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Authors	Dawn Chinagorom-Abiakalam, and Fernando Leibovici
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Federal Reserve Bank of St. Louis, Research Division, P.O. Box 442, St. Louis, MO 63166

Import Source Reallocation and Aggregate Price Dynamics in the United States [1]

Dawn Chinagorom-Abiakalam

Federal Reserve Bank of St. Louis

Fernando Leibovici

Federal Reserve Bank of St. Louis

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Abstract

This paper studies the impact of changes in the composition of U.S. import sources on aggregate import prices and their implications for consumer prices. We decompose import price changes into within-source price adjustments and changes in sourcing composition. Using bilateral import data, we find that sourcing from lower-cost suppliers, particularly China, put sustained downward pressure on aggregate import prices until the mid-2010s. Since then, shifts away from China have partially reversed this effect, raising both import and consumer prices. We also find sourcing reallocation responds sharply to trade policy, playing a notable role during the 2018 U.S.–China trade war.

[1]Correspondence address: fleibovici@gmail.com. The views expressed herein are those of the individual authors and do not necessarily reflect official positions of the Federal Reserve Bank of St. Louis, the Federal Reserve System, or the Board of Governors.

1 Introduction

Global shifts in production and trade in recent decades have fundamentally reshaped global supply chains, altering the sourcing patterns of U.S. imports. This period saw deeper integration with key trading partners, including the implementation of NAFTA in the 1990s and China's accession to the WTO in 2001, which led U.S. firms to increasingly source goods from countries with significantly lower production costs. Recently, these sourcing patterns have begun to shift again in response to rising geopolitical tensions, increased trade barriers, and efforts to reduce dependence on China. These developments raise important questions about how changes in the composition of import suppliers affect U.S. import prices and their macroeconomic consequences.

These long-run shifts in global integration can be observed in the evolving composition of U.S. import sources. Panel (a) of Figure 1 shows a sharp rise in import shares from low-cost countries, particularly China and other emerging economies, during the early 2000s. At the same time, the share of imports from traditional trading partners such as Canada, Japan, and the European Union declined. More recently, however, these trends have partially reversed, with sourcing from China falling and the share of imports from other regions, including Mexico and the EU, rising in its place. These patterns reflect two distinct phases in U.S. sourcing: an earlier period of integration with lower-cost suppliers, followed by a partial shift back toward higher-cost or geographically closer partners.

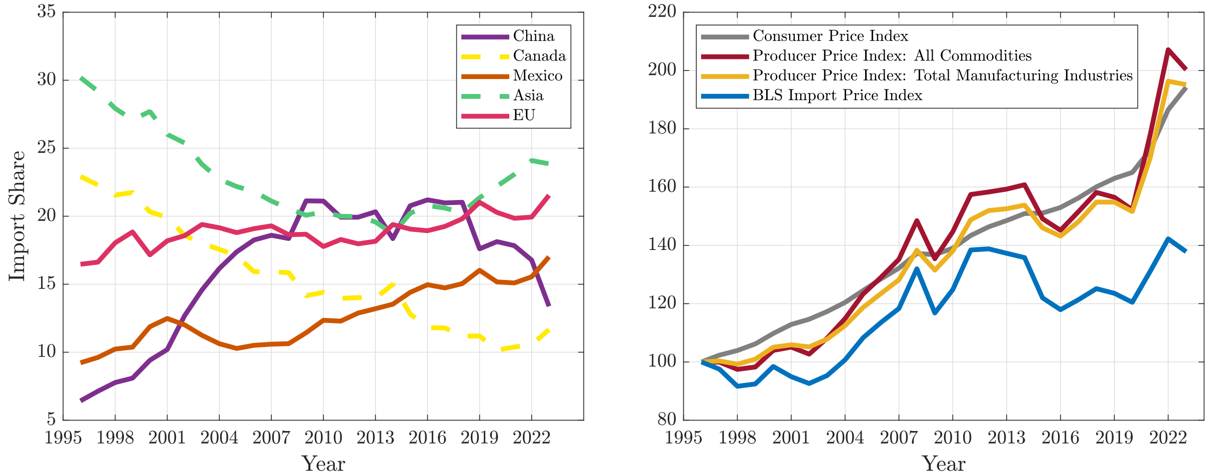
The shifts in sourcing patterns documented in Panel (a) are mirrored by the dynamics of import prices observed in Panel (b) of Figure 1. While domestic price indices such as the Consumer Price Index (CPI) and Producer Price Index (PPI) have steadily increased over the past several decades, the BLS Import Price Index (MPI) has risen more slowly. This persistent divergence suggests that changes in the composition of import sources, particularly the shift toward lower-cost suppliers, may have contributed to moderating import price growth.

These patterns raise three central questions. First, how have changes in the composition of U.S. import sources affected the aggregate import price index over time? Second, to what extent do these sourcing effects account for the gap between import prices and other domestic price indices? Third, how have these sourcing changes affected broader measures of domestic price changes, such as the Consumer Price Index (CPI)?

We address these questions by developing a flexible analytical framework that links changes in the sourcing composition of imports to aggregate import prices. The framework

Figure 1: Import Sourcing and Aggregate Import Price Dynamics

(a) Import Shares Across Countries **(b) Import Prices vs. CPI and PPI**



builds on a standard nested demand structure that aggregates imported varieties across countries at the product level and combines products into total imports. This setup yields an exact decomposition of changes in the aggregate import price index into three components: price changes within countries, sourcing reallocation across countries within products, and reallocation of expenditure across products.

To implement the decomposition empirically, we construct a Fisher price index using detailed bilateral trade data from the United Nations COMTRADE database, covering U.S. imports at the six-digit Harmonized System (HS6) level from 1996 to 2023. We proxy prices using unit values, defined as the ratio of import values to quantities, and compute expenditure shares at the country-product-year level. The resulting index closely tracks the dynamics of the official import price index published by the U.S. Bureau of Labor Statistics (BLS), validating our measurement approach despite some differences in underlying data and implementation.

We begin the empirical analysis by decomposing changes in the aggregate U.S. import price index into two components: shifts in sourcing shares across partners and within-source price changes. We find that sourcing reallocation exerted substantial downward pressure during the early 2000s, as imports shifted toward lower-cost suppliers. In recent years, however, this moderating effect has diminished and begun to reverse, with sourcing changes now putting upward pressure on import prices as imports shift away from low-cost sources. Over the full period, within-source price increases have been the larger contributor, accounting for a cumulative rise of about 50 percent in the import price index.

To assess the role of sourcing reallocation in shaping overall price dynamics, we compare our constructed import price index with and without this component. Excluding sourcing reallocation, the index closely tracks domestic price indices such as the Consumer Price Index (CPI) and the Producer Price Index (PPI), both in levels and growth rates. This finding suggests that the divergence between import and domestic price changes over the past three decades is largely accounted for by changes in the composition of import suppliers, rather than by slower price growth within countries.

We separately quantify how major trading regions contribute to price changes within sources and to price changes arising from shifts in sourcing composition. Within-source price increases have been moderate and broad-based, with no single country accounting for a disproportionate share of overall price changes. China stands out for its particularly muted contribution, consistent with long-run stability in its export prices. In contrast, sourcing reallocation effects are heavily driven by China. Increased sourcing from China through 2017 placed sustained downward pressure on aggregate import prices, reducing them by nearly 8 percent. This effect partially reverted after 2018, as sourcing shifted away from China following increased trade tensions. Reallocation effects from other regions were relatively modest and stable throughout the period. These patterns highlight the distinct role of China in shaping both the within-source and compositional components of U.S. import price dynamics.

We find substantial heterogeneity in the contribution of sourcing reallocation to import price dynamics across product categories and economic use types. In sectors such as Agriculture and Wood Products, within-source price changes account for nearly all of the observed price growth, reflecting stable sourcing patterns over time. In contrast, categories like Machinery, Precision Instruments, and Apparel exhibit larger reallocation effects, with shifts toward lower-cost suppliers placing downward pressure on prices. These patterns are echoed in the decomposition by use: reallocation plays a significant role for capital goods, offsetting within-source price increases through much of the sample, while import prices for intermediate goods are driven almost entirely by within-source changes. Consumption goods fall between these two extremes, with reallocation effects becoming more pronounced prior to 2018 and reversing thereafter. Across categories, China plays a leading role in driving reallocation effects, especially for capital goods, while contributions from other regions remain relatively modest and stable.

Given the importance of China in shaping sourcing reallocation, we then examine how sourcing patterns respond to trade policy by analyzing the 2018 U.S.–China trade war, which imposed tariffs on imports of selected products from China. We compare the decomposition of import prices for tariffed and non-tariffed Chinese goods. For tariffed goods, the onset of the trade war marks a clear reversal: sourcing away from China accelerates, shifting the reallocation margin from negative to positive and placing upward pressure on import prices. In contrast, non-tariffed goods show no comparable change, with sourcing patterns and price dynamics remaining stable. This contrast illustrates that targeted trade policy can generate sharp adjustments in sourcing composition, with measurable consequences for aggregate import prices.

To assess how changes in import sourcing patterns may have affected consumer prices, we develop an analytical framework that links import prices to the Consumer Price Index (CPI). The framework traces this link through three channels: imported consumption goods, imported capital goods, and imported intermediate inputs. We apply this framework using disaggregated trade data combined with calibrated input–output parameters. This allows us to separate observed CPI changes into the portions explained by within-source price movements and by shifts in sourcing composition. The results suggest that sourcing reallocation dampened the contribution of import prices to the CPI in the early 2000s, as imports shifted toward lower-cost suppliers. In recent years, this effect has diminished and has at times reversed, with reallocation contributing modestly to aggregate price changes in the latter part of the sample.

Our findings highlight the importance of accounting for changes in the sourcing composition of imports when analyzing aggregate price dynamics. Our analysis connects most directly to the literature on how official import price indices, such as those produced by the U.S. Bureau of Labor Statistics, handle changes in sourcing. This work documents that matched-model methods at the product–country level can miss systematic price differences between exiting and entering suppliers, creating an import-sourcing substitution bias akin to substitution and outlet biases in consumer price indices (Diewert, 1998; Diewert et al., 2009; Reinsdorf, 1993; Greenlees and McClelland, 2008; Reinsdorf and Yuskavage, 2014). For imports, "new goods" and variety adjustments show how entry and exit matter for true price measurement (Feenstra, 1994; Broda and Weinstein, 2006), and recent decompositions find that variety, quality, and heterogeneity can dominate average-price movements (Redding and Weinstein, 2024). Methodological work has emphasized that resampling and comparability rules can embed bias when sources change (Alterman, 2009; Nakamura et al., 2014), with related mismeasurement issues from offshoring (Houseman et al., 2011; Byrne et al., 2016; Diewert and Nakamura, 2009) and product turnover (Nakamura and Steinsson, 2012). By separating aggregate import price changes into within-supplier and reallocation components, our framework directly isolates the component most closely related to sourcing-substitution bias as defined in this literature.

Our paper is also related to a large body of work studies the determinants of import prices, including the role of global demand and supply conditions, exchange rates, commodity prices, and exporters' pricing strategies (Cavallo et al., 2021; Gopinath et al., 2010; Amiti et al., 2014). These forces vary across products, source countries, and over time, including in the context of broader shifts in global production and value chains (Auer et al., 2017; Bianchi and Civelli, 2015). Our focus on the composition of import suppliers complements this literature by showing how shifts in sourcing can shape aggregate import price movements even when within-supplier prices remain stable.

Closely related is research on the transmission of import prices to domestic prices through both direct channels, via imported consumption goods, and indirect channels, through imported inputs used in domestic production (Gopinath et al., 2010; Amiti et al., 2014, 2019; Auer and Fischer, 2010; Bianchi and Civelli, 2015; Comin and Johnson, 2022; Jaravel and Sager, 2024; Cavallo et al., 2021; Fajgelbaum et al., 2020; Flaaen et al., 2020). This work highlights the implications of global price movements for domestic price dynamics and for monetary policy, including the role of trade integration in shaping inflation outcomes. Our analysis contributes by quantifying the contribution of sourcing reallocation to domestic price changes, combining disaggregated trade data with input–output linkages to capture both direct and indirect channels.

Finally, our work relates to the growing literature on the macroeconomic consequences of shifting global trade patterns in an era of heightened geopolitical risk, trade tensions, and policy interventions. Studies document how tariff increases, export restrictions, and reshoring efforts are reshaping supply chains, with China's role in particular evolving during episodes such as the 2018–2019 U.S.–China trade war (Fajgelbaum et al., 2024; Alfaro and Chor, 2023; Iyoha et al., 2024). By tracing how these developments affect both import and consumer prices, our results provide new evidence on one channel through which global trade disruptions influence domestic economic outcomes.

The remainder of the paper is organized as follows. Section 2 documents cross-country differences in import prices and their dynamics. Section 3 develops the analytical framework and derives the decomposition of the aggregate import price index into within-source price changes and sourcing reallocation effects. Section 4 presents the empirical implementation and the main results on the contribution of sourcing changes to import price dynamics. Section 5 quantifies the broader implications of these sourcing effects for aggregate inflation measures. Section 6 concludes.

2 Import Price Differences Across Countries

This section documents cross-country differences in the level and dynamics of U.S. import prices, presenting empirical patterns that motivate the analysis in the remainder of the paper. We begin by describing the data sources and the construction of the dataset used throughout our study. On the one hand, we document systematic differences in the level of import prices across countries, highlighting the role of low-cost suppliers such as China. On the other hand, we examine differences in the evolution of import prices over time, showing that some sources are associated with systematically lower import price growth. Taken together, these patterns suggest that changes in the composition of import sources can significantly influence the evolution of aggregate import prices.

2.1 Data

Our empirical analysis uses annual bilateral trade data at the six-digit Harmonized System (HS) level from the United Nations' COMTRADE database, covering the period 1996–2023. We focus on imports reported by the United States. We conduct the analysis using COMTRADE data at the HS6 level because it provides a harmonized product classification that is consistent over time.

We proxy import prices using unit values, defined as the ratio of import values to imported quantities. While unit values can reflect heterogeneity in product quality or shipment characteristics, they are widely used in the trade literature as a practical measure of price movements, particularly when constructed at a disaggregated product–country–year level (Feenstra, 1994; Amiti et al., 2014, 2019).

To improve comparability and reduce the influence of outliers, we follow the data cleaning procedures of Amiti et al. (2024). Specifically, we restrict the sample to trading partners that account for the top 95 percent of import value within each HS product, which collectively cover approximately 98 percent of total U.S. imports. We drop observations with missing quantities or inconsistent reporting of quantity units within the same HS code. We also exclude extreme unit values, defined as those whose level or year-over-year change lies outside the 2.5th to 97.5th percentile range of the full distribution. These steps help ensure consistency in unit value comparisons across products, countries, and years.

2.2 Import Price Levels Across Countries

We begin by documenting cross-country differences in the level of U.S. import prices. Imports exhibit substantial variation in prices across trading partners, with some countries systematically supplying goods at lower prices than others. As a result, shifts in the composition of import sources can significantly influence the aggregate level of import prices.

Panel (a) of Figure 2 displays the share of six-digit HS products for which each country was the lowest-cost source of U.S. imports in 2023. China stands out as the dominant low-cost supplier, accounting for around 15 percent of all products, well ahead of other major partners such as Canada and Mexico. In contrast, traditional trading partners like Germany and Japan appear far less frequently as the cheapest source. This pattern underscores China's central role in shaping the cost structure of U.S. imports and suggests that reallocation of sourcing toward or away from China can meaningfully affect aggregate import prices.

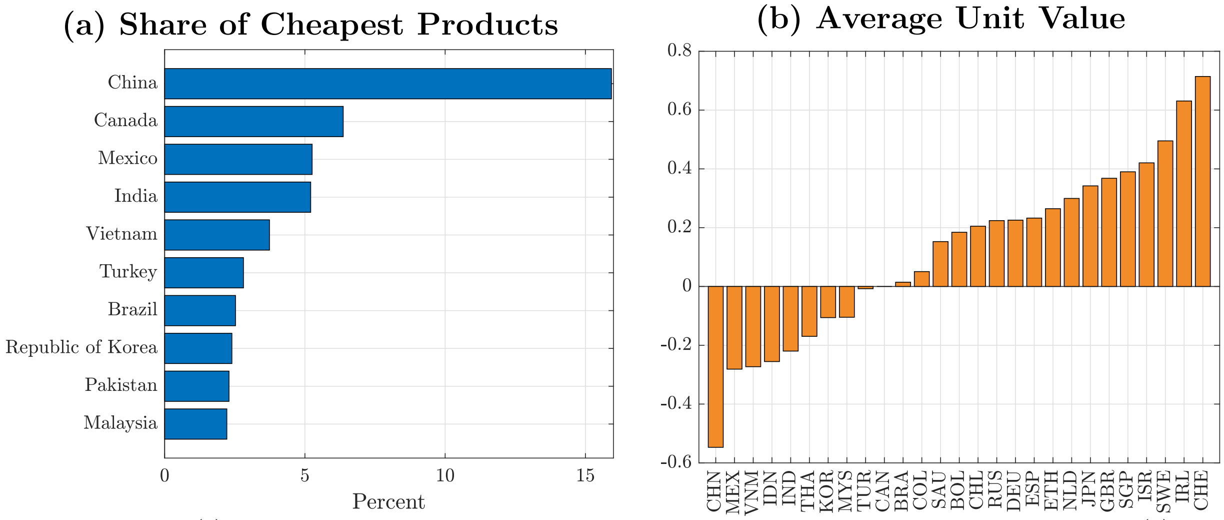
Panel (b) of Figure 2 provides further evidence on cross-country price differences by plotting the estimated country fixed effects from a regression of the log of product-level unit values on country and HS6 product fixed effects, with Canada as the omitted category. The estimated country fixed effects measure the average price premium or discount associated with sourcing from each country relative to Canada, after controlling for systematic differences across products, pooling data from 1996 to 2023. We find that China, Vietnam, and several other emerging market economies consistently supply products at substantially lower prices, while high-income exporters such as Switzerland, Ireland, and Sweden tend to supply higher-priced goods. These systematic differences persist even after conditioning on product-specific variation and underscore the importance of a product's country of origin in shaping aggregate import price levels.

2.3 Import Price Dynamics Across Countries

Beyond differences in import price levels across countries, there are also important differences in the dynamics of import prices over time. Figure 3 plots import price indices for selected U.S. trading partners, normalized to 100 in 2004.[2] The figure shows that import prices from China have grown much more slowly than import prices from other major trading partners, such as Mexico, Canada, and the European Union. While import prices from Mexico and

[2] We report here "import price indexes by origin" as collected by the U.S. Bureau of Labor Statistics (BLS). Industrialized countries are grouped following the BLS, consisting of Western European countries, Canada, Japan, Australia, New Zealand, and South Africa.

Figure 2: Cross-Country Differences in Import Prices



Notes: Panel (a) shows the share of products for which each country is the lowest-cost source in 2023. Panel (b) shows the average log difference in unit values relative to Canada across products.

other regions exhibit substantial volatility and sharp increases during periods such as the COVID-19 pandemic, import prices from China display a remarkably stable and subdued trajectory over the entire period.

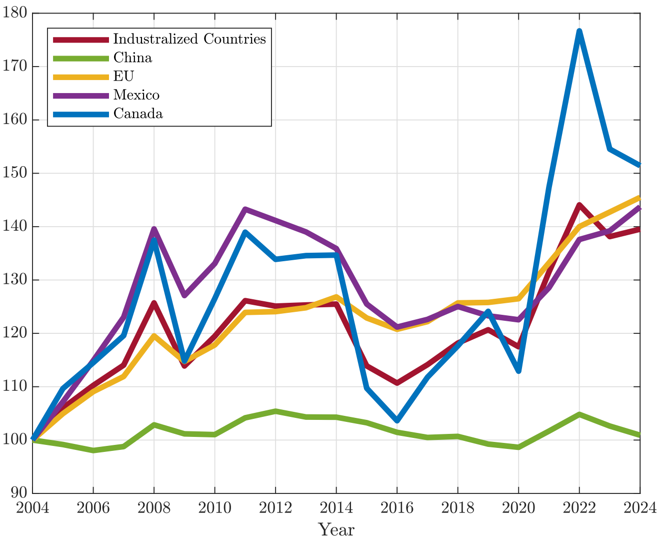
These differences in price dynamics across countries show that sourcing patterns can influence not only the level of import prices but also how those prices evolve over time. In particular, shifts in sourcing away from countries with relatively stable or slower-growing import prices toward countries with faster import price growth can contribute to higher aggregate import price inflation. These patterns underscore the need to account for supplier composition when analyzing the dynamics of import prices.

More broadly, the evidence in this section points to substantial differences in both the levels and the dynamics of import prices across U.S. trading partners. This motivates the analytical framework developed in the next section, which decomposes changes in the aggregate import price index into components attributable to within-country price changes and to shifts in the composition of import suppliers.

3 Analytical Framework

This section develops a theoretical framework to decompose the aggregate import price index. We consider a nested demand structure in which a representative firm aggregates imported varieties across countries using a constant elasticity of substitution (CES) technology at the product level, and combines products into total imports using a Cobb-Douglas aggregator.

Figure 3: Import Price Dynamics Across Countries



This structure allows us to separate the effects of price changes within sourcing countries from the effects of shifts in sourcing composition, providing a basis to quantify the role of reallocation in driving changes in aggregate import prices.

We begin by introducing notation to characterize how micro-level prices and sourcing patterns contribute to aggregate import price movements. Time is discrete and indexed with subscript t. Let P_t denote the aggregate import price index, P_{jt} the import price index for product j, and p_{ijt} the price of product j imported from country i. Let M_{jt} denote the total quantity of a bundle of imports of product j, and m_{ijt} the quantity sourced from country i. The set of sourcing countries for product j is denoted by S_{jt}.

The remainder of this section describes the structure of the model, including the aggregation of imported varieties across countries and products. In the following subsections, we derive the solution for the aggregate import price index and present its decomposition into within price changes and reallocation effects.

3.1 Model

3.1.1 Imports of product j

We first describe the aggregation of imported varieties at the product level. A representative firm aggregates varieties of product j sourced from different countries using a constant elasticity of substitution (CES) technology:

$$M_{jt} = \left[\sum_{i \in S_{jt}} m_{ijt}^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}},$$

where M_{jt} denotes the total imports of product j, m_{ijt} represents the quantity imported from country i, and $\sigma > 1$ is the elasticity of substitution across sources.

Taking import prices P_{jt} and p_{ijt} as given, the firm chooses quantities to maximize profits:

$$\max_{\{m_{ijt}\}_{i \in S_{jt}}} \quad P_{jt} M_{jt} - \sum_{i \in S_{jt}} p_{ijt} m_{ijt} \quad \text{subject to} \quad M_{jt} = \left[\sum_{i \in S_{jt}} m_{ijt}^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}},$$

where P_{jt} denotes the import price index for product j.

3.1.2 Aggregate imports

We then describe the aggregation of product-level imports into total imports. A representative firm combines imports of different products using a Cobb-Douglas technology:

$$M_t = \prod_{j \in J} M_{jt}^{\alpha_{jt}},$$

where M_t denotes the total quantity of imports, M_{jt} represents imports of product j, and α_{jt} captures the expenditure share of product j in total imports, with $\sum_{j \in J} \alpha_{jt} = 1$.

Taking import prices P_t and P_{jt} as given, the firm chooses quantities $\{M_{jt}\}_{j \in J}$ to maximize profits:

$$\max_{\{M_{jt}\}_{j \in J}} \quad P_t M_t - \sum_{j \in J} P_{jt} M_{jt} \quad \text{subject to} \quad M_t = \prod_{j \in J} M_{jt}^{\alpha_{jt}},$$

where P_t denotes the aggregate import price index.

In the next section, we solve for the product-level and aggregate import price indices implied by this structure, and derive a decomposition of aggregate import price changes into within price movements and reallocation effects.

3.2 Import Price Indices

In this section, we derive analytical expressions for the import price indices at both the product and aggregate levels.

3.2.1 Product-Level Import Price Index

At the product level, imports of product j are aggregated across sourcing countries using a CES structure. Thus, the solution of the model implies the product-level import price index can be expressed as:

$$P_{jt} = \left(\sum_{i \in S_{jt}} p_{ijt}^{1-\sigma} \right)^{\frac{1}{1-\sigma}}.$$

This expression shows that the product-level import price index P_{jt} depends on individual prices from each source country, p_{ijt}, with the elasticity of substitution σ determining how strongly the index shifts toward lower-cost suppliers when prices differ. A high σ indicates that buyers readily reallocate expenditure toward lower-cost suppliers, causing the index to be heavily influenced by the prices of those sources, whereas a low σ reflects limited substitution and a greater influence of higher-cost suppliers on the index.

To better interpret this index, it is useful to rewrite the product-level price index in terms of expenditure shares. Let $s_{ijt} \equiv \frac{p_{ijt} m_{ijt}}{\sum_{k \in S_{jt}} p_{kjt} m_{kjt}}$ denote the expenditure share of imports from country i for product j in total expenditure on that product. Using these shares, we obtain:

$$\ln P_{jt} = \sum_{i \in S_{jt}} s_{ijt} \ln p_{ijt} + \frac{1}{\sigma - 1} \sum_{i \in S_{jt}} s_{ijt} \ln s_{ijt}.$$

The first term represents an expenditure-weighted average of log prices across source countries. The second term captures the dispersion of expenditure shares across sources. If substitutability across sources is perfect ($\sigma \to \infty$), this expression reduces to a simple expenditure-weighted average. This formulation will be particularly helpful when examining changes over time, as it will allow us to isolate the role of changing expenditure shares from direct price changes within source countries.

3.2.2 Aggregate Import Price Index

In the aggregate, imports across products are combined using a Cobb-Douglas aggregator. Thus, the solution of the model implies the aggregate import price index is given by:

$$P_t = \prod_{j\in J} \left(\frac{P_{jt}}{\alpha_{jt}}\right)^{\alpha_{jt}},$$

where α_{jt} denotes the expenditure share of product j in total imports at time t, with $\sum_{j\in J} \alpha_{jt} = 1$ for all t. This formulation implies that the aggregate import price index is a geometric weighted average of the product-level prices, where weights correspond explicitly to their time-varying expenditure shares.

To clearly express this in terms of product-level expenditure shares, define the expenditure share of product j as:

$$\mu_{jt} \equiv \frac{P_{jt}M_{jt}}{\sum_{k\in J} P_{kt}M_{kt}},$$

representing the share of expenditure on product j relative to total import expenditure across all products at time t. Then, the aggregate price index can be expressed in log terms as:

$$\ln P_t = \sum_{j\in J} \mu_{jt} \ln P_{jt} - \sum_{j\in J} \mu_{jt} \ln \mu_{jt}.$$

The first term corresponds to the average of product-level log prices, weighted by their current-period expenditure shares. The second term captures the influence of changes in expenditure composition across products. Thus, shifts toward products with relatively higher or lower price indices will affect the aggregate price index independently of within-product price changes.

3.3 Decomposition of Import Price Changes

In this subsection, we develop a decomposition of changes in import price indices at both the product and aggregate levels. This decomposition allows us to separately identify the contributions from price changes within sourcing countries and from changes in the composition of sourcing across countries.

3.3.1 Product-Level Import Price Changes

To study how the import price index evolves over time, we take the log difference between periods t and $t-1$, yielding:

$$\ln \frac{P_{jt}}{P_{jt-1}} = \sum_{i \in S_{jt}} s_{ijt} \ln \frac{p_{ijt}}{p_{ijt-1}} + \sum_{i \in S_{jt}} (s_{ijt} - s_{ijt-1}) \ln p_{ijt-1} + \frac{1}{\sigma - 1} \left(\sum_{i \in S_{jt}} s_{ijt} \ln s_{ijt} - \sum_{i \in S_{jt-1}} s_{ijt-1} \ln s_{ijt-1} \right)$$

The first term is an expenditure-weighted average of the log price changes within each source country. The second term reflects the effect of sourcing reallocation, arising from changes in expenditure shares across countries. If sourcing shifts toward lower-cost suppliers, this term exerts downward pressure on the index, whereas shifting toward higher-cost suppliers pushes it upward. The third term captures changes in the dispersion of sourcing shares across countries.

A particularly useful benchmark is the special case when varieties from different sources are perfect substitutes ($\sigma \to \infty$). This limiting scenario is analytically convenient and serves as a natural baseline, simplifying the decomposition substantially by eliminating the dispersion term. In this case, the decomposition reduces to:

$$\ln \frac{P_{jt}}{P_{jt-1}} = \sum_{i \in S_j} s_{ijt} \ln \frac{p_{ijt}}{p_{ijt-1}} + \sum_{i \in S_j} (s_{ijt} - s_{ijt-1}) \ln p_{ijt-1}.$$

Under this assumption, changes in the import price index depend solely on within-source price changes and sourcing reallocations. Thus, focusing on this special case allows for clearer interpretation and more straightforward quantification of these effects.

To further examine the role of sourcing reallocation, it is useful to decompose changes in the import price index based on arbitrary groups of suppliers. Let G denote a partition of sourcing countries into groups $g \in G$.

To further examine the role of sourcing reallocation, it is useful to group import sources into broader categories and decompose the changes in the import price index along these groups. Let G denote a set of mutually exclusive and exhaustive groups of sourcing countries (for example, G could consist of China, North America, European Union, and Rest of World), and let $g \in G$ denote a particular group. Splitting the sum over sources into these groups, we obtain:

$$\ln \frac{P_{jt}}{P_{jt-1}} = \sum_{g \in G} \left[\sum_{i \in g} s_{ijt} \ln \frac{p_{ijt}}{p_{ijt-1}} + \sum_{i \in g} (s_{ijt} - s_{ijt-1}) \ln p_{ijt-1} \right].$$

This general decomposition allows for the flexible analysis of any group-specific sourcing dynamics. The first term within each group captures the effect of price changes among suppliers belonging to that group, while the second term captures the effect of shifts in sourcing shares within that group. This formulation facilitates analyzing the relative importance of different groups or regions in shaping import price dynamics, providing insight into how regional or policy-driven events affect import prices.

3.3.2 Aggregate Import Price Changes

Having established how product-level import prices aggregate into an overall import price index, we now examine how changes in the aggregate index can be decomposed into the contributions from within-source price changes and from shifts in sourcing composition across countries and products. The log change in the aggregate import price index is given by:

$$\ln \frac{P_t}{P_{t-1}} = \sum_{j \in J} \mu_{jt} \ln P_{jt} - \sum_{j \in J} \mu_{jt-1} \ln P_{jt-1}.$$

Since the product-level price index P_{jt} is itself an aggregation of prices across countries, substituting its decomposition from the previous subsection into the aggregate price change equation yields:

$$\ln \frac{P_t}{P_{t-1}} = \sum_{j \in J} \mu_{jt} \sum_{i \in S_{jt}} s_{ijt} \ln \frac{p_{ijt}}{p_{ijt-1}} + \sum_{j \in J} \mu_{jt} \sum_{i \in S_{jt}} (s_{ijt} - s_{ijt-1}) \ln p_{ijt-1}$$
$$+ \sum_{j \in J} (\mu_{jt} - \mu_{jt-1}) \sum_{i \in S_{jt-1}} s_{ijt-1} \ln p_{ijt-1}.$$

To sharpen the decomposition, we simultaneously express both reallocation terms relative to their respective average prices by adding and subtracting the respective terms:

$$\ln \frac{P_t}{P_{t-1}} = \sum_{j\in J} \mu_{jt} \sum_{i\in S_{jt}} s_{ijt} \ln \frac{p_{ijt}}{p_{ijt-1}}$$
$$+ \sum_{j\in J} \mu_{jt} \sum_{i\in S_{jt}} (s_{ijt} - s_{ijt-1}) \ln \overline{p}_{jt-1} + \sum_{j\in J} \mu_{jt} \sum_{i\in S_{jt}} (s_{ijt} - s_{ijt-1}) \ln \frac{p_{ijt-1}}{\overline{p}_{jt-1}}$$
$$+ \sum_{j\in J} (\mu_{jt} - \mu_{jt-1}) \ln \overline{P}_{t-1} + \sum_{j\in J} (\mu_{jt} - \mu_{jt-1}) \sum_{i\in S_{jt-1}} s_{ijt-1} \ln \frac{p_{ijt-1}}{\overline{P}_{t-1}},$$

where we define the average prices from period $t-1$ as:

$$\overline{p}_{jt-1} = \exp\left(\sum_{i\in S_{jt-1}} s_{ijt-1} \ln p_{ijt-1} \right), \quad \overline{P}_{t-1} = \exp\left(\sum_{j\in J} \mu_{jt-1} \sum_{i\in S_{jt-1}} s_{ijt-1} \ln p_{ijt-1} \right).$$

Expressing the reallocation terms relative to average prices makes it clear that these terms contribute to aggregate price changes only when there are price differences across sources within a product, or across products in the import bundle. In the absence of such relative price differences, the corresponding reallocation terms are zero.

We simplify this expression by observing that the second and fourth terms equal zero, given that $\sum_{i\in S_{jt}} (s_{ijt} - s_{ijt-1}) = 0$ and $\sum_{j\in J} (\mu_{jt} - \mu_{jt-1}) = 0$. Thus, we obtain the decomposition of aggregate import prices we focus on throughout:

$$\ln \frac{P_t}{P_{t-1}} = \underbrace{\sum_{j\in J} \mu_{jt} \sum_{i\in S_{jt}} s_{ijt} \ln \frac{p_{ijt}}{p_{ijt-1}}}_{\text{Within price changes}} + \underbrace{\sum_{j\in J} \mu_{jt} \sum_{i\in S_{jt}} (s_{ijt} - s_{ijt-1}) \ln \frac{p_{ijt-1}}{\overline{p}_{jt-1}}}_{\text{Across-source reallocation}}$$
$$+ \underbrace{\sum_{j\in J} (\mu_{jt} - \mu_{jt-1}) \sum_{i\in S_{jt-1}} s_{ijt-1} \ln \frac{p_{ijt-1}}{\overline{P}_{t-1}}}_{\text{Across-product reallocation}}.$$

The first term (within price changes) captures how changes in prices charged by exporting countries directly affect the aggregate import price index. The second term (across-source reallocation) isolates the impact of shifts in sourcing composition across countries within products, emphasizing explicitly that these reallocations influence the aggregate price index only when there are price differences across source countries within each product category. The third term (across-product reallocation) captures the influence of changes in expenditure composition across products, emphasizing explicitly that these reallocations influence the aggregate price index only when there are price differences across products.

This decomposition clearly separates the effects of exporter-specific price adjustments from sourcing reallocations. It also naturally accommodates the entry and exit of products and sourcing countries, as these events directly affect expenditure shares and are inherently captured through the sourcing reallocation term, ensuring that measured import price dynamics fully reflect shifts in import composition.

We note that our constructed import price index differs from the official index published by the U.S. Bureau of Labor Statistics (BLS). While the BLS index can incorporate sourcing reallocations across countries, the precise manner in which they are handled often depends on judgments regarding product comparability when sources change. By contrast, our decomposition provides a transparent, explicit quantification of the effects arising from sourcing reallocations. In the next section we compare our constructed index with the official BLS series.

3.4 Extending the Decomposition to a Fisher Index

The decomposition derived above evaluates within price changes using current-period expenditure shares, consistent with a Paasche-type price index. To address potential sensitivity to the timing of these expenditure shares, we extend the analysis to compute the decomposition for a Fisher index, a symmetric measure of import price changes that balances information from both current and previous expenditure patterns. The Fisher index is widely used in the literature and official statistics due to its desirable theoretical properties, particularly its robustness to the timing of expenditure shares. To construct this index, we first derive an analogous decomposition based on previous-period expenditure shares (Laspeyres-type) and then combine the Paasche and Laspeyres decompositions into the Fisher index.

Formally, we first restate the decomposition derived above explicitly, clarifying that it corresponds to a Paasche-type decomposition. Specifically, we weight within price changes using current-period expenditure shares (s_{ijt}) and current-period product-level shares (μ_{jt}), and evaluate sourcing reallocation using previous-period prices (p_{ijt-1}):

$$\ln \frac{P_t}{P_{t-1}} = \underbrace{\sum_{j \in J} \mu_{jt} \sum_{i \in S_{jt}} s_{ijt} \ln \frac{p_{ijt}}{p_{ijt-1}}}_{\text{Within price changes (Paasche weighting)}} + \underbrace{\sum_{j \in J} \mu_{jt} \sum_{i \in S_{jt}} (s_{ijt} - s_{ijt-1}) \ln \frac{p_{ijt-1}}{\overline{p}_{jt-1}}}_{\text{Sourcing reallocation (previous-period prices)}}$$
$$+ \underbrace{\sum_{j \in J} (\mu_{jt} - \mu_{jt-1}) \sum_{i \in S_{jt-1}} s_{ijt-1} \ln \frac{p_{ijt-1}}{\overline{P}_{t-1}}}_{\text{Across-product reallocation (previous-period prices)}} .$$

To address potential sensitivity to this timing choice, we consider an analogous decomposition based on previous-period expenditure shares, corresponding to a Laspeyres-type decomposition. This alternative decomposition can be obtained from the Paasche decomposition by adding and subtracting the term $\sum_{j \in J} \mu_{jt-1} \sum_{i \in S_{jt-1}} s_{ijt-1} \ln \frac{p_{ijt}}{p_{ijt-1}}$ and then rearranging terms. Specifically, we weight within price changes using previous-period country shares (s_{ijt-1}) and previous-period product shares (μ_{jt-1}), shifting the reference prices in the sourcing reallocation term from previous-period prices (p_{ijt-1}) to current-period prices (p_{ijt}):

$$\ln \frac{P_t}{P_{t-1}} = \underbrace{\sum_{j \in J} \mu_{jt-1} \sum_{i \in S_{jt-1}} s_{ijt-1} \ln \frac{p_{ijt}}{p_{ijt-1}}}_{\text{Within price changes (Laspeyres weighting)}} + \underbrace{\sum_{j \in J} \mu_{jt-1} \sum_{i \in S_{jt-1}} (s_{ijt} - s_{ijt-1}) \ln \frac{p_{ijt}}{\overline{p}_{jt}}}_{\text{Sourcing reallocation (current-period prices)}}$$
$$+ \underbrace{\sum_{j \in J} (\mu_{jt} - \mu_{jt-1}) \sum_{i \in S_{jt}} s_{ijt} \ln \frac{p_{ijt}}{\overline{P}_t}}_{\text{Across-product reallocation (current-period prices)}} .$$

Finally, to address the sensitivity to the timing choices embedded in the Paasche and Laspeyres decompositions, we construct the Fisher decomposition as a symmetric measure of aggregate import price changes. The Fisher decomposition explicitly averages the two approaches by weighting within price changes using the average of current- and previous-period expenditure shares, and by evaluating sourcing reallocations and across-product reallocations using the average of previous- and current-period reference prices and expenditure shares.

Formally, the Fisher decomposition is given by:

$$\ln \frac{P_t}{P_{t-1}} = \underbrace{\sum_{j \in J} \sum_{i \in S_{jt}} \left(\frac{\mu_{jt} s_{ijt} + \mu_{jt-1} s_{ijt-1}}{2} \right) \ln \frac{p_{ijt}}{p_{ijt-1}}}_{\text{Within price changes (Fisher weighting)}}$$

$$+ \underbrace{\sum_{j \in J} \left(\frac{\mu_{jt} + \mu_{jt-1}}{2} \right) \sum_{i \in S_{jt}} (s_{ijt} - s_{ijt-1}) \left(\frac{1}{2} \ln \frac{p_{ijt-1}}{\overline{p}_{jt-1}} + \frac{1}{2} \ln \frac{p_{ijt}}{\overline{p}_{jt}} \right)}_{\text{Sourcing reallocation (average of previous- and current-period prices)}}$$

$$+ \underbrace{\sum_{j \in J} (\mu_{jt} - \mu_{jt-1}) \left(\frac{1}{2} \sum_{i \in S_{jt-1}} s_{ijt-1} \ln \frac{p_{ijt-1}}{\overline{P}_{t-1}} + \frac{1}{2} \sum_{i \in S_{jt}} s_{ijt} \ln \frac{p_{ijt}}{\overline{P}_t} \right)}_{\text{Across-product reallocation (average of previous- and current-period prices)}}.$$

Due to its symmetric treatment of expenditure shares and reference prices across consecutive periods, as well as its theoretical robustness and widespread adoption, we rely on this Fisher decomposition as the primary measure for import price dynamics throughout the remainder of our analysis.

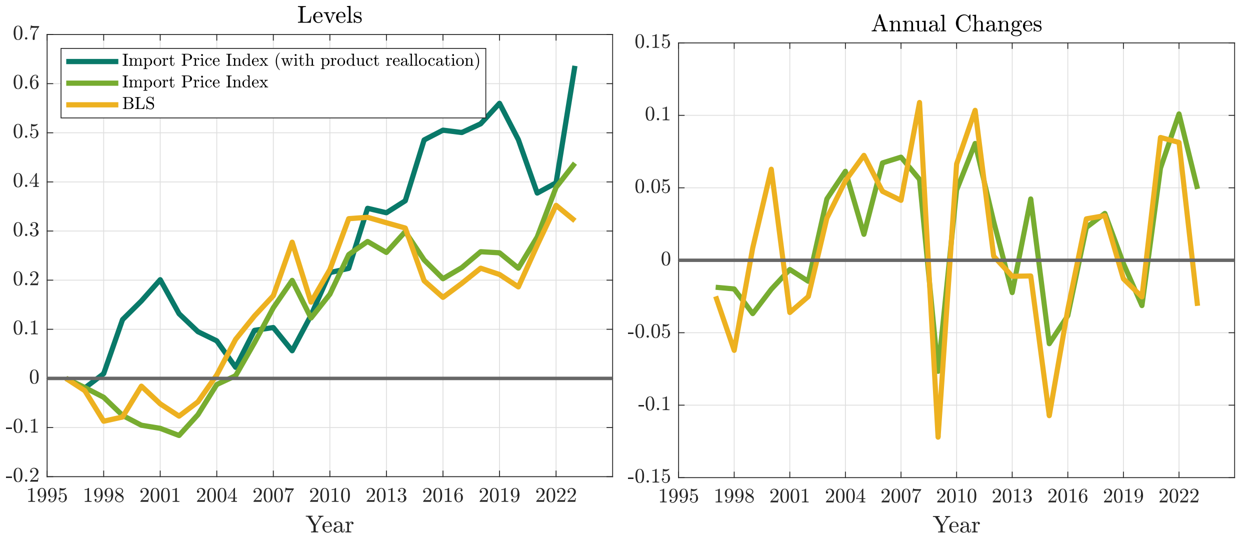
4 Decomposing U.S. Import Price Changes

In this section, we empirically quantify how changes in the composition of U.S. import sources have affected aggregate import prices. We apply the decomposition derived in Section 3 to detailed U.S. import data, isolating the role of sourcing reallocations. Our goal is to assess the extent to which shifts toward or away from specific trading partners have influenced overall import price dynamics. We begin by presenting aggregate results, then investigate the extent of heterogeneity across product categories and industries, and finally examine episodes involving significant trade policy changes. In the next section, we quantify the implications of these import price changes for aggregate consumer prices.

4.1 Empirical Implementation

We briefly summarize our data and explain how we implement the Fisher decomposition derived in Section 3. We rely on detailed bilateral import data from the United Nations COMTRADE database, covering U.S. imports at the six-digit Harmonized System (HS)

Figure 4: Comparison of BLS vs. Total Effect



product level over the period 1996–2023.[3] Unit values computed at the country-product-year level serve as proxies for import prices. A detailed description of the data sources, construction methods, and cleaning procedures is provided earlier in Section 2.

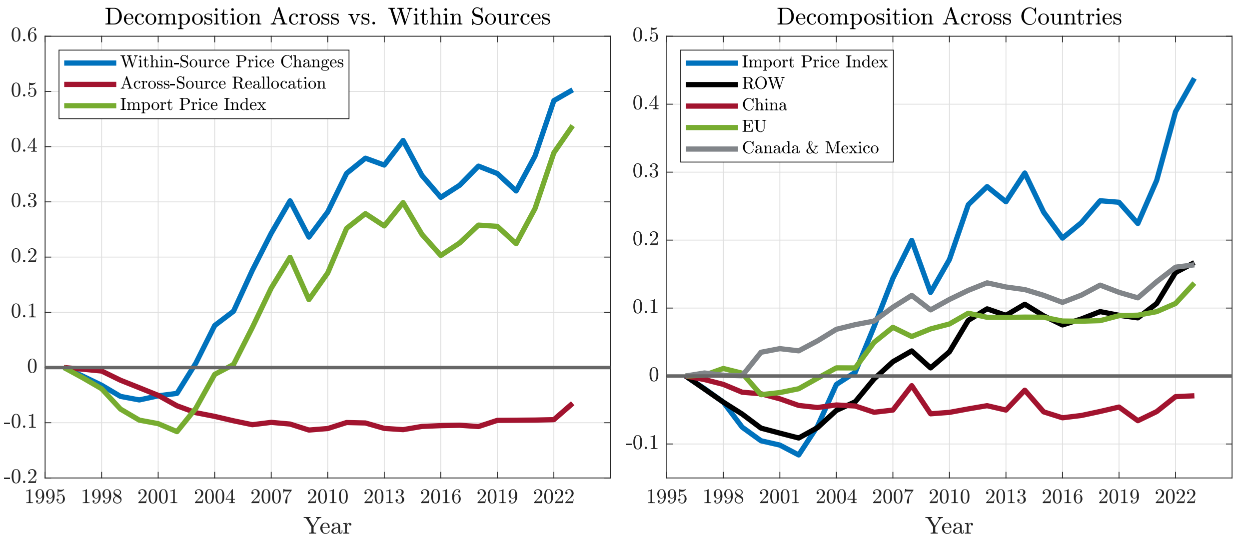
We adopt the Fisher decomposition as our benchmark measure, as it combines Paasche and Laspeyres indices to incorporate expenditure patterns from both the current and previous periods. This approach improves robustness to timing and provides a symmetric treatment of sourcing reallocation effects.

To implement the decomposition empirically, we compute expenditure shares across source countries and across products using observed import values at each point in time, and we calculate average product-level prices ($\bar{p}_{jt}$) as expenditure-weighted averages across source countries within each product and year.

To assess the validity of our constructed import price index, Figure 4 compares our index with the official import price index published by the U.S. Bureau of Labor Statistics (BLS). The BLS index is based on establishment surveys that track prices for specific product–firm pairs over time using a matched-model approach, aggregated with trade-value weights in a modified Laspeyres formula that is chained monthly and reweighted annually with a two-year lag. This methodology captures price changes within continuing product–firm pairs but abstracts from high-frequency reallocations across products and reflects changes in sourcing only when a replacement item passes comparability checks, so systematic price differences

[3]We focus on a 6-digit HS classification that is harmonized to be comparable over time, across changes in the classification.

Figure 5: Import Price Index Decompositions



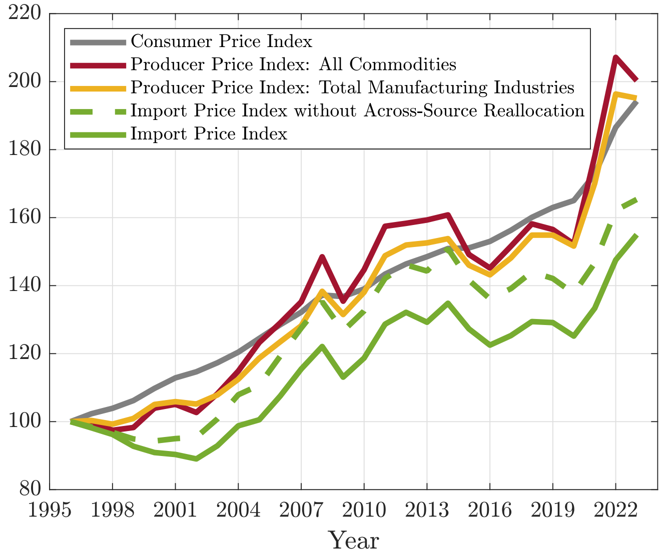
between exiting and entering suppliers may be missed. In contrast, our index uses customs-based trade data, measuring prices as country–product–year unit values and applying a Fisher formula that explicitly decomposes and incorporates the effects of both product- and source-level reallocations alongside within-source price changes.

To determine the closest counterpart to the BLS index, we report two versions of our constructed index: one that includes both product- and source-level reallocations, and one that excludes the product-level reallocation component. As shown in Figure 4, the version excluding product reallocation—which, like the BLS methodology, abstracts from high-frequency shifts in expenditure shares across products—aligns closely with the BLS series, both in levels and annual changes. Based on this comparison, we compute all results using the full decomposition but restrict attention to reporting the components related to within-source price changes and across-source reallocations. For simplicity, we refer to the import price index in what follows as the version that excludes the product reallocation term.

4.2 Aggregate Results

This subsection presents the main aggregate results from our decomposition of aggregate import prices. We begin by presenting two complementary decompositions of changes in the aggregate U.S. import price index. The first decomposition separates overall import price dynamics into contributions from (i) price changes within each import source, holding sourcing composition fixed, and (ii) shifts in the composition of import sources across countries. The second decomposition quantifies the contributions from each major sourcing region. Both

Figure 6: Import Price Dynamics



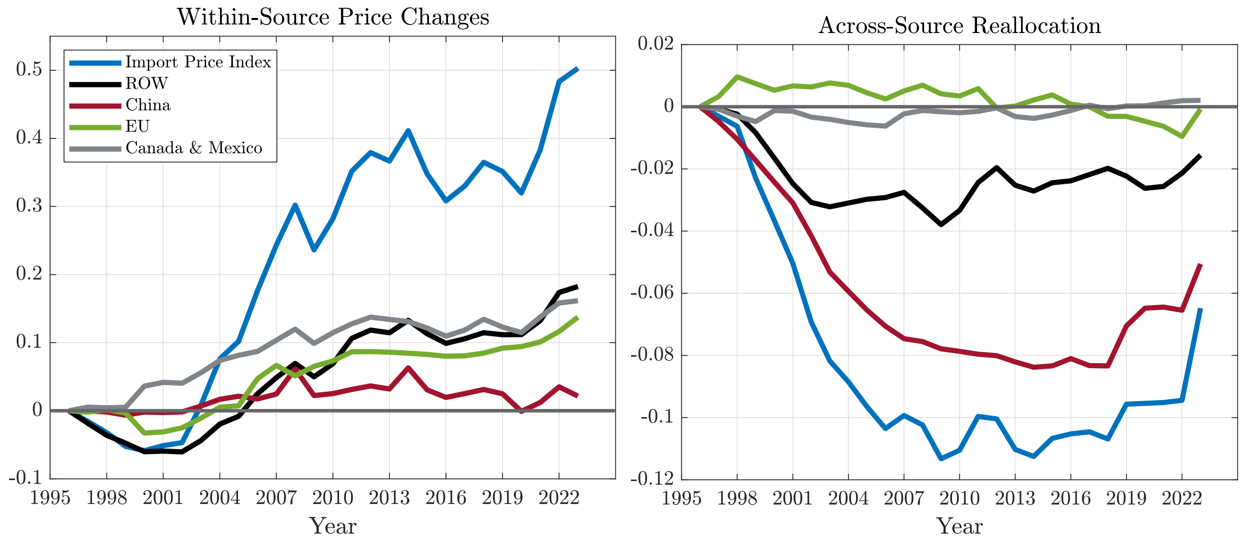
decompositions are additive, with their respective components exactly recovering aggregate import price changes.

Figure 5 illustrates the two aggregate decompositions. The left panel shows the cumulative contributions of within-source price changes and across-source reallocations to aggregate import prices from 1996 to 2023. Within-source price increases dominate, accounting for a cumulative rise of approximately 50 percent over the period. In contrast, sourcing reallocations initially exert downward pressure, reducing cumulative import prices by roughly 10 percent through the mid-2000s. This moderating effect gradually diminishes and partly reverses in recent years, reflecting shifts away from lower-cost sources.

The right panel breaks down the total contribution to import price changes by major trading regions, incorporating both within-source price changes and reallocation effects. China stands out as the only region exerting persistent downward pressure on import prices through 2017, reflecting both its role as a low-cost supplier and the relatively slow growth of its export prices over this period. Starting in 2018, this trend reverses: sourcing shifts away from China, likely in response to rising trade tensions and tariffs, contributing to a gradual increase in import prices. Meanwhile, other regions such as North America and the EU account for a growing share of upward pressure over time, reflecting both rising prices within sources and a steady increase in sourcing shares.

Figure 6 investigates the extent to which reallocation across import sources can account for the relatively subdued growth of import prices compared to other aggregate price indices, as shown in Panel b of Figure 1. The figure compares our aggregate import price

Figure 7: Within and Across-Source Changes, by Country



index—including and excluding the contribution of sourcing reallocation—relative to the Consumer Price Index (CPI) and two versions of the Producer Price Index (PPI). When the reallocation component is excluded, our import price index tracks the CPI and PPI more closely, both in levels and in growth rates. This pattern suggests that changes in the composition of import sources account for an important share of the divergence between import and domestic price indices over the past three decades, beyond differences in within-country price growth.

4.3 Within and Across-Source Changes

We now examine more closely how major trading regions contribute to within price changes and across-source reallocation. Figure 7 displays the cumulative contribution of each region to these two components of the aggregate import price index. The left panel isolates the within price changes, holding product and sourcing shares fixed, while the right panel captures the effect of changes in sourcing composition across countries.

The left panel reveals relatively modest within-source price increases across all major regions, with cumulative changes generally contributing from 10 to 20 percent by 2023. China stands out for its particularly muted contribution, consistent with earlier evidence (Figure 3) of stable and subdued import price growth from Chinese suppliers. Despite the moderate magnitude of regional contributions, their combined effect results in a substantial aggregate increase of nearly 50 percent—underscoring the broad-based nature of within-source price changes over the past three decades.

The right panel shows the contributions of major regions to import price changes arising from sourcing reallocation. China plays a central role: increased U.S. sourcing from China exerted sustained downward pressure on import prices, cumulatively reducing them by around 8 percent through 2017. Beginning around 2018, this trend reverses, as sourcing shifts away from China—likely in response to rising trade tensions—partially unwind these earlier gains. Reallocation effects from other regions, including North America and the EU, remain relatively small and stable over the period. The rest of the world (ROW) exerted modest downward pressure early in the sample, followed by a gradual reversal in recent years.

Overall, these findings highlight the significance of sourcing reallocation as a driver of import price dynamics and the central role of China within this channel. The pronounced and persistent effects associated with shifts in sourcing to and from China contrast with the comparatively limited contributions from other regions, underscoring China's distinctive influence on the reallocation component of U.S. import prices.

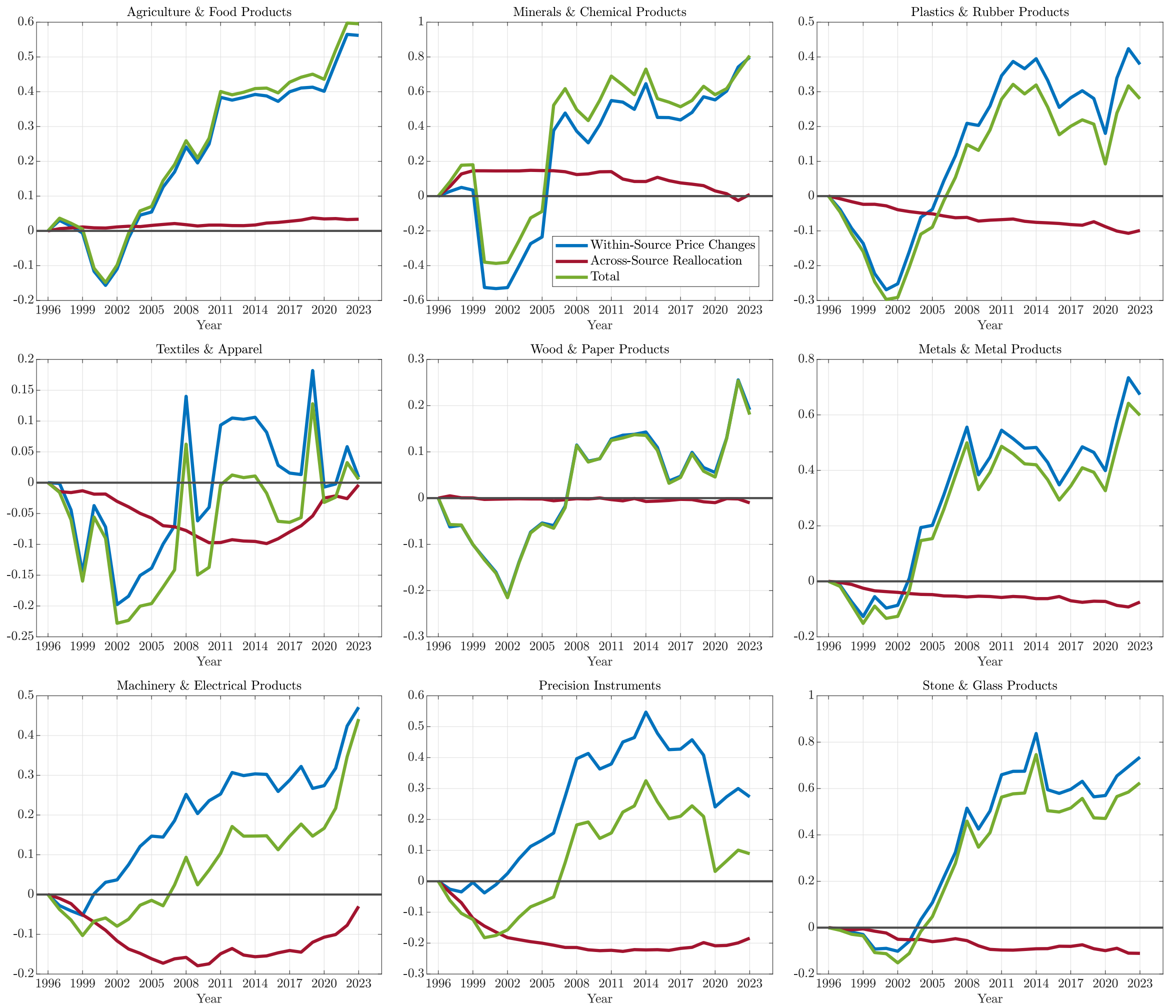
4.4 Product-Level Results

While the aggregate decompositions presented above highlight the overall importance of within-source price changes and sourcing reallocations, these effects can vary significantly across different types of imported products. We now investigate this heterogeneity by decomposing import price dynamics along two distinct product-level dimensions. First, we consider variation across major product categories, assessing the extent to which different products exhibit distinct patterns of price changes and sourcing adjustments. Second, we investigate how these decompositions differ according to the economic use of the products, differentiating between consumption goods, intermediate inputs, and capital goods.

4.4.1 Across Broad Product Categories

Figure 8 presents the decomposition of cumulative import price changes into within-source price changes and across-source reallocation effects across major product categories. In several sectors, within-source price changes account for nearly all of the observed import price growth, with sourcing reallocation playing only a negligible role. This is particularly true for Agriculture & Food Products and Wood & Paper Products, where sourcing patterns remain relatively stable over time. In contrast, categories such as Machinery & Electrical Products, Precision Instruments, and Textiles & Apparel exhibit more substantial reallocation effects, with shifts toward lower-cost suppliers contributing significantly to downward

Figure 8: Import Price Decomposition Across Broad Product Categories



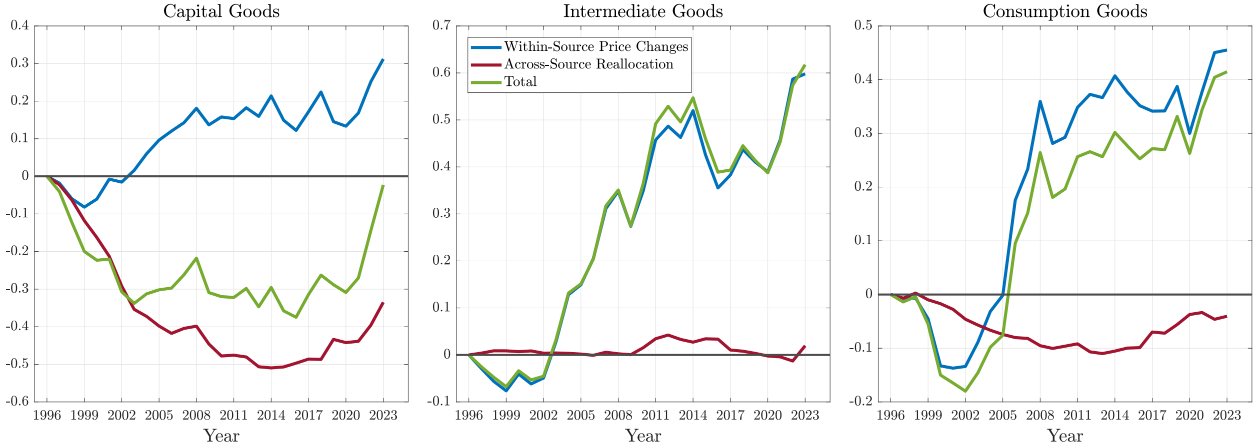
pressure on prices. These patterns underscore the substantial heterogeneity across sectors in the contribution of sourcing reallocation to import price dynamics.

4.4.2 Across Consumption, Intermediates, and Capital Goods

To assess how the importance of within-source price changes and sourcing reallocation varies by product use, we decompose import price changes into capital goods, intermediate inputs, and consumption goods. Figure 9 presents the aggregate decomposition separately for these three categories. While within-source price changes dominate across all groups, their magnitude and the contribution of sourcing reallocation vary considerably.

For capital goods, sourcing reallocation plays a sizable role. Although within-source prices rise steadily over time, shifts toward lower-cost suppliers more than offset these in-

Figure 9: Aggregate Decomposition



creases, causing aggregate import prices for capital goods to decline substantially through much of the sample. At its peak, reallocation lowered the cumulative import price index by nearly 50 percentage points. This effect begins to unwind after 2018, as sourcing patterns shift.

Intermediate goods exhibit a markedly different pattern. Aggregate import prices in this category closely mirror within-source price changes, with only minor contributions from sourcing reallocations. This alignment suggests that sourcing composition across countries has remained relatively stable for intermediate goods over the sample period.

Consumption goods exhibit a moderate role for sourcing reallocation. For most of the sample period, aggregate import price dynamics largely reflect within-source price changes, with sourcing reallocation exerting modest downward pressure. This effect gradually intensifies through 2016–2017, as sourcing shifts toward lower-cost suppliers. Beginning around 2017, however, this trend reverses, and reallocation begins to contribute upward pressure on import prices. This shift coincides with the onset of trade tensions and tariff increases affecting a range of consumption goods.

To better understand the regional drivers of sourcing reallocation, Figure 10 decomposes sourcing reallocation effects by major trading partner across product categories. China plays a central role throughout, particularly for capital goods, where increased sourcing from China accounts for most of the sustained downward pressure on import prices through 2018. For intermediate and consumption goods, China's contribution is smaller in magnitude but still significant. In contrast, contributions from North America and the EU are generally modest and relatively stable over time, reflecting more limited shifts in sourcing toward or away

Figure 10: Across Source Reallocation, by Country

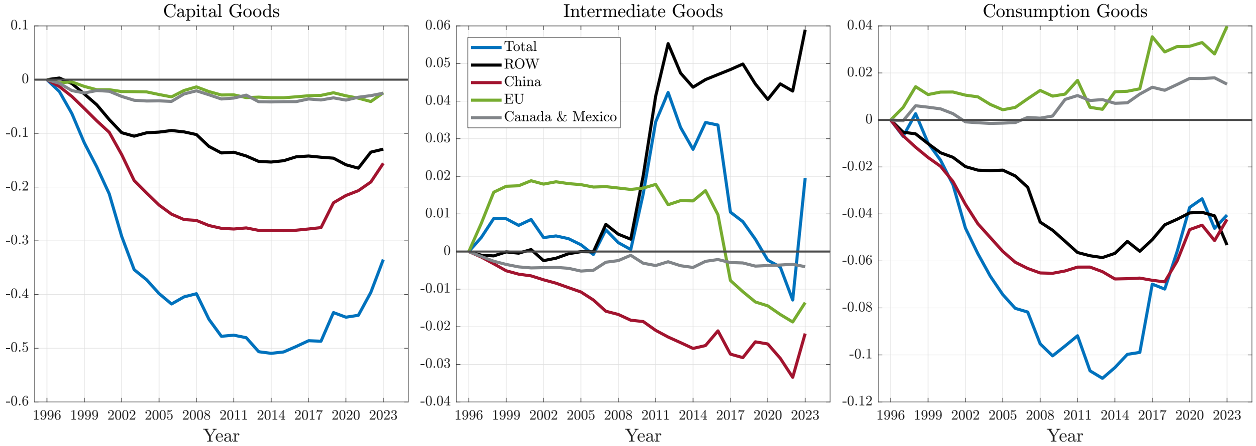
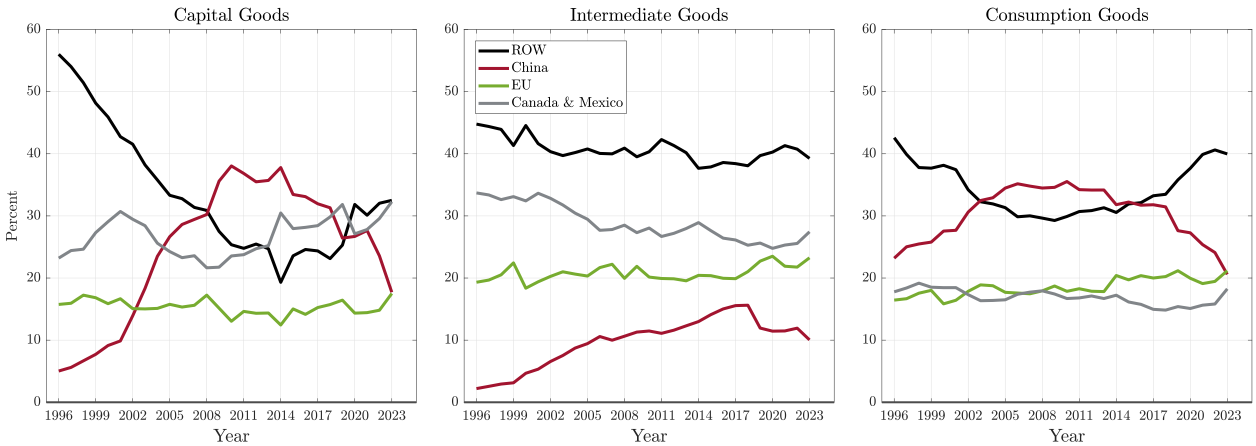


Figure 11: Share of Imports by Source Country

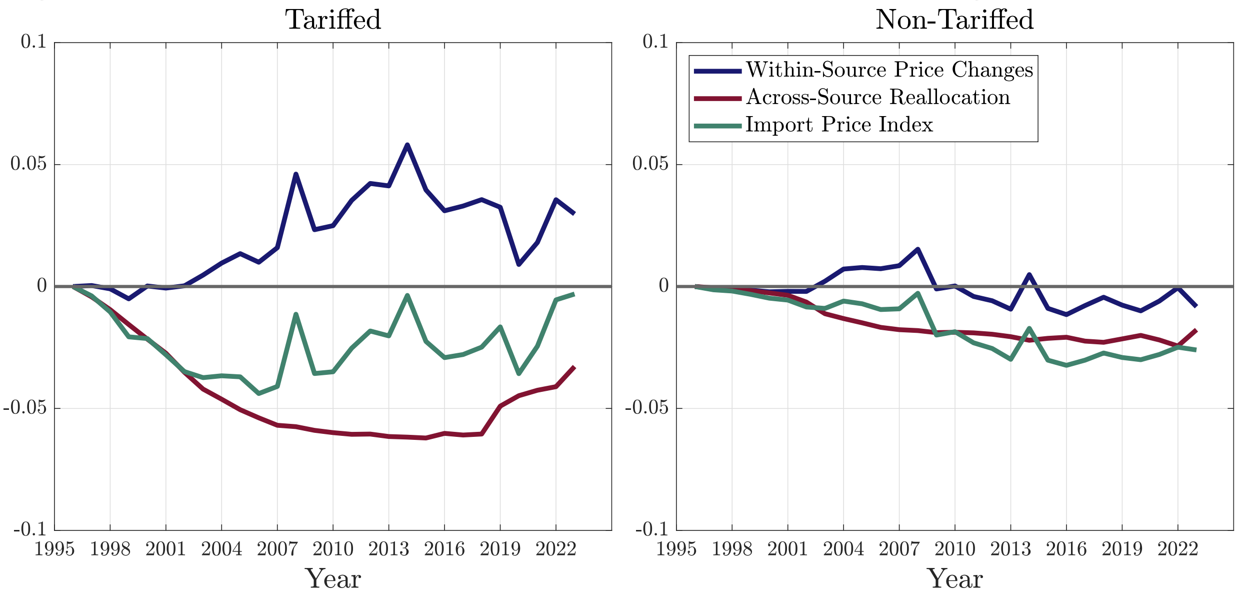


from these partners.

Figure 11 provides further context by showing the share of imports sourced from each major region over time. For capital goods, the pronounced rise and subsequent decline in China's import share mirrors the dynamics of its reallocation effect. For intermediate goods, the sourcing structure is more stable, with ROW remaining dominant and China's share rising gradually. In the case of consumption goods, China's share rises sharply in the early 2000s and remains elevated until declining after 2018, in parallel with the reversal in its contribution to reallocation effects.

Together, these figures highlight the key role of China in driving sourcing reallocation patterns across product types. They also illustrate how shifts in sourcing shares can translate into meaningful movements in aggregate import prices over time.

Figure 12: Decomposition of Import Prices from China During 2018 Trade War



4.5 Sourcing Reallocation after the 2018 Trade War

The preceding analysis highlights the role of sourcing reallocation, particularly involving China, in shaping aggregate import price dynamics. To assess how sourcing patterns respond to changes in trade policy, we examine the 2018 U.S.–China trade war, which introduced substantial tariff increases on selected categories of Chinese imports. Figure 12 compares the contribution of Chinese goods to the aggregate U.S. import price index, separately for products subject to the 2018 tariffs and for those that were not. For each group, the figure shows the decomposition into within-source changes, across-source reallocation, and their sum. By contrasting goods directly affected by the tariffs with those whose tariffs remained unchanged, we assess how increased trade costs influenced sourcing reallocation and price dynamics.

The left panel of Figure 12 shows the contribution of tariffed Chinese goods to the aggregate import price index. The green line reflects the total contribution, while the red and blue lines show the underlying decomposition into across-source reallocation and within-source price changes, respectively. Following the onset of the trade war, sourcing away from China accelerates notably, reversing the direction of the reallocation effect. Whereas reallocation had previously placed sustained downward pressure on import prices, it begins to contribute upward pressure starting in 2018. This shift gradually offsets part of the earlier price decline, raising the cumulative import price index for tariffed goods by the end of the sample.

The right panel focuses on Chinese goods that were not subject to the 2018 tariff increases. Unlike tariffed goods, this group shows no discernible change in price dynamics following the introduction of tariffs. Sourcing reallocation remains relatively stable, and within-source price changes continue to follow a steady path, with no evident break after 2018. These muted responses suggest that the tariff shocks had limited spillover effects on non-tariffed categories. More broadly, the dynamics of these goods also differ from those of tariffed products in the years leading up to the trade war, suggesting structural differences in how these categories evolved over time.

Together, these findings highlight how sharply import sourcing patterns respond to trade policy. The contrast between tariffed and non-tariffed goods illustrates that targeted trade barriers can drive meaningful shifts in sourcing composition, with measurable effects on import price dynamics.

5 Implications for Aggregate Consumer Price Changes

Changes in import sourcing affect not only import price indexes but also broader measures of aggregate prices, such as the Consumer Price Index (CPI) and the Personal Consumption Expenditures (PCE) index. The goal of this section is to quantify the impact of these import sourcing changes on aggregate consumer prices. To do so, we distinguish two key channels. First, a *direct effect*, reflecting the impact on consumer prices arising from changes in the price of imported consumer goods. Second, an *indirect effect*, arising from the impact of changes in the prices of imported capital goods and intermediate inputs on the price of domestically-produced goods. We begin by introducing an analytical framework that captures these two channels explicitly, followed by our empirical implementation and the decomposition of the resulting effects.

5.1 Analytical Framework

While the model presented in Section 3 focuses on the composition and pricing of imports, we now expand the analysis to consider final consumption, which includes both imported and domestically produced goods, as well as the determinants of domestic production. This broader setup allows us to formalize the direct and indirect channels through which sourcing changes affect aggregate consumer prices.

5.1.1 Aggregate Consumption — Direct Effect of Imports

Consider a representative firm producing an aggregate final consumption good by combining domestically-produced and imported goods. The production technology is Cobb-Douglas:

$$C_t = D_t^{\beta} M_t^{1-\beta},$$

where C_t denotes aggregate consumption, D_t is the quantity of domestically produced goods, and M_t is the quantity of imported goods. The parameter $\beta \in (0, 1)$ captures the expenditure share on domestically produced goods.

Given prices for domestic goods (P_t^D) and imported goods (P_t^M), the representative firm chooses quantities to maximize profits subject to the above production function. For clarity, in this section we write the aggregate import price index as P_t^M (denoted P_t in previous sections). The solution implies that the aggregate consumption price index at time t can be expressed as:

$$P_t^{\text{CPI}} = \left(P_t^D\right)^{\beta} \left(P_t^M\right)^{1-\beta},$$

where P_t^M was previously decomposed into sourcing and price effects.

5.1.2 Aggregate Output — Indirect Effects

We now characterize the indirect effects of imported capital and intermediate inputs on the price index of domestically produced goods P_t^D. Consider a representative domestic firm producing output D_t using labor (L_t), capital (K_t), and intermediate inputs (X_t) according to a Cobb-Douglas technology:

$$D_t = A_t L_t^{\alpha} K_t^{\gamma} X_t^{1-\alpha-\gamma},$$

where A_t denotes total factor productivity, and parameters α and γ capture the shares of labor and capital in value added. Labor is paid a real wage w.

Intermediate inputs are produced by combining domestic (X_t^D) and imported (X_t^M) varieties, aggregated via a Cobb-Douglas technology:

$$X_t = \left(X_t^D\right)^{\theta_X} \left(X_t^M\right)^{1-\theta_X},$$

where θ_X denotes the domestic input share.

Investment (I_t) combines domestic (I_t^D) and imported (I_t^M) investment goods via a Cobb-Douglas aggregator:

$$I_t = \left(I_t^D\right)^{\theta_I} \left(I_t^M\right)^{1-\theta_I},$$

where θ_I denotes the share of investment sourced domestically. Aggregate capital (K_t) then evolves according to a standard law of motion:

$$K_t = (1-\delta)K_{t-1} + I_t,$$

with depreciation rate δ.

Given these technologies, we derive the price of domestically produced goods, P_t^D, which reflects the cost of labor, capital, and intermediate inputs—some of which are themselves affected by import prices. In particular, this price equals the cost-minimizing geometric average of input prices, weighted by their elasticities:

$$P_t^D = w^{\alpha} r_{K,t}^{\gamma} P_{X,t}^{1-\alpha-\gamma},$$

where w is the real wage, $r_{K,t}$ is the user cost of capital, and $P_{X,t}$ is the price index of intermediate inputs.

The user cost of capital is defined as a weighted average of the rental rate on previously installed capital, denoted r_t, and the rental rate on newly installed capital, denoted r_t^{new}. The weights correspond to the respective shares of existing and new capital in the total stock, with the share of new capital given by the investment-to-capital-stock ratio I/K:

$$r_{K,t} = (1 - I/K)r_t + (I/K)r_t^{new}.$$

We treat r_t as fixed, while r_t^{new} reflects current investment conditions and is given by:

$$r_t^{\text{new}} = P_{I,t}(i_t + \delta - \pi_t),$$

where $P_{I,t}$ is the investment goods price index, i_t is the nominal interest rate, δ is the depreciation rate, and π_t is expected inflation in investment goods.

Given intermediate and investment goods are Cobb-Douglas aggregates of domestic and imported components, their price index is given by:

$$P_{X,t} = (P_{X,t}^D)^{\theta_X} (P_{X,t}^M)^{1-\theta_X},$$
$$P_{I,t} = (P_{I,t}^D)^{\theta_I} (P_{I,t}^M)^{1-\theta_I}.$$

where θ_X and θ_I denote the domestic input shares for intermediate and investment goods, respectively.

Substituting these expressions into the price index for domestically produced goods:

$$P_t^D = w^\alpha \left[(1 - I/K)r_t + (I/K)\left(P_{I,t}^D\right)^{\theta_I}\left(P_{I,t}^M\right)^{1-\theta_I}(i_t + \delta - \pi_t)\right]^\gamma \left(P_{X,t}^D\right)^{(1-\alpha-\gamma)\theta_X}\left(P_{X,t}^M\right)^{(1-\alpha-\gamma)(1-\theta_X)}.$$

This expression highlights how import prices enter the cost of domestic production both through intermediate inputs (P_{X_M}) and through investment goods ($P_{I,t}^M$) via their effect on the user cost of capital.

5.1.3 Combined Effect on Consumption Prices

We now combine the direct and indirect effects derived above to characterize the full impact of import prices on consumer prices. Substituting the expression for P_t^D into the aggregate CPI formula yields:

$$P_t^{\text{CPI}} = \left\{w^\alpha \left[(1 - I/K)r_t + (I/K)(i_t + \delta - \pi_t)(P_{I,t}^D)^{\theta_I}(P_{I,t}^M)^{1-\theta_I}\right]^\gamma \left[(P_{X,t}^D)^{\theta_X}(P_{X,t}^M)^{1-\theta_X}\right]^{1-\alpha-\gamma}\right\}^\beta (P_t^M)^{1-\beta}$$

This expression shows that import prices enter the consumption price index through three channels: directly via imported consumption goods (P_t^M), and indirectly through imported investment goods ($P_{I,t}^M$) and intermediate inputs ($P_{X,t}^M$).

We take logs and first differences of the expression above to obtain a decomposition in log changes. To focus on the role of import prices, we assume that all non-import price components, such as domestic wages, the rental rate on existing capital, and the prices of domestic inputs, remain constant over time. As a result, their log changes drop out of the decomposition, leaving only the contribution of imported goods.

The capital cost term involves a convex combination of a fixed component and a time-varying component that depends on investment prices. Since the log of a sum does not equal the sum of logs, we approximate:

$$\Delta \log r_{K,t} \approx (I/K)\Delta \log P_{I,t},$$

assuming that $(i_t + \delta - \pi_t)$ and r_t are constant over time, and that the investment-to-capital-stock ratio I/K is small and stable. Because $P_{I,t}$ is a Cobb-Douglas aggregate of domestic and imported investment prices, we have:

$$\Delta \log P_{I,t} = \theta_I \Delta \log P^D_{I,t} + (1-\theta_I)\Delta \log P^M_{I,t}.$$

Substituting these expressions into P_t^{CPI} above, yields the following decomposition:

$$\Delta \log P_t^{\text{CPI}} = (1-\beta)\Delta \log P_t^M + \beta\gamma(I/K)(1-\theta_I)\Delta \log P^M_{I,t} + \beta(1-\alpha-\gamma)(1-\theta_X)\Delta \log P_{X_M,t}.$$

This decomposition isolates how changes in import prices affect aggregate consumer prices through three distinct channels: imported consumption goods, imported capital goods, and imported intermediate inputs.

5.2 Empirical Implementation

To quantify the effects of import sourcing changes on aggregate consumer prices, we apply the P_t^{CPI} decomposition derived above using disaggregate trade data and calibrated structural parameters. The decomposition requires two main inputs: (*i*) time series of import price indices for consumer goods, intermediate inputs, and investment goods, and (*ii*) parameter values characterizing the structure of domestic production, including input cost shares and expenditure weights.

We use the import price indices constructed in Section 4, based on the decomposition developed in Section 3. Specifically, we use the import price index for consumer goods, P_t^M, as well as the indices for imported intermediate inputs, $P_{X_M,t}$, and imported investment goods, $P^M_{I,t}$. Each of these series is available both in aggregate form and decomposed into within price changes and across-source reallocation effects, allowing us to isolate the specific contribution of sourcing changes to the dynamics of each price component.

We also require a set of parameters that control input and expenditure shares. These include the share of domestic goods in consumption (β), the shares of labor and capital in gross output (α, γ), and the domestic shares of intermediate inputs (θ_X) and investment

Table 1: Parametrization

Parameter	Description	Value
β	Share of domestic goods in consumption	0.95
α	Labor share in gross output	0.28
γ	Capital share in gross output	0.28
θ_X	Domestic share of intermediate inputs	0.91
θ_I	Domestic share of investment goods	0.72
I/K	Investment-to-capital-stock ratio	0.16

Note: Parameter values are calibrated from the Bureau of Economic Analysis (BEA) Input-Output Tables or drawn from standard values in the macroeconomic literature. All values are interpreted as annualized steady-state levels.

goods (θ_I). In addition, we calibrate the investment-to-capital-stock ratio (I/K). Table 1 summarizes the baseline parameter values used in the analysis, computed from the Bureau of Economic Analysis (BEA) Input-Output Tables.

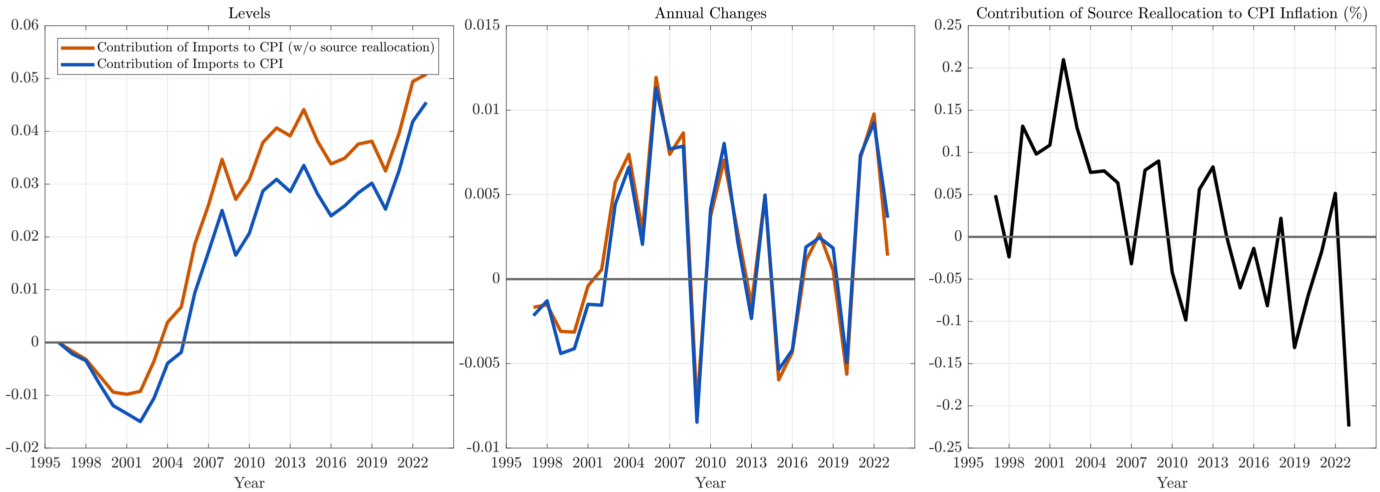
5.3 Decomposition of Changes in Consumer Prices

We use the decomposition derived above to quantify how imports of consumer goods, capital goods, and intermediate inputs contribute to changes in the CPI. For each category, the contribution is computed from the corresponding import price index. We further split each category's price changes into within-source and across-source components to isolate the role of sourcing reallocation.

Figure 13 presents the decomposition of CPI changes due to imports over the sample period. The left panel reports the cumulative contribution of import prices to the CPI, the middle panel plots the year-on-year changes in both the within-source and total series, and the right panel shows the contribution of across-source reallocation, calculated as the difference between the two series.

The left panel indicates that, over the full sample period, import prices contributed to an increase in the CPI of nearly 5 percent. This cumulative effect reflects both an initial period of downward pressure in the early 2000s—associated with declining import prices and increased sourcing from lower-cost suppliers—and a more recent period in which rising import prices and changes in sourcing patterns contributed positively to consumer price

Figure 13: Contribution of Import Prices to CPI Changes



inflation.

The orange line shows the impact of imports on the CPI when excluding sourcing reallocation, holding sourcing shares fixed, while the blue line includes both within-source price changes and reallocation effects. The orange line lies consistently above the blue line, indicating that the contribution of imports to the CPI has always been higher when sourcing reallocation is excluded. The gap between the two series widens during the early 2000s, narrows somewhat in the mid-2010s, and increases again toward the end of the sample, reflecting fluctuations in the effect of sourcing reallocation on import-driven consumer price changes.

The middle panel shows the year-on-year changes in the CPI attributable to imports, comparing the series with and without sourcing reallocation. The two move closely together, but the gap between them marks periods when sourcing changes altered the effect of import prices on overall CPI changes. The right panel plots this gap directly. It is positive for much of the first half of the sample, indicating that reallocation dampened the annual effect of imports on the CPI, and turns negative in recent years, implying a modest positive contribution to CPI changes.

Overall, the decomposition shows that sourcing reallocation has systematically tempered the effect of imports on consumer prices for much of the past three decades, with the largest dampening occurring in the early 2000s. In more recent years, this effect has diminished and occasionally reversed, as changes in sourcing patterns have contributed modestly to upward movements in the CPI. These patterns underscore that the price impact of imports depends not only on movements in supplier prices, but also on the evolving composition of import sources.

6 Concluding Remarks

This paper develops a framework to quantify how changes in the composition of import suppliers affect both aggregate import and consumer prices. We begin by documenting systematic differences in the levels and dynamics of import prices across source countries, and show that sourcing reallocation, particularly toward lower-cost suppliers, has historically placed downward pressure on aggregate import prices in the United States. More recently, shifts away from low-cost suppliers such as China have partially reversed these effects, contributing to rising import prices and reshaping the cost structure of U.S. trade.

We then embed these patterns into a simple analytical framework to trace their effects through to consumer prices. By decomposing changes in the CPI into contributions from imported consumption goods, capital goods, and intermediate inputs, we isolate the role of import sourcing in shaping aggregate price dynamics. Our results highlight that sourcing reallocation can have significant and persistent effects on observed import and consumer price indices. As global supply chains continue to evolve, tracking the composition of import sources, and not just average foreign prices, remains essential for understanding the behavior of aggregate prices in open economies.

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