

## EVALUATION OF U.S. TARIFF POLICY AND ITS IMPACT ON IMPORTS IN THE CONTEXT OF GLOBALIZATION

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**Abstract.** This study presents a comparative analysis of U.S. tariff policy in 1930 and 2025, focusing on how the macroeconomic transmission of trade shocks has changed as globalization deepened. We propose a Globalization-Augmented Import Adjustment (GAIA) framework, which embeds a globalization coefficient  $G_{\text{eff}}$  directly into the structural import demand equation. The adjusted estimate suggests that under 2025 tariff rates, total U.S. import contraction may reach approximately 24%, exceeding the Tax Foundation CGE projection (22%), the IMF forecast (20%), and the WTO trade decline estimate (8-10%). A historical comparison with the Smoot-Hawley episode reveals that despite higher nominal rates in the 1930s, the overall import contraction was more limited owing to shallow integration and the dominance of final-goods trade. These findings imply that globalization functions as a structural multiplier of protectionist measures.

**Key words:** *tariffs, Smoot-Hawley, trade policy, globalization, global value chains (GVCs), KOF index, CGE model, GAIA, protectionism, import elasticity*

### 1. Introduction

The question of whether protectionist trade policy is economically justified has long occupied both academic economists and policymakers. The wave of tariff measures initiated by the United States administration in 2025 has given this debate renewed urgency: the proposed tariffs are the most comprehensive in scope since the Smoot-Hawley Tariff Act of 1930, which has become the defining symbol of interwar trade policy.

Yet a straightforward comparison of tariff rates across the two periods is insufficient for assessing their economic consequences. The global economy of 2025 differs fundamentally from that of the 1930s in its degree of integration. Trade in intermediate goods within global value chains (GVCs), the share of exports in world GDP, and the density of cross-border production linkages together create a structurally different environment for the transmission of trade shocks.

Existing forecasts from the IMF (2025), WTO (2025), Tax Foundation (2025), and EY-Parthenon (2024) rely on standard CGE models and scenario analysis. A common

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limitation is that they do not explicitly model the structural shift in trade sensitivity attributable to the manifold increase in globalization relative to the historical baseline period. While standard CGE models capture behavioral responses and current elasticities, they treat the degree of global economic integration as a fixed parameter rather than a structural amplifier that changes over time.

This paper pursues two objectives. First, it proposes the GAIA (Globalization-Augmented Import Adjustment) framework, which explicitly incorporates a time-varying globalization coefficient into the structural import demand equation. Second, it applies this framework to quantify how the increase in globalization since 1990 amplifies the trade contraction effects of the 2025 U.S. tariffs relative to the Smoot-Hawley episode, providing a structural explanation for why equal nominal tariff rates produce substantially different economic outcomes across historical periods.

The paper is organized as follows. Section 2 reviews the theoretical and empirical literature on tariff effects and the role of GVCs in amplifying trade shocks. Section 3 describes the methodology and the GAIA model. Section 4 presents the results. Section 5 provides the conclusion and discussion.

## 2. Literature Review

Most economists agree that protectionism generates negative consequences for economic growth and welfare. The central mechanism is the concept of deadweight loss: tariffs distort price signals and inefficiently reallocate resources from more productive uses to less efficient, protected industries. Irwin (2002) confirms through empirical analysis of historical tariff episodes that protectionism does not generate durable comparative advantages.

The Infant Industry Argument holds that nascent industries may require temporary protection to achieve economies of scale. However, Melitz (2005) indicates that such protection tends to entrench inefficiency. Optimal Tariff Theory holds that a large economy could theoretically improve its terms of trade through an optimal tariff, but Bagwell and Staiger (1999) demonstrate that retaliatory measures typically eliminate the potential gains.

It is also argued that tariffs can correct market failures or respond to unfair trading practices such as dumping (Dixit, 1983; Grossman, 1986; Krugman, 1986). Nevertheless, Greenwald and Stiglitz (1986) show that tariffs represent an inefficient instrument for correcting domestic market failures. Autor, Dorn, and Hanson (2013) demonstrate that employment gains in protected sectors are typically offset by losses in export-oriented industries. Furceri, Hannan, Ostry, and Rose (2018) question the effect of tariffs on the trade balance.

Amiti, Redding, and Weinstein (2019) showed that the 2018 tariffs were fully passed through to U.S. consumers with no reduction in world prices. Levy, Singhal, and Fox (2025) documented systemic supply chain disruptions resulting from tariff measures.

A growing strand of literature focuses specifically on how GVC participation transforms the transmission mechanism of trade policy shocks. Baldwin (2012) argues that the "second unbundling" of globalization creates a qualitatively different trade structure in which intermediate inputs cross multiple borders before final assembly, causing tariff costs to accumulate along the chain. Antras (2020) demonstrates that GVC participation raises the effective trade cost exposure of domestic firms beyond what

bilateral tariff rates suggest. These findings provide the theoretical foundation for why a globalization coefficient should amplify the baseline import contraction estimate.

The historical episode most closely analogous to the 2025 tariff wave is the Smoot-Hawley Tariff Act of 1930. Irwin (2011) establishes that the direct effect of the tariff on import volumes was relatively modest, with the bulk of the Great Depression's trade collapse attributable to income effects and retaliation rather than the tariff mechanics themselves. This finding is central to the present paper's comparative framework.

Despite this extensive literature, most existing forecasting models are calibrated on current elasticities and do not explicitly model the structural shift in trade sensitivity attributable to the increase in globalization relative to the pre-WWII baseline. The GAIA framework proposed in this paper addresses this gap.

Among political rationales for protectionism, the reduction of trade deficits and stimulation of employment are most frequently invoked. The empirical record does not support these claims: Autor, Dorn, and Hanson (2013) demonstrate that gains in protected sectors are typically offset by losses in export-oriented industries and sectors dependent on imported inputs. Furceri, Hannan, Ostry, and Rose (2018) find that tariff increases are associated with lower output and higher unemployment in the medium term, with the contractionary effects persisting for several years. These findings are consistent with the GAIA framework's implication that the aggregate economic impact of tariffs is larger in highly integrated economies than standard single-stage models suggest.

### **3. Methodology**

The methodology combines comparative-historical analysis with a modified structural approach. Two key episodes of U.S. protectionist policy are compared: the Smoot-Hawley Tariff of 1930 and the tariff measures of 2025.

The comparative-historical method is particularly well-suited to the research question at hand. By holding the tariff instrument constant - examining two episodes characterized by broadly similar tariff rate levels - and varying the structural context (the degree of global economic integration), it is possible to isolate the amplification effect of globalization from other determinants of trade contraction. This quasi-experimental logic is central to the paper's identification strategy: the Smoot-Hawley episode serves as a counterfactual baseline in which the same instrument was applied to a world with fundamentally shallower integration.

The choice of 1930 and 2025 as comparison points is substantively motivated. Both episodes involve the United States - the world's largest import market - imposing broad-based tariff increases that triggered retaliatory responses from major trading partners. Both occurred during periods of elevated economic uncertainty. The key structural difference is the intervening transformation of global trade architecture: from a world dominated by bilateral flows of final goods and primary commodities to one organized around multilayered GVC networks in which intermediate inputs cross borders multiple times before reaching consumers.

#### **3.1 Baseline import demand equation**

In the standard General Equilibrium Model (GEM), the relative change in import volume in response to a tariff is:

$$\frac{\Delta M}{M} = -\varepsilon \frac{t}{1+t} \quad (1)$$

where  $\frac{\Delta M}{M}$  is a relative change in import volume,  $\varepsilon$  - price elasticity of import demand ( $\varepsilon = 3$ , following Tax Foundation, 2025) and  $t$  - tariff rate as a decimal fraction.

This specification assumes that the structural sensitivity of the economy to trade shocks remains constant regardless of the degree of global integration.

### 3.2 The GAIA framework and its distinction from standard CGE

The GAIA framework introduces  $G_{\text{eff}}$  as a time-varying structural amplifier. While a standard CGE model produces equation (1), the GAIA framework produces:

$$\left(\frac{\Delta M}{M}\right)^* = \left(\frac{\Delta M}{M}\right) * G_{\text{eff}} \quad (2)$$

where  $G_{\text{eff}}$  is a globalization amplification coefficient ( $G_{\text{eff}} \geq 1$ ); all other variables as in equation (1).

The key distinction is that standard CGE models implicitly assume  $G_{\text{eff}} = 1$ . The GAIA framework relaxes this assumption by scaling the baseline estimate upward to reflect the fact that a given tariff rate generates larger cascade effects in a deeply integrated GVC-based economy. In modern supply chains, a tariff compounds at each border crossing, amplifying the effective cost shock throughout the production network.

### 3.3 Calculation of $G_{\text{eff}}$

The coefficient  $G_{\text{eff}}$  captures the smoothed relative growth in global integration between a reference period and the present. The KOF Globalization Index (ETH Zurich) is available from 1970 onwards; no data exist for 1930. The year 1990 is used as the baseline, representing the onset of modern GVC formation following the end of the Cold War and the integration of China and Eastern Europe into global supply chains (Baldwin, 2012). According to KOF data (Gygli, Haelg, Potrafke, and Sturm, 2019), the index of economic globalization rose from  $KOF_{1990} = 59$  to  $KOF_{2025} = 88$ , an increase of approximately 1.5-fold. The empirical exchange-rate pass-through literature consistently reports short-run transmission coefficients of 0.2-0.4 (Campa and Goldberg, 2005). By analogy, a power-smoothing transformation from the Box-Cox family (Box and Cox, 1964) is applied:

$$G_{\text{eff}} = 1 + \lambda * (G^* - 1) = 1 + \lambda * \left(\left(\frac{KOF_{2025}}{KOF_{1990}}\right) - 1\right) \quad (3)$$

where  $\lambda$  is a smoothing parameter (0.2 at central estimate);  $\frac{KOF_{2025}}{KOF_{1990}} = 88/59 = 1.49$  (KOF Globalization Index, ETH Zurich, 2024).

At the central conservative value  $\lambda = 0.2$ :

$$G_{\text{eff}} = 1 + 0.2 * (7.5 - 1) = 1.099 \quad (4)$$

### 3.4 Justification of $\lambda = 0.2$

The value of 0.2 is chosen as the lower bound of the pass-through range established in the literature (Campa and Goldberg, 2005; Frankel and Rose, 1998), yielding a conservative estimate. Robustness is verified through a sensitivity analysis (Table 1).

It is important to note what  $\lambda$  captures conceptually and what it does not. It does not represent a direct estimate of GVC pass-through derived from trade data: such an estimate would require product-level data on supply chain depth and tariff incidence across stages, which is beyond the scope of this paper. Rather,  $\lambda$  is a calibrated parameter that translates the observed increase in globalization as measured by the KOF index into a proportional amplification of the import demand response. The use of the exchange-rate pass-through range as a reference point (Campa and Goldberg, 2005;

Frankel and Rose, 1998) is an analogy motivated by the common underlying mechanism: in both cases, an external price shock is only partially transmitted into domestic economic outcomes due to market adaptation, contractual rigidities, and substitution effects. The conservative choice of  $\lambda = 0.2$  ensures that the GAIA estimate errs on the side of understatement rather than overstatement.

**Table 1. Sensitivity analysis with respect to lambda<sup>1</sup>**

$\lambda$	G_eff	Adjusted import decline
0.10	1.049	~23.1%
0.15	1.074	~23.6%
0.20 (central)	1.099	~24.2%
0.25	1.123	~24.7%
0.30	1.147	~25.2%

For any value of lambda in the range 0.10-0.30, the adjusted estimate robustly exceeds the Tax Foundation baseline (22%) and falls within 23-25%.

### 3.5 Data sources and time periods

The study draws on: (i) KOF Globalization Index (ETH Zurich, 2024; Gygli et al., 2019) - observations for 1990 and 2025, index available from 1970 onwards; (ii) Tax Foundation (2025) CGE modelling results as the baseline forecast; (iii) historical U.S. trade data from the US Department of Commerce (1975), digitized by the Federal Reserve Bank of St. Louis - annual series 1929-1940; (iv) Our World in Data (n.d.) and Federico and Tena-Junquera (2019) on the dynamics of world trade - 1920-2014; (v) World Bank World Development Indicators (2024) for post-2014 trade-to-GDP ratios.

## 4. Results

### 4.1 The Smoot-Hawley Tariff: historical analysis

The Smoot-Hawley Tariff Act, signed on June 17, 1930, is one of the most studied examples of protectionist policy in U.S. history. It was enacted against the backdrop of the early Great Depression and preceded by a prolonged crisis in U.S. agriculture. The United States already maintained high tariffs under the Fordney-McCumber Act of 1922. Despite rising imports of manufactured goods, the U.S. retained a positive trade balance, which undermined the argument that protection was necessary.

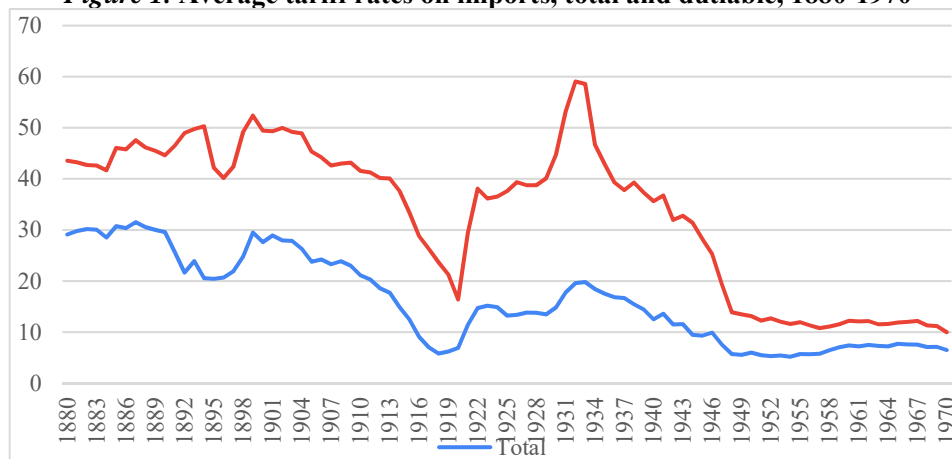
The bill was substantially broadened through industrial lobbying and logrolling, ultimately raising tariffs on more than 20,000 import categories. Notably, 1,028 economists signed a petition against the bill.

The average tariff rate on dutiable imports rose from approximately 40% in 1929 to 47% in 1930. A key driver of further increases was deflation: roughly two-thirds of imported goods were subject to specific (fixed) duties. Import prices fell by 18% in 1930, 22% in 1931, and another 22% in 1932, nearly 49% relative to 1929. As a result, the

<sup>1</sup> All values follow directly from equation (3):  $G_{eff} = 1 + \lambda * (G^* - 1)$ . The adjusted estimate is  $0.22 * G_{eff}$ , where 0.22 is the Tax Foundation (2025) CGE baseline.

average tariff on dutiable imports automatically rose to 53% in 1931 and 59% in 1932 (US Department of Commerce, 1975).

**Figure 1. Average tariff rates on imports, total and dutiable, 1880-1970**

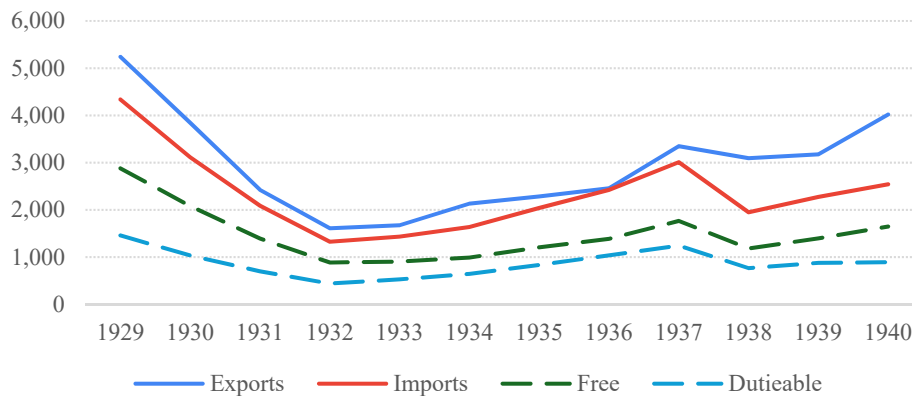


Source: US Department of Commerce (1975), series U-211-12, seen 08.01.2026

The act itself raised the average rate on dutiable goods by approximately six percentage points. Two factors limit its direct effect. First, the 15% price increase on dutiable imports implied only approximately 4% increase in consumer prices. Second, one-third of imports were already dutiable in 1929; the new act covered the remaining two-thirds, mainly raw materials (silk, coffee, rubber). Treating duty-free imports as a control group, the law reduced dutiable imports by approximately 20%, implying approximately 7% reduction in total imports.

Between 1929 and 1932, the value of U.S. exports and imports fell by nearly 70%, partly due to falling prices. In volume terms, exports declined by 49% and imports by 40%, a steeper fall than the 25% decline in real GDP.

**Figure 2. U.S. exports and imports, 1929-1940, USD million**



Source: US Department of Commerce (1975), seen 08.01.2026

The Smoot-Hawley Act triggered retaliatory measures from Canada, the United Kingdom, France, Germany, and others. World trade values contracted by approximately 60% by 1934. Real U.S. GDP fell approximately 45.7% between 1929 and 1933; world GDP contracted by an estimated 15% over five years (Grossman and Meissner, 2010). Most research concludes that the direct effect of the tariff itself was modest relative to the Great Depression overall: Bond, Crucini, Potter, and Rodrigue (2012) estimate a decline in TFP of approximately 0.5%. Unemployment rose from 3.2% in 1929 to 24.9% in 1933.

#### 4.2 U.S. tariff policy in 2025

U.S. trade policy in 2025 is characterized by a comprehensive tariff system with high rates and significant uncertainty. The main components are:

- **Universal baseline tariff:** approximately 10% on imports from most countries.
- **"Reciprocal" tariffs:** individualized rates for more than 50 countries. Implementation was suspended for 90 days in April 2025, except for China.

**Table 2. U.S. tariffs on major trading partners, September 2025**

Country	Tariff Rate	Taxable Import Volume (USD bn)
EU	15%	\$319.76
China	30%	\$266.53
Canada	35%	\$256.10
Mexico	25%	\$255.20
Vietnam	20%	\$89.54
Japan	15%	\$73.37
India	50%	\$54.11
South Korea	15%	\$47.07
Thailand	19%	\$35.60
Taiwan	20%	\$31.99
Malaysia	19%	\$25.42
Switzerland	39%	\$25.40
Indonesia	19%	\$23.61
Brazil	50%	\$6.61

Source: Tax Foundation (2025), seen 25.09.2025

The White House published a methodology for calculating reciprocal duties (US Trade Representative, n.d.):

$$\Delta \tau_i = \frac{x_i - m_i}{\varepsilon * \varphi * m_i} \quad (5).$$

where  $\Delta \tau_i$ - reciprocal tariff for country  $i$ ,  $x_i$  - U.S. exports to country  $i$ ,  $m_i$ - U.S. imports from country  $i$ ,  $\varepsilon$  - price elasticity of import demand (set at 4);  $\varphi$  - elasticity of import prices with respect to tariffs (set at 0.25).

Since  $\varepsilon * \varphi = 4 * 0.25 = 1$ , the elasticity factor cancels out, reducing the tariff to the ratio of the bilateral trade deficit to import volume, a methodology widely criticized as economically unfounded.

According to Tax Foundation (2025) calculations, the trade-weighted average applied tariff on all imports will rise to 19%, the highest since 1943, though well below the Great Depression peak of 59% in 1932.

The 19% trade-weighted average represents a significant structural shift in U.S. trade policy, but its economic impact is not uniform across sectors. Intermediate goods - components, semiconductors, industrial machinery, pharmaceutical inputs - face the same statutory rates as final consumer goods, yet their tariff burden compounds across production stages. A 19% tariff on a component that crosses the U.S. border twice before final assembly effectively generates a higher real cost increase than the nominal rate suggests. This sectoral heterogeneity is one of the mechanisms through which the GAIA framework captures additional impact beyond standard CGE projections.

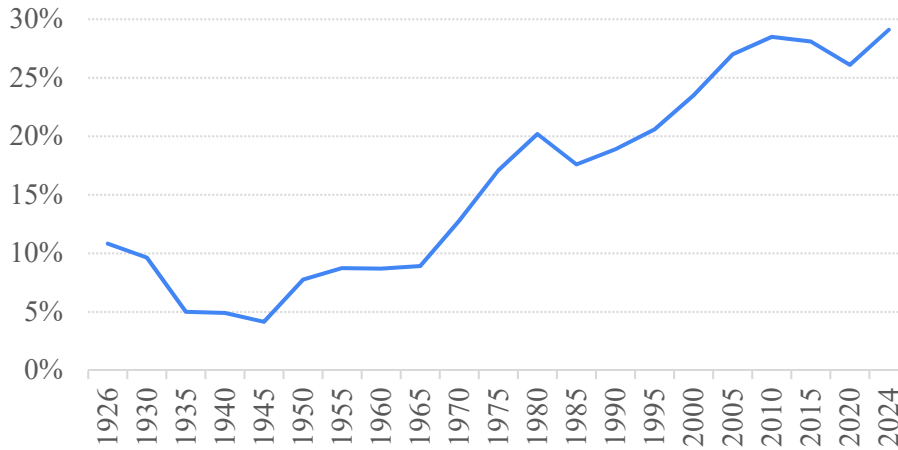
The economic rationale underlying the reciprocal tariff methodology also deserves scrutiny. By setting tariff rates equal to the bilateral trade deficit divided by import volume - effectively treating the entire trade deficit as a tariff-equivalent distortion - the White House methodology conflates different economic phenomena: comparative advantage, domestic savings-investment imbalances, exchange rate dynamics, and supply chain relationships. Most mainstream economists have criticized this approach as theoretically unfounded (Bagwell and Staiger, 1999). Nevertheless, these tariffs are legally in force and their economic consequences must be assessed regardless of their methodological basis, which is precisely the objective of the GAIA framework.

#### 4.3 Globalization dynamics: a comparison across periods

Recent decades have witnessed unprecedented growth in global economic integration (Figure 3). The world export share of GDP reached 29.1% in 2024, nearly six times the level recorded in 1935 (5.0%) and three times the 1930 level (9.6%), which had already begun to decline under the impact of the Smoot-Hawley tariffs and the Great Depression. The lowest point of the entire series was 4.2% in 1945. After sustained growth through the postwar period, the ratio peaked at 28.5% in 2010, declined to 26.1% in 2020 during the COVID-19 pandemic, and recovered to a new high of 29.1% by 2024. In the 1930s this figure did not exceed 10%, and following the Depression it collapsed to below 5%, underscoring the structural gulf between the two periods being compared in this paper.

The growth in trade intensity was underpinned by a sharp reduction in transport and communication costs, which made cross-border fragmentation of production economically viable and drove the formation of modern GVCs (Baldwin, 2012).

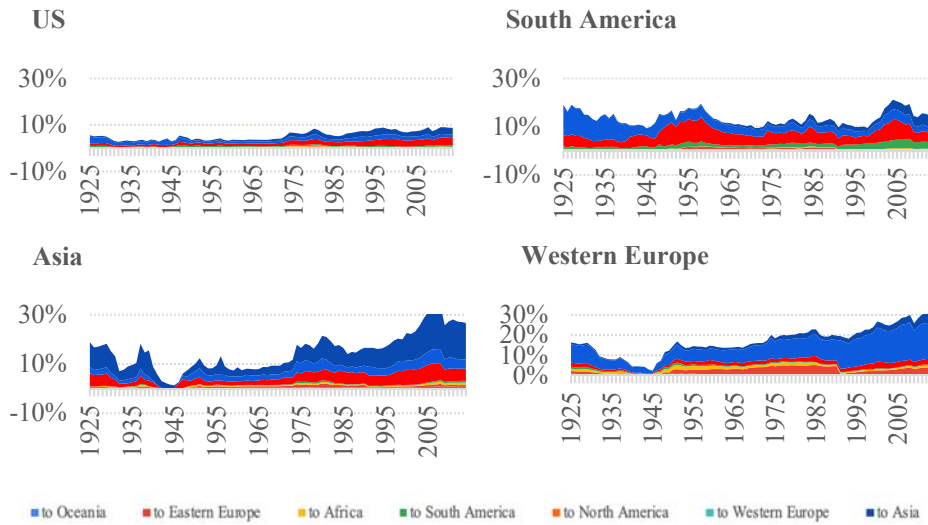
**Figure 3. World export share of GDP, %, 1925-2024**



Source: Our World in Data (1926-1969), seen 05.08.2025  
World Bank (1970-2024) seen 03.06.2026

While 1930s trade consisted predominantly of final goods and raw materials with production chains rarely crossing more than one border, today intermediate goods cross borders multiple times before final assembly (Figure 4). This structural difference is critical: in the 1930s, tariffs acted primarily on the prices of final imported goods, while today the same tariff accumulates at each border crossing within a production chain. This is the mechanism that  $G_{eff}$  captures.

**Figure 4. Regional export geography, % of world exports, 1925-2014**



Source: Our World in Data (1926-1969), seen 05.08.2025

#### 4.4 Adjusted estimate: the GAIA model

The baseline is taken from Tax Foundation (2025) CGE modelling: at an average tariff rate of approximately 19%, the expected decline in imports is 22%. This model, like other standard CGE approaches, does not account for the structural change in trade sensitivity attributable to the increase in globalization, treating  $G_{eff}$  as implicitly equal to 1.

Applying the GAIA framework (equation 2):

$$\left(\frac{\Delta M}{M}\right)^* = \left(\frac{\Delta M}{M}\right)_{base} * G_{eff} = 1.099 * 0.22 = 0.24 \quad (6)$$

The adjusted central estimate is approximately 24%, exceeding the baseline by 2 percentage points. Across  $\lambda = 0.10$  to  $0.30$ , the estimate robustly falls between 23% and 25% (Table 1).

The comparison with Smoot-Hawley is instructive: the direct tariff effect then amounted to approximately 7% of total imports, despite considerably higher nominal rates. The gap is explained not by differences in tariff levels but by the fundamentally different architecture of world trade.

To appreciate the significance of the 2-percentage-point difference between the GAIA estimate (24%) and the Tax Foundation baseline (22%), it is useful to consider both the absolute magnitude and the structural mechanism. At 2024 U.S. goods import levels of approximately \$3.1 trillion (US Census Bureau, 2025), a 2-percentage-point increment translates into approximately \$62 billion in additional import reduction relative to standard projections. This is not a marginal correction: it represents a sum larger than the entire goods trade of many mid-sized economies and reflects the systematic underestimation that results from ignoring the structural amplification role of GVC integration.

The structural mechanism behind this difference is also substantively important. Standard CGE models treat the import demand response as a single-stage phenomenon: a tariff raises the price of imported goods, demand falls in proportion to the price elasticity, and the exercise is complete. The GAIA framework recognizes that in a GVC-intensive economy, the same tariff operates at multiple stages of the production chain simultaneously. A tariff on imported steel raises costs for automotive manufacturers who use steel as an input; those manufacturers in turn face higher domestic production costs, which feeds back into the prices of downstream products and reduces overall competitiveness. This cascade logic, captured parsimoniously by  $G_{eff}$ , is absent from models that treat the bilateral tariff rate as the final word on trade cost transmission.

#### 5. Conclusion and Discussion

This paper has proposed the GAIA framework and applied it to the 2025 U.S. tariff wave. The comparative-historical analysis demonstrates that, despite higher nominal rates under Smoot-Hawley, the direct impact on U.S. imports (approximately 7%) was considerably more limited than the expected effect of the 2025 tariffs (approximately 24%). The key explanatory factor is the fundamentally different architecture of world trade: in 2025, deeply integrated GVCs cause tariff costs to accumulate multiplicatively along production chains rather than acting as a one-time price shock on final goods.

Unlike standard CGE models that treat the degree of global integration as a fixed structural parameter implicitly equal to 1, GAIA introduces a time-varying coefficient  $G_{eff}$  that scales the baseline import response to reflect the historical depth of globalization. The framework is theoretically grounded in the GVC literature (Baldwin,

2012; Antras, 2020) and empirically motivated by the exchange-rate pass-through literature.

**Table 3. Summary of forecasts of U.S. tariff impact on the economy, 2025**

Source	Economic indicators	Methodology	Globalization accounted for
IMF (April 2025)	World: GDP -2.8%, Trade -4.9%; US: GDP -1.8%, Trade ~-20%	Global growth macro-model with policy shocks	No
EY-Parthenon (Dec. 2024)	US: GDP -1.2 pp; World: GDP -0.5-0.9 pp, Trade ~-6%	Scenario analysis, Oxford Global Economic Model	Limited GVC elasticities
Tax Foundation (Sept. 2025)	US: GDP -0.8%; Imports - \$745bn (-22%)	CGE model with agent behaviour	Elasticities modelled; GVC structure not explicit
WTO (Oct. 2025)	World: GDP -2.1%; Trade -8-10%	Consumer response and trade shock analysis	No formal trade model
GAIA (this study, 2025)	US imports ~-24%	G_eff in structural import equation	Yes

Source: IMF (2025); EY-Parthenon (2024); Tax Foundation (2025); WTO (2025); authors' calculations, seen 10.10.2025

None of the models surveyed explicitly accounts for the structural effect of globalization on trade sensitivity. The adjusted GAIA estimate (approximately 24%) exceeds the Tax Foundation CGE projection (22%) by 2 percentage points. To quantify this difference: total U.S. goods imports in 2024 amounted to approximately \$3.1 trillion (US Census Bureau, 2025), yielding an additional import reduction of  $0.02 * \$3.1$  trillion, approximately \$62 billion relative to the standard forecast. It should be noted that this figure represents goods imports only; if goods and services imports (approximately \$4.1 trillion in 2024) are used as the base, the additional reduction would be approximately \$82 billion.

**Model limitations.** The parameter  $\lambda = 0.2$  is a conservative lower bound; higher values within the empirically justified range yield estimates of 23.1-25.2%. The model does not simulate dynamic retaliatory responses of trading partners, which could substantially amplify the final effect. KOF data carry a temporal lag. The GAIA framework represents a partial structural correction to an existing CGE model rather than a full structural model with explicit GVC participation.

**Policy implications.** Tariff impact assessments based solely on standard CGE models are likely to underestimate import contraction in highly globalized economies. Modern protectionist measures are structurally more disruptive per percentage point of tariff than their historical counterparts, requiring policymakers to account for the depth of GVC integration when calibrating tariff levels.

**Future research directions** include development of a full structural CGE model with explicit GVC participation; empirical calibration of lambda using panel data on intermediate goods trade; extension of the GAIA framework to third countries affected by U.S. tariff measures through supply chain contagion.

### References

- Amiti, M., Redding, S. J., & Weinstein, D. E. (2019). The impact of the 2018 tariffs on prices and welfare. *Journal of Economic Perspectives*, 33(4), 187-210. <https://doi.org/10.1257/jep.33.4.187>
- Antras, P. (2020). Conceptual aspects of global value chains. *Economic Review*, 34(3), 551-574. <https://doi.org/10.1093/wber/lhaa006>
- Autor, D. H., Dorn, D., & Hanson, G. H. (2013). The China syndrome: Local labor market effects of import competition in the United States. *American Economic Review*, 103(6), 2121-2168. <https://doi.org/10.1257/aer.103.6.2121>
- Bagwell, K., & Staiger, R. W. (1999). An economic theory of GATT. *American Economic Review*, 89(1), 215-248. <https://doi.org/10.1257/aer.89.1.215>
- Baldwin, R. (2012). Trade and industrialisation after globalisation's 2nd unbundling: How building and joining a supply chain are different and why it matters (NBER Working Paper No. 17716). National Bureau of Economic Research. <https://doi.org/10.3386/w17716>
- Bond, E. W., Crucini, M. J., Potter, T., & Rodrigue, J. (2012). Misallocation and productivity effects of the Smoot-Hawley tariff (NBER Working Paper No. 18034). National Bureau of Economic Research. <https://doi.org/10.3386/w18034>
- Box, G. E. P., & Cox, D. R. (1964). An analysis of transformations. *Journal of the Royal Statistical Society, Series B*, 26(2), 211-252.
- Campa, J. M., & Goldberg, L. S. (2005). Exchange rate pass-through into import prices. *Review of Economics and Statistics*, 87(4), 679-690. <https://doi.org/10.1162/003465305775098189>
- Dixit, A. (1983). International trade policy for oligopolistic industries. *The Economic Journal*, 94, 1-16.
- EY-Parthenon. (2024). Trump's tariffs playbook. [https://www.ey.com/en\\_us/insights/strategy/macroconomics/trumps-tariff-playbook](https://www.ey.com/en_us/insights/strategy/macroconomics/trumps-tariff-playbook)
- Federico, G., & Tena-Junquera, A. (2019). A tale of two globalizations: Gains from trade and openness 1800-2010. *Review of World Economics*, 155(3), 601-626. <https://doi.org/10.1007/s10290-019-00347-2>
- Frankel, J. A., & Rose, A. K. (1998). The endogeneity of the optimum currency area criteria. *The Economic Journal*, 108(449), 1009-1025. <https://doi.org/10.1111/1468-0297.00327>
- Furceri, D., Hannan, S. A., Ostry, J. D., & Rose, A. K. (2018). Macroeconomic consequences of tariffs (NBER Working Paper No. 25402). National Bureau of Economic Research. <https://doi.org/10.3386/w25402>
- Greenwald, B. C., & Stiglitz, J. E. (1986). Externalities in economies with imperfect information and incomplete markets. *Quarterly Journal of Economics*, 101, 229-264.
- Grossman, G. (1986). Strategic export promotion: A critique. In P. Krugman (Ed.), *Strategic trade policy and the new international economics*. MIT Press.
- Grossman, R. S., & Meissner, C. M. (2010). International aspects of the Great Depression and the crisis of 2007: Similarities, differences, and lessons (NBER Working Paper No. 16269). National Bureau of Economic Research. <https://doi.org/10.3386/w16269>
- Gygli, S., Haelg, F., Potrafke, N., & Sturm, J.-E. (2019). The KOF Globalization Index revisited. *Review of International Organizations*, 14(3), 543-574. <https://doi.org/10.1007/s11558-019-09344-2>
- IMF. (2025). World economic outlook: A critical juncture amid policy shifts. International Monetary Fund. <https://www.imf.org/en/Publications/WEO/Issues/2025/04/22/world-economic-outlook-april-2025>
- Irwin, D. A. (2002). Interpreting the tariff-growth correlation of the late 19th century. *American Economic Review*, 92(2), 165-169. <https://doi.org/10.1257/000282802320191642>
- Irwin, D. A. (2011). *Peddling protectionism: Smoot-Hawley and the Great Depression*. Princeton University Press.

- Krugman, P. (1986). *Strategic trade policy and the new international economics*. MIT Press.
- Levy, C., Singhal, S., & Fox, Z. (2025). *Tariffs and global trade: The economic impact on business*. McKinsey & Company.
- Melitz, M. J. (2005). When and how should infant industries be protected? *Journal of International Economics*, 66(1), 177-196. <https://doi.org/10.1016/j.jinteco.2004.07.001>
- Our World in Data. (n.d.). Trade and globalization. <https://ourworldindata.org/trade-and-globalization> (Accessed August 5, 2025)
- Tax Foundation. (2025). Trump tariffs: The economic impact of the Trump trade war. <https://taxfoundation.org/research/all/federal/trump-tariffs-trade-war/>
- US Census Bureau. (2025). U.S. international trade in goods and services, annual 2024. <https://www.census.gov/foreign-trade/statistics/highlights/annual.html>
- US Department of Commerce. (1975). *Foreign commerce (Series U 187-352)*. Digitized by Federal Reserve Bank of St. Louis. [https://fraser.stlouisfed.org/files/docs/publications/histstatus/pages/1975-1979/58477\\_1975-1979.pdf](https://fraser.stlouisfed.org/files/docs/publications/histstatus/pages/1975-1979/58477_1975-1979.pdf)
- US Trade Representative. (n.d.). Reciprocal tariff calculations. [https://ustr.gov/sites/default/files/files/Issue\\_Areas/Presidential%20Tariff%20Action/Reciprocal%20Tariff%20Calculations.pdf](https://ustr.gov/sites/default/files/files/Issue_Areas/Presidential%20Tariff%20Action/Reciprocal%20Tariff%20Calculations.pdf)
- World Bank. (2024). World development indicators. <https://databank.worldbank.org/source/world-development-indicators>
- WTO. (2025). *Global trade outlook and statistics, October 2025*. [https://www.wto.org/english/news\\_e/news25\\_e/stat\\_07oct25\\_e.pdf](https://www.wto.org/english/news_e/news25_e/stat_07oct25_e.pdf)