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Abstract

This paper examines tariff incidence through multi-stage supply chain analysis. It addresses three specific questions: (i) how do tariffs propagate through multi-stage supply chains? (ii) What is the quantitative distribution of burden between consumers and foreign producers? and (iii) how do supply chain markups amplify the inflationary impact of tariffs? By examining these questions through both theoretical modelling and empirical analysis, we aim to move beyond political assertions to provide evidence-based insights on tariff incidence.

Key Words: Global trade, supply chain, tariffs, tax incidence, exporters, importers, retailers, landing cost, consumer demand.

1. Introduction

The implementation of substantial import tariffs raises fundamental questions about economic incidence: who ultimately bears the burden of these trade taxes? With proposed tariffs projected to generate $350 billion in federal revenue, understanding the distribution of this economic burden between foreign exporters and domestic consumers has become critical for evaluating trade policy impacts. The mechanics of tariff collection—where US importers write checks to the Treasury at ports of entry—represent only the visible surface of a complex economic adjustment process that ultimately determines incidence.

At first glance, the mechanics seem straightforward. When imported goods arrive at American ports, US importers write checks to the Treasury for tariff payments. Those dollars flow directly into government coffers. Yet this observable transaction is merely the opening act in a complex economic drama. The critical question is not who writes the check to the government. It is who ultimately bears the economic burden, as adjustments ripple through supply chains, pricing decisions, and consumer markets.

This paper addresses three specific questions: (i) how do tariffs propagate through multi-stage supply chains? (ii) What is the quantitative distribution of burden between consumers and foreign producers? and (iii) how do supply chain markups amplify the inflationary impact of tariffs? By examining these questions through both theoretical modelling and empirical analysis, we aim to move beyond political assertions to provide evidence-based insights on tariff incidence.

Section II reviews the relevant literature, while Section III presents the multi-stage supply chain analysis using Indian imports as a case study. Section IV examines the distributional implications, and Section V concludes with policy recommendations.

II. Literature Review

The question of tariff incidence has garnered renewed scholarly attention following recent shifts in trade policy. Amiti, Redding, and Weinstein (2019) examined the 2018–2019 US tariff wave and found nearly complete pass-through to domestic prices, with the entire burden falling on US consumers and importers. Their work documented that import prices, inclusive of tariffs, did not fall, indicating that foreign exporters maintained their pre-tariff prices.

Fajgelbaum et al. (2020) extended this analysis to welfare effects, calculating that the tariffs reduced real income by $1.4 billion per month by the end of 2018, with regressive distributional consequences. These empirical findings align with the theoretical framework established by Feenstra (1989), which shows that the distribution of the tariff burden depends critically on the relative elasticities of import supply and demand. Our contribution extends this literature by explicitly modelling the multi-stage supply chain through which tariffs propagate, revealing how intermediary markups create a multiplicative effect that amplifies the final consumer burden.

Economic theory presents competing narratives about the distribution of burdens. In perfectly competitive markets with infinitely elastic supply, the classical result suggests that there is complete pass-through to consumers. However, when tariffs raise prices and demand falls, foreign exporters facing downward-

sloping demand curves might absorb part of the burden by reducing prices to maintain market share. Some governments provide export subsidies to offset tariffs, effectively sharing the burden with foreign taxpayers. The actual incidence depends on intricate interactions between supply and demand elasticities, market structure, strategic firm responses, and currency adjustments—factors that vary across products and over time.

Yet despite extensive empirical evidence from recent tariff episodes, the public debate remains surprisingly unsettled. This confusion stems partly from the complexity of tracing costs through global supply chains, where multiple intermediaries apply sequential markups that compound the original tariff. Additionally, the distinction between statutory incidence (who legally pays) and economic incidence (who bears the real burden) remains poorly understood in policy discussions. These knowledge gaps have significant consequences: misunderstanding tariff incidence can lead to policies that unintentionally impose regressive consumption taxes while failing to achieve stated objectives of protecting domestic industries or pressuring foreign governments.

This analysis cuts through the confusion by systematically examining how tariffs actually work. By tracking the flow of costs from foreign factories through importers, distributors, and retailers to American consumers, we can move beyond assertion to evidence. Using real-world parameters and economic modelling, we will demonstrate not just who pays for tariffs, but how much each party pays—replacing political slogans with economic substance.

The answer matters enormously. If American consumers bear most of the burden, Trump's tariffs amount to one of the most significant tax increases in American history—one that falls

disproportionately on lower-income families, who spend a larger share of their budget on traded goods. If foreign exporters truly pay, America has discovered an extraordinary tool for economic statecraft that can generate revenue while protecting domestic industries. The truth, as we will show, lies in the precise mathematical relationships between markups, elasticities, and market structure that determine incidence. These relationships, formalised in our theoretical framework and validated by empirical evidence, reveal that supply chain intermediation creates a multiplicative effect: for every dollar of tariff revenue collected, consumers typically pay $2-3 more due to sequential markup amplification.

Having established the empirical context and theoretical foundations from prior research, we now develop a formal framework for analysing tariff incidence through multi-stage supply chains. Our approach extends the classical incidence analysis by explicitly modelling how sequential markups amplify the consumer burden beyond the direct tariff payment.

III. Tracing the Tariff Burden: A Multi-Stage Analysis

To understand who truly pays tariffs, we must follow the money through each stage of the global supply chain. Consider a concrete example: the proposed 50% tariff on Indian imports. This single policy intervention triggers a cascade of economic adjustments that ultimately determines whether American consumers or Indian exporters bear the burden.

In the Appendix, we have identified six stages of the global supply chain through which trade transactions between India and the US occur. These six stages can be expanded further to make the trade

transactions more realistic, capturing the real-world complexities. However, for this paper, the six-stage framework will suffice. Table 1, based on the framework presented in the Appendix, illustrates the empirical transactions at various stages of the supply chain.

The journey begins in Indian factories producing textiles, jewellery, and agricultural products. Suppose India produces export goods worth, say, $100 billion, destined for the American market. The production of this output incurs various factor costs, including wages, profits, rents, and other expenses. Indian exporters do not simply ship raw factory costs—they add a markup of, say, 10%, covering logistics, insurance, shipping, and profit margins. This creates a "landed value" of $110 billion when goods reach US ports (Table 1).

This landed value is crucial because the US tariffs apply not to factory costs but to the full delivered price. After paying tariffs of 50%, the US importers' cost basis jumps to 1.50×110 = $165 billion. Can an importer absorb this 50% cost increase? Economic reality suggests otherwise. Operating on thin margins and facing competitive pressures, importers must pass costs forward. They add their standard markup of 20% for custom clearance, warehousing, distribution, and profit, and sell to retailers at 1.20×165=$198 billion.

Retailers face similar pressures. With operating costs for stores, staff salaries, marketing, and profits to cover, they apply their typical markup of 30%, setting consumer prices at: 1.30×198=$257.4 billion, the price set by retailers for consumers to pay.

When tariffs are combined with markups, import prices rise, making consumers unwilling to pay high prices and thereby reducing their purchases of imported goods. This is the demand effect in response to price increases. The extent of the cutdown depends on the price elasticity of imports. India generally exports low-value-added products, such as clothing, groceries, and footwear, so its price elasticity is expected to be low. Therefore, we assume that the percentage reduction in demand for imports from India will also be low. We, therefore, assume that the decrease in consumer demand will not exceed 5%, resulting in consumer demand (purchases) of $244.5 billion. This is the final amount paid by American consumers; the larger the amount, the greater the price increases they face.

Table 1: Cost burden of imports on consumers in the US at various supply channels

Supply channel	Markups %	Costs ($ billion)
Manufacturing in India	0	100.0
Exporters in India	10	110.0
Tariffs in the USA	50	165.0
Importers in the USA	20	198.0
Retailers in the USA	30	257.4
Total consumer demand	-5	244.5
Source: Authors' calculations		

Figure 1: Cost of Imports to consumers at various Stages of supply chain (in b$)

The landed value of Indian exports arriving at US ports is $110 billion. Still, retailers in the USA set the price at $257.4 billion for final consumers, implying an additional burden of $147.4 billion borne by consumers in the USA. Of this additional burden on consumers, the tariff cost is $55 billion (37.3%), and the remaining $92.4 billion is shared jointly by importers and retailers in the USA (62.7%). The US Treasury collects $55 billion in revenue, while US importers and retailers collectively generate $92.4 billion in revenue. US consumers bear both of these costs through price increases on imports from India. The price increases are directly proportional to the cost increases consumers face. Thus, Trump's tariffs raise the prices of imported goods by the amount of the $55 billion tariffs. At the same time, consumer prices also rise in tandem due to importers' and retailers' markups, totalling $92.4 billion. The US government has no control over these costs, which consumers pay.

We can now reveal why tariffs can be so inflationary. The importer's and retailer's markups together are $92.4 billion, which, as a share of $55 billion tariff, is 1.68. This ratio indicates that for

every dollar of tariff revenue collected by the government, the cost to consumers $2.68, including tariff and markup costs. This multiplier effect explains why even modest tariffs can trigger significant inflation, particularly when applied broadly across a wide range of consumer goods.

It would be revealing to know what the impact on consumers would be if the Trump administration were to increase the tariff rate from 50% to 60%. This is a relevant policy question because the Trump administration consistently changed the tariff rates. For instance, in India, the administration initially set the tariff rate at 25%, then raised it to 50% just a few days later.

After accounting for the new tariff rate and importers' and retailers' markups, retailers set the import price at $274.6 billion for final consumers, imposing an additional burden of $164.6 on them in the USA. Of this additional burden on consumers, the tariff component is $66 billion (40%), and the remaining $98.6 billion (60%) is borne jointly by importers and retailers in the USA. Thus, by increasing the tariff rate from 50% to 60%, the Treasury collects an additional $11 billion in revenue, while importers and retailers collectively save $6.2 billion. A fantastic message emerging from this analysis is that increasing the tariff rate benefits both the government and importers and retailers in the USA. The current debate is focused solely on tariffs, ignoring the impact of markups, which, through the multiplier effect, makes broad tariffs inherently inflationary.

IV. Who Really Pays for Tariffs?

The debate on who pays the tariff is very much alive in the USA. No consensus seems to be emerging. Various stakeholders are

indulging in assertions. The discussion has become confusing. The confusion arises because the operation of tariffs is highly complex, involving several channels through which they are implemented. Several agents participate in their implementation, who make independent decisions at various stages.

When tariffs are applied, import prices rise, leading to a decrease in demand for those imports. The extent of this decline depends on the price elasticity of the imported goods. In response to falling demand, exporting-country governments, such as India or China, may subsidise their exporters, thereby shifting a portion of the tariffs to the exporting country. It is also plausible that exporters may reduce their profits to maintain their market share of exports to the USA. That means that exporting countries may pay some of the US tariffs.

However, President Trump persistently asserts that the exporting foreign countries bear the entire cost of the tariffs. He seems to believe that the USA, as the world's largest consumer market, can generate significant revenue by imposing tariffs on other countries without incurring any costs for the USA. The mathematics provides little comfort for his belief.

For Indian manufacturers to fully offset a 50% tariff, they would need to reduce the prices of their exports by $55 billion. India exports goods worth $100 billion, so Indian manufacturers need to reduce the prices of their export goods by as much as 55% to pay for Trump's tariffs. Since India is a low-cost country, with low wages and meagre profit margins, it is inconceivable that Indian manufacturers could ever sustain exporting to the USA. They would rather skip exporting to the USA than suffer losses. And sell their goods to either other countries or in the domestic market. It

is exactly happening in India. India is already diversifying its trade to other countries. It would be wishful thinking for the USA to assert that India would pay for the entire tariffs collected by the US Treasury. India would also not be able to subsidise the exports to the extent of the 55% discount. India will likely cease all its exports to the USA. That means that US consumers will be deprived of their access to Indian goods. However, if US importers import Indian goods without any subsidy from India, the tariffs would be entirely borne by American consumers through higher prices.

Recent empirical evidence from the 2018–2019 U.S.-China trade war validates our conclusion. Studies by Amiti et al. (2019) and Fajgelbaum et al. (2020) found that tariff costs were nearly completely passed through to consumer prices. Cavallo et al. (2021) demonstrated that foreign export prices remained essentially unchanged, while US retail prices rose almost dollar-for-dollar with the tariffs. The reason becomes clear through our framework: the multiplicative effect of sequential markups makes it mathematically impossible for exporters to absorb such costs without incurring a loss.

A realistic scenario would be that exporting countries are forced to pay a proportion of the tariff cost to the USA. A critical question is how high such costs are. To gauge the magnitude, we need to examine the impact of tariffs on India's exports to the USA. India's primary concern is that falling exports could lead to unemployment in specific sectors. In such circumstances, India may be forced to subsidise exports to maintain the same level. Policymakers need to know how much the subsidy would be and if India could afford it. Our framework can answer this question.

As noted in Table 1, retailers shift their costs to the final consumer, amounting to $257.4 billion. Final consumers, unwilling to pay such a high price, reduce their demand for India's imports to $244.5, which means India's export demand in the USA will decline by $12.9 billion. If India maintains the same level of exports of $100 billion, as before, it would need to subsidise its exports to the tune of $12.9 %. This is also a significant subsidy, so the Indian government faces the dilemma of whether to stop exporting to the USA or explore alternative options to mitigate unemployment in the sector.

V. Concluding Remarks

Having traced the cost flow through each supply chain stage, we can now definitively answer the central question: who bears the burden of tariffs—foreign exporters or domestic consumers? Economic theory suggests that the answer depends on the relative elasticities of supply and demand. Still, real-world supply chains introduce additional layers of complexity that amplify the ultimate consumer burden. To understand the true incidence of tariffs, we must trace how costs propagate through each stage of the distribution chain, from foreign factories to American retail shelves.

We have revealed in the paper why tariffs can be so inflationary. The importer's and retailer's markups together are $92.4 billion, which, as a share of $55 billion tariff, is 1.68. This ratio indicates that for every dollar of tariff revenue collected by the government, the cost to consumers $2.68, including tariff and markup costs. This multiplier effect explains why even modest tariffs can trigger significant inflation, particularly when applied broadly across a wide range of consumer goods.

We have also explored a policy question: if the Trump administration increases the tariff rate from 50% to 60%, what would the impact be on consumers? We have arrived at a result: the Treasury receives an additional $11 billion in revenue, and importers and retailers together receive an extra $6.2 billion. A fantastic message emerging is that increasing the tariff rate benefits both the government and importers and retailers in the USA. The current debate is focused solely on tariffs, ignoring the impact of markups, which, when multiplied, make broad tariffs inherently inflationary.

The path forward requires acknowledging economic reality rather than political convenience. Tariffs are taxes on American consumers, not foreign producers. They generate less revenue than their monetary cost, enriching supply chain intermediaries while burdening working families. If policymakers genuinely seek to protect American industries, pressure foreign governments, or raise federal revenue, alternative policy instruments exist that can achieve these objectives at far lower cost and without the regressive distributional consequences that characterise tariff policy.

Several limitations warrant mention. Our analysis assumes complete cost pass-through at each supply chain stage, which may not hold in markets with significant monopsony power or long-term contracts. The six-stage model, while more detailed than standard analysis, still abstracts from additional complexities such as inventory effects, currency adjustments, and strategic pricing by multinational firms. Finally, our focus on Indian imports—while illustrative—may not fully generalise to all trade relationships, particularly those involving differentiated products with high brand premiums or industries with substantial sunk costs.

Economic analysis cannot dictate policy choices, but it can clarify trade-offs. On tariff policy, the trade-offs are clear: significant consumer losses, modest government revenues, and deeply regressive distributional effects. Whether these costs are justified by strategic considerations or other objectives remains a political judgment, but that judgment should be informed by the evidence this analysis provides.

Author Contributions Statement

Both authors, Nanak Kakwani and Hyun H. Son, contributed equally to all aspects of this work. Specifically, both authors were involved in: the conception and design of the study; the development of the theoretical framework; the analysis and interpretation of data; the drafting of the manuscript; critical revision of the manuscript for important intellectual content; and the final approval of the version to be published. Both authors agree to be accountable for all aspects of the work and ensure that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Declaration of Competing Interests

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APPENDIX

A.1 Tracing the Tariff Burden: A Multi-Stage Analysis

To understand who truly pays tariffs, we must follow the money through each stage of the global supply chain. Consider a concrete example: the proposed 50% tariff on Indian imports. This single policy intervention triggers a cascade of economic adjustments that ultimately determines whether American consumers or Indian exporters bear the burden.

Stage 1: Manufacturing in India: The journey begins in Indian factories producing te10xtiles, jewellery, and agricultural products, etc., worth, say, 100 billion, destined for American markets. The production of this output incurs various factor costs such as wages, profits, rents, and numerous other production expenses.

Stage 2: Exporters in India: Indian exporters do not simply ship raw factory costs—they add markups (m_e%) covering logistics, insurance, shipping, and profit margins. This creates a "landed value" of x_l when goods reach US ports, given by

$$x_l = x_m(1 + m_e) \tag{A.1}$$

Stage 3: Tariffs in the USA: The tariffs in the USA are levied on the landed value of the imported goods. Suppose the tariff rate is t %, then the tariff collected by the government in dollars will be given by

$$T = x_l t = x_m (1 + m_e) t \tag{A.2}$$

Stage 4: The Importer's Dilemma American importers now face a critical decision. After paying tariffs, their cost basis jumps to:

$$x_i = x_m (1 + m_e)(1 + t) \tag{A.3}$$

Can importers absorb this 50% cost increase? Economic reality suggests otherwise. Operating on thin margins and facing competitive pressures, importers must pass costs forward. They add their standard markup of say. m_i for warehousing, distribution, customs clearance, and profit, selling to retailers at:

$$x_r = x_i (1+m_i) = x_m (1+m_e)(1+t)(1+m_i) \qquad (A.4)$$

which is the cost borne by retailers.

Stage 5: The Retail Multiplication Retailers face similar pressures. With operating costs for stores, staff, and marketing to cover, they apply their markup of m_r, setting consumer prices at:

$$x_c = x_r (1+m_r) = x_m (1+m_e)(1+t)(1+m_i)(1+m_r) \qquad (A.5)$$

which is the sale price of the goods to be paid by the final consumers.

Stage 6: The Consumer Dilemma: When tariffs are applied, the prices of imports rise, so the consumers are unwilling to pay high prices, and therefore, cut down their purchases of imported goods. This is the demand effect in response to price increases. The extent of the cutdown depends on the price elasticity of imports. Suppose the percentage reduction in demand for imports is given by m_d, the consumer expenditure on imports will be given by:

$$x_c^* = x_c(1 - m_d) = x_m(1 + m_e)(1 + t)(1 + m_i)(1 + m_r)(1 - m_d) \qquad (A.6)$$

which is the sale price of imports to final consumers.

A.2 Who Contributes to the Burden?

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As given in (A.6), x_c^* is the crucial metric that determines how much final consumers pay for imported goods from India. This consumer cost includes costs at different stages of the supply chain, including the manufacturing, exporters, tariffs, importers, and retailers' markups, and the consumer demand effect.

The following costs are incurred at different stages of the supply chain.

Base production cost: x_m

Exporter markup addition: $x_m m_e$

Tariff addition: $x\_m (1+ m_e)t$

Importer markup addition: $x_m (1+ m_e)(1+t) m_i$

Retailer markup addition: $x_m (1+ m_e)(1+t)(1+m_i) m_r$

Demand effect: $-x_m (1+ m_e)(1+t)(1+m_i)(1+m_r)m_d$ (A.7)

The demand effect in this equation indicates how much final consumers reduce their consumption in response to price increases. The sum of these costs equals x_c^*. The final consumers bear these costs through higher prices, which results in a reduction in demand for imports, say, by *md*%. We have identified six stages through which the US final consumers bear the cost of imports from India. This decomposition provides information about the percentage contribution of each stage of the supply chain to the total cost borne by the final consumer. This decomposition provides insight into who and how much burden contributes to final consumer expenditure, which determines the economic welfare of the population.

A.3 World Without Tariffs

We now consider a world without tariffs. To isolate the tariff's impact, consider the same supply chain without trade barriers:

$$x_{0c}{}^* = x_m\,(1+m_e)(1+m_i)(1+m_r)(1-m_d) \qquad (A.8)$$

The revelation comes from comparing equations (A.6) and (A.8). While the USA government collects the tariff revenue of T billion as given in (A.2), the consumers pay an additional cost of ΔC given by:

$$\Delta C = x_c^* - x_{0c}^* = x_m(1 + m_e)(1 + m_i)(1 + m_r)(1 - m_d)t \quad (A.9)$$

which represents the consumer burden; it is not government revenue, but a pure deadweight loss created by markups applied throughout the supply chain.

This mathematical reality exposes a fundamental truth: tariffs do not just add costs—they multiply them. Each intermediary in the supply chain applies percentage markups to their inflated cost basis, creating a compound effect. The consumer burden grows exponentially with each markup layer; the larger the tariffs, the greater the cost burden of various markups.