groups would likely resist. Internationally, the framework faces significant obstacles. The high probability of violating WTO commitments ²⁵ invites legal challenges and undermines the rules-based trading system. Furthermore, the risk of widespread retaliation from trading partners is considerable ²⁴, potentially leading to trade wars that negate any benefits. Although legislation based on Buffett's idea was introduced in 2006 ¹⁵, it did not advance, suggesting significant political barriers.
- **Operational Complexity:** Establishing and managing a national market for Import Certificates would be a complex undertaking. It requires designing and implementing a robust system for: issuing ICs to potentially millions of exporters based on verified export values; tracking IC ownership and transfers; creating a secure and efficient trading platform accessible to importers and traders; ensuring market liquidity; defining precisely which transactions generate and require ICs (e.g., handling services, returns, transshipments); developing mechanisms to prevent fraud, counterfeiting, and market manipulation; and coordinating the data flows and operational roles between participating agencies (potentially Customs, Treasury, USITC, USTDA). The operational complexity might rival that of establishing large-scale environmental permit markets, such as carbon trading schemes.¹¹⁹
- **Market Stability and Price Discovery:** A key concern is the potential for high volatility in the price of ICs.³⁴ This volatility would create significant uncertainty for both importers (regarding future costs) and exporters (regarding the value of earned ICs), potentially hindering business planning, investment, and long-term contracting. Mechanisms used in other markets to manage volatility, such as price collars or circuit breakers ¹²⁸, might be considered. However, these interventions have their own drawbacks, potentially interfering with efficient price discovery, creating artificial market stops, or even paradoxically attracting destabilizing trading activity near thresholds (the "magnet effect").¹³⁰ Implementing such mechanisms in a new, untested market for ICs would add another layer of

complexity and potential unintended consequences. The process of price discovery itself during market halts or under stress could become fragmented and disorderly.¹²⁹

- **Data and Analytical Infrastructure:** The "Moneyball" component, regardless of the specific techniques employed, demands a sophisticated data and analytical infrastructure far exceeding current capabilities in many policy domains.⁴⁴ It requires integrating vast datasets, ensuring data quality and security, developing and validating complex models, and having the necessary human expertise and computational resources within the relevant agencies.⁷⁵ Assessing the readiness of existing federal data systems (e.g., at Census, BEA, Customs, USITC) and the feasibility of building the required analytical capacity is critical.
- **Transitional Challenges:** Shifting from the current trade policy regime to one based on ICs would entail a major adjustment for the U.S. economy. Businesses have established supply chains, investment plans, and pricing strategies based on existing tariffs, trade agreements, and exchange rate expectations. The introduction of ICs would fundamentally alter the cost structure for imports and the revenue structure for exports, likely in unpredictable ways initially due to IC price fluctuations.³⁴ This uncertainty during the transition phase could disrupt trade flows, dampen investment, and impose significant adjustment costs on firms and workers. While a gradual phase-in of the system, as suggested in the Dorgan/Feingold proposal²⁴, might aim to smooth this adjustment, it introduces its own complexities, such as managing changing rules over time and potentially creating opportunities for strategic behavior to exploit the phase-in schedule. Effectively managing this transition represents a critical implementation challenge.

D. Robustness and Limitations

The long-term viability and effectiveness of the Hardison framework depend on its robustness to changing conditions and its inherent limitations.

- **Sensitivity to Assumptions:** The outcomes predicted by any mathematical framework underpinning the proposal will be sensitive to underlying assumptions.⁹³ Key parameters like trade elasticities (how responsive imports and exports are to price changes)³⁵, the degree to which IC costs are passed through to consumer prices, assumptions about agent rationality and expectations formation¹⁰⁶, and the assumed responses of trading partners will significantly shape the results. Economic models are simplifications of reality, and their predictive accuracy for a novel and complex policy like this is inherently uncertain.
- **Potential for Gaming and Evasion:** Any regulatory system creates incentives for

circumvention. Firms might engage in activities to artificially inflate export values to gain more ICs, under-report import values to reduce IC requirements, or attempt to manipulate the IC trading market. The design would need robust verification and enforcement mechanisms. Critiques of earlier legislative proposals also highlighted potential loopholes, such as the treatment of goods with high value but low domestic value-added (e.g., re-exports or goods incorporating valuable imported components).¹⁵

- **Explainability and Trust:** If the "Moneyball" component relies heavily on complex AI/ML algorithms, the "black box" problem becomes a significant limitation.⁴⁹ Lack of transparency and explainability makes it difficult for policymakers, businesses, and the public to understand *why* certain decisions are made or predictions generated by the system.⁷⁹ This opacity can erode trust, hinder accountability, make it difficult to detect or correct biases⁷⁷, and complicate legal or political justification of the system's operations. Building trustworthy AI requires addressing fairness, transparency, and robustness explicitly.⁴³
- **Comparison to Alternatives:** The complexity and potential downsides of the Hardison framework must be weighed against simpler or more conventional policy options.¹ As discussed, tariffs are generally viewed as ineffective for the overall deficit and carry significant negative consequences.¹ Direct macroeconomic policies (fiscal adjustments, influencing the exchange rate) are often considered more appropriate for managing the overall balance.¹ The Hardison framework represents a highly complex, market-engineering approach whose potential benefits over these alternatives are uncertain and must be balanced against its significant implementation risks and potential side effects.
- **Scalability and Adaptability:** The robustness of the framework also depends on its capacity to operate effectively at the immense scale of U.S. international trade and to adapt over time. Global commerce involves millions of daily transactions across countless product categories and trading partners.¹³⁴ The integrated system – involving a new market mechanism, multiple federal agencies, and potentially complex analytics – must be scalable to handle this volume efficiently and reliably. Furthermore, the global economic landscape is constantly evolving due to technological change (e.g., the rise of digital trade, AI impacting supply chains⁴⁸), shifting geopolitical alignments, new trade agreements, and unforeseen crises (e.g., pandemics, wars). The inherent complexity of the Hardison framework, with its multiple interacting components, might make it less agile and adaptable to such changes compared to simpler policy instruments. This potential lack of adaptability could compromise its long-term effectiveness and resilience.

IV. Conclusion and Recommendations

A. Summary of Findings

Professor Arion Hardison's proposed framework presents an ambitious and intellectually stimulating approach to addressing the persistent U.S. trade deficit. It seeks to integrate Warren Buffett's Import Certificate (IC) concept – a market-based mechanism designed to automatically balance trade – with the operational capabilities of federal agencies (USTDA and USITC) and the analytical power of data-driven methods ("Moneyball"), all structured within a formal mathematical framework.

The analysis reveals several key points:

- **Coherence:** While the core IC mechanism and the potential analytical role for USITC show logical synergy, the integration of USTDA appears problematic given its narrow mandate. Significant potential exists for bureaucratic complexity and conflict in coordinating agency roles for the new functions required by an IC system. The "Moneyball" component's complexity may also sit uneasily with the intended simplicity of the IC market.
- **Effectiveness:** Theoretically, the IC mechanism is designed to force trade balance. Modeling suggests it could significantly reduce the deficit but likely at the cost of higher consumer prices and potential inflation. However, its ability to sustainably eliminate the overall deficit is questionable if underlying macroeconomic drivers (Savings-Investment imbalance) remain unaddressed. It may be more effective at altering trade composition than guaranteeing overall balance.
- **Feasibility:** The framework faces severe feasibility challenges. Politically, it would likely encounter strong domestic opposition due to consumer costs and significant international resistance due to WTO incompatibility and the high risk of retaliation. Operationally, establishing and managing a national IC market is highly complex, requiring new infrastructure, robust oversight, and clear agency coordination. Ensuring IC market stability without hindering price discovery presents a further challenge. The data and analytical requirements for the "Moneyball" aspect are substantial.
- **Robustness and Limitations:** The framework's success depends heavily on model assumptions and parameter estimates. It is potentially vulnerable to gaming and evasion. If reliant on complex AI, issues of explainability, bias, and trust become critical limitations. The system's complexity may also hinder its scalability and adaptability to a dynamic global economy.

B. Overall Assessment

The Hardison framework represents a creative synthesis of ideas aimed at tackling a long-standing policy challenge. Its core appeal lies in the market-based nature of the IC mechanism, offering an alternative to distortionary tariffs, and the incorporation of modern analytical techniques.

However, the evaluation suggests that the framework, as presented, faces formidable obstacles that likely render it unviable as a practical policy proposal in its current form. The combination of likely WTO violations, high risk of international retaliation, significant operational complexity, potential for market instability, adverse consumer impacts, and fundamental questions about its ability to override macroeconomic forces driving the deficit collectively represent major weaknesses. The integration of existing agencies seems problematic without substantial mandate changes, and the "Moneyball" component, while potentially offering benefits in monitoring, adds layers of complexity and opacity concerns.

While the IC concept itself remains an intriguing theoretical alternative to tariffs, its implementation within the complex, integrated structure proposed by Hardison appears to multiply, rather than mitigate, the inherent challenges. The potential benefits seem unlikely to outweigh the substantial economic, political, and operational risks involved.

C. Recommendations for Further Research/Refinement

Despite the critical assessment, certain elements of the framework warrant further investigation, primarily from an academic or exploratory perspective, before dismissing the underlying ideas entirely:

1. **Modeling the IC Mechanism:** Rigorous CGE and DSGE modeling studies are needed to specifically simulate the IC market mechanism (not just treating it as a generic tariff/quota). These models should explicitly incorporate IC price formation, test sensitivity to key parameters (especially trade elasticities and pass-through assumptions), and crucially, simulate various scenarios of international retaliation.³⁵
2. **WTO Compatibility Analysis:** A detailed legal analysis by trade law experts is required to definitively assess the compatibility of the IC proposal (and potential variants like the Levy Institute auction) with specific WTO agreements and predict the likely outcomes of legal challenges.²⁵
3. **IC Market Dynamics Simulation:** Further research, potentially using

agent-based modeling or financial market simulation techniques, should explore the likely dynamics of the IC market, focusing on price volatility, liquidity, potential for bubbles or crashes, and vulnerability to manipulation.³⁴ Analysis of existing emissions trading markets could provide relevant insights.¹¹⁹

4. **"Moneyball" Feasibility Study:** A practical assessment is needed to determine the feasibility of implementing the data-intensive "Moneyball" component. This should involve mapping required data sources, assessing data quality and availability within federal agencies, evaluating necessary analytical tools and expertise, and addressing privacy and security concerns.⁴⁴ Pilot projects focusing on specific analytical tasks (e.g., near real-time trade flow monitoring) could test capabilities.
5. **Distributional Impact Analysis:** Detailed studies are needed to quantify the likely distributional consequences of an IC system across different U.S. industries (exporters, importers, import-competing), household income groups, and regions. This requires models capable of tracking welfare changes for heterogeneous agents.⁹⁸
6. **Agency Integration Blueprint:** If the concept were pursued, a detailed blueprint outlining the specific roles, responsibilities, necessary legislative changes, and coordination mechanisms for integrating USTDA, USITC, and potentially other agencies (e.g., Customs, Treasury) would be essential.

D. Final Policy Perspective

The Hardison framework enters a policy arena where debates about the U.S. trade deficit often polarize between focusing on trade policy tools (like tariffs) and emphasizing macroeconomic management. The evidence strongly suggests that macroeconomic factors, particularly the national savings-investment balance influenced by fiscal policy, are the primary drivers of the overall trade deficit.¹ Trade policy interventions like tariffs have proven largely ineffective at reducing the aggregate deficit and often impose significant costs on the domestic economy.¹

In this context, the Hardison framework, while innovative, appears to be an overly complex and high-risk attempt to use a trade-related mechanism to solve what is fundamentally a macroeconomic problem. Its potential effectiveness is uncertain, while its implementation challenges and potential negative consequences (WTO conflict, retaliation, consumer costs, market instability) are substantial.

While the pursuit of novel solutions to complex policy problems like the trade deficit is valuable, policymakers should remain grounded in economic fundamentals. Addressing the U.S. trade deficit sustainably likely requires a focus on sound domestic

macroeconomic policies, particularly fiscal responsibility, rather than complex market-engineering schemes with high implementation risks and uncertain outcomes. The intellectual exercise presented by the Hardison framework serves as a useful reminder of the complexities involved but does not currently offer a practical path forward for U.S. trade policy.

Works cited

1. The U.S. Trade Deficit: Myths and Realities - Brookings Institution, accessed May 2, 2025, https://www.brookings.edu/wp-content/uploads/2025/03/3_Obstfeld.pdf
2. Balance on current account (IEABC) | FRED | St. Louis Fed, accessed May 2, 2025, <https://fred.stlouisfed.org/series/IEABC>
3. International Transactions | U.S. Bureau of Economic Analysis (BEA), accessed May 2, 2025, <https://www.bea.gov/data/intl-trade-investment/international-transactions>
4. Warren Buffett's 2003 Plan To Fix The Trade Deficit Without A War Deserves A Second Look As US-China Tariff War Continues - Webull, accessed May 2, 2025, <https://www.webull.com/news/12654633361589248>
5. U.S. INTERNATIONAL TRADE IN GOODS AND SERVICES, DECEMBER 2024 - U.S. Census Bureau, accessed May 2, 2025, https://www.census.gov/foreign-trade/Press-Release/ft900/ft900_2412.pdf
6. The U.S. Trade Deficit: How Much Does It Matter? - Council on Foreign Relations, accessed May 2, 2025, <https://www.cfr.org/backgrounder/us-trade-deficit-how-much-does-it-matter>
7. U.S. International Trade in Goods and Services, February 2025 | U.S. Bureau of Economic Analysis (BEA), accessed May 2, 2025, <https://www.bea.gov/news/2025/us-international-trade-goods-and-services-february-2025>
8. U.S. INTERNATIONAL TRADE IN GOODS AND SERVICES, FEBRUARY 2025 - U.S. Census Bureau, accessed May 2, 2025, https://www.census.gov/foreign-trade/Press-Release/current_press_release/ft900.pdf
9. Here's What Warren Buffett Thinks of Tariffs -- and It's Probably Not What You'd Think, accessed May 2, 2025, <https://www.fool.com/investing/2025/04/16/heres-what-warren-buffett-thinks-of-tariffs-its-pr/>
10. Buffett's alternative to tariffs is seriously brilliant (Import Certificates) : r/investing - Reddit, accessed May 2, 2025, https://www.reddit.com/r/investing/comments/1k2ez1u/buffetts_alternative_to_tariffs_is_seriously/
11. Why Buffett Rejected Tariffs And What He Proposed Instead - Dad is FIRE, accessed May 2, 2025, <https://dadisfire.com/why-buffett-rejected-tariffs/>
12. THE CASE FOR FAIR TRADE - Project 2025, accessed May 2, 2025, https://static.project2025.org/2025_MandateForLeadership_CHAPTER-26.pdf

13. Reducing U.S. trade deficits will generate a manufacturing-based recovery for the United States and Ohio: Ending currency manipulation by China and others is the place to start | Economic Policy Institute, accessed May 2, 2025, <https://www.epi.org/publication/bp351-trade-deficit-currency-manipulation/>
14. Fiscal and exchange rate policy, not tariffs, can reduce the trade deficit | PIIE, accessed May 2, 2025, <https://www.piie.com/research/piie-charts/2025/fiscal-and-exchange-rate-policy-not-tariffs-can-reduce-trade-deficit>
15. Import certificates - Wikipedia, accessed May 2, 2025, https://en.wikipedia.org/wiki/Import_certificates
16. Strategic Plan* Fiscal Years 2022- 2026 - Amazon S3, accessed May 2, 2025, https://s3-us-gov-west-1.amazonaws.com/cg-654ebf73-8576-4082-ba73-dd1f1a7fe8dc/uploads/USTDA-Strategic-Plan-FYs-22-26-Final_Amended.pdf
17. Trade and Development Agency - U.S. Government Manual, accessed May 2, 2025, <https://www.usgovernmentmanual.gov/Agency?EntityId=Qlo2+v3btFY=&ParentEntityId=+klubNxgV0o=&EType=jY3M4CTKVHY=>
18. United States Trade and Development Agency (USTDA) - AllGov - Departments, accessed May 2, 2025, <http://www.allgov.com/departments/independent-agencies/united-states-trade-and-development-agency-ustda?agencyid=7282>
19. USTDA: Good Value for Development Dollars - CSIS, accessed May 2, 2025, <https://www.csis.org/analysis/ustda-good-value-development-dollars>
20. USTDA – United States Trade and Development Agency, accessed May 2, 2025, <https://www.ustda.gov/>
21. About Us – USTDA, accessed May 2, 2025, <https://www.ustda.gov/about/>
22. U.S. Trade and Development Agency (USTDA) | USAGov, accessed May 2, 2025, <https://www.usa.gov/agencies/u-s-trade-and-development-agency>
23. United States Trade and Development Agency (USTDA) | Spending Profile, accessed May 2, 2025, <https://www.usaspending.gov/agency/90>
24. EPI WORKING PAPER – Economic Policy Institute, accessed May 2, 2025, <https://www.epi.org/page/-/pdf/wp286.pdf>
25. Buffett on the Trade Deficit - International Economic Law and Policy Blog, accessed May 2, 2025, <https://ielp.worldtradelaw.net/2009/01/buffett-on-the-trade-deficit.html>
26. About the USITC | United States International Trade Commission, accessed May 2, 2025, https://www.usitc.gov/press_room/about_usitc.htm
27. United States International Trade Commission: Section 332 - Center Forward, accessed May 2, 2025, https://center-forward.org/wp-content/uploads/2023/06/USITC_Sect-332-Basic-FINAL.pdf
28. United States International Trade Commission - Wikipedia, accessed May 2, 2025, https://en.wikipedia.org/wiki/United_States_International_Trade_Commission
29. United States International Trade Commission: Section 332 - Center Forward, accessed May 2, 2025,

<https://center-forward.org/basic/united-states-international-trade-commission-section-332/>

30. U.S. International Trade Commission (USITC) | USAGov, accessed May 2, 2025, <https://www.usa.gov/agencies/u-s-international-trade-commission>
31. Office of Investigations | United States International Trade Commission - USITC, accessed May 2, 2025, <https://www.usitc.gov/offices/investigations>
32. Understanding Other USITC Statutory Responsibilities | United States International Trade Commission, accessed May 2, 2025, http://www.usitc.gov/press_room/statutory_resp.htm
33. Economic Impact of Trade Agreements Implemented under Trade Authorities Procedures, 2021 Report - USITC, accessed May 2, 2025, <https://www.usitc.gov/publications/332/pub5199.pdf>
34. The Buffett plan for reducing the trade deficit - EconStor, accessed May 2, 2025, <https://www.econstor.eu/bitstream/10419/31615/1/571725325.pdf>
35. Modeling Trade Tensions: Different Mechanisms in General Equilibrium, accessed May 2, 2025, <https://www.imf.org/en/Publications/WP/Issues/2020/12/11/Modeling-Trade-Tensions-Different-Mechanisms-in-General-Equilibrium-49869>
36. ENERGY MARKETS AND THE EURO AREA MACROECONOMY JUNE 2010 - European Central Bank, accessed May 2, 2025, <https://www.ecb.europa.eu/pub/pdf/other/energymarketandeuroareamacroeconomy201006en.pdf>
37. Key Methods for Measuring Public Policy Outcomes - Number Analytics, accessed May 2, 2025, <https://www.numberanalytics.com/blog/key-methods-measuring-policy-outcomes>
38. Employment Impact Assessments (EmplA) - International Labour Organization, accessed May 2, 2025, https://www.ilo.org/sites/default/files/wcmsp5/groups/public/@ed_emp/documents/publication/wcms_774061.pdf
39. ACEEE State Policy Toolkit: Guidance on Measuring the Economic Development Benefits of Energy Efficiency Introduction, accessed May 2, 2025, <https://www.aceee.org/sites/default/files/Jobs%20Toolkit%203-8-19.pdf>
40. (PDF) Evaluating Local Job Creation - ResearchGate, accessed May 2, 2025, https://www.researchgate.net/publication/233128526_Evaluating_Local_Job_Creation
41. Method memo on estimating the jobs impact of various policy changes, accessed May 2, 2025, <https://www.epi.org/publication/methodology-estimating-jobs-impact/>
42. Updated employment multipliers for the U.S. economy - Economic Policy Institute, accessed May 2, 2025, <https://www.epi.org/publication/updated-employment-multipliers-for-the-u-s-economy/>
43. Kirill Yurovskiy: AI Models and Their Influence on Macroeconomic Stability - Retail Insider, accessed May 2, 2025,

- <https://retail-insider.com/articles/2025/03/kirill-yurovskiy-ai-models-and-their-influence-on-macroeconomic-stability/>
44. Optimizing Policy Analysis with AI: Strategies & Research - Number Analytics, accessed May 2, 2025, <https://www.numberanalytics.com/blog/optimizing-policy-analysis-ai-strategies-research>
 45. AI Policy Analysis 2025 | Public Policy with Intelligent Systems - Rapid Innovation, accessed May 2, 2025, <https://www.rapidinnovation.io/post/ai-agent-public-policy-impact-analyzer>
 46. Introduction to AI for Public Policy, accessed May 2, 2025, <https://www.datatopolicy.org/ai-for-policy>
 47. The Role of AI in Public Policy Making [2025] - DigitalDefynd, accessed May 2, 2025, <https://digitaldefynd.com/IQ/role-of-ai-in-public-policy-making/>
 48. The Impact of AI on International Trade: Opportunities and Challenges - ResearchGate, accessed May 2, 2025, https://www.researchgate.net/publication/385400814_The_Impact_of_AI_on_International_Trade_Opportunities_and_Challenges
 49. From Segmentation to AI: How Neural Networks are Revolutionizing Price Optimization, accessed May 2, 2025, <https://pros.com/learn/blog/segmentation-to-ai-neural-networks-revolutionizing-price-optimization>
 50. Neural Network Analysis of International Trade - USITC, accessed May 2, 2025, https://www.usitc.gov/publications/332/working_papers/neural_networks_and_international_trade_-_compiled_draft_06.pdf
 51. Full article: Multi-objective optimization for the sustainability of infrastructure projects under the influence of climate change - Taylor & Francis Online, accessed May 2, 2025, <https://www.tandfonline.com/doi/full/10.1080/23789689.2023.2171197>
 52. (PDF) A Multi-Objective Optimization Framework for Water Resources Allocation Considering Stakeholder Input - ResearchGate, accessed May 2, 2025, https://www.researchgate.net/publication/372532232_A_Multi-Objective_Optimization_Framework_for_Water_Resources_Allocation_Considering_Stakeholder_Input
 53. The AI Economist: Taxation policy design via two-level deep multiagent reinforcement learning - PMC, accessed May 2, 2025, <https://pmc.ncbi.nlm.nih.gov/articles/PMC9067926/>
 54. Mechanism Design and Artificial Intelligence - American Economic Association, accessed May 2, 2025, <https://www.aeaweb.org/conference/2025/program/2111?q=eNqrVipOLS7OzM8LqSxIVbKqhnGVrJQMIWp1IJITS1LT84sqgXwlHaXE4uL8ZAizJLUoF8JKSYTKImTpkJYZZmp5SDDigoKgAKmBiCTChLTQbKmSrVcMFnnXCJk>
 55. The AI Economist: Optimal Economic Policy Design via Two-level Deep Reinforcement Learning - IDEAS/RePEc, accessed May 2, 2025, <https://ideas.repec.org/p/arx/papers/2108.02755.html>
 56. [2108.02755] The AI Economist: Optimal Economic Policy Design via Two-level

- Deep Reinforcement Learning - arXiv, accessed May 2, 2025,
<https://arxiv.org/abs/2108.02755>
57. Artificial Intelligence, Economics, and Industrial Organization, accessed May 2, 2025, https://www.nber.org/system/files/working_papers/w24839/w24839.pdf
 58. Discussion Paper - Deutsche Bundesbank No 51/2021 Optimal monetary policy using reinforcement learning Natascha Hinterlang, accessed May 2, 2025, <https://d-nb.info/1248317343/34>
 59. Artificial intelligence as structural estimation: Deep Blue, Bonanza, and AlphaGo | The Econometrics Journal | Oxford Academic, accessed May 2, 2025, <https://academic.oup.com/ectj/article/23/3/S1/5802896?guestAccessKey=0ae4d44a-686c-431f-adc3-c856e8c05bce>
 60. Composite indicators as an innovative methodology for Communication Sciences: implementation for the assessment of European public service media - Profesional de la información, accessed May 2, 2025, <https://revista.profesionaldelainformacion.com/index.php/EPI/article/download/83590/61689/275387>
 61. Indicators of Regulatory Management Systems - Publications | OECD, accessed May 2, 2025, https://www.oecd-ilibrary.org/indicators-of-regulatory-management-systems_514h2j2fkmmmt.pdf
 62. 6. Composite indices and dashboards - UNECE, accessed May 2, 2025, https://unece.org/sites/default/files/2024-07/TaskForce_CH6_draft_version_v3.1_20240701.pdf
 63. Non-Compensatory Composite Indicators for Ranking Countries: A Defensible Setting - JRC Publications Repository, accessed May 2, 2025, <https://publications.jrc.ec.europa.eu/repository/bitstream/JRC32435/EUR%2021833%20EN.pdf>
 64. Tools for Composite Indicators Building, accessed May 2, 2025, <https://www.napawatersheds.org/img/managed/Document/3478/Nardo2005%20Tools4CompositeIndicatorBuilding.pdf>
 65. (PDF) Composite Indicators Between Analysis and Advocacy - ResearchGate, accessed May 2, 2025, https://www.researchgate.net/publication/225564006_Composite_Indicators_Between_Analysis_and_Advocacy
 66. SMART Multi-Criteria Decision Analysis (MCDA)—One of the Keys to Future Pandemic Strategies - MDPI, accessed May 2, 2025, <https://www.mdpi.com/2077-0383/14/6/1943>
 67. Subjective weight determination methods in multi-criteria decision-making: a systematic review | ResearchGate, accessed May 2, 2025, https://www.researchgate.net/post/Subjective_weight_determination_methods_in_multi-criteria_decision-making_a_systematic_review
 68. The Rapid Assessment Framework (RAF) - ESMAP, accessed May 2, 2025, https://www.esmap.org/sites/default/files/esmap-files/EECI_RAF_BBL_Ranjan_8-12-11.pdf
 69. Full article: SURVEY OF RECENT DEVELOPMENTS, accessed May 2, 2025,

- <https://www.tandfonline.com/doi/full/10.1080/00074910802001546>
70. White House FY2025 Budget Request: Key Tax Takeaways, accessed May 2, 2025, <https://www.bhfs.com/insights/alerts-articles/2024/white-house-fy2025-budget-request-key-tax-takeaways-1>
 71. When incumbents successfully retrench big and popular social policies: policy design matters, accessed May 2, 2025, <https://www.cambridge.org/core/journals/journal-of-public-policy/article/when-incumbents-successfully-retrench-big-and-popular-social-policies-policy-design-matters/813D554143C96649E31E411C025E038C>
 72. Minister of Export Promotion, International Trade and Economic Development appearance before the Standing Committee on International Trade (CIIT) on the 2026 CUSMA Review - Global Affairs Canada, accessed May 2, 2025, <https://www.international.gc.ca/transparency-transparence/briefing-documents-information/parliamentary-committee-comite-parlementaire/2023-06-13-ciit.aspx?lang=eng>
 73. Year Six of the Affordable Care Act: Obamacare's Mounting Problems, accessed May 2, 2025, <https://www.heritage.org/health-care-reform/report/year-six-the-affordable-care-act-obamacares-mounting-problems>
 74. The Impact of AI on International Trade: Opportunities and Challenges - Preprints.org, accessed May 2, 2025, <https://www.preprints.org/manuscript/202409.2123/v1>
 75. The Impact of AI on International Trade: Opportunities and Challenges - MDPI, accessed May 2, 2025, <https://www.mdpi.com/2227-7099/12/11/298>
 76. (PDF) The Impact of AI on Economic Forecasting and Policy-Making: Opportunities and Challenges for Future Economic Stability and Growth - ResearchGate, accessed May 2, 2025, https://www.researchgate.net/publication/382827405_The_Impact_of_AI_on_Economic_Forecasting_and_Policy-Making_Opportunities_and_Challenges_for_Future_Economic_Stability_and_Growth
 77. The Challenges of Machine Learning and Their Economic Implications - PMC, accessed May 2, 2025, <https://pmc.ncbi.nlm.nih.gov/articles/PMC7996274/>
 78. The Economic Impacts and the Regulation of AI: A Review of the Academic Literature and Policy Actions in - IMF eLibrary, accessed May 2, 2025, <https://www.elibrary.imf.org/view/journals/001/2024/065/article-A001-en.xml>
 79. What is AI Governance? - IBM, accessed May 2, 2025, <https://www.ibm.com/think/topics/ai-governance>
 80. Foundations of Ethical AI: Concepts and Principles of Explainability and Trust, accessed May 2, 2025, <https://www.niceactimize.com/blog/foundations-of-ethical-ai-concepts-and-principles-of-explainability-and-trust/>
 81. Towards a Standard for Identifying and Managing Bias in Artificial Intelligence - NIST Technical Series Publications, accessed May 2, 2025, <https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.1270.pdf>
 82. Revolutionizing Modern Policy Decisions with Cutting-Edge AI Tools - Number

- Analytics, accessed May 2, 2025,
<https://www.numberanalytics.com/blog/revolutionizing-modern-policy-decisions-ai-tools>
83. The Ethics of AI - The Digital Dilemma - RPC, accessed May 2, 2025,
<https://www.rpclegal.com/thinking/artificial-intelligence/ai-guide/the-ethics-of-ai-the-digital-dilemma/>
 84. Do All AI Systems Need to Be Explainable? - Stanford Social Innovation Review, accessed May 2, 2025,
https://ssir.org/articles/entry/do_ai_systems_need_to_be_explainable
 85. Making AI more explainable to protect the public from individual and community harms, accessed May 2, 2025,
<https://www.brookings.edu/articles/making-ai-more-explainable-to-protect-the-public-from-individual-and-community-harms/>
 86. Explainable AI Policy: It Is Time to Challenge Post Hoc Explanations, accessed May 2, 2025, <https://www.cigionline.org/documents/2696/no.296.pdf>
 87. Robustness and Explainability of Artificial Intelligence - JRC Publications Repository - European Union, accessed May 2, 2025,
https://publications.jrc.ec.europa.eu/repository/bitstream/JRC119336/dpad_report.pdf
 88. AI Brings Science to the Art of Policymaking | BCG, accessed May 2, 2025,
<https://www.bcg.com/publications/2021/how-artificial-intelligence-can-shape-policy-making>
 89. Trade Balance: Goods and Services, Balance of Payments Basis (BOPGSTB) | FRED | St. Louis Fed, accessed May 2, 2025, <https://fred.stlouisfed.org/series/BOPGSTB>
 90. Appendix Methodology for “Can liberalizing trade reduce the US consumer price index? Insights from an economywide analysis,” - Peterson Institute for International Economics, accessed May 2, 2025,
<https://www.piie.com/sites/default/files/documents/robinson-thierfelder-appendix-2022-03-24.pdf>
 91. Download - This document is discoverable and free to researchers across the globe due to the work of AgEcon Search. Help ensure our sustain, accessed May 2, 2025, <https://ageconsearch.umn.edu/record/198502/files/agecon-cal-524.pdf>
 92. QUANTIFYING THE EFFECTS OF TRADE AGREEMENTS - International Economics Consulting, accessed May 2, 2025,
<https://www.tradeeconomics.com/wp-content/uploads/2019/07/Quantifying-effects-fts.pdf>
 93. Chapter 3: Trade Agreements and Economic Theory | Wilson Center, accessed May 2, 2025,
<https://www.wilsoncenter.org/chapter-3-trade-agreements-and-economic-theory>
 94. Modeling Trade Tensions: Different Mechanisms in General Equilibrium in - IMF eLibrary, accessed May 2, 2025,
<https://www.elibrary.imf.org/view/journals/001/2020/279/article-A001-en.xml>
 95. Regulations in a CGE Model (Chapter 9) - Introduction to Computable General Equilibrium Models - Cambridge University Press, accessed May 2, 2025,

<https://www.cambridge.org/core/books/introduction-to-computable-general-equilibrium-models/regulations-in-a-cge-model/20FCA4AFF741BC975E9FEFDAB04D7146>

96. China's Agricultural Trade: Competitive Conditions and Effects on U.S. Exports - USITC, accessed May 2, 2025,
<https://www.usitc.gov/publications/332/pub4219.pdf>
97. International Trade and CGE Models: Theory, Practice, Problems, Improvements - USITC, accessed May 2, 2025,
https://www.usitc.gov/research_and_analysis/documents/EcoMod-July-2012-Trade.pdf
98. The Economic Effects of Initial Quota Allocations on Carbon Emissions Trading in China, accessed May 2, 2025,
https://www.researchgate.net/publication/285384136_The_Economic_Effects_of_Initial_Quota_Allocations_on_Carbon_Emissions_Trading_in_China
99. An environmental CGE model of China's economy: Modeling choices and application, accessed May 2, 2025,
<https://www.sciopen.com/article/10.26599/ECM.2024.9400002>
100. The Economic Effects of Trade: Overview and Policy Challenges - Congress.gov, accessed May 2, 2025,
<https://www.congress.gov/crs-product/R44546>
101. Trade Agreements: Impact on the U.S. Economy - EveryCRSReport.com, accessed May 2, 2025, <https://www.everycrsreport.com/reports/RL31932.html>
102. View of Approximating Terms of Trade Effects in Single Country CGE Models, accessed May 2, 2025, <https://jgea.org/ojs/index.php/jgea/article/view/276/257>
103. Macroeconomic and Trade Policy Impacts Based on DSGE Model - ResearchGate, accessed May 2, 2025,
https://www.researchgate.net/publication/362010172_Macroeconomic_and_Trade_Policy_Impacts_Based_on_DSGE_Model
104. The macroeconomic consequences of import tariffs and trade policy uncertainty - EconStor, accessed May 2, 2025,
<https://www.econstor.eu/bitstream/10419/283240/1/188059661X.pdf>
105. Renewable energy sources policies in a Bayesian DSGE model - ResearchGate, accessed May 2, 2025,
https://www.researchgate.net/publication/321940713_Renewable_energy_sources_policies_in_a_Bayesian_DSGE_model
106. DSGE Modeling at the Fund: Applications and Further Developments in: IMF Working Papers Volume 2007 Issue 200 (2007) - IMF eLibrary, accessed May 2, 2025,
<https://www.elibrary.imf.org/view/journals/001/2007/200/article-A001-en.xml>
107. Foreign capital flows, credit growth and macroprudential policy in a DSGE model with traditional and matter-of-fact, accessed May 2, 2025,
<https://www.bis.org/events/ccacnf2015/brazil.pdf>
108. The Macroeconomic Effects of Trade Tariffs: Revisiting the Lerner Symmetry Result - Working paper nr, accessed May 2, 2025,
<https://www.riksbank.se/globalassets/media/rapporter/working-papers/2019/no.->

[363-the-macroeconomic-effects-of-trade-tariffs-revisiting-the-lerner-symmetry-result.pdf](#)

109. Should the government implement AI-powered economic models to enhance economic output? : r/PoliticalDiscussion - Reddit, accessed May 2, 2025, https://www.reddit.com/r/PoliticalDiscussion/comments/1bvfv0d/should_the_government_implement_aipowered/
110. Policy Note: Artificial Intelligence Enables Multi-Dimensional Economics of Water - World Scientific Publishing, accessed May 2, 2025, <https://www.worldscientific.com/doi/pdf/10.1142/S2382624X23710030>
111. Multi-Objective Optimization for Public Policy Theodore P. Papalexopoulos - DSpace@MIT, accessed May 2, 2025, <https://dspace.mit.edu/bitstream/handle/1721.1/144994/papalexopoulos-tpapalex-phd-orc-2022-thesis.pdf?sequence=1&isAllowed=y>
112. Data-Driven Multi-objective Optimization With Fairness Constraints: Balancing Efficiency With Equity in Algorithmic Decision-Making - Preprints.org, accessed May 2, 2025, <https://www.preprints.org/manuscript/202407.0924/v1>
113. Multi-objective optimization and multi-attribute decision-making support for optimal operation of multi stakeholder integrated energy systems - DOI, accessed May 2, 2025, <https://doi.org/10.1016/j.asoc.2024.112426>
114. Multi-Objective Optimization for Food Availability under Economic and Environmental Risk Constraints - MDPI, accessed May 2, 2025, <https://www.mdpi.com/2071-1050/16/11/4336>
115. Value Modelling for Multi-Stakeholder and Multi-Objective Optimization in Engineering Design - ePrints Soton - University of Southampton, accessed May 2, 2025, <https://eprints.soton.ac.uk/400063/1/Value%2520Modelling%2520for%2520MultiSH%2520MultiObj%2520Optimization%2520in%2520Engineering%2520Design.pdf>
116. What Lies beyond the Pareto Front? A Survey on Decision-Support Methods for Multi-Objective Optimization - IJCAI, accessed May 2, 2025, <https://www.ijcai.org/proceedings/2023/0755.pdf>
117. The Economics of Artificial Intelligence: An Agenda, accessed May 2, 2025, <https://www.nber.org/system/files/chapters/c14009/c14009.pdf>
118. Susan Athey The Economics of Technology Professor, Stanford Graduate School of Business Written Testimony House Comm, accessed May 2, 2025, <https://hai.stanford.edu/sites/default/files/2020-09/08.10.20Truth-in-Testimony-Form-SA-rev.pdf>
119. The Pricing of Carbon-Linked Bonds for Agricultural Systems in Transition: Implications and Applications, accessed May 2, 2025, <https://ag.purdue.edu/commercialag/home/wp-content/uploads/2024/05/PAER-2024-18.pdf>
120. Prediction of Carbon Price in EU-ETS Using a Geometric Brownian Motion Model and Its Application to Analyze the Economic Competitiveness of Carbon Capture and Storage - MDPI, accessed May 2, 2025, <https://www.mdpi.com/1996-1073/16/17/6333>

121. Modeling CO2 Emission Allowance Prices and Derivatives: Evidence From the European Trading Scheme | Request PDF - ResearchGate, accessed May 2, 2025, https://www.researchgate.net/publication/222730039_Modeling_CO2_Emission_Allowance_Prices_and_Derivatives_Evidence_From_the_European_Trading_Scheme
122. Modeling and Computation of Transboundary Industrial Pollution with Emission Permits Trading by Stochastic Differential Game | PLOS One, accessed May 2, 2025, <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0138641>
123. Potential Future Exposure Modelling for the Carbon Market - University of Twente Student Theses, accessed May 2, 2025, http://essay.utwente.nl/98328/1/van%20Gestel_Industrial%20Engineering%20%26%20Management_Faculty%20of%20Behavioural%2C%20Management%20and%20Social%20Sciences.pdf
124. Stochastic Differential Equation Models for the Price of European CO 2 Emissions Allowances - MDPI, accessed May 2, 2025, <https://www.mdpi.com/2071-1050/9/2/207>
125. The Economic Effects of Trade: Overview and Policy Challenges - CRS Products from the Library of Congress, accessed May 2, 2025, <https://crsreports.congress.gov/product/pdf/R/R44546>
126. Office of the Secretary | United States International Trade Commission - USITC, accessed May 2, 2025, https://www.usitc.gov/offices/secretary_office
127. 24-1 Why Trump's Tariff Proposals - Would Harm Working Americans - Peterson Institute for International Economics, accessed May 2, 2025, <https://www.piie.com/sites/default/files/2024-05/pb24-1.pdf>
128. Circuit breakers: a regulatory response to excessive volatility in the gas derivatives market - Oxford Academic, accessed May 2, 2025, <https://academic.oup.com/jwelb/article/doi/10.1093/jwelb/jwaf002/8086432?rss=1>
129. Price Discovery During Market Wide Circuit Breakers (Part 2) - IEX Group, accessed May 2, 2025, <https://www.iex.io/article/price-discovery-during-market-wide-circuit-breakers-part-2>
130. Trading curb - Wikipedia, accessed May 2, 2025, https://en.wikipedia.org/wiki/Trading_curb
131. The dark side of stock market circuit breakers | MIT Sloan, accessed May 2, 2025, <https://mitsloan.mit.edu/ideas-made-to-matter/dark-side-stock-market-circuit-breakers>
132. Mechanisms Used by Trading Venues to Manage Extreme Volatility and Preserve Orderly Trading - IOSCO, accessed May 2, 2025, <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD594.pdf>
133. CIRCUIT BREAKERS AND MARKET QUALITY - World Federation of Exchanges, accessed May 2, 2025, https://www.world-exchanges.org/storage/app/media/research/US_Circuit_Breakers_V20220518%20w_Cover.pdf

134. U.S. Trade Policy Primer: Frequently Asked Questions | Congress.gov,
accessed May 2, 2025, <https://www.congress.gov/crs-product/R45148>