Tracking the Short-Run Price Impact of U.S. Tariffs*

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Abstract

Using daily prices from major U.S. retailers, AI-based trade classifications, and country-of-origin data, we construct high-frequency indices to measure the short-run effects of the 2025 U.S. tariffs. Prices rose after the March tariffs and climbed through October. Increases were larger for imported than domestic goods, for affected goods within each group, and for Chinese products and cheaper varieties. Domestic increases suggest competitive spillovers. We estimate that after seven months, retail tariff pass-through reached 25 percent, consumers bore 45 percent of the tariff burden, and annual CPI inflation would have been about 2.2 percent rather than 3 percent without the tariffs.

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1 Introduction

In early 2025, the United States introduced broad new import tariffs, marking one of the largest shifts in U.S. trade policy in recent decades. These measures represent a rare opportunity to study how large tariff changes in a developed country affect consumer prices and inflation dynamics. Quantifying these effects, however, is difficult because official consumer price indices are released at coarse levels of aggregation and frequency, obscuring short-run price movements and differences across products and trading partners. Absent clear and timely evidence, U.S. policymakers continue to debate whether tariffs raised retail prices in the short run.

We answer this question by constructing a high-frequency database that tracks retail prices for goods with different tariff exposure across sectors and source countries. We link daily prices from five major U.S. retailers—covering over 80 percent of commodities in the CPI basket—with country-of-origin data obtained via Universal Product Code (UPC) matching or generative AI. We then use AI to classify these products with 10-digit Harmonized System (HS-10) trade codes and retrieve their tariff rates from data provided by the U.S. International Trade Commission (USITC) and the Census Bureau. The resulting data cover the period from October 1, 2024, to October 1, 2025, seven months after the first major tariffs were imposed. This combined dataset enables us to trace how retail prices for affected and unaffected goods evolve across product categories and trading partners, estimating the short-run timing and magnitude of tariff pass-through with a level of precision not achievable in official statistics.

Our empirical strategy proceeds in three steps. We first present descriptive price indices and evaluate post-tariff changes against three benchmarks: the March 4 price level, extrapolated pre-tariff trends, and unaffected products. For our main pass-through estimates, we follow Cavallo et al. (2021) and use a standard difference-in-differences-style regression with distributed lags that exploits variation in tariff changes across products and over time. Finally, we aggregate price deviations under the three benchmarks using official CPI expenditure weights to estimate the tariffs' contribution to the all-items CPI.

We find that retail prices rose sharply following the March 2025 tariff implementation and continued to increase gradually over subsequent months. The impact can be seen for both imported and domestic goods, implying significant spillovers. Between March and October, prices of imported goods increased by 4.3 to 6.3 percent, depending on the counterfactual benchmark, while domestic goods rose by 1.2 to 3.7 percent. These increases are sizable relative to the average increase in applied tariff rates of 23.8 percentage points in our sample. Within each group, affected products experienced larger increases than unaffected products. In particular, for domestic goods, the increases are concentrated in categories with greater exposure to tariff-affected imports, suggesting an important role for strategic complementarities in short-run pricing dynamics.

Price responses also varied across trading partners and sectors. Chinese goods—subject to

higher or more persistent tariffs—experienced larger and more sustained price increases than those from Canada and Mexico, where USMCA exemptions reduced applied tariffs.[1] Across product categories, the greatest effects were concentrated in household furnishings and miscellaneous goods, both highly dependent on Chinese imports. Food, which is mostly domestic, and electronics, which were largely exempted, showed smaller or insignificant deviations from pre-tariff trends. Within categories, cheaper varieties exhibited faster price increases than higher-priced ones, suggesting that firms with thinner markups may have passed through a larger share of tariff costs. The heterogeneous responses highlight the importance of product characteristics, markups, and sourcing structure in shaping short-run price dynamics. They also point to important distributional implications, as low-income households, which disproportionately consume lower-priced goods, likely faced more tariff-induced inflation in the short run.

Under our baseline pass-through specification using applied tariff rates and detrended price changes, retail pass-through is estimated at up to 25 percent after seven months. These rates are higher and materialized faster than those observed during the 2018–2019 U.S.–China trade war, but remain incomplete, reflecting gradual transmission and uncertainty about policy persistence. Assuming full pass-through at the border, consistent with recent evidence (Gopinath and Neiman, 2026; Hinz et al., 2026), and a 50 percent import cost share at the retail level, we estimate that U.S. consumers paid 45 percent of the tariff burden in the short run, with the rest absorbed by U.S. firms.

Despite gradual pass-through, the estimated impact on inflation is significant. Aggregating price deviations for imported and domestic goods using official CPI expenditure weights, we estimate that tariffs potentially added up to 0.78 percentage points to the all-items CPI. This implies that the annual inflation rate in the non-seasonally adjusted CPI—which stood at 3 percent at the end of our sample—would have been close to 2.2 percent without the tariffs, a level broadly consistent with the Federal Reserve's target.

We interpret the magnitude of these estimates with caution, as they depend on the counterfactual and identifying assumptions. The descriptive indices compare observed price movements to benchmarks based on no trend, pre-tariff trends, or unaffected products. The pass-through regressions use product-level variation in applied tariff changes and require that deviations from the included controls are not systematically correlated with tariff exposure. These assumptions are strong in a setting with volatile pre-period prices, overlapping tariff announcements, and potential spillovers to domestic goods. We therefore present the results as an informative range of estimates on short-run price adjustment patterns, rather than a definitive causal decomposition.

Our paper contributes to a growing literature on tariff pass-through. Recent border evidence

[1]The United States–Mexico–Canada Agreement (USMCA) is the free-trade agreement among the three countries, in force since 2020 as the successor to NAFTA. Goods meeting its rules of origin were exempted from the tariffs imposed on Canada and Mexico in March 2025; Section 3.4 documents the extent of these exemptions.

finds that tariffs are almost fully passed through to duty-inclusive import prices and lead to large declines in trade volumes (Amiti et al., 2019b; Fajgelbaum et al., 2020; Cavallo et al., 2021; Gopinath and Neiman, 2026). However, evidence on how tariff increases transmit to retail prices remains limited due to data constraints. One exception is Cavallo et al. (2021), who use a similar approach combining micro-level retail price data with tariff classifications to study the 2018–2019 trade war. We extend their framework to the 2025 episode and augment the data with substantially broader country-of-origin coverage, AI-assisted HS-10 classification, and applied tariff rates. Like them, we find that tariff pass-through to consumer prices is incomplete in percentage terms, reflecting frictions in the transmission from border costs to retail prices. However, our estimated pass-through rates are significantly higher than those observed during the earlier episode, when comparable estimates remained below 5 percent after one year.

Our results are similar to other micro-data estimates for the 2025 tariff episode, including evidence from Canada (Cavallo et al., 2026) and the United States (Hacıoğlu-Hoke et al., 2026). More broadly, our findings are consistent with studies emphasizing how domestic costs and margins dampen retail price responses to border cost shocks (Burstein et al., 2003; Nakamura and Zerom, 2010; Sangani, 2026; Flaaen et al., 2025). For domestic goods, our results support the competitive pricing mechanisms highlighted by Amiti et al. (2019a) and Flaaen et al. (2020). At the aggregate level, our estimated CPI impact is within the range of model-based predictions by researchers at the Federal Reserve, including Barbiero and Stein (2025), Minton and Somale (2025), and Dvorkin et al. (2025).

2 Data Construction and Measurement

2.1 Timeline of Tariff Announcements

The 2025 tariff changes unfolded in several stages. On February 4, the United States imposed an additional 10 percent tariff on imports from China. On March 4, this rate rose to 20 percent, while imports from Mexico and non-energy imports from Canada became subject to 25 percent tariffs; USMCA-compliant goods were exempted two days later. On April 2, the administration announced the "Liberation Day" regime, consisting of a 10 percent baseline tariff on nearly all countries and higher country-specific rates. Most of the higher rates were paused on April 10, while tariffs on Chinese imports rose to 145 percent. A May 12 agreement reduced the additional tariff on Chinese goods to 30 percent. On July 7–9, the administration sent letters to foreign governments announcing revised country-specific rates, including 25 percent for Japan and South Korea and 50 percent for Brazil. Finally, on September 29, it announced tariffs on lumber, wood furniture, and cabinets. Separate measures targeting steel and aluminum, automobiles and parts, copper, and related products were introduced throughout the year. The dashed vertical lines in our figures mark the March 4, April 2, May 12, July 7–9, and

September 29 announcements. Appendix A provides a complete timeline.

2.2 Retail Prices

We use daily product-level prices collected by PriceStats from the online stores of five large U.S. multichannel retailers from October 1, 2024 to October 1, 2025, including roughly seven months after the first major tariffs were implemented.[2] The data cover over 80 percent of the commodities component of the CPI (28.5 percent of the all-items basket), including furnishings, household goods, electronics, and food. Each product has a stable identifier, a detailed description, and a category assignment in the Classification of Individual Consumption According to Purpose (COICOP). Although prices are collected online, prior work shows that online and offline prices closely co-move within large retail chains, reflecting uniform pricing policies (Cavallo, 2017; DellaVigna and Gentzkow, 2019). In the Appendix, we further show that aggregate PriceStats inflation closely tracks official CPI-U inflation, and that a weighted index from our sample matches the official commodities CPI.

2.3 Country-of-Origin

To measure tariff exposure, we augment retail prices with product-level country-of-origin (COO) information obtained with two complementary approaches.

First, we use UPCs to match goods to an online-only retailer that discloses origin information on its website. Its large catalog overlaps substantially with the products sold by three of the five retailers in our sample, allowing us to obtain COO information for approximately 308,000 products.

Second, when UPC matches are unavailable, we use generative AI models to retrieve country of origin from any website where the product can be found. Validated against a sample of UPC-matched products, the AI-based approach correctly distinguishes domestic from imported goods in 88 percent of cases and identifies the exact country in 85 percent. This method substantially expands our coverage in food and beverages, where UPC matching is limited. More broadly, it offers a scalable approach for recovering COO information in retail datasets where such information is otherwise difficult to obtain.

2.4 Tariff Data

AI-based HS-10 Classifications We also need to assign retail products to HS-10 codes. Retail price data, however, are organized in consumption taxonomies such as COICOP, which

[2]Four retailers are large general-merchandise or grocery chains representing roughly 10 percent of 2024 U.S. retail trade sales (National Retail Federation, 2025; U.S. Census Bureau, 2025). The fifth is a specialized appliance and electronics retailer ranked among the top ten U.S. major-appliance retailers (TWICE, 2017).

map poorly into trade classifications, while existing concordances are too coarse to identify product-level tariffs. We therefore develop a hierarchical AI classification that assigns each product an HS-10 code from its description. Mimicking manual classification, products are first assigned to broad HS sections and then iteratively refined until reaching a unique HS-10 code. This coarse-to-fine approach leverages large language models, requires no labeled training data, and is fully scalable. Measurement error remains possible because some HS-10 distinctions depend on attributes often missing from retailer descriptions, including material composition, technical specifications, or value thresholds. However, as shown in Appendix B, their impact is limited because most 2025 tariff changes were country-level or broad product-group measures, so exposure depends more on origin than on the exact HS-10 code.

Statutory and Applied Rates Figure 1a shows the increase in the average tariff rates for the products in our sample, computed in two ways. First, we link each product's HS-10 classification to tariff rates using the successive 2025 revisions of the Harmonized Tariff Schedule. This provides the *statutory* tariff rates for each country–HS-10 combination. These statutory rates incorporate the tariff measures summarized in Section 2.1.

Statutory rates often differ from the duties firms actually pay. Many goods were exempted from the new tariffs, either by product (Section 3.2 describes these exemptions) or by origin (USMCA-compliant goods from Canada and Mexico).[3] We therefore also calculate *applied* tariff rates using U.S. Census Bureau import data, measured monthly as duties paid divided by the customs value of imports for each country–HS-10 pair (Azzimonti, 2025; Gopinath and Neiman, 2026). In our sample, applied rates rose gradually during 2025 and remained substantially below statutory rates in April and May. By the end of the period, the average applied tariff rate had risen by 23.8 percentage points, compared with a statutory increase of 27.8 percentage points.[4]

2.5 Combined Dataset

The final dataset includes 359,412 products with identified origins and daily price observations. Products are concentrated among a small number of source countries, with the U.S. and China accounting for most items. Coverage is skewed toward furnishings, household goods, and recreation, reflecting the product mix of large U.S. general-merchandise retailers. Appendix B provides additional details on data construction and validation, including country-of-origin retrieval, HS classification, tariff measurement, and sample composition.

[3]Tariffs apply only to goods entering the country after each measure takes effect, so shipments already in transit or imported in advance are not taxed.

[4]The two rates are moderately correlated (0.40–0.71 across aggregation levels), reflecting HS-level exemptions and daily-vs-monthly timing differences across sources, as shown in the Appendix. These patterns are consistent with estimates for all U.S. imports (Yale Budget Lab, 2025; Waugh, 2025; Gopinath and Neiman, 2026).

2.6 Price Index Methodology

We construct daily price indices using the chained matched-model approach described in Cavallo (2013). Prices are cleaned following CPI guidelines, with short gaps filled using the latest observation and extreme price changes excluded. For each product, we compute daily price relatives and aggregate them using unweighted geometric means within groups defined by country of origin, tariff exposure, and consumption category. These daily changes are chained over time to produce price indices normalized to one on March 4, 2025.

Price relatives are computed for products observed in two consecutive periods, allowing product entry and exit. We do not adjust for quality or seasonality, maintaining consistency across products and focusing on short-run dynamics. For aggregate CPI effects, we weight category-level indices using official CPI expenditure shares.

3 Price Impact

This section presents descriptive evidence on retail price adjustments following the 2025 tariffs. We first compare imported and domestic goods and then affected and unaffected products within each group, helping distinguish direct responses from spillovers into domestic prices. We next examine variation across countries, product categories, and price tiers to explore heterogeneity in price adjustment. Throughout, we evaluate post-tariff movements against three complementary benchmarks: the March 4 price level, extrapolated pre-tariff trends, and unaffected products. Because each benchmark relies on different assumptions, we emphasize conclusions that are robust across them. Appendix C reports additional country- and category-level results, as well as robustness checks with longer samples, balanced-panel indices, front-loading of inventories and product turnover. These comparisons are all descriptive, while Section 4 uses product-level variation in tariff changes to estimate pass-through.

3.1 Domestic vs Imported Goods

Figure 1b compares retail price indices for domestic and imported goods between October 1, 2024, and October 1, 2025, and pre-tariff trends through March 4, 2025.

Before the tariffs, two patterns are evident. First, imported-goods prices fell temporarily from late November to early January, reflecting holiday discounts in categories such as electronics and household products.[5] Second, both domestic and imported goods exhibited a mild deflationary trend during the initial months. Many goods, particularly electronics and furniture, enter at high prices and are gradually discounted over time; because the matched-model index does not link new to old models or adjust for quality, these markdowns appear as steady

[5]Similar holiday-season declines are visible in the PriceStats aggregate index and the official CPI in Figure A3, as well as in the Canadian micro price data used in Cavallo et al. (2026).

price declines. These pre-tariff trends provide a natural benchmark for evaluating subsequent price movements. Because their slopes differ across groups, we construct counterfactuals using group-specific trends. One concern is whether the estimated trends are sensitive to the choice of estimation window. Reassuringly, Appendix C.3 shows that extending the trend-estimation window back to January 1, 2024 produces broadly similar post-tariff deviations and leaves the main qualitative conclusions unchanged.

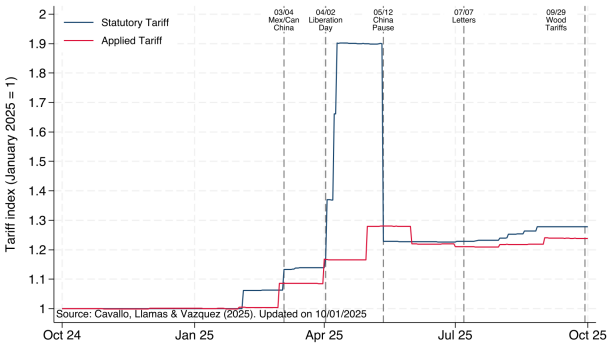
After the tariffs were implemented, four patterns emerge.

First, retail prices jumped sharply following the March 4, 2025 additional tariffs on China, Mexico and Canada. Within days, prices of imported goods rose by about 2 percent, while domestic prices increased by roughly half as much. Prices rose further after the April 2 "Liberation Day" announcement, which introduced a 10 percent baseline tariff on nearly all imports. Subsequent announcements were also reflected in prices: the May 12 pause, which cut tariffs on Chinese goods from 145 to 30 percent, coincided with a temporary decline, while the July announcements of higher country-specific rates were followed by renewed upward pressure. Because retailers sell mostly from inventories that entered the country before the tariffs took effect, goods sold within days of the announcements had likely not yet incurred additional duties. Instead, these rapid reactions suggest retailers are forward-looking, adjusting prices in anticipation of higher import replacement costs.

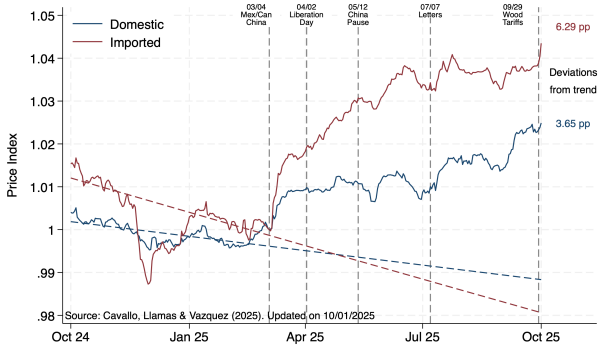
Second, prices continued rising gradually rather than as a one-time adjustment. After the initial response, prices followed a smooth and persistent upward trajectory, marking a break from pre-tariff trends. This pattern is consistent with heightened uncertainty regarding the level and duration of the tariffs, with firms adjusting prices incrementally as information becomes available rather than implementing large, one-time increases.

Third, domestic prices also increased steadily after March, including in categories not directly tariffed. This may reflect strategic complementarities in pricing, with reduced competition from foreign goods in categories where domestic and imported products are close substitutes (Amiti et al., 2019a), higher imported-input costs (Amiti et al., 2019b), or broader pricing adjustments in response to higher expected inflation. We examine these spillovers in Section 3.3.

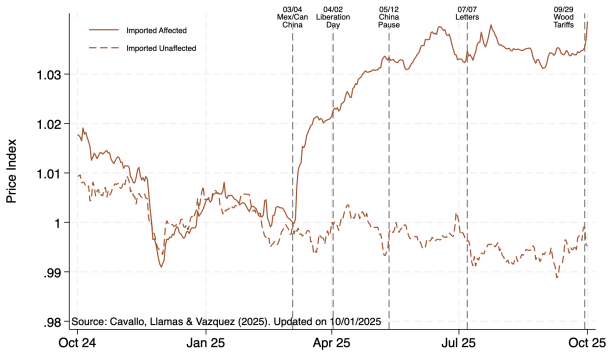
Finally, although these price increases seem modest relative to headline tariff rates, they are economically meaningful. In seven months, prices of imported goods rose by about 4.3 percent from their March 4 level and by 6.3 percent relative to pre-tariff trends, while domestic prices increased by 2.5 and 3.7 percent, respectively. These adjustments are sizable relative to the average applied tariff increase of 23.8 percentage points, suggesting a pass-through of roughly one quarter in the short run, which we formally estimate in Section 4.



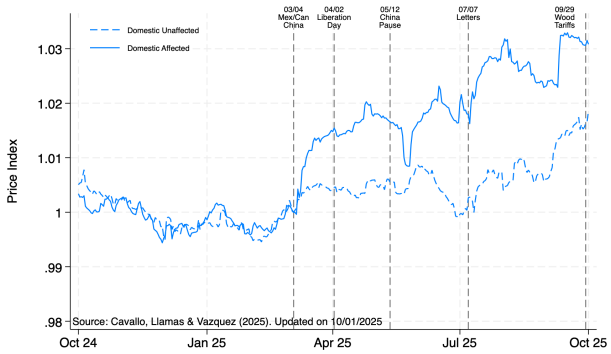
(a) Statutory vs Applied Tariff Rates



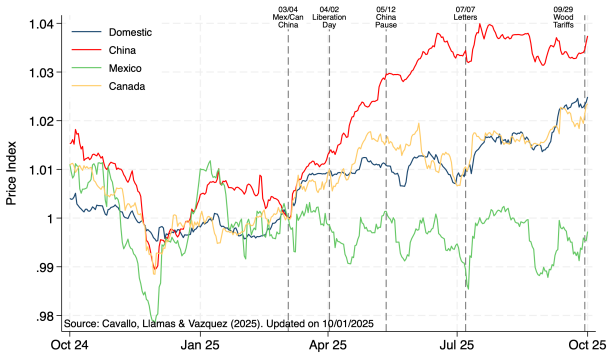
(b) Domestic vs Imported Goods



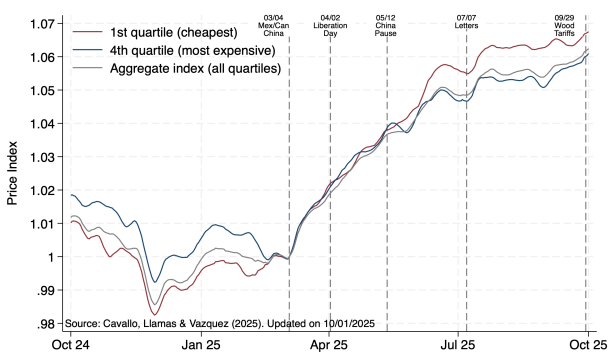
(c) Imported Goods: Affected vs Unaffected



(d) Domestic Goods: Affected vs Unaffected



(e) By Country of Origin



(f) By Price-Level Quartile

Figure 1: Retail price responses to the 2025 tariffs.

Notes: Panel (a) shows the average statutory and applied U.S. tariff rates over time as an index equal to one plus the additional tariff rate relative to January 2025. The remaining panels report retail price indices constructed from daily prices of five large U.S. retailers and normalized to 1 on March 4, 2025. Vertical lines indicate major tariff announcements. Panel (b) compares domestic and imported goods; (c) shows imported goods split by tariff exposure (affected vs unaffected); (d) shows domestic goods split by exposure to tariffed imports; (e) shows indices for domestic goods and the three foreign origins first targeted by the 2025 tariffs (China, Mexico, and Canada); (f) shows imported goods by pre-tariff price-level quartile.

3.2 Imported Goods: Affected vs Unaffected

We further classify imported goods as tariff-affected if their HS-10–country combination faced any additional tariff during the sample period. Under this definition, nearly all imported goods in our data are affected, with only a small number of exemptions (1,019 products), primarily pharmaceuticals, consumer electronics, selected auto parts, and minerals that were excluded even from the April baseline tariffs. These unaffected products are those whose HS codes appear on the published exemption lists and whose origin was not subject to one of the origin-based tariffs on China, Canada, and Mexico introduced in early 2025.

Figure 1c shows a stark contrast: prices of exempt imports remained roughly flat around the announcements, while other imports rose sharply as in Section 3.1. By the end of the sample, affected imported prices stood about 4.5 percent above unaffected ones. If post-March movements reflected broader inflation, exchange rates, or retailer markups, exempt and affected imports should have moved together. Instead, exempt categories were largely shielded despite sharing the same retail environment and time window.

3.3 Spillovers into Domestic Prices

The price increases documented in Section 3.1 show that the impact extended to domestic goods. An important question is whether higher prices for these goods reflect competitive spillovers induced by tariffs on foreign goods or higher imported input costs. We shed light on these mechanisms by exploiting variation in domestic goods' exposure to tariffed imports and the timing of price adjustments.

For domestic goods, we define exposure based on direct competition with affected imports. A domestic product is classified as affected if it belongs to a three-digit COICOP category in which more than half of the products are imported and tariff-affected. This definition is designed to isolate strategic complementarity spillovers (Amiti et al., 2019a), whereby domestic firms respond to competitors' prices rather than to their own costs. Input-cost channels likely operate more gradually and cannot be directly identified in our data, but they should not generate systematic differences across our groups.

Figure 1d shows a clear separation of about 1.2 percentage points between the two groups of domestic goods. The prices of *domestic affected* goods closely mirrored those of *imported affected* goods in timing, magnitude and dynamics, suggesting that spillovers to domestic prices operated primarily through strategic pricing complementarities. In contrast, the prices of domestic unaffected goods displayed only a mild upward deviation after March, consistent with indirect channels such as gradually higher input costs or broader inflationary pressures.

3.4 Heterogeneity across Countries and Categories

Price responses to the 2025 tariffs display substantial heterogeneity across countries of origin and product categories, reflecting differences in tariff exposure, import intensity, product composition, and market structure. We summarize the main patterns here and report more detailed results in Appendix C.

Across countries, retail price increases vary widely. Figure 1e plots price indices for the three largest U.S. trading partners, affected by the first country-based tariff actions: China, Mexico, and Canada. These tariffs were first announced in February and fully in place by March 4. Goods from China experienced the largest and most persistent increases, consistent with their higher and more sustained exposure. In contrast, Mexican goods prices remained essentially flat, reflecting extensive USMCA exemptions: the applied tariff on Mexican and Canadian goods in our sample rose by only 1.4 and 0.6 percentage points, against statutory increases of 25 and 35 percentage points.[6] Canadian prices nonetheless rose in April and May before stabilizing later on. Unlike Mexico, Canada retaliated with tariffs on U.S. goods, which may have raised input costs and policy uncertainty for Canadian exporters.

Figure 2 plots cumulative price changes since March 4 against the additional applied tariffs for all countries in our sample, highlighting in red those with at least 1,000 products. The relationship is weak: higher-tariff countries did not necessarily have larger retail price increases. This is because country samples pool products that differ in sectoral composition, markups, substitutes, inventories, and opportunities for trade diversion, among other factors that can affect pass-through. Turkey's large increase, for instance, is driven almost entirely by "Carpets and Other Floor Coverings," a highly differentiated category with limited substitutes.

[6] By July 2025, about 80 percent of U.S. imports from Mexico and Canada entered duty free under USMCA exemptions (Martínez-García and Mau, 2026).

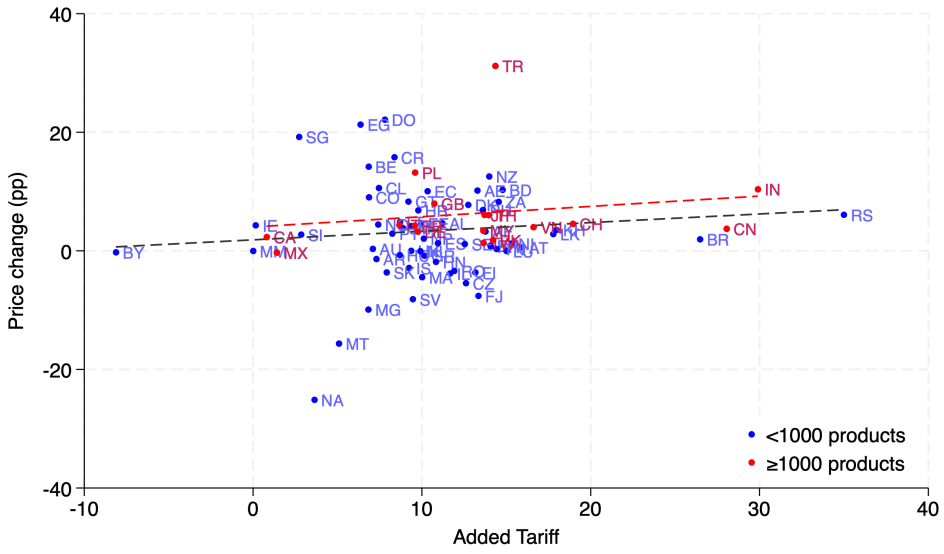


Figure 2: Added applied tariffs and cross-country price changes.

Notes: Each dot is a country of origin. The horizontal axis shows the additional applied tariff rate, in percentage points relative to January 2025, measured at the end of the sample as duties paid divided by the customs value of imports at the country–HS-10 level and averaged to the country level. The vertical axis shows the cumulative retail price change between March 4 and October 1, 2025. Countries shown in red have at least 1,000 products in the sample; all other countries are shown in blue. The black dashed line is a linear fit estimated using all countries; the red dashed line is a linear fit estimated using only those with at least 1,000 products.

Across categories, the largest price increases are concentrated in import-intensive sectors, particularly furnishings, household equipment, and miscellaneous goods, where a large share of products originates from China. Food categories, which are predominantly domestic, exhibit smaller deviations from pre-tariff trends, with the exception of coffee, where prices rose sharply following a 50 percent tariff increase on Brazilian imports. Electronics also show muted responses, consistent with widespread tariff exemptions.

3.5 Heterogeneity across Price Tiers

Another dimension of tariff exposure our data allow us to examine is whether price increases differ across cheaper and more expensive varieties within the same product category. This matters for distributional incidence because lower-income households disproportionately buy lower-priced varieties (Bils and Klenow, 2001; Handbury, 2021; Jaimovich et al., 2020). To study this margin, we rank imported goods within each three-digit COICOP category by their average pre-tariff price and group them into quartiles. We then construct separate price indices for each quartile using the baseline methodology.

Lower-priced varieties exhibit faster and larger price increases than higher-priced ones (Figure 1f). Between March and October 2025, prices in the lowest quartile rose by roughly 1

percentage point more than those in the highest quartile. This pattern is consistent with markup-based mechanisms in which cheaper goods carry thinner margins and pass through more of a cost increase (Mongey and Waugh, 2025). Similar patterns appear in studies of *cheapflation* during the post-pandemic inflation surge (Cavallo and Kryvtsov, 2024; Chen et al., 2024) and of exchange-rate depreciations (Cravino and Levchenko, 2017), suggesting that the unequal short-run impact of inflationary shocks across the price distribution remains important and underexplored.

3.6 Discussion

The three benchmarks have complementary strengths and limitations. The zero-trend benchmark measures changes relative to March 4 and is the most transparent, but it may understate the effect by ignoring the pre-tariff deflationary trend of these products. The pre-trend benchmark adjusts for that drift but can be sensitive to the trend estimation period. The unaffected-products benchmark avoids trend extrapolation and nets out shocks common to affected and unaffected goods, but it requires a comparable control group, which is small for exempt imports and may itself face indirect tariff effects.

Despite these differences, the benchmarks yield the same qualitative conclusions: prices rose after March, with larger increases for imported than domestic goods and for affected than unaffected products. Across benchmarks, imported prices increased by 4.3 to 6.3 percent, compared with 1.2 to 3.7 percent for domestic prices. Relative to the 23.8 percentage-point increase in applied tariffs, the imported price response indicates substantial but incomplete short-run pass-through, while the positive domestic response suggests meaningful competitive spillovers.

Several features support a tariff-related interpretation: price increases began around tariff announcement dates, were larger for affected products, and varied across countries and categories in ways that align with tariff exposure. These patterns remain descriptive, however, and may also reflect differences in import intensity, substitution possibilities, and market structure. To sharpen identification, the next section uses product-level variation in tariff changes within consumption sectors to estimate pass-through.

4 Tariff Pass-through and Incidence

We now turn to product-level pass-through regressions and use the resulting estimates to assess the incidence of the tariffs.

Following standard practice in the literature, we measure tariff pass-through as the percentage of tariff-induced changes in import costs that is reflected in final consumer prices. We estimate distributed-lag specifications using monthly observations, controlling for sector-level

effects and exploiting variation in tariff rates across products and over time. The frequency and granularity of the data allow us to assign tariff exposure and estimate its effects at the product level, while the specification facilitates direct comparisons with estimates from previous tariff episodes.

We note, however, that this approach assumes away spillovers across products. Domestic goods enter the regressions with zero tariff changes, even though the previous section suggests that tariffs affected their prices. To the extent that spillovers also raise the prices of domestic products, they narrow the observed price differential and attenuate the estimated coefficient. We therefore interpret our estimates as a lower bound on overall pass-through, capturing only the portion that can be directly attributed to the tariffs on imported products.

4.1 Pass-through Regressions

We estimate:

$$\Delta \ln p_{it} = \sum_{\ell=0}^{7} \gamma_\ell \, \Delta\tau_{i,t-\ell} + \alpha_k + \varepsilon_{it}, \tag{1}$$

where p_{it} is the retail price for item i in month t, measured as the first daily price observed in that month, and $\Delta\tau_{i,t-\ell}$ is the change in the log gross tariff rate applied to product i at month $t-\ell$. Applied rates are monthly by construction, and statutory rates are those in force on the date of the price observation. The fixed effects α_k are COICOP 3-digit sector fixed effects absorbing time-invariant differences in average monthly price changes across sectors. The lag structure lets price changes reflect tariff changes that took effect at different times. We show the cumulative pass-through after seven months by reporting the point estimate and standard error of $\sum_{\ell=0}^{7} \gamma_\ell$.

This specification is closely related to Cavallo et al. (2021). The sample includes all products in our retailers' data to which we can assign a valid tariff rate based on country of origin and HS classification, observed for at least eight consecutive months. Domestic products enter with a tariff rate of zero throughout, and the pass-through coefficient is identified from variation in tariff exposure, with domestic products serving as part of the within-sector comparison group.

Column (1) of Table 1, using statutory tariff rates, implies a seven-month pass-through of 6.0 percent. This number is low, but applied rates diverged sharply from statutory rates in mid-2025 (Figure 1a), as they incorporate exemptions and delayed implementation. Using the smaller change in applied tariff rates raises the pass-through to 21.7 percent, as shown in Column (2). The estimate rises further to 25 percent when the dependent variable is instead the log price change net of each product's pre-tariff trend, as in Column (3): for each product, we estimate its pre-tariff monthly rate of price change by regressing its log price on a linear monthly trend over January 2024 to March 2025, and subtract that rate from its log price

changes in every month, so that the regression captures price changes relative to that trend.[7]

Table 1: Pass-through Regression of Statutory and Applied Tariffs with Monthly Data

Variable		(1) Statutory	(2) Applied	(3) Applied Detrended	(4)
Tariffs 7 mo.	$\left(\sum_{\ell=0}^{7}\gamma_\ell\right)$	0.060	0.217	0.249	
		(0.056)	(0.064)	(0.071)	
Over 15 pp	$\left(\sum_{\ell=0}^{7}\gamma_\ell^O\right)$				0.254
					(0.075)
Under 15 pp	$\left(\sum_{\ell=0}^{7}\gamma_\ell^U\right)$				0.195
					(0.100)
Adjusted R^2		0.002	0.002	0.003	0.003
Observations		515,630	309,958	309,958	309,958
Products		128,539	100,122	100,122	100,122
Sector Fixed effects (COICOP-3)		Yes	Yes	Yes	Yes

Notes: Table reports estimated coefficients from distributed-lag regressions of monthly log price changes on changes in statutory or applied tariff rates, as described in Section 4.1. Pass-through is measured as the cumulative response over seven months. Standard errors are clustered by 3-digit COICOP category. Columns (2)–(4) include fewer products because applied rates, from U.S. Census import data, are unavailable for some HS–country combinations. In Column (4), a test of equality of the Over 15 pp and Under 15 pp cumulative coefficients gives a p-value of 0.43.

Finally, in Column (4) we report a specification that further splits the sample into those products that faced a cumulative tariff change above or below 15 percentage points. We find that pass-through is about 6 percentage points higher for goods facing tariff increases over this threshold. Although modest, this difference suggests that firms experiencing larger cost increases are more likely to pass them on to consumers, as predicted by state-dependent models of price setting (Cavallo et al., 2024).

The estimates in Table 1 rely on a parallel-trends restriction. In Columns (1)–(2), identification requires that, absent the tariff changes, products with different tariff exposure would have experienced similar residual monthly price changes within sectors. Columns (3)–(4) partially relax this restriction by removing product-specific linear trends estimated during the pre-tariff period. However, identification still requires that these trends would have continued in the absence of the tariffs. Similarly, non-tariff price shocks must not be systematically related to the timing or magnitude of tariff changes. Appendix D therefore presents several additional robustness exercises. First, we augment the baseline specification with month fixed effects and, separately, sector × month fixed effects to address some concerns about omitted non-tariff

[7]We use longer pre-trends because price indices are noisier at this level. Appendix D.2 reports similar results with shorter trends. Appendix B.2.2 and Table A5 show both statutory and applied estimates are robust to coarser HS aggregation absorbing HS-10 misclassification.

shocks. The estimated cumulative pass-through of applied tariffs declines only modestly. We also obtain similar or larger estimates when we add China-origin fixed effects, use shorter windows to estimate product-specific trends, or use tariff-exempt imported products as the control group.

In terms of magnitude, our estimates point to faster and larger transmission into retail prices than during the 2018–2019 trade war (Cavallo et al., 2021). This contrast may reflect the greater size and breadth of the 2025 tariffs and a more flexible post-COVID price-setting environment. Even so, pass-through remained incomplete after seven months, consistent with firms gradually raising prices and temporarily compressing margins amid continued uncertainty about tariff persistence.

4.2 Tariff Incidence

Our pass-through estimates measure the percentage response of retail prices to a tariff change, but that is not necessarily the share of the tariff cost borne by consumers. To estimate who paid for the tariffs, we need data or assumptions on border-price adjustment as well as the importance of distribution, margins, and other domestic costs in the retail price. In particular, if the imported cost is a relatively small fraction of the final retail price, a low percentage pass-through coefficient can still imply that consumers bear a substantial share of the tariff burden (Sangani, 2026).

Translating our estimates into incidence therefore requires two additional assumptions. First, foreign exporters must not offset the tariffs by lowering their prices. This assumption is consistent with the evidence in Gopinath and Neiman (2026) and Hinz et al. (2026), who find nearly complete pass-through of the 2025 tariffs to U.S. import prices in the short run. Second, we need the share of import costs in retail prices. Based on the literature's evidence that domestic distribution costs and margins account for approximately half of U.S. retail prices (Burstein et al., 2003; Goldberg and Campa, 2010), we use an import-cost share of 50 percent.

Under these assumptions, a 23.8 percent increase in border costs would raise retail prices by 11.9 percent under full dollar pass-through. By comparison, our detrended estimate implies a price increase of $100 \times 0.249 \times \ln(1.238) = 5.3$ percent for tariffed goods. We therefore estimate that consumers bore approximately 45 percent of the tariff-induced border cost after seven months.

Although this estimate is a lower bound because it excludes spillovers to domestic goods, it provides a useful interpretation of the pass-through coefficient: consumers bore a substantially larger share of the tariff burden than the retail price increase alone might suggest.

5 Estimated Impact on CPI

Beyond pass-through and incidence, a key policy question for the Federal Reserve is how tariff-driven price changes affected inflation dynamics. To assess this, we combine our data on both imported and domestic goods with official CPI expenditure weights and construct price index deviations relative to three alternative counterfactuals: the March 4 price level (zero-trend), the pre-tariff trend extrapolation, and unaffected-goods prices as the control group. These are the weighted-index analogues of the three benchmarks in Section 3.

In all cases, we compute chained price indices from daily prices within 3-digit COICOP categories and aggregate them using official CPI expenditure weights. For the zero-trend and pre-trend benchmarks, the deviation between the observed price index and the counterfactual is computed at the aggregate level. For the control-group benchmark, we instead construct affected and unaffected weighted indices separately for imported and domestic products, compute the affected–unaffected differential for each origin group, and combine the imported and domestic contributions using their product shares in our sample. In the first two benchmarks, we scale the resulting deviations by the 28.5 percent share of those goods in the all-items CPI, implicitly assuming that the sectors not covered by our data (mostly services) were not affected by the tariffs in the short run. Appendix E provides construction details.

As shown in Figure 3, the three counterfactuals put the cumulative CPI impact since March in a range of roughly 0.4–0.8 percentage points: 0.38 pp under the zero-trend benchmark, 0.67 pp under the pre-trend extrapolation, and 0.78 pp under the control group. The pre-trend is higher because it accounts for the downward drift of prices before the tariffs. The control-group estimate rises further, mostly because of a surge in domestic affected prices in July, as seen in Figure 1d. Overall, these magnitudes are consistent with the Fed's model-based projections using input–output tables, which imply increases of 0.5–0.8 percentage points in CPI or PCE inflation (Barbiero and Stein, 2025; Minton and Somale, 2025; Dvorkin et al., 2025).

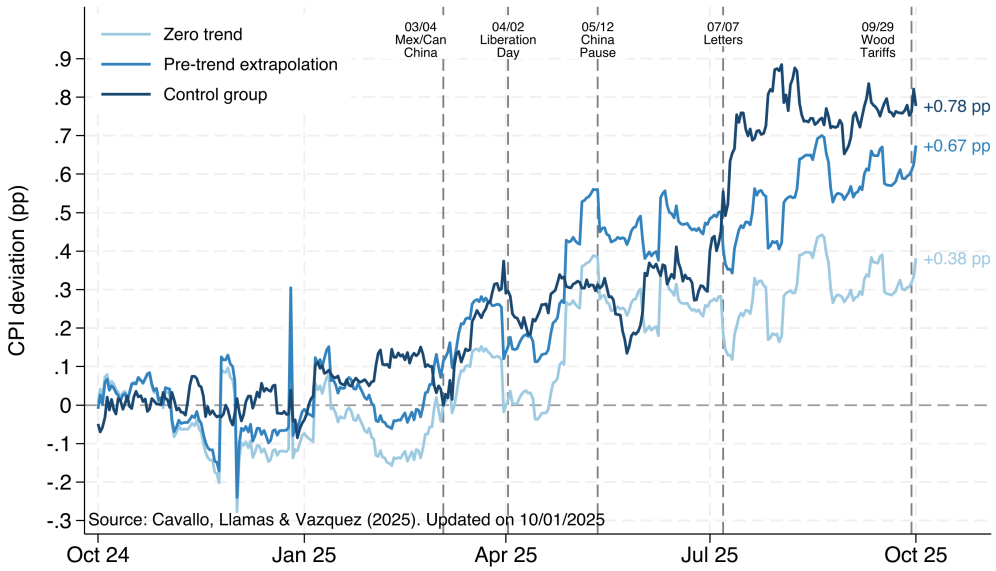


Figure 3: Cumulative Impact of Tariffs on All-Items CPI-U, Not Seasonally Adjusted

Notes: The figure plots the estimated cumulative contribution of tariff-affected goods to the all-items CPI (all products) under the three counterfactuals described in the text: zero-trend (lightest), pre-trend extrapolation (intermediate), and control-group (darkest). End-of-sample values are labeled at the last date, and vertical lines mark the main 2025 tariff events.

These estimates suggest that the tariff impact on the CPI was significant. At the upper end of our range, a cumulative effect of 0.78 percentage points implies that the annual inflation rate of 3 percent as of October 1 would have been roughly 2.2 percent without the tariffs – much closer to the Federal Reserve's inflation target.

6 Conclusion

This paper combines daily prices from five major U.S. retailers, detailed country-of-origin data, and AI-based trade classifications to measure the short-run retail effects of the 2025 U.S. tariffs. Prices began rising within days of the March announcements and continued climbing through October. Increases were larger for imported than domestic goods and for affected than unaffected products within each group, with the domestic response pointing to competitive spillovers. After seven months, retail pass-through of applied tariffs reached 25 percent. Assuming near-complete border pass-through and a 50 percent import-cost share, consistent with evidence in the literature, we estimate that consumers bore about 45 percent of the tariff burden. CPI-weighted estimates imply that tariffs added up to 0.78 percentage points to the all-items CPI; without them, annual CPI inflation would have been about 2.2 percent rather than 3 percent.

These findings show that trade policy can generate meaningful inflationary effects that

official price statistics cannot easily isolate. The price response was quick but accumulated gradually. Retailers reacted before goods bearing the new duties could reach shelves, then continued adjusting prices as policy evolved. This pattern is consistent with forward-looking pricing under uncertainty, while inventories, exemptions, implementation delays, trade diversion, and concerns about consumer response may have slowed pass-through. Strategic pricing complementarities amplified the effects beyond directly tariffed goods.

High-frequency data are especially valuable when policy shocks unfold in stages. The HBS Tariff Tracker made our estimates publicly available while this paper was being written and continued to update them as tariff policy evolved. It illustrates how real-time measures can complement academic papers by providing timely, continuously updated evidence. More broadly, our AI-based approach to tariff classification and country-of-origin retrieval provides a scalable way to link retail prices to trade policy, and study how firms adjust prices, sourcing, and product variety under policy uncertainty.

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Online Appendix
"Tracking the Short-Run Price Impact of U.S. Tariffs"

By Alberto Cavallo, Paola Llamas, and Franco M. Vazquez

This Appendix is organized into five sections. First, we provide a list of the main tariff announcements during 2025. Second, we describe the data construction in more detail. Third, we present additional results for the descriptive price impact analysis, including robustness checks using longer time trends starting in January 2024. Fourth, we provide additional methodological details and results for the pass-through analysis. Finally, we describe the construction of the CPI impact estimates under the three alternative counterfactuals.

A Timeline of Main U.S. Tariff Measures in 2025

Most origin-based measures below were imposed under the International Emergency Economic Powers Act (IEEPA), a 1977 statute granting the President broad economic powers in a declared national emergency; the sectoral tariffs on steel, aluminum, automobiles, copper, and wood were imposed under Section 232 of the Trade Expansion Act of 1962, on national-security grounds.

Date	Description
February 4	10% tariff imposed on all imports from China.
March 4*	Increase from 10% to 20% on all imports from China. 25% on all imports from Mexico. 10% on Canadian energy products (oil, natural gas, electricity). 25% on all other Canadian imports.
March 6	Exemptions for Canadian and Mexican goods meeting USMCA rules of origin.
March 12	25% tariffs on steel, aluminum, and derivative products take effect.
April 2*	"Liberation Day" tariffs announced: 10% baseline on nearly all countries, plus higher country-specific rates, labeled "reciprocal" by the administration and scaled to each country's bilateral goods trade surplus with the United States.
April 3	25% tariff on automobiles takes effect; tariffs on auto parts delayed until May 3.
April 5	10% baseline tariff takes effect on nearly all countries.
April 10	90-day pause on the higher country-specific reciprocal tariffs, leaving the 10% baseline in effect; tariffs on Chinese imports raised to 145%.
April 11	Exemptions announced for a list of semiconductor-containing products, including smartphones and other consumer electronics.
May 3	25% tariff on auto parts takes effect.
May 12*	90-day pause with China: reduction in the additional tariff on imports from China from 145% to 30% (subject to carve-outs for certain products).
June 4	50% tariffs on steel, aluminum, and derivative products take effect.
June 11	President Trump announces deal with China on Truth Social; no legal details provided.
June 23	Additional steel tariffs on appliances take effect.
July 7–9*	A series of letters announcing updated tariff rates is sent, including 25% for Japan and South Korea, and 50% for Brazil.
August 1	50% tariffs on copper and derivative products take effect; tariff on non-USMCA imports from Canada raised from 25% to 35%.
August 18	Additional steel and aluminum tariffs on more derivative products take effect.
September 5	Executive order modifying the scope of the April 2 reciprocal tariffs.
September 29*	10% tariff on lumber and 25% tariff on wood furniture and cabinets/vanities announced (rising to 30% and 50%, respectively, on Jan 1, 2026).

*Source: Trump's Trade War Timeline 2.0: An Up-to-Date Guide (2025), Peterson Institute for International Economics. Note: * These events are marked with vertical lines in figures.*

B Dataset Construction

B.1 Country of Origin

To identify how tariff exposure varies across products, we supplement retail price data with product-level information on countries of origin (COO). Because this information is rarely disclosed on retail websites, we develop two complementary methods to recover it.

B.1.1 UPC Matching

The first method links products in the PriceStats dataset to external sources that report country-of-origin (COO) information. We begin by obtaining Universal Product Codes (UPCs) for each item in our data. UPCs are standardized identifiers assigned to specific retail products. Unlike retailer-specific product identifiers, often called SKUs, UPCs are designed to identify the same product across retailers.

A UPC corresponds to a particular product variant, including its brand, size, package type, count, flavor, formulation, and other relevant characteristics. For example, a 16-ounce jar of creamy peanut butter would have a different UPC from the same brand's 16-ounce jar of crunchy peanut butter, or from the same product sold in a 28-ounce size. Similarly, a six-pack of a soft drink would have a different UPC from a twelve-pack of the same product. A UPC typically remains associated with that exact product variant for as long as it remains in the market. If the manufacturer changes the product in a way that creates a new variant, such as changing the size, count, packaging, or formulation, a new UPC may be assigned.

We use these UPCs to match products in our data to the product pages of a large online-only retailer that discloses COO details. The match is done in two steps. First, we construct a bridge between each UPC in the PriceStats data and the retailer's internal product identifier. Second, we use the retailer-specific identifier to locate the corresponding product page and extract the COO information reported on the retailer's website. The large catalog of this online retailer generates substantial overlap with the products sold by the retailers in our sample, making the bridge useful for a broad set of categories. Importantly, we use the online retailer only as a source of COO information. We do not use its prices in the analysis.

This procedure yields COO data for approximately 308,000 products. Although this represents a substantial share of the sample, the method can only be applied to three of the five U.S. retailers in our dataset. It provides broad coverage in household goods, furniture, and electronics, but more limited coverage in food-related categories, since these items are generally not sold by the online-only retailer used for the UPC bridge.

B.1.2 Gen AI Search

The second method uses generative AI models to retrieve COO information through automated online searches. For each product, the model receives both the description and URL and first scans the retailer's website for COO metadata. If that information is not available, it performs a targeted

search for the same item across other online retail platforms. The model records the country of origin when identified; if only general information can be confirmed, it classifies the item as "Domestic" or "Imported," and leaves the field blank when no reliable evidence is found. High accuracy is achieved only when the model is allowed to search online—a capability that has recently become accessible through API integration—and the reliability of the retrieved results has improved steadily as the underlying systems and search tools have advanced.

In implementation, we keep the system message fixed and set it to the COO retrieval protocol described above. For each product, we then send a message that supplies the item identifiers and the starting URL for retrieval:

```
Tell me the country of origin of this item: {product_name}.
      Begin your search with this URL: {product_url}.
```

We assess the accuracy of this approach using a validation sample of 10,000 products with known COO drawn from the UPC-matched subset described in Section B.1.1. As shown in Table A2, the model correctly distinguishes domestic from imported items 88 percent of the time and identifies the specific country in 85 percent of cases. These accuracy rates are broadly consistent across major product categories and countries.

Table A2: AI-Based Predictions of Country of Origin

	Products	**Accuracy (%)**
Domestic/Imported	9,840	88
Imported	7,827	87
Domestic	2,013	89
Country of Origin	6,820	85
China	3,074	84
United States	2,013	89
Canada	127	82
Mexico	84	68
Taiwan	200	83
Turkey	294	96
India	333	93
Vietnam	134	81
Malaysia	54	87
Other countries	507	66
Food and non-alcoholic beverages	315	90
Alcoholic beverages, tobacco and narcotics	21	81
Housing, water, electricity, gas and other fuels	56	84
Household and Furnishings	4,171	86
Health	130	93
Transportation	372	69
Communication	140	41
Electronics and Recreation	1,228	87
Miscellaneous Goods	383	92

Note: This table reports the number of products and prediction accuracy for AI-based country-of-origin classification. Accuracy rates are computed from a validation sample of 10,000 products with known countries of origin matched through UPC codes. Predictions were generated in May 2025 using OpenAI's gpt-4o-search-preview model. Product categories do not sum to the country-of-origin total because COICOP is missing for four of those products.

We note that COO identification is more difficult for products with short or coarse descriptions, or when origin varies at a more granular level than the product description reveals. In those cases, the AI procedure has less information to work with, and classification accuracy can fall.

This AI-based method is used to identify the COO for about 14 percent of all products in our sample, including 57 percent of those in the "Food and Non-Alcoholic Beverages" category. Although its main contribution in this paper is to enhance coverage in food-related products, the approach offers a scalable and replicable framework that can be applied to recover country-of-origin information for additional retailers, sectors, and countries in future work.

B.2 The Tariffs Dataset

B.2.1 AI-based HS-10 Classifications at the Individual Product Level

We develop an AI-based method to classify individual retail products directly into the HS hierarchy at the 10-digit level. Our approach uses large language models (LLMs) in a hierarchical and iterative manner: rather than assigning a product to an HS code in a single step, the algorithm moves sequentially through the HS tree, refining the classification one level at a time. This mirrors how a human expert would classify goods—starting from broad distinctions and progressively narrowing the choice set until reaching a unique HS-10 code.

At each stage, the model is provided with (i) the product description and (ii) the list of valid HS subcategories at the current level of the hierarchy. The prompt—submitted via API—is simple and structured to minimize ambiguity. It takes the following form:

```
Classify the following item into one of these subcategories: {list}
Item: "{product description}"
Return exactly one code from the list.
```

Once a category is selected, we retrieve its immediate subcategories and repeat the procedure. This process continues recursively until the model reaches a terminal node of the HS tree, typically at the national 10-digit level. Each decision is therefore local, constrained, and conditioned on all previous choices.

Figure A1 illustrates this process using the example of *fresh bananas*. At the top level, the model easily distinguishes between broad HS sections such as *Live animals and animal products* and *Vegetable products*, correctly selecting the latter. Within *Vegetable products*, it identifies *Chapter 08: Edible fruit and nuts* from a set of nine chapters. In the next iteration, it selects *Heading 0803: Bananas, including plantains* from among ten headings. It then chooses *Subheading 0803.90: Other* from two available options. Finally, it selects the appropriate national subheading—*0803.90.00.35: Fresh*—from a set of three.

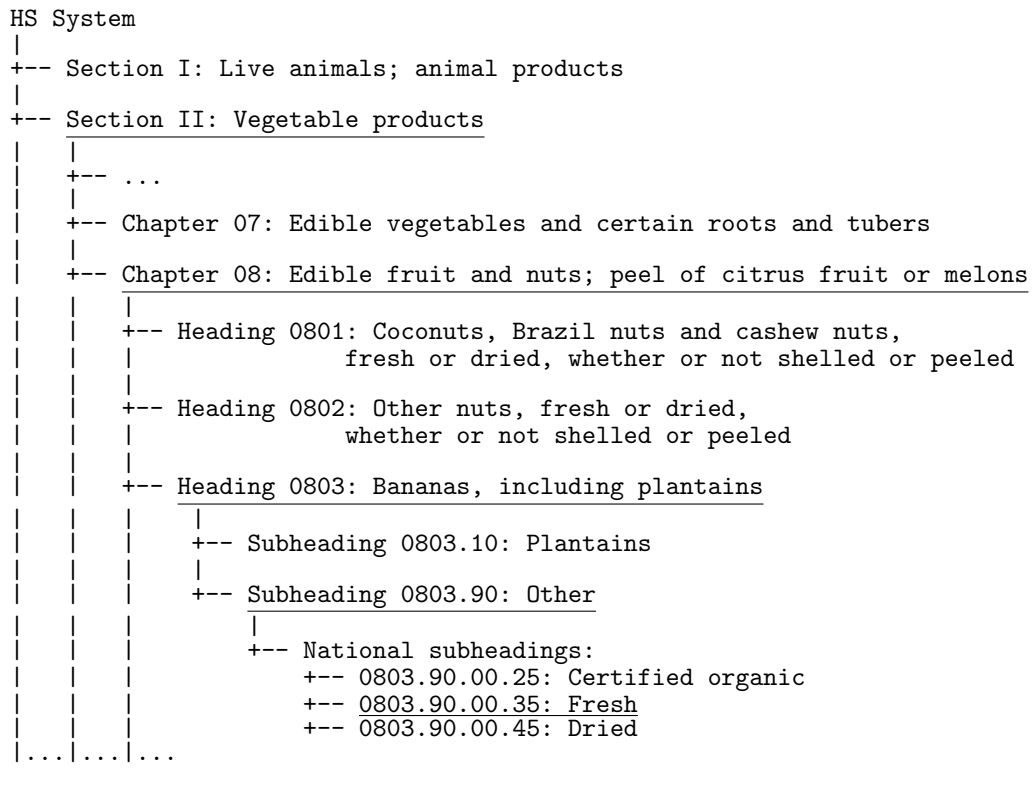


Figure A1: Structure of the Harmonized System classification, illustrated for fresh bananas

A key advantage of this approach over traditional machine-learning classifiers is that it does not require a labeled training dataset. Instead, it leverages the ability of large language models to perform structured, coarse-to-fine reasoning over hierarchical taxonomies. These distinctions are made without task-specific training and rely instead on the model's general semantic reasoning. By limiting the choice set at each step, the method reduces classification errors that often arise when models are asked to choose among thousands of HS codes simultaneously.

In practice, many standard HS descriptions are ambiguous or too vague to support reliable classification, particularly for retail products. To address this, we augment the original HS hierarchy with enriched labels and clarifying annotations that make category boundaries more explicit. These refinements improve accuracy in cases where the official HS text lacks the specificity needed to classify consumer goods in our sample.

We apply this classification procedure uniformly to both imported and domestic products. This allows us not only to identify goods directly subject to tariffs, but also to map domestic products into the same HS categories, facilitating comparisons between imported goods and their domestic competitors. The resulting HS-10 assignments provide a consistent and scalable bridge between high-frequency retail price data and detailed tariff schedules, enabling precise measurement of tariff exposure at the product level.

B.2.2 Sensitivity to HS-10 Classification Errors

We assess how sensitive our tariff assignments are to potential errors in the AI-based HS-10 classification described above. A first relevant fact is that most 2025 tariff proclamations were not specified at the HS-10 level. We identify 1,002 distinct HS codes targeted by these measures before October 1, 2025. Their distribution by the level of HS at which the proclamation is defined is shown in Table A3.

Table A3: Distinct HS codes targeted by 2025 tariff proclamations effective before October 1, 2025, by HS specification level

Level of HS specification	Distinct HS codes	Share
HS-4	34	3.4%
HS-6	30	3.0%
HS-8	668	66.7%
HS-10	270	26.9%
Total	1,002	100.0%

Notes: Each row counts the number of distinct HS codes targeted by at least one tariff proclamation effective before October 1, 2025. The level column reports the HS digit-length at which the proclamation specifies the affected codes.

73.1% of the HS codes targeted by pre-October-2025 proclamations are specified at HS-8 or coarser levels. For these tariffs, an HS-10 misclassification within the same HS-8 parent does not alter the assigned tariff.

A second potential concern is that some HS codes are defined along criteria that an AI classifier may not be able to infer from a typical retail product description—specifically, the per-unit price, weight, volume, or physical dimensions of the item (e.g., "Valued not over $3/pair", "Weighing less than 100 g each", "Diameter exceeding 75 mm"). To gauge how prevalent such codes are in the U.S. HTS, we use the latest available archive revision (April 23, 2026) and apply an LLM classifier to every HS description in that revision. We flag each description that discriminates products by one of these four criteria.

Linking each product in our retail panel to its AI-assigned HS-10 code, we find that only 2.74% carry a *final* HS-10 description that the LLM classifier flags as discriminating along one of these four dimensions. More importantly, we ask how often the AI had to navigate among such descriptions *before* arriving at a final HS-10: the classification proceeds hierarchically (Appendix B.2.1), and at each step we flag whether any candidate code uses one of these four criteria. Table A4 reports the resulting shares. Ambiguity is uncommon at every step, and only 14.93% of products face it at *any* point in the cascade—falling to 7.82% if we restrict to ambiguity arising before HS-8, the level at which most tariffs are applied (Table A3).

Table A4: Products facing an AI-ambiguous HS description, by classification stage

Stage at which a candidate code uses an ambiguous criterion	Products	Share
HS-10 description (final assigned code)	9,030	2.74%
HS-8 step	26,537	8.05%
HS-6 step	19,770	5.99%
HS-4 step	6,810	2.06%
Any stage (union)	49,252	14.93%
of which, before reaching HS-8	25,783	7.82%

Notes: A description is "ambiguous" if it discriminates products by per-unit price, weight, volume, or physical dimensions—features an LLM may not infer from a retail product description. The first row flags each product's final HS-10; the rest flag whether any candidate code at that step of the hierarchical classification (Appendix B.2.1) qualifies. Shares are out of 329,816 classified products; "before reaching HS-8" combines the HS-6 and HS-4 steps.

Finally, we ask how much the pass-through estimates themselves depend on the fine-grained HS-10 tariff assignment. We re-estimate the distributed-lag pass-through of Table 1, replacing each product's HS-10 tariff with the average tariff computed over progressively coarser cells: by country of origin and month within the same HS-8 or HS-6 heading. We repeat this for both the applied and the statutory tariff (Columns 1 and 2 of Table A5). In both cases, cell averages are computed over all HS-10×country combinations in each cell with import data, using the Census effective-rate data for the applied tariff and an analogously constructed statutory HS-10×country panel for the statutory tariff. Aggregating to HS-6 is especially telling: it averages away any HS-10 misclassification within an HS-6 heading, so the tariff a product is assigned can be distorted only by ambiguities the AI faced before reaching HS-8, which arise for just 7.82% of classified products (Table A4). Even so, the HS-6 estimate of 0.250 lies only 3.3 percentage points above the HS-10 baseline of 0.217. The statutory pass-through (Column 2) is likewise essentially flat across aggregation levels (0.060 at all three).

Table A5: Pass-through by level of tariff aggregation: applied and statutory tariffs

	Cumulative pass-through, 7 mo. $\left(\sum_{\ell=0}^{7}\gamma_\ell\right)$	
Tariff aggregation level	Applied	Statutory
HS-10	0.217	0.060
	(0.064)	(0.056)
HS-8	0.190	0.060
	(0.083)	(0.060)
HS-6	0.250	0.060
	(0.096)	(0.060)
Observations	309,958	515,630
Products	100,122	128,539
Sector fixed effects (COICOP-3)	Yes	Yes

Notes: Each row re-estimates the distributed-lag pass-through regression of Table 1 replacing each product's HS-10 tariff with the average tariff in the indicated cell (country of origin × HS group). Pass-through is the cumulative response over seven months, $\sum_{\ell=0}^{7}\gamma_\ell$. Standard errors, in parentheses, are clustered by 3-digit COICOP category.

B.2.3 Statutory tariffs

We construct a panel of statutory tariff rates from the U.S. International Trade Commission's Harmonized Tariff Schedule (HTS) Revisions Data Archive (hts.usitc.gov). The archive records every revision to the HTS since 1989, including tariff columns and statistical annotations at the ten-digit (HS-10) level. Our sample window begins with the revisions issued in October 2024 and covers all subsequent updates through calendar year 2025.

Each HTS revision reports the ad valorem and specific rates at the HS-10 level. Using these files, we harmonize HS-10 lines across consecutive revisions and build a revision-by-country-by-HS-10 panel. Let r index revisions, c countries of origin, and h HS-10 subheadings. For each (r, c, h), we compute the statutory change

$$\Delta\tau_{rch} \equiv \ln\big(1+\tau_{rch}\big) - \ln\big(1+\tau_{r^-ch}\big), \tag{2}$$

where r^- denotes the immediately preceding revision.

A distinctive feature of the 2025 policy environment is that many measures are promulgated via Chapter 99 ("Temporary Modifications"). Chapter 99 provisions appear as separate lines whose numbers begin with 99 and specify additional or temporary duties that apply to articles classified under referenced base subheadings. Because these adjustments are not encoded as new rates on the base HS-10 lines themselves, a mechanical comparison of successive revisions would miss them. We therefore identify all relevant Chapter 99 entries in each revision, read the associated descriptions and cross-references, and apply the specified adders (e.g., "an additional duty of 25 percent on products

of country c classified under subheading h") to the corresponding (c, h) pairs in our panel.[8] This procedure yields a unified statutory rate for each country–HS-10 combination by revision date, and $\Delta\tau_{rch}$ captures both baseline changes and Chapter 99 adders.

Our baseline is the first revision at or after October 2024 ("2024, Revision 10" in the archive). We carry rates forward between revisions in the absence of changes, and we time-stamp each modification using the effective date reflected in the revision. The resulting dataset provides a complete record of statutory tariff changes for all country–HS-10 pairs from late 2024 through 2025.

B.2.4 Applied tariffs

We complement the statutory series with realized duties from the U.S. Census Bureau's monthly import statistics (census.gov). The data are reported at the ten-digit HS (HS-10) level by country of origin and month. We use the import series aligned with *imports for consumption*, for which customs duties are assessed.

From this source we extract three variables:

- **Country of origin:** The reported country of origin for each HS-10 import line.
- **General imports, customs value:** The monthly value (USD) of all entries, excluding insurance and international freight.
- **Duties collected:** The monthly customs duties paid by U.S. importers (USD).

Let m index months, c countries of origin, and h HS-10 subheadings. We compute the effective applied tariff rate (an ad valorem equivalent that captures both ad valorem and specific charges) as

$$a_{mch} = \frac{Duties_{mch}}{Import\ Value_{mch}}. \tag{3}$$

Applied rates are only observed when there are imports: if an HS-10 from country c does not enter in month m, no duties are recorded and a_{mch} is unobserved.

B.2.5 Tariff Exemptions and Unaffected Products

Throughout the paper, an imported product is classified as *tariff-affected* if its HS-10–country combination faced any additional tariff at some point during the sample period, and as *unaffected* (exempt) otherwise.

The exemption mechanism is HS-level and origin-independent: the authorities publish lists of HTSUS subheadings excluded from the April 2 baseline and Annex I reciprocal tariffs—Annex II of the Reciprocal Tariff Executive Order, the April 11 Presidential Memorandum on Clarification of Exceptions, and the September 5, 2025 Executive Order modifying the scope of reciprocal tariffs—which together cover about 1,040 subheadings and operate regardless of country of origin.

[8] In practice, Chapter 99 lines can impose ad valorem or specific adders, temporary suspensions, or program-contingent differentials. We map each entry to its referenced HS-10s and countries of origin, respecting any exclusions, notes, or effective-date qualifiers stated in the revision.

However, these exemption lists do not displace the origin-based IEEPA orders. Products from China, Hong Kong, and Macau remain subject to the IEEPA fentanyl tariff, and non-USMCA-qualifying Canadian and Mexican goods remain subject to the IEEPA border tariffs (Canada and Mexico). A product therefore enters our unaffected set only if (i) its HS code is on one of the published exemption lists *and* (ii) its origin is not subject to one of these origin-based tariffs.

Under this definition, only 1,019 imported products qualify as unaffected. Appendix D.5 shows the evolution of the change in applied tariff rates for these products, which remains essentially at zero throughout the sample period, validating this classification.

B.2.6 Relationship between Statutory and Applied Tariffs

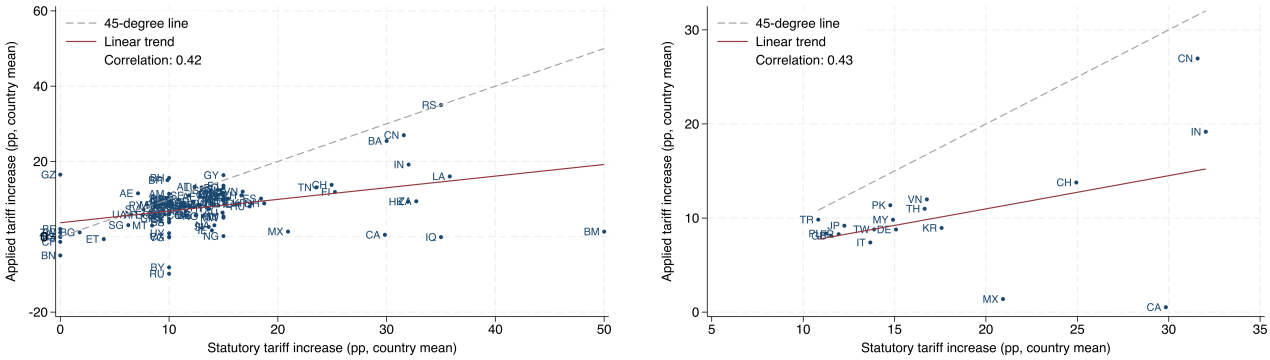
The two series can diverge for two main reasons. First, exemptions leave a wedge between the statutory headline rate and the duty actually collected. Second, statutory rates are tracked at the daily frequency from HTS revisions, whereas Census data report applied duties only at the monthly frequency, so any timing mismatch between announcement and import recording attenuates the correlation between the two series. To document the extent of this divergence, Table A6 reports the correlation between statutory and applied tariffs on the panel of product-month averages over February–October 2025, at four aggregation levels: product, HS-10–country, HS-10, and country. Both tariff series capture the additional duty introduced by the 2025 tariff measures: statutory rates record the HS-level increments specified in the 2025 HTS revisions, while applied rates are computed as the change relative to each product's last observed value in January 2025. The correlation ranges from 0.40 at the country level to 0.71 at the HS-10–country level, confirming that the two series are positively but imperfectly correlated.

Table A6: Correlation between Statutory and Applied Tariffs (Monthly Averages)

Aggregation level	**N**	**Correlation**
Product	859,914	0.48
HS10-country	8,760	0.71
HS10	2,947	0.66
Country	119	0.40

Notes: Correlations on the panel of product-month monthly averages of statutory and applied tariff rates over Feb–Oct, 2025. Applied tariffs are expressed as the change relative to each product's last observed value in January 2025.

Figure A2 provides a visual companion to the table. Each panel plots the country-level mean of the applied tariff change against the country-level mean of the statutory tariff change, and a linear fit. Panel (a) includes every country present in the dataset; panel (b) restricts the sample to the 18 countries reported in Table A11 (excluding U.S.).



(a) All countries

(b) Table A11 countries

Figure A2: Statutory vs Applied Tariff Change at the Country Level

Notes: Each dot is a country; coordinates are the mean of the statutory and applied tariff changes relative to January 2025 across that country's products, in percentage points, using the latest available observation per product after February 1, 2025. Panel (a) includes every country present in the dataset; panel (b) restricts the sample to the 18 countries in Table A11 (excluding U.S.). The dashed line is the 45-degree reference; the solid line is the linear fit.

B.3 Combined Dataset

Table A7: Product Counts by Country of Origin

Product Origin	**Frequency**	**Percentage (%)**
US	134,743	37.49
China	128,761	35.83
India	14,561	4.05
Turkey	9,477	2.64
Vietnam	6,672	1.86
Taiwan	6,266	1.74
Mexico	5,007	1.39
Canada	4,654	1.29
Others	49,271	13.71
Total	**359,412**	**100.00**

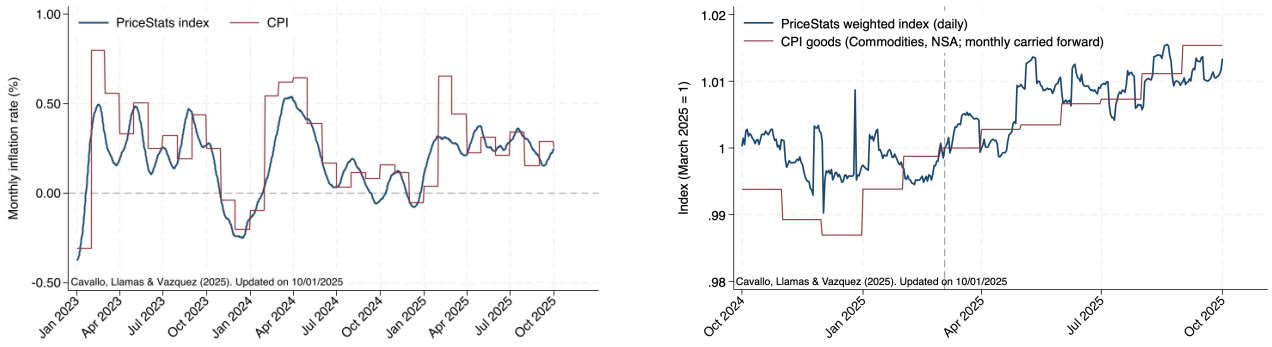
Table A8: Number of Products by Category

Category Name	**Products**	**Percentage (%)**
Furnishings & Household	192,415	53.58
Recreation and culture	77,134	21.48
Food and non-alcoholic beverages	33,195	9.24
Miscellaneous goods and services	24,671	6.87
Transport	13,854	3.86
Health	7,247	2.02
Communication	4,973	1.38
Housing, water, electricity, gas and other fuels	2,804	0.78
Alcoholic beverages, tobacco and narcotics	1,945	0.54
Clothing and footwear	866	0.24
Education	0	0.00
Restaurants and hotels	0	0.00
Total	**359,104**	**100.00**

Notes: 308 products are not classified into any COICOP category and are therefore excluded from this table.

B.4 Comparison with Official CPI Series

To further assess the representativeness of our data, Figure A3, Panel (a), compares monthly inflation rates computed by PriceStats at daily frequency with official all-items CPI-U inflation in the United States. The PriceStats series closely tracks the dynamics of monthly CPI inflation, although temporary discrepancies arise because PriceStats does not include shelter, while the official CPI series plotted does. Because our analysis uses a subset of the full PriceStats data, we also construct a price index from our sample, aggregating chained daily category indices with CPI expenditure weights at the 3-digit COICOP level, following the methodology described in Section 2.6. Panel (b) compares this index in levels with the official CPI for commodities and shows that both the level and dynamics of our sample-based index are closely aligned with the official series. These comparisons indicate that the online price data capture the main aggregate price patterns in the United States and provide a reliable basis for studying product-level price responses.



(a) Monthly inflation rates

(b) Price indices

Figure A3: Comparison of inflation and price indices, CPI and PriceStats

Notes: Panel (a) shows month-over-month inflation rates for the United States computed by PriceStats and the official CPI-U all-items inflation rate from the BLS, from January 2023 to October 2025. Panel (b) shows a price index computed from our sample, weighted at the 3-digit COICOP level, and the official CPI for commodities, both normalized to one in March 2025, over the sample period October 1, 2024–October 1, 2025.

C Additional Price Impact Results

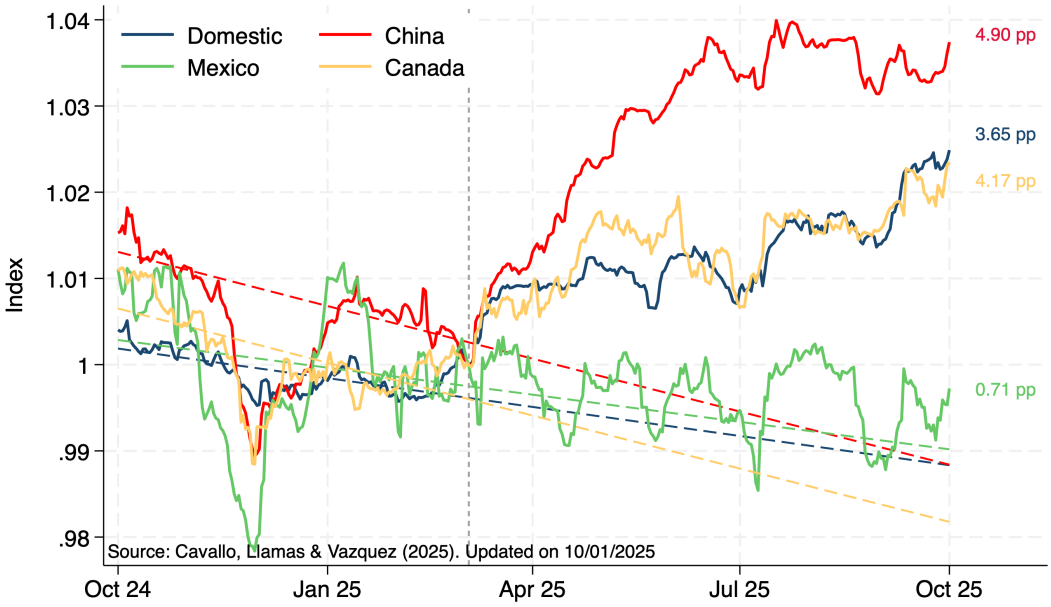


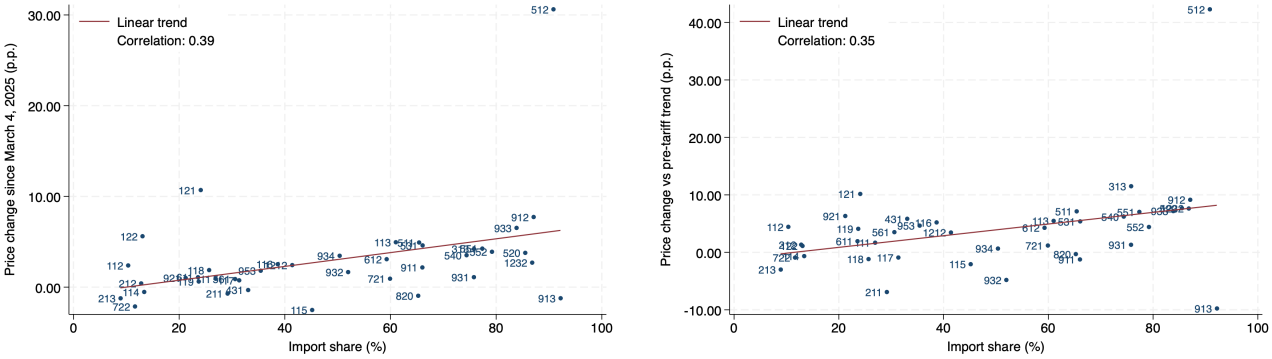
Figure A4: U.S. retail price indices by country of origin with pre-tariff trends

Note: Data from five large U.S. retailers. Vertical line denotes March 4, 2025. Pre-tariff trends estimated from October 1, 2024 to March 4, 2025 using a robust regression with preliminary outlier deletion based on Cook's distance.

Table A9: Retail Price Changes by Sector

Category	Price Change			vs. Pre-Tariff Trend		
	All	Imports	Domestic	All	Imports	Domestic
Furnishings, household equipment	5.34	6.06	3.30	8.17	9.44	4.94
Miscellaneous goods and services	2.79	3.90	1.28	5.30	6.91	3.17
Food and non-alcoholic beverages	2.24	2.35	2.27	2.21	3.00	2.08
Recreation and culture	1.62	1.88	1.29	0.63	-0.08	2.36
Health	1.61	2.20	1.31	2.53	2.48	2.55
All sectors	**3.57**	**4.35**	**2.49**	**5.16**	**6.29**	**3.65**

Notes: "Price Change" columns measure differences between March 4, 2025 and October 1, 2025; "vs. Pre-Tariff Trend" columns show deviations from trends estimated over October 2024–March 2025. Results are reported separately for all, imported, and domestic goods.



(a) Price change since March 4

(b) Price change vs pre-tariff trend

Figure A5: Price Change vs Import Share by COICOP Level-3 Category

Notes: Each dot is a COICOP Level-3 category. Import share is the share of distinct imported products in the category over the total. Panel (a) reports the cumulative price change since March 4, 2025; panel (b) reports the deviation from the pre-tariff trend. The solid line is a linear fit.

Table A10: Retail Price Changes by Sector

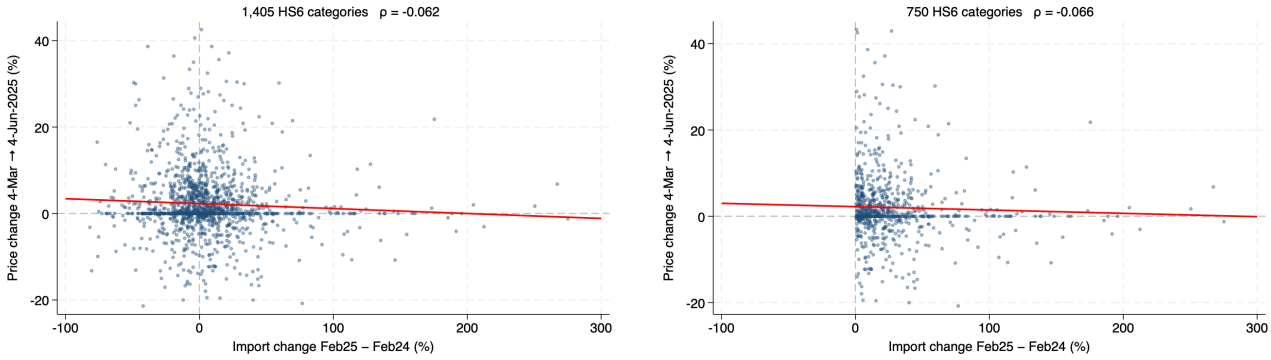
	Change since March 4, 2025			Relative to pre-tariff trend		
Category	All	Imported	Domestic	All	Imported	Domestic
Carpets and other floor coverings	30.64	31.59	18.56	42.32	42.37	35.20
Coffee, tea and cocoa	10.72	12.03	10.88	10.20	9.84	11.09
Photographic and cinematographic equipment and optical instruments	7.75	7.65	7.20	9.18	8.63	11.65
Gardens, plants and flowers	6.55	6.70	4.62	7.21	7.80	2.43
Mineral waters, soft drinks, fruit and vegetable juices	5.63	2.41	6.20	1.15	-1.15	1.53
Fish and seafood	4.97	7.32	-0.15	5.51	9.92	-1.66
Furniture and furnishings	4.94	4.73	6.94	7.17	7.22	8.79
Major household appliances whether electric or not and small electric household appliances	4.62	5.23	3.46	5.42	6.46	3.39
Major tools and equipment	4.27	4.66	-0.12	7.07	7.24	3.06
Other articles of clothing and clothing accessories	4.23	4.77	5.02	11.54	13.36	5.08
Small tools and miscellaneous accessories	3.92	4.19	1.87	4.45	4.55	3.07
Household textiles	3.80	4.06	0.18	7.71	8.10	3.66
Glassware, tableware and household utensils	3.54	4.35	-0.49	6.25	8.14	-0.82
Pets and related products, veterinary and other services for pets	3.48	4.73	1.53	0.69	-0.03	0.44
Other medical products; therapeutic appliances and equipment	3.10	4.03	-1.31	4.30	4.40	1.40
Other personal effects	2.72	2.84	2.74	7.66	7.43	10.04
Fruits	2.55	4.95	0.78	5.24	6.36	3.83
Electrical appliances for personal care; other appliances, articles and products for personal care	2.45	4.10	1.09	3.48	5.01	2.26
Meat	2.41	3.35	2.25	4.47	8.17	4.02
Equipment for the reception, recording and reproduction of sound and picture	2.19	1.95	5.62	-1.20	-3.35	6.69
Sugar, jam, honey, chocolate and confectionery	1.90	-0.43	2.80	-1.14	-2.68	-0.43
Miscellaneous printed matter; stationery and drawing materials	1.83	3.34	1.08	4.68	5.02	4.57
Equipment for sport, camping and open-air recreation	1.68	2.06	4.78	-4.77	4.07	-10.70
Games, toys and hobbies	1.12	1.39	-1.74	1.35	-0.03	3.73
Pharmaceutical products	1.11	0.09	2.20	1.97	0.51	3.15
Major durables for indoor and outdoor recreation including musical instruments	1.03	0.66	1.60	6.36	3.61	11.01
Spare parts and accessories for personal transport equipment	0.95	2.33	-0.06	1.22	3.50	-1.00
Bread and cereals	0.94	-0.11	1.35	1.71	0.90	2.08
Non-durable household goods	0.91	3.07	0.21	3.55	4.27	3.47
Vegetables	0.77	3.50	-0.39	-0.87	4.92	-3.10
Food products n.e.c.	0.64	0.91	0.68	4.13	1.73	4.92
Wine	0.43	0.62	0.24	1.37	0.24	1.44
Materials for the maintenance and repair of the dwelling	-0.30	2.80	-2.65	5.87	6.71	5.01
Milk, cheese and eggs	-0.51	2.05	-0.90	-0.62	8.82	-2.28
Spirits	-0.69	-0.76	-0.49	-6.87	-8.48	-6.09
Telephone and telefax equipment	-0.93	-1.79	0.63	-0.27	0.20	-0.15
Information processing equipment	-1.20	-1.32	5.80	-9.73	-11.22	11.45
Beer	-1.21	-1.69	-1.12	-2.96	-11.28	-2.23
Fuels and lubricants for personal transport equipment	-2.11	0.00	-2.22	-0.88	-0.32	-0.95
Oils and fats	-2.50	-2.02	-2.71	-2.03	-0.72	-3.34
All sectors	3.57	4.35	2.49	5.16	6.29	3.65

C.1 Inventory Front-loading and the Price Response

Section 3.1 interprets the rapid retail price response to the tariff announcements as evidence that retailers are forward-looking, adjusting prices in anticipation of higher import costs. A natural concern for this interpretation is the role of inventories: firms that front-loaded imports ahead of the tariffs hold larger stocks of cheaper, pre-tariff goods and could, in principle, have drawn them down to delay or dampen their price increases. Under that view, categories that front-loaded more should display smaller price increases.

We examine this using U.S. Census import data. For each HS6 category we measure front-loading as the year-on-year change in the monthly customs value of imports for consumption (February 2025 versus February 2024),[9] and relate it to the cumulative retail price change of imported products in the same category over the three months following the March 4 announcement. Figure A6 plots this relationship for all categories (panel a) and for the subset whose imports rose relative to a year earlier (panel b).

We find a very faint relationship in this direction. In both samples the correlation between front-loading and the subsequent price change is about -0.06 to -0.07: categories that front-loaded more did raise prices slightly less, consistent with a modest role for inventory buffering. The magnitude is nonetheless minor—front-loading accounts for well under one percent of the cross-category variation in price changes. Retailers were, for the most part, forward-looking, raising prices in anticipation of higher import costs soon after the announcements.



(a) All categories

(b) Categories with rising imports

Figure A6: Import Front-loading and the Retail Price Response

Notes: Each dot is an HS6 category. The horizontal axis is the year-on-year change in the monthly customs value of U.S. imports for consumption, comparing February 2025 with February 2024 (a proxy for tariff front-loading); the vertical axis is the cumulative retail price change of imported products in that category over the three months following the March 4 announcement. Panel (a) includes all categories; panel (b) restricts to categories whose imports rose year-on-year. The Pearson correlation ρ is reported in each panel. Import data: U.S. Census Bureau. Retail prices are from five large U.S. retailers.

[9]February 2025 is the last month of import data available before the March 4, 2025 tariff announcements.

C.2 Tariff Increases and Price Changes

Table A11 reports, for each country with at least 1,000 products, the cumulative price change since March 4 and the deviation from the pre-tariff trend, together with the increase in applied and statutory tariff rates between January 2025 and the end of the sample; Table A12 extends this to every country in the sample.

Table A11: U.S. Retail Price Level Changes by Country of Origin — Selected Countries

			Tariff Increase (pp)	
Country	**Price Change**	**Deviation from Pre-Tariff Trend**	**Applied**	**Statutory**
Turkey	31.21	38.66	14.4	15.0
Poland	13.22	14.55	9.6	15.6
India	10.41	16.24	29.9	49.0
United Kingdom	8.04	18.07	10.4	15.4
Japan	6.09	8.68	13.7	19.6
Thailand	6.03	8.28	14.0	20.9
Switzerland	4.58	5.88	19.0	35.2
Italy	4.39	5.90	8.6	17.4
France	4.27	5.23	9.6	15.1
Vietnam	4.02	6.79	16.6	21.4
China	3.74	4.90	28.3	30.6
Malaysia	3.41	12.09	13.6	19.3
Germany	3.26	4.55	9.7	19.2
United States	2.49	3.65	—	—
Canada	2.35	4.17	0.6	35.0
Pakistan	1.82	3.54	14.2	19.1
Taiwan	1.36	1.33	14.0	21.7
South Korea	0.75	2.01	14.1	24.6
Mexico	-0.28	0.71	1.4	25.0
All Countries	**3.57**	**5.16**	**23.8**	**27.8**

Notes: The table includes countries of origin with at least 1,000 products in the sample. Price changes reflect cumulative increases since the March 4, 2025 tariff announcements. Pre-tariff trends are estimated from country-specific regressions over the period October 1, 2024 to March 4, 2025. Applied and statutory tariffs are the additional tariff rates introduced by the 2025 measures, in percentage points relative to January 2025, measured at the end of the sample and averaged across each country's products. The values reported under "All Countries" represent averages at the country–HS-10 level, weighted by product counts.

Table A12: U.S. Retail Price Level Changes by Country of Origin — All Countries (with product counts, two panels)

Country	Products	Price Change	Deviation from Pre-Tariff Trend	Tariff Increase (pp)	
				Applied	Statutory
Panel A. Countries with at least 1,000 products					
Turkey	9,477	31.2	38.7	14.4	15.0
Poland	1,645	13.2	14.6	9.6	15.6
India	14,561	10.4	16.2	29.9	49.0
United Kingdom	1,313	8.0	18.1	10.4	15.4
Japan	2,631	6.1	8.7	13.7	19.6
Thailand	2,710	6.0	8.3	14.0	20.9
Switzerland	1,628	4.6	5.9	19.0	35.2
Italy	4,397	4.4	5.9	8.6	17.4
France	2,037	4.3	5.2	9.6	15.1
Vietnam	6,672	4.0	6.8	16.6	21.4
China	128,761	3.7	4.9	28.3	30.6
Malaysia	2,718	3.4	12.1	13.6	19.3
Germany	2,790	3.3	4.5	9.7	19.2
United States	134,743	2.5	3.7	—	—
Canada	4,654	2.3	4.2	0.6	35.0
Pakistan	1,744	1.8	3.5	14.2	19.1
Taiwan	6,266	1.4	1.3	14.0	21.7
South Korea	1,132	0.8	2.0	14.1	24.6
Mexico	5,007	-0.3	0.7	1.4	25.0
Panel B. Remaining countries					
Senegal	1	60.6	-10.1	6.0	10.0
Ghana	4	47.1	55.7	12.7	32.5
Cyprus	4	37.6	-91.7	9.3	15.0
Ukraine	73	33.9	38.9	12.9	10.0
Dominican Republic	88	22.1	18.7	7.8	12.5
Egypt	923	21.3	34.0	6.4	10.0
Laos	32	20.7	9.5	15.5	40.0
Singapore	41	19.2	19.5	2.7	7.8
Gaza Strip	1	16.8	0.0	16.5	10.0
Costa Rica	49	15.8	16.2	8.4	16.2
Lebanon	4	14.6	6.2	5.9	10.0
Belgium	492	14.2	15.6	6.7	17.0
New Zealand	95	12.6	11.6	14.0	15.6
Chile	83	10.6	11.8	7.4	13.0
Bangladesh	80	10.3	7.7	14.7	20.0
United Arab Emirates	8	10.2	20.7	13.3	8.0

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Table A12 – continued from previous page

Country	Products	Price Change	Deviation from Pre-Tariff Trend	Tariff Increase (pp)	
				Applied	Statutory
Ecuador	84	10.1	22.4	10.4	15.0
Colombia	183	9.1	2.4	6.8	13.4
Guatemala	15	8.3	1.6	9.2	10.0
South Africa	54	8.3	14.4	14.5	42.0
Denmark	650	7.8	5.8	12.8	12.3
Philippines	484	6.9	11.2	13.6	19.6
Croatia	8	6.8	-8.3	9.8	15.0
Serbia	6	6.1	7.5	35.0	35.0
Paraguay	5	5.1	12.8	6.8	10.0
Lithuania	24	4.9	7.2	8.7	15.0
Albania	78	4.7	5.3	11.2	10.0
Estonia	35	4.7	-7.6	10.0	15.0
Norway	40	4.5	-3.8	7.4	15.0
Ireland	116	4.3	6.7	0.4	15.3
Peru	56	4.0	11.5	9.4	11.0
Barbados	4	4.0	5.8	10.0	10.0
Jamaica	22	3.9	-9.1	8.9	10.0
Cambodia	366	3.6	12.8	18.0	19.5
Afghanistan	45	3.3	11.3	13.8	17.0
Portugal	188	2.9	10.6	8.1	15.6
Sri Lanka	350	2.9	3.3	17.8	19.4
Slovenia	23	2.8	-0.7	2.8	15.0
Nepal	12	2.1	6.3	10.1	10.0
Malawi	3	2.1	10.5	5.5	15.0
Brazil	402	2.0	2.0	26.5	14.7
Nicaragua	8	1.3	1.9	15.3	18.0
Spain	443	1.3	2.5	10.9	20.7
Sweden	92	1.2	-0.9	12.5	13.9
Bahrain	7	0.9	18.6	14.0	10.0
Austria	269	0.6	-3.2	15.9	14.8
Netherlands	223	0.4	-2.5	9.8	15.1
Australia	238	0.4	1.2	7.1	18.9
Tunisia	49	0.3	3.9	14.4	25.0
Montserrat	1	0.0	-14.4	0.0	0.0
Panama	2	0.0	4.5	4.0	10.0
Hong Kong	165	0.0	5.8	9.3	30.3
Kenya	3	0.0	-13.1	8.6	10.0
Luxembourg	6	0.0	9.7	15.0	15.0
Christmas Island	1	0.0	-32.0	0.0	10.0
Belarus	7	-0.2	0.7	-8.1	10.0

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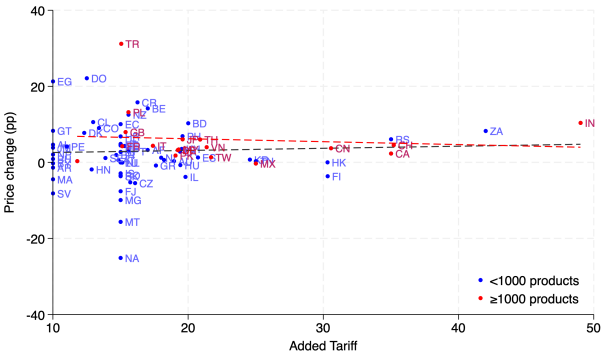
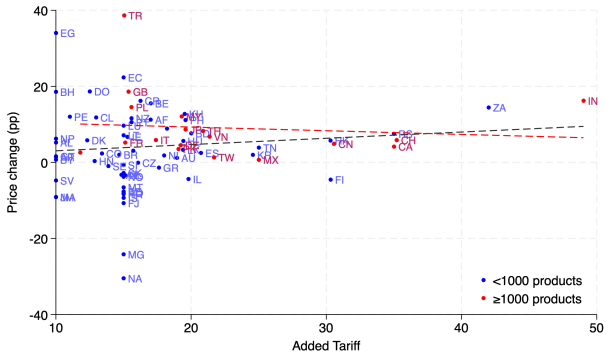
Table A12 – continued from previous page

Country	Products	Price Change	Deviation from Pre-Tariff Trend	Tariff Increase (pp)	
				Applied	Statutory
Bosnia-Herzegovina	4	-0.3	16.6	24.2	30.0
Hungary	126	-0.7	5.7	8.6	19.4
Greece	104	-0.8	-1.4	10.2	17.6
Ethiopia	5	-1.1	-23.1	4.0	10.0
Argentina	48	-1.4	1.4	7.3	10.0
Mauritius	4	-1.6	-21.2	5.4	15.0
Honduras	38	-1.8	0.4	10.7	12.9
Iceland	24	-2.9	-9.3	9.2	15.0
Romania	44	-3.4	-8.0	11.9	15.0
Finland	26	-3.6	-4.5	13.1	30.3
Slovakia	38	-3.6	-2.8	8.9	15.0
Israel	293	-3.8	-4.3	11.7	19.8
Bolivia	1	-4.3	5.4	13.0	15.0
Morocco	31	-4.4	-9.1	10.0	10.0
Czech Republic	189	-5.3	0.1	12.6	16.1
Fiji	17	-7.6	-10.7	13.3	15.0
El Salvador	20	-8.1	-4.7	9.5	10.0
Madagascar	8	-9.9	-24.1	6.8	15.0
Jordan	3	-14.3	-15.4	10.8	15.0
Malta	32	-15.6	-6.5	5.1	15.0
Namibia	7	-25.1	-30.4	3.6	15.0
Haiti	2	-46.3	-1501.8	8.1	10.0
Bulgaria	15	-47.9	-40.7	12.4	15.0
All Countries	**359,412**	**3.6**	**5.2**	**23.8**	**27.8**

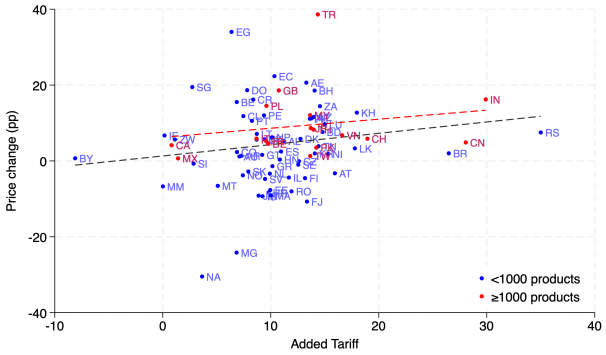
Notes: Panel A reports countries of origin with at least 1,000 products in the sample and Panel B the remaining countries. Price changes reflect cumulative increases since the March 4, 2025 tariff announcements. Pre-tariff trends are estimated from country-specific regressions over the period October 1, 2024 to March 4, 2025. Applied and statutory tariffs are the additional tariff rates introduced by the 2025 measures, in percentage points relative to January 2025, measured at the end of the sample and averaged across each country's products. The values reported under "All Countries" represent averages at the country–HS-10 level, weighted by product counts. The total also includes 16,702 imported products with no identified country of origin.



(a) Statutory tariffs (change since March 4)



(b) Statutory tariffs (deviation from trend)



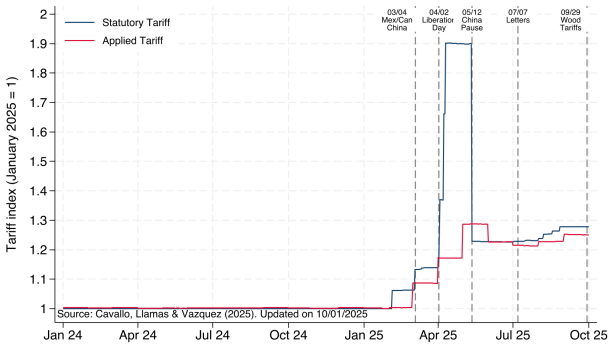
(c) Applied tariffs (deviation from trend)

Figure A7: Added tariffs and cross-country price changes: additional panels.

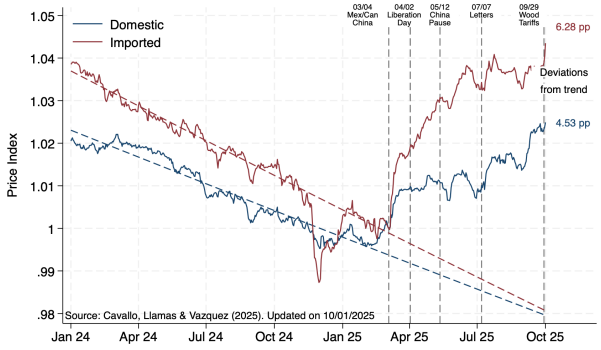
Notes: Each dot is a country of origin. Panels (a) and (b) use additional statutory tariff rates; panel (c) uses additional applied rates (duties paid divided by the customs value of imports at the country–HS-10 level, averaged to the country level). Both are in percentage points relative to January 2025, measured at the end of the sample. Panel (a) plots the cumulative price change since March 4, 2025; panels (b) and (c) plot the deviation from the pre-tariff trend estimated over October 2024–March 2025. Countries shown in red have at least 1,000 products in the sample; all other countries are shown in blue. The black dashed line is a linear fit estimated using all countries; the red dashed line is a linear fit estimated using only those with at least 1,000 products. The applied-tariff panel for the change since March 4 is shown in the main text (Figure 2).

C.3 Extended data: starting in January 2024

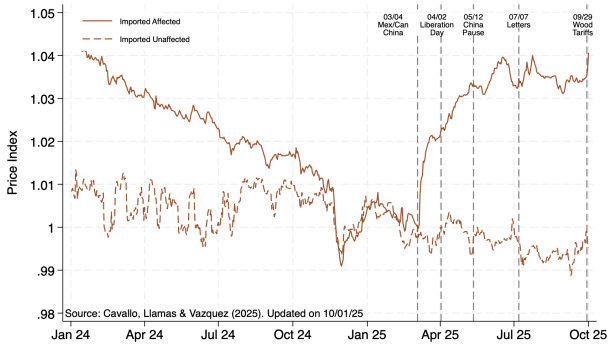
The plots in this subsection extend the main results back to January 1, 2024. They show that pre-tariff trends remained stable from January 2024 through early March 2025, indicating that observed movements after March reflect tariff impacts rather than seasonality.



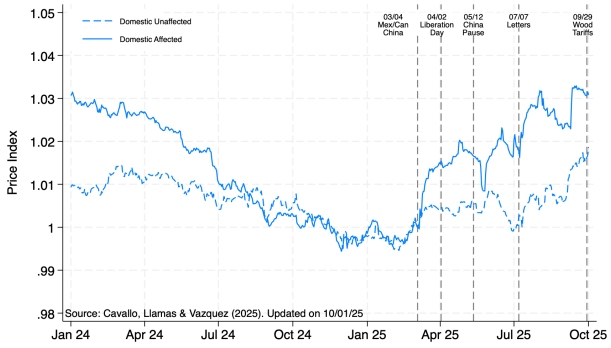
(a) Statutory vs Applied Tariff Rates



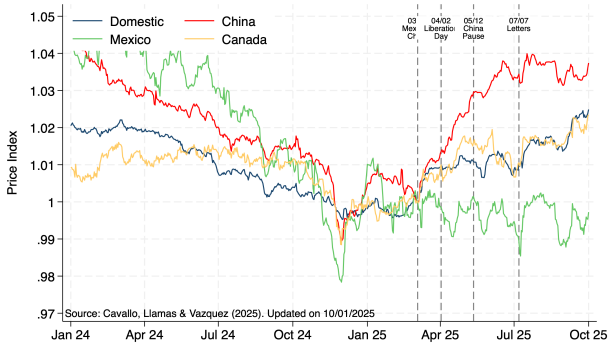
(b) Domestic vs Imported Goods



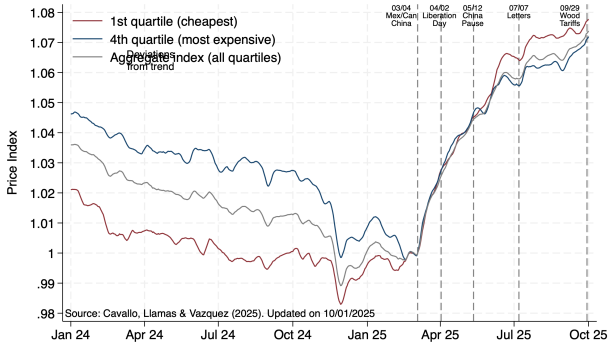
(c) Imported Goods: Affected vs Unaffected



(d) Domestic Goods: Affected vs Unaffected



(e) By Country of Origin



(f) By Price-Level Quartile

Figure A8: Retail price responses to the 2025 tariffs — extended horizon (sample from January 2024).

Notes: Replicates Figure 1 with the sample extended back to January 1, 2024. Panel (a) shows the average statutory and applied U.S. tariff rates over time as an index equal to one plus the additional tariff rate relative to January 2025. The remaining panels report retail price indices from five large U.S. retailers, with pre-tariff trends estimated from January 1, 2024 to March 4, 2025. Vertical lines indicate major tariff announcements. Panel (b) compares domestic and imported goods; (c)–(d) split imported and domestic goods by tariff exposure; (e) shows indices for domestic goods and the three foreign origins first targeted by the 2025 tariffs (China, Mexico, Canada); (f) shows imported goods by pre-tariff price-level quartile.

Table A13: U.S. Retail Price Level Changes by Country of Origin with Extended Horizon

Country	Price Change	Deviation from Pre-Tariff Trend	Tariff Increase (pp)	
			Applied	Statutory
Turkey	31.21	39.22	14.4	15.0
Poland	13.22	12.78	9.6	15.6
India	10.41	14.91	29.9	49.0
United Kingdom	8.04	10.99	10.4	15.4
Japan	6.09	10.41	13.7	19.6
Thailand	6.03	7.98	14.0	20.9
Switzerland	4.58	3.72	19.0	35.2
Italy	4.39	4.42	8.6	17.4
France	4.27	4.83	9.6	15.1
Vietnam	4.02	7.83	16.6	21.4
China	3.74	5.49	28.3	30.6
Malaysia	3.41	9.19	13.6	19.3
Germany	3.26	5.27	9.7	19.2
United States	2.49	4.53	—	—
Canada	2.35	3.09	0.6	35.0
Pakistan	1.82	−1.20	14.2	19.1
Taiwan	1.36	2.36	14.0	21.7
South Korea	0.75	2.47	14.1	24.6
Mexico	−0.28	3.11	1.4	25.0
All Countries	**3.57**	**5.48**	**23.8**	**27.8**

Notes: The table includes countries of origin with at least 1,000 products in the sample. Price changes reflect cumulative increases since the March 4, 2025 tariff announcements. Pre-tariff trends are estimated from country-specific regressions over the period January 1, 2024 to March 4, 2025. Applied and statutory tariffs are the additional tariff rates introduced by the 2025 measures, in percentage points relative to January 2025, measured at the end of the sample and averaged across each country's products. The values reported under "All Countries" represent averages at the country–HS-10 level, weighted by product counts.

Table A14: Retail Price Changes by Sector

Category	Price Change			vs. Pre-Tariff Trend		
	All	Imports	Domestic	All	Imports	Domestic
Furnishings, household equipment	5.34	6.06	3.30	8.41	8.97	6.97
Miscellaneous goods and services	2.79	3.90	1.28	3.43	5.28	1.18
Food and non-alcoholic beverages	2.24	2.35	2.27	3.49	2.56	3.88
Recreation and culture	1.62	1.88	1.29	2.78	3.13	2.28
Health	1.61	2.20	1.31	2.53	2.42	2.61
All sectors	**3.57**	**4.35**	**2.49**	**5.48**	**6.28**	**4.53**

Note: Price changes reflect cumulative increases since tariff announcements. Pre-tariff trend estimates are based on category-specific regressions between January 1, 2024 and March 4, 2025.

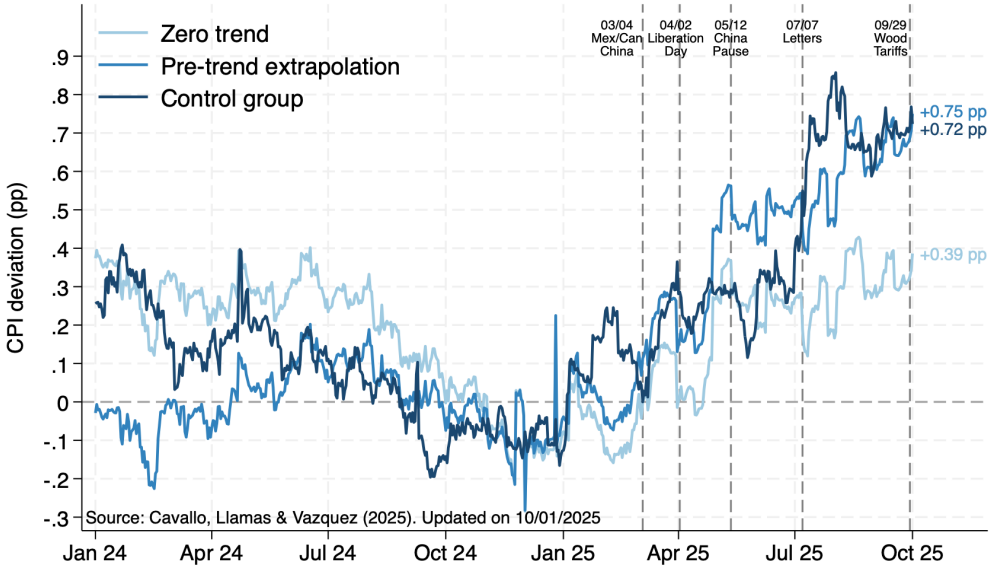


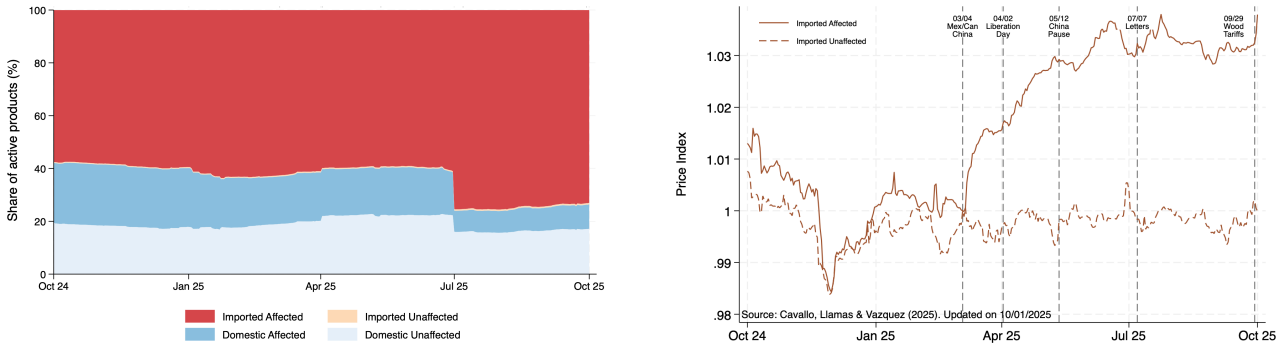
Figure A9: Cumulative Impact of Tariffs on All-Items CPI-U, Not Seasonally Adjusted, under three counterfactuals (extended pre-trend horizon: January 2024–March 2025).

Notes: The figure replicates Figure 3 with the sample and pre-trend estimation window extended back to January 1, 2024 (in the relevant counterfactuals). It plots the estimated cumulative contribution of tariff-affected goods to the all-items CPI (all products) under the three counterfactuals described in Section 5: zero-trend (lightest), pre-trend extrapolation estimated over January 2024 to March 2025 (intermediate), and control-group (darkest). End-of-sample values are labeled at the last date, and vertical lines mark the main 2025 tariff events.

C.4 Product entry/exit and balanced-panel robustness

Because our price indices are computed using a chained matched-model approach, they capture the response of retail prices for products that remain in the panel: the price changes of items observed in two consecutive periods. They do not directly capture adjustments that operate through changes in product availability — for instance, retailers discontinuing affected imported items to substitute them with alternative products at higher prices. If tariffs prompted such adjustments, our estimates of pass-through and CPI impact would constitute lower bounds on the true effect.

To gauge the quantitative importance of this concern, Figure A10 reports two complementary diagnostics. Panel (a) plots the daily composition of the active product catalog: the share of scraped products in each exposure group (domestic and imported, tariff-affected and unaffected). If retailers systematically discontinued affected imports after the March 4 announcement, the share of tariff-affected imported products would fall. Panel (b) restricts the sample to a balanced subset of imported products: those with at least one valid price observation in 2024 (the pre-tariff period) *and* at least one in the last month of the sample. By construction, this subset removes any contribution of entry or exit to the index from products absent at either end of the sample.



(a) Composition of the active catalog

(b) Balanced panel: Imported Affected vs Unaffected

Figure A10: Extensive-margin diagnostics and balanced-panel robustness for imported products.

Notes: Panel (a) reports the daily share of active products in each exposure group (domestic and imported, tariff-affected and unaffected), where a product is active on a day if it was scraped that day or lies within a temporary scraping gap of at most 30 days between two observed prices; the four shares sum to 100%. Panel (b) replicates the imported-side panel of Figure 1c on a balanced sample: only imported products with at least one valid price observation in 2024 (the pre-tariff period) *and* at least one in the last month of the sample are retained. Vertical lines denote major tariff events.

The two diagnostics jointly suggest that adjustments through product availability are a minor channel in our setting. In panel (a), the composition of the active catalog is broadly stable across the sample: the share of tariff-affected imported products shows no permanent decline following any of the major tariff events marked by the vertical lines, providing no evidence of retailer-driven discontinuation of tariff-exposed products (the only pronounced movement in the composition is a drop

in the share of domestic products around mid-2025, which affects both tariff-affected and unaffected domestic items and raises the share of tariff-affected imported products). The balanced-panel index in panel (b) yields a divergence between affected and unaffected items quantitatively comparable to the corresponding panel of Figure 1c in the main text, indicating that compositional changes in the set of products entering and exiting the panel do not drive the post-March separation between the two groups. More precisely, the end-of-sample divergence between the affected and unaffected indices equals 4.5 percentage points in the full sample (Figure 1c) and 3.8 percentage points in the balanced panel (panel (b) of Figure A10). These diagnostics show no signature of tariff-induced product withdrawal in our data. However, varieties that might have been introduced absent the tariffs are by definition unobserved; if such suppressed entry is material, our intensive-margin estimates understate the full effect.

D Additional Pass-Through Methods and Results

D.1 Pass-through by Size of Tariff Exposure

This section describes the methodology used for Column (4) of Table 1 in the main text. In this specification, we allow for heterogeneous pass-through by splitting products according to whether the cumulative change in their applied ad valorem tariff rate is over or under 15 percentage points. Specifically, each product i is assigned to an over-15 group if $D_i > 0.15$, and to an under-15 group if $D_i \leq 0.15$, where D_i denotes the change in the applied tariff rate between the product's last month up to February 2025 and its last month in the sample.

The dependent variable is the same as in Column (3) of Table 1. That is, we use the monthly log price change net of the product-specific pre-tariff trend,

$$\widetilde{\Delta \ln p_{it}} \equiv \Delta \ln p_{it} - \widehat{\Delta \ln p_{it}}^{trend}, \tag{4}$$

where $\widehat{\Delta \ln p_{it}}^{trend}$ is the predicted monthly price change obtained from a product-level linear trend estimated using data from January 2024 to March 2025.

We then estimate the following distributed-lag specification:

$$\widetilde{\Delta \ln p_{it}} = \sum_{\ell=0}^{7} \gamma_\ell^O \, \Delta\tau_{i,t-\ell} \cdot \mathbb{1}\{D_i > 0.15\} + \sum_{\ell=0}^{7} \gamma_\ell^U \, \Delta\tau_{i,t-\ell} \cdot \mathbb{1}\{D_i \leq 0.15\} + \alpha_k + \varepsilon_{it}, \tag{5}$$

where $\Delta\tau_{it} \equiv \Delta \ln(1 + \tau_{it})$ is the change in log gross applied tariffs, and k indexes COICOP 3-digit sectors. The fixed effects α_k absorb time-invariant differences in average monthly price changes across sectors, and we cluster standard errors at the COICOP 3-digit sector level.

We report the cumulative pass-through after seven months by presenting the point estimates and standard errors of $\sum_{\ell=0}^{7} \gamma_\ell^O$ and $\sum_{\ell=0}^{7} \gamma_\ell^U$ for the over- and under-15 groups, respectively.

D.2 Pass-through Regressions with Shorter Trends (October 2024–March 2025)

This appendix reports results for the specification in Column (3) of Table 1 using product-level trends estimated over October 2024 to March 2025 (instead of January 2024 to March 2025). The estimated pass-through is similar under this alternative trend window.

Table A15: Pass-through Regression with Deviations from Trend (Trends: Oct. 2024–Mar. 2025)

Variable		(1) Statutory	(2) Applied	(3) Applied	(4) Detrended
Tariffs 7 mo.	$\left(\sum_{\ell=0}^{7}\gamma_\ell\right)$	0.060	0.217	0.207	
		(0.056)	(0.064)	(0.069)	
Over 15 pp	$\left(\sum_{\ell=0}^{7}\gamma_\ell^O\right)$				0.212
					(0.074)
Under 15 pp	$\left(\sum_{\ell=0}^{7}\gamma_\ell^U\right)$				0.113
					(0.099)
Adjusted R^2		0.002	0.002	0.006	0.006
Observations		515,630	309,958	309,958	309,958
Products		128,539	100,122	100,122	100,122
Sector Fixed effects (COICOP-3)		Yes	Yes	Yes	Yes

Notes: Table reports estimated coefficients from distributed-lag regressions of monthly log price changes on changes in statutory or applied tariff rates, as described in Section 4.1. Pass-through is measured as the cumulative response over seven months. Standard errors are clustered by 3-digit COICOP category.

D.3 Pass-through Regressions with Time Fixed Effects

This appendix reports the same four specifications as Table 1 in the main text with two alternative fixed-effects structures. Panel A adds year-month fixed effects to the COICOP-3 sector fixed effects (additive). Panel B replaces them with the COICOP-3 × year-month interaction, so that pass-through is identified from within-sector-month variation. The results for applied rates are similar in both cases.

Table A16: Pass-through Regression with Time Fixed Effects (Additive and Interaction)

Variable		(1) Statutory	(2) Applied	(3) Applied	(4) Detrended
Panel A: COICOP-3 + Year-Month FE					
Tariffs 7 mo.	$\left(\sum_{\ell=0}^{7}\gamma_\ell\right)$	0.027	0.198	0.222	
		(0.071)	(0.049)	(0.056)	
Over 15 pp	$\left(\sum_{\ell=0}^{7}\gamma_\ell^O\right)$				0.220
					(0.057)
Under 15 pp	$\left(\sum_{\ell=0}^{7}\gamma_\ell^U\right)$				0.193
					(0.082)
COICOP-3 FE		Yes	Yes	Yes	Yes
Year-Month FE		Yes	Yes	Yes	Yes
COICOP-3 × Year-Month FE		No	No	No	No
Observations		515,630	309,958	309,958	309,958
Products		128,539	100,122	100,122	100,122
Panel B: COICOP-3 × Year-Month FE					
Tariffs 7 mo.	$\left(\sum_{\ell=0}^{7}\gamma_\ell\right)$	0.014	0.175	0.196	
		(0.075)	(0.033)	(0.040)	
Over 15 pp	$\left(\sum_{\ell=0}^{7}\gamma_\ell^O\right)$				0.193
					(0.041)
Under 15 pp	$\left(\sum_{\ell=0}^{7}\gamma_\ell^U\right)$				0.169
					(0.074)
COICOP-3 FE		No	No	No	No
Year-Month FE		No	No	No	No
COICOP-3 × Year-Month FE		Yes	Yes	Yes	Yes
Observations		515,611	309,948	309,948	309,948
Products		128,536	100,120	100,120	100,120

Notes: Table reports estimated coefficients from distributed-lag regressions of monthly log price changes on changes in statutory or applied tariff rates, as described in Section 4.1. Panel A adds year-month fixed effects to the COICOP-3 sector fixed effects (additive); Panel B uses the COICOP-3 × year-month interaction. Pass-through is measured as the cumulative response over seven months. Standard errors are clustered by 3-digit COICOP category.

D.4 Pass-through Regressions with a Chinese-Origin Control

This appendix reports the same four specifications as Table 1 in the main text, adding a Chinese-origin dummy (equal to 1 if the product's country of origin is China, 0 otherwise) as an additional control on top of the COICOP-3 sector fixed effects.

Table A17: Pass-through Regression with COICOP-3 and Chinese-Origin Fixed Effects

Variable		(1) Statutory	(2) Applied	(3) Applied	(4) Detrended
Tariffs 7 mo.	$\left(\sum_{\ell=0}^{7}\gamma_\ell\right)$	0.131	0.268	0.319	
		(0.099)	(0.126)	(0.132)	
Over 15 pp	$\left(\sum_{\ell=0}^{7}\gamma_\ell^O\right)$				0.349
					(0.144)
Under 15 pp	$\left(\sum_{\ell=0}^{7}\gamma_\ell^U\right)$				0.219
					(0.105)
COICOP-3 FE		Yes	Yes	Yes	Yes
Chinese-Origin FE		Yes	Yes	Yes	Yes
Observations		515,630	309,958	309,958	309,958
Products		128,539	100,122	100,122	100,122

Notes: Table reports estimated coefficients from distributed-lag regressions of monthly log price changes on changes in statutory or applied tariff rates, as described in Section 4.1, with a Chinese-origin dummy (1 if the product's country of origin is China) added to the COICOP-3 sector fixed effects. Pass-through is measured as the cumulative response over seven months. Standard errors are clustered by 3-digit COICOP category.

D.5 Pass-through with exempt imports as the control

This section re-estimates tariff pass-through into retail prices using exempt imported products as an explicit control group. The exercise is intended as a robustness check on the baseline distributed-lag specification in Section 4.1: instead of relying only on sector fixed effects or product-level trends to account for non-tariff price movements, we net out the contemporaneous price change of imported products that were explicitly exempt from the 2025 tariff measures.

The affected and exempt groups are defined from the tariff schedule, as described in Appendix B.2.5. Affected products are imported goods whose country–HS combination faced an additional tariff during the sample period. Exempt products are imported goods whose HS codes were written into the exemption lists and whose origin was not subject to one of the origin-based IEEPA tariffs. The treatment is the monthly change in the log gross applied tariff, $\Delta \ln(1 + \tau_{i,t})$, measured relative to each product's pre-tariff applied rate.

The tariff treatment differs sharply across the two groups. Table A18 shows that affected imports experienced large increases in applied tariff rates, rising from 8.9 percentage points in March to 17.4 percentage points in April and 29.3 percentage points in May, before stabilizing around 22–24 percentage points later in the sample. In contrast, tariff increases for exempt imports remained close to zero throughout the period. In the underlying distribution (Table A19), the median exempt product has a zero tariff increase in every month from February through September.

Table A18: Increase in applied tariff rates on affected and exempt imported products

	Tariff Increase (pp)		Products	
Month	Affected	Exempt	Affected	Exempt
Feb 2025	0.5	0.0	115,235	588
Mar 2025	8.9	0.0	100,231	562
Apr 2025	17.4	0.1	88,347	534
May 2025	29.3	0.1	86,700	532
Jun 2025	23.0	0.0	84,586	513
Jul 2025	21.8	0.0	82,615	501
Aug 2025	22.4	0.2	78,797	479
Sep 2025	24.3	0.0	71,204	412

Notes: The tariff increase is measured in percentage points relative to each product's last applied tariff rate on or before January 31, 2025. Product counts refer to distinct products observed in each month.

Table A19: Distribution of the tariff increase (pp) across exempt imported products, by month

Month	P10	P30	P50	P90	P99	Mean
Feb 2025	0.00	0.00	0.00	0.00	0.00	0.00
Mar 2025	0.00	0.00	0.00	0.00	0.00	0.00
Apr 2025	0.00	0.00	0.00	0.33	1.45	0.11
May 2025	0.00	0.00	0.00	0.15	2.94	0.14
Jun 2025	0.00	0.00	0.00	0.07	0.61	0.05
Jul 2025	0.00	0.00	0.00	0.02	0.50	0.00
Aug 2025	0.00	0.00	0.00	0.21	5.85	0.21
Sep 2025	0.00	0.00	0.00	0.09	1.79	0.04

Notes: The table reports percentiles and the mean of the tariff increase, in percentage points, across exempt imported products, measured relative to each product's last applied tariff rate on or before January 31, 2025.

A limitation of this exercise is that the exempt control group is small and compositionally selected. In the applied-rate regression sample, the exempt group contains 696 products, compared with more than 56,000 affected imported products. Table A20 shows that exempt products are concentrated in Health and Recreation, with little support in Furnishings, Food, and Transport. We therefore view this exercise as a robustness check rather than as a preferred identification strategy.

Table A20: Composition of the exempt control group

COICOP division	Products	Percent
06 Health	334	48.0
09 Recreation	200	28.7
12 Miscellaneous	73	10.5
05 Furnishings	32	4.6
08 Communication	28	4.0
01 Food	19	2.7
04 Housing	5	0.7
07 Transport	3	0.4
02 Alcohol/Tobacco	2	0.3
Total	696	100.0

Notes: The table counts distinct exempt imported products in the applied-rate estimation sample. Of the 1,019 exempt imported products, the 323 not shown lack eight consecutive months with both price and applied-tariff data.

To implement the robustness check, we subtract from each affected product's monthly price change the contemporaneous average price change of exempt imported products and regress this netted change on contemporaneous and lagged changes in the applied tariff:

$$\Delta \ln p_{i,t} - \overline{\Delta \ln p_t}^{ex} = \sum_{\ell=0}^{7} \gamma_\ell \Delta \ln(1+\tau_{i,t-\ell}) + \text{FE} + \varepsilon_{i,t}.$$

The exempt average $\overline{\Delta \ln p_t}^{ex}$ is the mean price change of all exempt imports in month t, so the control absorbs aggregate contemporaneous price movements among exempt imported goods. We report the cumulative seven-month pass-through, $\sum_{\ell=0}^{7} \gamma_\ell$, across a fixed-effects ladder with no fixed effects, COICOP-3 fixed effects, and COICOP-3 fixed effects plus a China-origin dummy. Standard errors are clustered by 3-digit COICOP category.

Table A21 reports the results. Across specifications, the seven-month applied-rate pass-through ranges from 0.214 to 0.269. These estimates are close to the baseline applied-rate estimates in Table 1, indicating that the main pass-through result is not driven by common price movements that also affected exempt imported goods.

Table A21: Pass-through regressions with exempt imports as control

	(1)	(2)	(3)
Tariffs 7 mo. $\left(\sum_{\ell=0}^{7}\gamma_\ell\right)$	0.214	0.229	0.269
	(0.076)	(0.086)	(0.143)
Adjusted R^2	0.001	0.002	0.002
Observations	214,759	214,759	214,759
Products	56,123	56,123	56,123
Sector FE (COICOP-3)	No	Yes	Yes
China dummy	No	No	Yes

Notes: Each column reports the seven-month cumulative pass-through, $\sum_{\ell=0}^{7}\gamma_\ell$, from a distributed-lag regression of monthly log price changes on changes in applied tariff rates, estimated over affected imported products only. The dependent variable nets out the contemporaneous average price change of exempt imported products in the same month. Standard errors, clustered by 3-digit COICOP category, are reported in parentheses.

E CPI Impact under Alternative Counterfactuals

This appendix describes how we construct the CPI impact estimates reported in Section 5. The objective is to translate the high-frequency retail price movements documented in Section 3.1 into contributions to the all-items CPI, while making explicit the counterfactual assumptions behind each estimate.

All three counterfactuals are based on CPI-weighted aggregate price indices, and in all three cases the deviation from the counterfactual is computed after aggregation. They differ in the number of aggregate indices used and in how the counterfactual is constructed.

For the zero-trend and pre-trend counterfactuals, we first construct a single price index within each COICOP-3 category using all available products, regardless of their origin or tariff status. Because these category-level indices use unweighted geometric averages of item-level price relatives, each product receives equal weight within a category on each link of the chained index. The relative importance of imported and domestic goods, and of affected and unaffected goods, is therefore implicitly determined by their product counts within each COICOP-3 category. We then aggregate the category-level indices using official CPI expenditure weights and compare the resulting aggregate index with either its March 4 level or its extrapolated pre-tariff trend.

For the control-group counterfactual, we instead divide products into four groups before aggregation: affected imports, unaffected imports, affected domestic goods, and unaffected domestic goods. We construct a separate CPI-weighted aggregate price index for each group. We then calculate the difference between the affected and unaffected aggregate indices separately for imported and domestic goods. Finally, we combine the imported and domestic deviations using their product shares in our retail sample. These product-share weights make explicit the compositional weighting that is implicit in the all-products COICOP-3 indices used for the first two counterfactuals.

Each counterfactual rests on a different identifying assumption. The zero-trend estimate assumes

no counterfactual price growth after March 4. The pre-trend estimate assumes that the pre-tariff trend in the weighted aggregate index would have continued. The control-group estimate assumes that the weighted index for unaffected goods provides a valid counterfactual for the corresponding weighted index for affected goods. We view the three benchmarks as complementary sensitivity exercises rather than as competing estimates.

CPI weights and the all-products index. Let c index COICOP-3 categories, and let $P_c(t)$ denote the chained price index constructed from all products in category c. Let ω_c denote the official all-items CPI expenditure share of category c, and let C be the set of categories covered by our sample. Define

$$\Omega = \sum_{c \in C} \omega_c = 0.285, \qquad \widetilde{\omega}_c = \frac{\omega_c}{\Omega}.$$

The categories represented in our data therefore account for 28.5 percent of the all-items CPI basket. We assume that categories not covered by our data, consisting primarily of services, were not affected by the tariffs in the short run.

The CPI-weighted price index for the categories covered by our sample is

$$W(t) = \sum_{c \in C} \widetilde{\omega}_c P_c(t).$$

The zero-trend and pre-trend counterfactuals are both constructed from this single aggregate index. We first aggregate the observed category-level indices into $W(t)$ and then calculate the deviation of $W(t)$ from the relevant aggregate counterfactual. Multiplying this deviation by Ω expresses it as a contribution to the all-items CPI.

Zero-trend counterfactual. The zero-trend counterfactual assumes that, absent the tariffs, the weighted aggregate index would have remained at its March 4, 2025 level. Let t_0 denote March 4, 2025. The implied contribution to the all-items CPI is

$$\Delta_0^{\text{CPI}}(t) = 100 \times \Omega \left[W(t) - W(t_0) \right].$$

Because the underlying category-level indices are normalized to one on March 4, $W(t_0) = 1$. This benchmark is transparent and deliberately conservative, but it may understate the tariff impact if prices would otherwise have continued along the mild deflationary path observed before March.

Pre-trend extrapolation counterfactual. The pre-trend counterfactual allows for the price dynamics observed before the tariffs. We estimate a log-linear trend for the weighted aggregate index $W(t)$ from October 1, 2024 to March 4, 2025 using a robust regression, and extrapolate it through the end of the sample. Let $W^{\text{trend}}(t)$ denote this extrapolated counterfactual path. The implied contribution to the all-items CPI is

$$\Delta_{\text{trend}}^{\text{CPI}}(t) = 100 \times \Omega \left[W(t) - W^{\text{trend}}(t) \right].$$

The trend is therefore estimated for the aggregate weighted index rather than separately for each COICOP-3 category. This benchmark accounts for pre-existing movements in the prices represented in our sample, but it is sensitive to the period used to estimate the trend and to volatility during the pre-tariff period.

Control-group counterfactual. The control-group counterfactual does not specify a hypothetical time path for the all-products index $W(t)$. Instead, it uses the observed aggregate price movements of unaffected goods as a counterfactual for affected goods. Because imported and domestic goods rely on different definitions of tariff exposure, we conduct this comparison separately for the two origin groups.

Let $g \in \{\text{imp}, \text{dom}\}$ denote the origin group and $a \in \{\text{aff}, \text{unaff}\}$ denote tariff status. For each origin–status group and COICOP-3 category c, let

$$P^g_{a,c}(t)$$

denote the chained price index constructed from the products belonging to that group and category. Let C^g_a denote the set of COICOP-3 categories represented in group (g, a), and define

$$\Omega^g_a = \sum_{c \in C^g_a} \omega_c, \qquad \widetilde{\omega}^g_{a,c} = \frac{\omega_c}{\Omega^g_a}.$$

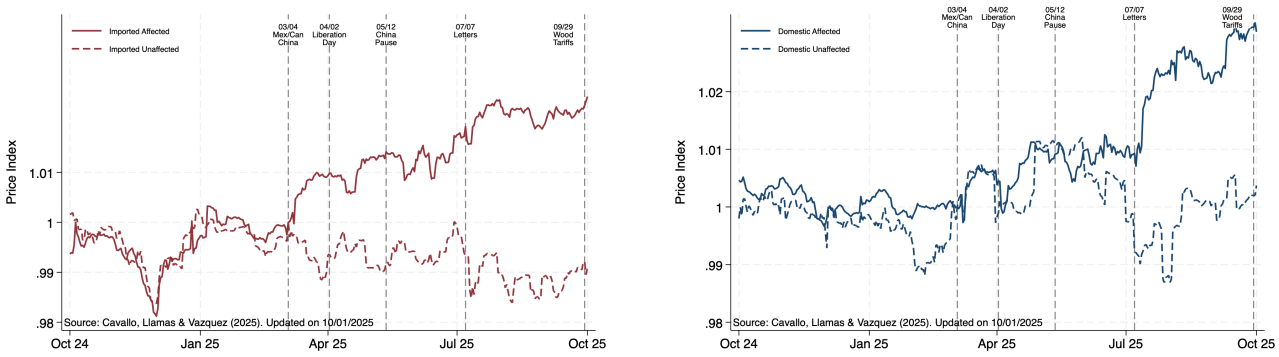
The CPI-weighted aggregate index for group (g, a) is

$$W^g_a(t) = \sum_{c \in C^g_a} \widetilde{\omega}^g_{a,c} P^g_{a,c}(t).$$

This procedure produces four aggregate indices:

$$W^{\text{imp}}_{\text{aff}}(t), \qquad W^{\text{imp}}_{\text{unaff}}(t), \qquad W^{\text{dom}}_{\text{aff}}(t), \qquad W^{\text{dom}}_{\text{unaff}}(t).$$

Figure A11 plots these weighted indices separately for imported and domestic goods.



(a) Imported: affected vs. unaffected

(b) Domestic: affected vs. unaffected

Figure A11: Weighted price indices for affected and unaffected categories, by origin.

Notes: Each panel plots the chained weighted price indices used in the control-group counterfactual, separately for imported and domestic products. Within each panel, the solid line shows the index for tariff-affected products and the dashed line shows the corresponding unaffected control.

The affected–unaffected deviation is calculated after the underlying COICOP-3 indices have been aggregated. For each origin group g, define

$$D_g(t) = 100 \left[W^g_{\text{aff}}(t) - W^g_{\text{unaff}}(t) \right].$$

To obtain the aggregate deviation, let

$$C_g = C^g_{\text{aff}} \cup C^g_{\text{unaff}}$$

denote the set of categories represented in the origin-specific comparison, and let

$$\Omega^g = \sum_{c \in C_g} \omega_c$$

denote their share of the all-items CPI basket.

Because the imported and domestic comparisons are constructed separately, we must also account for the relative importance of imported and domestic goods in the retail sample. Let s_{imp} and s_{dom} denote the imported and domestic product shares, with

$$s_{\text{imp}} + s_{\text{dom}} = 1.$$

The all-products control-group estimate is

$$\Delta^{\text{CPI}}_{\text{CG}}(t) = s_{\text{imp}} \Omega^{\text{imp}} D_{\text{imp}}(t) + s_{\text{dom}} \Omega^{\text{dom}} D_{\text{dom}}(t). \tag{6}$$

The origin product shares are an important part of this calculation. They ensure that the imported and domestic deviations contribute to the aggregate estimate in proportion to the prevalence of imported and domestic products in our sample. In the zero-trend and pre-trend calculations, this

compositional weighting is already implicit in the construction of the all-products COICOP-3 indices: because products receive equal weight within each category, the contribution of each origin and tariff-status group depends on its product count within that category. Once the groups are separated under the control-group approach, the imported and domestic product shares must be introduced explicitly when recombining their estimated contributions.

The control-group benchmark avoids extrapolating a pre-tariff trend and absorbs price movements shared by the affected and unaffected aggregate indices. Its identifying assumption is that, absent the tariffs, the affected and unaffected weighted indices within each origin group would have followed similar paths. This assumption may be violated if the groups differ in category composition or are exposed differently to other shocks.

Thin-cell exclusions. A small number of COICOP-3 cells contain very few observed products but have relatively large CPI expenditure weights. In these cases, idiosyncratic price movements in a handful of products could have a disproportionate effect on one of the four weighted indices. We therefore exclude these thin cells from the control-group counterfactual.

The excluded cells are listed in Table A22. In total, the restriction removes 819 product IDs out of 359,412, or 0.23 percent of the sample. These exclusions apply only to the control-group counterfactual. The zero-trend and pre-trend counterfactuals use the full sample.

Table A22: Excluded COICOP-3 categories in the control-group CPI estimation

Group	Excluded COICOP-3 categories (product IDs)
Imported affected	321 (597), 722 (29)
Imported unaffected	111 (5), 116 (3), 312 (1), 511 (20), 531 (3), 722 (2), 911 (39)
Domestic affected	321 (1), 712 (119)
Domestic unaffected	—
Total	819 / 359,412 (0.23%)

Notes: The table reports the COICOP-3 cells excluded from the control-group counterfactual used in Section 5. The number of product IDs in each excluded cell is reported in parentheses.