The Anatomy of Tariff Pass-through into Consumer Prices*

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Abstract

Tariffs raise the prices of goods made at home, not just the imports they tax—an effect that standard pass-through estimates largely miss. Studying the 2025 U.S. tariffs, we find that about 26 percent of the tariff increase passes through to consumer prices. These estimates are measured relative to less-exposed goods and hold aggregate conditions fixed. The direct effect accounts for 64 percent of this increase, as tariffs raise the consumer prices of foreign varieties of a good. The remaining 36 percent arises indirectly—tariffs raise the cost of imported inputs used by U.S. producers, and domestic producers raise their markups because they face less competition from higher-priced imports. The direct effect passes through quickly, since tariffs raise import prices almost immediately, but the indirect effect takes nine to twelve months to work its way through supply chains. As a result, tariffs have a larger and more drawn-out impact on consumers than the direct effect alone would suggest.

Key Words: Tariffs, pass-through, inflation, consumer prices, import prices.
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1 Introduction

There has been intense interest among economists and policymakers in the effect of the 2025 U.S. tariffs on consumer prices. Two features stand out. The tariffs were broad-based, levied on nearly all trading partners and products. They were also large, raising the average tariff rate on U.S. imports to levels not seen in nearly a century, from about 3 percent at the start of the year to a peak of about 16 percent in September. Gauging their effect, however, is far from straightforward: tariffs pass through to consumer prices via three distinct channels. The direct channel captures the impact of the tariff on imported *consumer* goods—a tariff raises the price at the border, and retailers pass part of the increase on to consumers. The other two channels work through the prices of *domestically* produced goods. The marginal cost channel operates through the higher tariff-inclusive cost of imported intermediate inputs, which raises the cost—and hence the price—of domestically produced consumer goods. Finally, the strategic complementarity channel arises from the increase in markups that domestic firms charge in the wake of diminished foreign competition (Amiti, Itskhoki, and Konings 2019). The total effect on consumer prices is the sum of these three.

Previous studies of tariff pass-through to *consumer* prices have mostly focused on the direct channel. The marginal cost channel, where discussed, is not separately estimated but calculated from an accounting benchmark. The strategic complementarity channel is typically omitted altogether. Important industry case studies have examined pass-through to consumer prices for specific industries (Flaaen, Hortaçsu, and Tintelnot 2020; Flaaen et al. 2025), and some capture domestic firms' price responses, but none of these studies isolates the marginal cost channel. This paper is the first to estimate all three channels of tariff pass-through into consumer prices—direct, marginal cost, and strategic complementarity. By estimating them within a unified framework, we can combine them into an overall pass-through estimate for the goods categories of the Consumer Price Index (CPI).[1]

Pass-through of tariffs into import prices and producer prices can be estimated using highly disaggregated classifications matched to the tariffs (Amiti, Redding, and Weinstein 2019; Fajgelbaum et al. 2020). The step that has been missing in the literature is carrying these effects through to the CPI. This task is difficult because CPI item definitions do not map neatly into U.S. tariff classifications or the industry classifications for which producer prices are collected, and CPI items mix imported and domestically produced varieties. We therefore build a concordance—none exists in official statistics—that links each CPI item to the imported products and the domestic industries that supply it, drawing on the universe of U.S. import transactions at the country and Harmonized Tariff System 10-digit (HTS10) level, producer prices at the North American Industrial Classification 6-digit (NAICS6) level, and input-output (IO) data on the cost structure of U.S. industries. This mapping lets us estimate, for each CPI item, the tariff-induced movement in import and producer prices, and how much of that movement is passed through to consumer prices.

We obtain our estimates in three steps. First, we estimate how much tariffs raise the prices of imported goods at the border. Second, we estimate the effect of tariffs on U.S. producer prices through the marginal cost and strategic complementarity channels. These estimates inform us about the impact of tariffs on the *pre-retail* prices of domestically produced goods. Third—the crux of our strategy—we combine observed

1. Throughout, the terms consumer goods and CPI items refer to the non-oil goods categories of the CPI.

import and producer price changes into a pre-retail composite price change for each CPI item, and estimate retail pass-through by regressing CPI price changes on this composite, instrumenting it with the tariff-driven price changes predicted by the first two steps.

A regression of consumer prices on tariffs alone cannot separate the three channels: the same tariffs move both import and domestic prices, and the CPI does not distinguish varieties by where they were produced. This is why we estimate pass-through into import prices and producer prices first, at the level where each channel is identified, and only then estimate the consumer-price regression, in which the composite's two tariff-predicted components—one for import prices, one for domestic prices—serve as instruments. We also construct an alternative instrument set, output and input tariffs measured directly at the CPI level, and obtain nearly identical estimates.

Two further issues are central to identification. First, we distinguish between *statutory tariff* rates, set by policy, and the *duty* rates that importers actually pay, which differ because of exemptions, the timing of shipments, and substitution toward lower-tariff suppliers. In our sample, the effective duty rate runs well below the statutory rate, at roughly two-thirds of it by the end of the sample. Because importers substitute away from high-tariff goods, the duty rate is endogenous, and we instrument it with the statutory rate throughout. Second, the import and producer prices that make up the consumer-price composite are measured with substantial noise, which introduces classical measurement error. Because our instruments are built from statutory tariffs rather than realized prices, instrumenting corrects the resulting attenuation in the consumer-price estimate.

Our estimates show that all three channels are economically meaningful. Pass-through of tariffs into import prices at the border is high, around 90 percent. On the domestic side, we find evidence of both channels. The dominant one is the marginal cost channel: in the average industry producing consumer goods, a 10 percent increase in duties raises producer prices by about 2.6 percent. The strategic complementarity effect is smaller but also positive: an industry's producer prices rise with the output tariff that shields the industry from import competition, by about 0.7 percent for a 10 percent increase in duties.

Combining all three channels, our headline result is that the pass-through of tariffs to consumer goods prices is about 26 percent. We obtain this number from a simple counterfactual exercise: applying our estimates, a uniform 10 percent tariff on all imports would raise consumer goods prices by about 2.6 percent.[2] The largest share, about 1.7 percentage points, comes from the direct channel, as tariffs on imported final goods raise their prices at the border. Importantly, the remaining 0.9 percentage points arise indirectly, through the prices of domestically produced goods: 0.77 percentage points because tariffs raise the marginal costs of U.S. producers of consumer goods, and the remaining 0.17 percentage points because domestic firms raise their markups as foreign competition recedes.

The channels differ sharply in how quickly they reach consumers. Estimating our specifications at horizons ranging from one to twelve months, we find that the direct channel is almost immediate: tariffs pass through to import prices nearly completely in the first month. The indirect channels build much more slowly, as higher input costs and reduced competitive pressure gradually cause domestic producers

2. This is a partial-equilibrium calculation rather than a forecast of aggregate CPI inflation: because our regressions include time fixed effects, they identify the effect of tariffs on the prices of more-exposed goods relative to less-exposed ones, and the exercise holds macroeconomic conditions, such as the exchange rate and the monetary-policy response, fixed.

to raise prices. Marginal cost pass-through is small at short horizons and becomes large and statistically significant only after nine to twelve months, and the combined contribution of the two indirect channels roughly doubles six to twelve months after the tariffs are raised. The full pass-through of a tariff to consumer prices is therefore reached only after about a year. Overall, tariffs have larger and more drawn-out effects on consumers than the direct effect alone would suggest.

Our paper relates to several strands of work on the price effects of tariffs. A first strand studies pass-through at the border and consistently finds that tariffs are passed through nearly fully into the dollar prices U.S. importers pay, so that foreign exporters bear little of the burden, both in the 2018–19 episode (Amiti, Redding, and Weinstein 2019; Fajgelbaum et al. 2020; Cavallo et al. 2021) and in 2025 (Gopinath and Neiman 2025; Fajgelbaum and Khandelwal 2026). We find the same near-complete pass-through and use it as the first step in tracing tariffs through to consumers.

A second strand estimates the consumer-price effect of the 2025 tariffs by combining input-output tables with an accounting benchmark. Some studies report the resulting predicted effects (Barbiero and Stein 2025; Baslandze et al. 2025); others go further and regress observed PCE or CPI inflation on the price effects implied by the benchmark (Minton, Ray, and Somale 2026; Mau and Smith 2026; Dvorkin, Leibovici, and Santacreu 2025; Mehrotra and Waugh 2026).[3] The accounting benchmark typically fixes markups in dollars, so that domestic firms pass on only the dollar increase in their imported-input costs and retail margins do not scale with cost. These papers bundle the direct and marginal cost channels together and do not include the strategic complementarity channel. We instead *estimate* the pass-through of each channel directly from the price data and separately identify all three. We find both domestic responses to be substantial: tariffs on intermediate inputs pass through strongly into producer prices, and domestic firms raise their markups when tariffs hit their competitors.

A third strand uses retail or scanner microdata to measure pass-through into the prices of individual products, achieving very fine identification of the direct channel and, in some cases, of spillovers to domestic substitutes (Bai, Jaccard, and Stumpner 2025; Cavallo, Llamas, and Vazquez 2026; Flaaen, Hortaçsu, and Tintelnot 2020; Hacıoğlu-Hoke, Malladi, and Feler 2026). Our framework complements these studies on two fronts: it covers a broad range of non-oil consumer goods in the CPI rather than the products a particular retailer or scanner panel carries, and it separates the domestic price response into its marginal cost and strategic complementarity components, which retail prices alone cannot distinguish. Reassuringly, Cavallo, Llamas, and Vazquez (2026) find a short-run retail pass-through of 24 percent, broadly consistent with our estimates.

The remainder of the paper proceeds as follows. Section 2 describes the data and the construction of our price, tariff, and input-exposure variables. Section 3 estimates tariff pass-through into import prices, domestic producer prices, and consumer prices. Section 4 interprets the results, decomposing the total tariff effect into the three channels and tracing its dynamics across horizons. Section 5 concludes.

3. Mehrotra and Waugh (2026) find that price changes across goods categories through December 2025 were only weakly related to predicted tariff exposure. Their comparison is a single cross-section of cumulative changes, in which any category-level trend correlated with exposure enters directly; our estimates instead come from a monthly panel with category and time fixed effects, and imply that the marginal cost and strategic complementarity channels build gradually, with full pass-through taking about a year—as they acknowledge, tariff-induced price increases may still have been in the pipeline.

2 Data and Measurement

The CPI for a category of goods is a weighted average of price quotes for consumer goods produced in the U.S. and imported goods produced in foreign countries. To estimate the effect of tariffs on CPI, we combine data on tariffs, import prices, and domestic prices. These data come in different classification systems and at different levels of aggregation, so a central challenge is to link them to consumer prices. We begin by describing the tariffs, which are the source of variation we exploit, and then turn to the price data. We index HTS10 imports by h, exporters by c, NAICS6 industries by k, consumer prices at the CPI item level by i, and the month of the observation by t. We use two measures of tariffs: τ denotes the tariff measured by the effective duty rate, and τ' the tariff measured by the statutory rate.

2.1 Tariffs

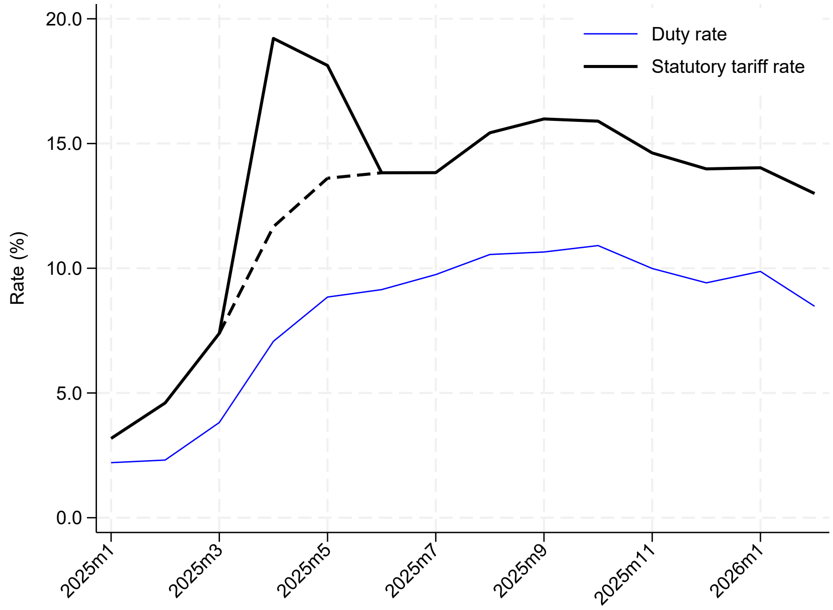
During 2025 the United States raised import tariffs to their highest levels since the 1930s. The new tariffs were imposed under three main statutory authorities.[4] Most of the broad, country-wide tariffs were levied under the International Emergency Economic Powers Act (IEEPA), which the administration invoked first to address fentanyl trafficking and border security and then, in April, to impose so-called reciprocal tariffs aimed at bilateral trade deficits. A second set of tariffs was imposed under Section 232 of the Trade Expansion Act of 1962, on national-security grounds, and applied to specific products: steel, aluminum, automobiles and parts, copper, lumber and timber, medium- and heavy-duty vehicles, and later semiconductors. A third set continued the product-specific Section 301 tariffs on China that were already in place.

Because these actions were layered on top of one another and on top of pre-existing most-favored-nation rates, the average statutory tariff facing U.S. imports rose steeply. The escalation came in a rapid sequence of waves. In February and March 2025 the IEEPA fentanyl tariffs took effect: an additional 10 percent on all imports from China, raised to 20 percent in March, and 25 percent on imports from Canada and Mexico (10 percent on Canadian energy), with goods that qualified under the United States-Mexico-Canada Agreement (USMCA) exempted. In March, the Section 232 tariffs on steel and aluminum were extended to all trading partners and the aluminum rate was raised to 25 percent, removing the country exemptions and quotas that had been in place since 2018. April brought a 25 percent tariff on automobiles and, on April 2, the reciprocal ("Liberation Day") tariffs: a 10 percent baseline applied to nearly all countries, together with higher country-specific rates.

These actions moved the average tariff rate in Figure 1 by very different amounts, because a country's contribution depends on both its tariff rate and its weight in U.S. imports, which the figure fixes at 2022 values. Canada and Mexico together supplied about 28 percent of U.S. imports in 2022, but they added little to the average because most of their trade enters duty-free under the USMCA. China supplied about 16 percent and faced much higher rates, and so accounted for a large part of the increase. In April the reciprocal tariff on Chinese goods was raised to 125 percent before being cut by 115 percentage points in mid-May, taking it back to the 10 percent baseline; the fentanyl and Section 301 tariffs on China remained

4. The tariff data used throughout the paper are built from the underlying legal actions, namely Presidential proclamations and executive orders published in the Federal Register and the tariff schedules of the U.S. International Trade Commission, assembled into a panel of statutory rates at the HTS10-country-month level.

Figure 1: Average import tariff and duty rates



Notes: The figure plots the monthly average statutory tariff rate and duty rate across all imported goods (HTS10 by country), from 2025m1 to 2026m2. The statutory tariff rate is the average statutory rate across goods, weighted by 2022 annual import values, with each rate scaled by the fraction of the month it is in effect (a tariff that takes effect mid-month counts at half value that month and in full thereafter). The duty rate is the aggregate ratio of total calculated duties to total import value each month. The solid statutory line includes the April-May 2025 spike in tariffs on Chinese goods; the dashed line shows the spike-excluded rate that we use in the analysis.

in place. Our baseline series excludes this short-lived spike.[5] Figure 1 plots the baseline average, weighting each product and source country by its 2022 import value: the average statutory tariff rate climbed from about 3 percent in January 2025 to a peak of about 16 percent in September 2025, before easing to about 13 percent by February 2026. The United States and China de-escalated more broadly in May, and over the summer the remaining tariffs took fuller effect: a 25 percent tariff on automotive parts in May, an increase in the steel and aluminum rate to 50 percent in June, a 50 percent tariff on copper in August, and the country-specific reciprocal rates, which took effect in August after repeated postponements.

Over late 2025 and early 2026 the pattern shifted from escalation toward selective consolidation. A series of framework trade agreements with Japan, the European Union, South Korea, and Switzerland replaced the country-specific reciprocal rates with a cap of about 15 percent, while new Section 232 tariffs were added on lumber and timber, medium- and heavy-duty vehicles, and semiconductors. Some of the broad IEEPA tariffs were also wound back: the additional tariff on India was reduced in February 2026, and later that month, following a Supreme Court ruling that IEEPA does not authorize tariffs, the IEEPA fentanyl and reciprocal tariffs were terminated and replaced with a temporary 10 percent surcharge on all imports imposed under Section 122 of the Trade Act of 1974. Our sample runs through February 2026 and so captures the full run-up in statutory tariffs together with the beginning of this consolidation.

5. The 125 percent rate was in place for only about five weeks, and many importers postponed moving Chinese imports through customs until the tariffs were reduced. We exclude the spike by treating the April increase on Chinese goods as not having been in effect, holding China's reciprocal tariff at the 10 percent baseline through April and May. In Figure 1 the solid statutory line includes the spike over those two months, while the dashed branch is the spike-excluded rate used in the analysis.

The lower line in Figure 1 is the duty rate, defined as the duties actually collected divided by the total value of imports. It runs well below the statutory rate throughout, at roughly two-thirds of it (about 8.5 percent compared to the 13 percent statutory rate at the end of the sample). Two things drive the wedge between the statutory and the realized rate. First, many shipments do not pay the full scheduled rate: exemptions and exclusions, special entry under Chapter 98 (such as U.S. goods returned or goods assembled abroad from U.S. components), bonded warehouses, foreign-trade zones, duty drawback, and the timing of collection all mean that collected duties lag, and fall short of, the statutory schedule. This wedge is present at the level of an individual product and source country, not only in the aggregate. Second, the aggregate gap in Figure 1 is widened by composition: the statutory line is computed with fixed 2022 import weights, whereas the duty rate reflects contemporaneous trade. Therefore, as importers shift away from the most heavily taxed sources and products, the realized average falls below the fixed-weight statutory measure. Because the duty rate is what importers actually pay, it is the relevant cost shock for prices; we use the statutory rate, which is set by policy and not by firms' sourcing decisions, as an instrument for it.

2.2 Data Sources

Import data We proxy for U.S. import prices with unit values, defined as duty-inclusive, HTS10-country import values divided by quantity. We obtain data on import values and quantities at the HTS10 country level for each month from the U.S. Census Bureau Foreign Trade Statistics, comprising over 16,000 distinct HTS10 codes, covering U.S. imports from all countries.[6] We denote the import price of HTS10 product h from country c by P^M_{hct}, and construct its ℓ-month log change, $\triangle_\ell \ln P^M_{hct}$, where $\triangle_\ell$ is an operator that takes an ℓ-month difference of whatever follows.

Tariffs are generally set at the level of HTS8 codes, occasionally at the HTS10 level, and we build both the statutory rate and the duty rate at the HTS10-country-month level. The duty rate is computed from the Census Foreign Trade Statistics; the statutory rate combines the USITC tariff schedules with the U.S.-specific Acts described above, obtained from Federal Register proclamations. The construction is detailed in the data appendix.[7]

PPI We proxy domestic prices in each industry k, P^D_{kt}, with the Bureau of Labor Statistics (BLS) Producer Price Index (PPI), which is generally available at the NAICS6 level (it is more aggregated for a few industries). We drop oil-related industries throughout the analysis. Our regressions include the 293 industries for which the import data needed to construct the tariff and import-share regressors are available. We construct log changes of domestic prices in each industry k, $\triangle_\ell \ln P^D_{kt}$.

We use the BEA input-output (IO) table from 2017 (the most recent disaggregated table available) to identify intermediate input use by industry. The published table distinguishes 402 BEA detail industries; outside of government and a few special categories, each corresponds to one or more NAICS6 industries.

6. We exclude oil products, which are defined by the HTS10 codes that correspond to NAICS 3-digit codes 211 and 324, since their prices are highly volatile for reasons unrelated to tariffs. We drop observations without quantities and those that don't report quantities in consistent units over the sample (0.7 percent of the sample). We also drop observations with extreme movements in unit values, that is, those in which the ratio of unit values in t relative to $t-\ell$ was greater than three or less than a third.

7. Specific tariffs apply to 5.2 percent of the observations, which we convert to ad valorem equivalents where possible.

CPI We measure consumer prices using the BLS CPI at the item level. Our analysis uses the 67 CPI items that we can match to a NAICS6 industry with an available producer price index. These categories capture 20 percent of the consumption basket and 75 percent of the set of consumer goods expenditures (excluding oil). We denote the ℓ-month log change in the consumer price for CPI item i as $\triangle_\ell \ln \text{CPI}_{it}$.

2.3 Merging the Data

We link these classifications using a combination of manually constructed concordances and existing crosswalks. We map CPI items to HTS10 codes and to NAICS6 industries manually, keeping only final consumer goods. The NAICS6 to HTS10 concordance is from Pierce and Schott (2012), and the mapping between BEA IO industries and NAICS6 is provided by the BEA. The construction of each concordance is described in the data appendix.

2.4 Variable Construction

Tariff variables The tariff on each HTS10-country good is computed in two ways: the duty measure τ_{hct}, equal to one plus the duty rate (the ratio of duties collected to import value), and the statutory measure τ'_{hct}, equal to one plus the statutory rate. We denote their ℓ-month log changes by $\triangle_\ell \ln \tau_{hct}$ and $\triangle_\ell \ln \tau'_{hct}$.

Domestic prices in an industry can be affected by tariffs on the industry's own output, which we call the output tariff, and by tariffs on the industry's inputs, which we call the input tariff. We define the change in the output tariff as the weighted average of the changes of all the HTS10-country tariffs, $\triangle_\ell \ln \tau_{hct}$, that map to NAICS6, IO, and CPI sectors indexed by k, n, and i, respectively. The output tariffs are then given by the index variable $j \in \{k, n, i\}$:

$$\triangle_\ell \ln \tau_{jt} \equiv \sum_{h,c \in \Omega_{j,22}} w_{jhc} \triangle_\ell \ln \tau_{hct}, \text{ where } w_{jhc} = \frac{m_{hc,22}}{\sum_{h,c \in \Omega_{j,22}} m_{hc,22}}, \tag{1}$$

where $\Omega_{j,22}$ is the set of hc varieties imported in sector j in 2022, and $m_{hc,22}$ is the value of imports of product h from country c in 2022. Thus, $\triangle_\ell \ln \tau_{kt}$ is the change in the tariff on the imports of goods in NAICS sector k; $\triangle_\ell \ln \tau_{nt}$ is the change in the tariff on the imports of intermediate input in IO sector n; and $\triangle_\ell \ln \tau_{it}$ is the change in the tariff on imports of consumption item i.

We construct the change in the input tariff of industry k as a weighted average of the tariffs of the non-oil material input sectors n used by the industry according to the IO matrix:

$$\triangle_\ell \ln \tau^N_{kt} \equiv \sum_n w_{nk} \triangle_\ell \ln \tau_{nt}, \text{ where } w_{nk} = \frac{V_{nk}}{\sum_n V_{nk}}, \tag{2}$$

and V_{nk} is the value of intermediate input n used in industry k from the 2017 IO table. We construct the statutory counterparts $\triangle_\ell \ln \tau'_{jt}$ and $\triangle_\ell \ln \tau'^N_{kt}$ analogously, using the statutory rate in place of the duty rate.

Pre-retail consumer price changes We construct for each CPI item a pre-retail composite price change, which is equal to a weighted average of changes in the import price index and the producer price index for the item. Changes in import prices in CPI item i are given by $\triangle_\ell \ln P^M_{it} \equiv \sum_{h,c \in \Omega_{i,22}} w_{ihc} \triangle_\ell \ln P^M_{hct}$. Similarly, we construct the log change in the domestic producer price for each CPI item i ($\triangle_\ell \ln P^D_{it}$) by taking the weighted average of the producer price changes of the NAICS6 codes ($\triangle_\ell \ln P^D_{kt}$) corresponding to CPI item i using 2022 shipment weights. We define the log change in the pre-retail price of CPI item i, $\triangle_\ell \ln \tilde{P}_{it}$, as

$$\triangle_\ell \ln \tilde{P}_{it} \equiv s^M_i \triangle_\ell \ln P^M_{it} + s^D_i \triangle_\ell \ln P^D_{it}, \tag{3}$$

where s^M_i is the share of imports in consumer expenditures in 2022 in item i;[8] and $s^D_i \equiv 1 - s^M_i$ is the share of domestically produced goods in consumption. Table A1 in the Appendix reports summary statistics.

3 Tariff Pass-Through into Prices

This section estimates the pass-through of tariffs into import prices, domestic prices, and ultimately into consumer prices. We proceed in three steps. First, we estimate the direct effect of tariffs on import prices. Second, we estimate the effect of tariffs on domestic producer prices, which respond through the strategic complementarity and marginal cost channels. Each of these steps yields its own pass-through rate. At the retail stage, by contrast, we cannot estimate separate pass-through rates for imported and domestically produced varieties, because the CPI reports a single price for each item that blends the two. In the third step, we therefore assume that the pre-retail prices of domestic and foreign-made varieties of an item pass through to consumer prices at the same rate—an assumption we do not view as restrictive, since a retailer's pass-through is unlikely to depend on where a good was made. This allows us to combine import and domestic price changes into the single pre-retail composite defined in Section 2, and to estimate the pass-through from this composite into the retail price paid by consumers, using the tariff-predicted import and domestic price changes from the first two steps as instruments.

We estimate the first two steps using the most disaggregated data available—HTS10-country unit values for import price changes and NAICS6 PPI data for domestic price changes. With these estimates in hand, we then form the pre-retail composite price change, $\triangle_\ell \ln \tilde{P}_{it}$, defined in equation (3) for the period January 2022 to February 2026, and estimate its pass-through into the consumer price:[9]

$$\triangle_\ell \ln \mathrm{CPI}_{it} = \alpha_i + \alpha_t + \beta^C \triangle_\ell \ln \tilde{P}_{it} + \epsilon_{it}, \tag{4}$$

where α_i and α_t are item and date fixed effects, β^C is the pass-through elasticity (the percent by which item i's retail price rises in response to a 1 percent increase in its pre-retail price), and ϵ_{it} is an error term. Because the pre-retail price excludes the distribution and retail margins embedded in consumer prices, we would not expect β^C to equal one even with complete cost pass-through. The item fixed effect, α_i, absorbs persistent differences in inflation across products, and the date fixed effect, α_t, absorbs general-equilibrium effects that we do not model. For example, the dollar depreciated by roughly 2 percent against major currencies around the "Liberation Day" tariff announcement; to the extent that this raised all U.S. consumer prices, it is

8. We measure each category item's 2022 consumer expenditures by multiplying its 2022 CPI "relative importance weight" by aggregate consumer expenditure, from the Consumer Expenditure Survey. Because import values are recorded before distribution margins while consumer expenditures are measured at the retail level, this import share should be read as a pre-retail-based approximation. Its complement absorbs distribution margins along with the domestically produced share. The estimates are essentially unchanged if imports are instead valued inclusive of cost, insurance, and freight: the IV pass-through estimate in Table 3 falls from 0.56 to 0.54.

9. Although the major tariff changes were not implemented until February 2025, we include the earlier period to take account of pre-trends. For each specification the first observation is the change in 2022 month 1 relative to the period $t - \ell$.

absorbed by α_t. More generally, tariffs can affect monetary policy, nominal wages, investment, productivity, uncertainty, and other aggregate outcomes that are difficult to model and are beyond the scope of this paper. We therefore focus on how a given set of tariff changes affects relative producer and consumer prices, conditional on these aggregate effects.

3.1 Import Prices

We begin by estimating the effect of tariffs on import prices inclusive of duties, P^M_{hct}, which is the price paid by U.S. importers for a good that has cleared customs:

$$\triangle_\ell \ln P^M_{hct} = \beta^M \triangle_\ell \ln \tau_{hct} + \gamma_h + \gamma_{ct} + \epsilon_{hct}, \tag{5}$$

where the unit of observation is an ℓ-month change at the HTS10-country-month level; β^M measures the pass-through of the tariff into U.S. import prices; γ_h is an HTS 10-digit fixed effect to take account of any product-level price trends; γ_{ct} is an exporter-month fixed effect that controls for any country-specific time-varying general equilibrium effects such as exchange rate or monetary policy changes; and ϵ_{hct} is an error term. We estimate the regression using 12-month differences, i.e., $\ell = 12$, in our baseline. If foreign exporters do not adjust their export prices, then the tariff-inclusive import price would adjust by the full duty rate and β^M would equal 1, indicating full tariff pass-through.

Our estimates, presented in Table 1, indicate that tariff pass-through into U.S. import prices is nearly complete. We first estimate equation (5) using OLS in column (1) for the full sample of non-oil imports, i.e., including non-consumer goods. We find the coefficient is 0.92, which means that a 10 percent increase in the duty rate pushes up import prices by 9.2 percent. A concern with the OLS specification is that the duty rate is endogenous. The duty collected per dollar of imports is less than the statutory rate (see Figure 1) because some goods receive tariff exemptions or reductions and because importers substitute away from the most heavily taxed items. Since the realized duty rate is itself shaped by these sourcing decisions, which respond to the same shocks that move prices, OLS estimates of the pass-through are potentially biased. We address this concern by instrumenting the duty rate with the statutory rate, which is set by policy, not by firms' sourcing decisions. The IV coefficient on the duty rate, reported in column (2), is 0.86, which is lower than the OLS one. The first-stage coefficient is 0.67, reflecting the fact that the tariff exemptions and substitution away from high-tariff goods drive a wedge between the statutory and collected duty rates.[10]

The IV estimate is lower than the OLS estimate because the realized duty rate is positively correlated with the import-price residual. Part of this correlation is mechanical: because import prices are measured inclusive of duties, the collected duty enters both the dependent variable (duties plus import values divided by quantities) and the regressor (duties divided by import value). Tariff-induced changes in duties therefore move both variables together, and this movement reflects genuine pass-through. The upward bias arises instead from variation in realized duties that does not track the statutory tariff, such as endogenous sourcing, the timing of collection, exemptions, and classification. This variation also moves the dependent variable

10. In Amiti et al. (2026), we estimated a reduced-form equation regressing foreign export prices directly on tariffs and found pass-through rates of around 90 percent. See https://libertystreeteconomics.newyorkfed.org/2026/02/who-is-paying-for-the-2025-u-s-tariffs/.

Table 1: Import Prices and Tariffs: 12-Month Changes

Dependent variable: Change in import price	Full Sample		Consumer Goods			
	OLS	IV	OLS	IV	IV	IV
	(1)	(2)	(3)	(4)	(5)	(6)
Change in log duty rate	0.916***	0.862***	0.938***	0.905***	0.910***	0.925***
	(0.007)	(0.017)	(0.015)	(0.033)	(0.016)	(0.016)
Change in log exchange rate						0.116***
						(0.007)
N	4,461,249	4,461,249	1,481,460	1,481,460	1,432,957	1,432,957
Fixed effects:						
HTS10 product	Yes	Yes	Yes	Yes	Yes	Yes
Country×date	Yes	Yes	Yes	Yes	No	No
Country	No	No	No	No	Yes	Yes
Date	No	No	No	No	Yes	Yes
First stage: Dependent variable: Change in log duty rate						
Change in log statutory tariff rate		0.674***		0.853***	0.940***	0.939***
		(0.007)		(0.012)	(0.006)	(0.006)
First-stage F		8,336.39		5,249.91	25,081.98	24,982.02
[p-value]		[0.000]		[0.000]	[0.000]	[0.000]

Notes: "Change in import price" is the 12-month log change in the import price inclusive of duties (total import value plus duties, divided by quantity) for HTS10 product h from country c at time t (i.e., $\triangle_{12} \ln P^M_{hct}$). "Change in log duty rate" is the 12-month change in the log of one plus the duty rate (i.e., $\triangle_{12} \ln \tau_{hct}$). "Change in log statutory tariff rate" is the 12-month change in the log of one plus the statutory tariff rate (i.e., $\triangle_{12} \ln \tau'_{hct}$). "Change in log exchange rate" is the 12-month log change in the USD/foreign exchange rate (USD per unit of foreign currency; a positive value indicates USD depreciation). Results for "Consumer Goods" restrict the sample to HTS10 codes that we mapped to consumer goods. All columns include HTS10 fixed effects. In addition, columns (1) to (4) have country × date fixed effects; and columns (5) and (6) have separate country and date fixed effects. Standard errors, clustered at the HTS8-country level, in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

and the regressor together and biases the OLS estimate of the pass-through coefficient upward. Substitution reinforces this, since the realized duty rate stays high for goods with low elasticities of substitution, which also tend to have the most complete pass-through. Instrumenting with the statutory rate isolates the exogenous variation and removes these components, yielding a slightly lower estimate. Classical measurement error in the duty rate would attenuate OLS in the opposite direction, but the upward channels dominate; in all cases, pass-through is near-complete.

Given our interest in consumer prices, we next restrict the sample to HTS10 codes that we classify as consumer goods, i.e., HTS10 codes that we can map to CPI items. The OLS and IV coefficients on the duty rate in columns (3) and (4) are both around 0.9, very close to the full-sample estimates. The main difference from the full sample is that the first-stage coefficient in column (4) rises to 0.85, suggesting that imported consumer goods are less substitutable with other products than imported inputs and capital goods. The OLS–IV gap is also narrower here than in the full sample, consistent with the bias above: the higher first-stage coefficient reflects less substitution, so the realized duty rate is closer to exogenous and the OLS estimate is less inflated. Regardless of the sample or instrumenting procedure, we find that about 90 percent of the tariff is passed through into import prices. In the remainder of the analysis, we will treat these IV coefficients as our baseline estimates.

A natural concern is that the tariffs themselves moved the dollar. Tariff-induced appreciation would lower import prices and offset part of the tariffs' effect. In the results so far we cannot assess this, because exchange rate variation is absorbed by the country-date fixed effects. In column (5) we therefore re-estimate the column (4) consumer goods IV specification with separate country and date fixed effects rather than country-date fixed effects. The coefficient on the duty rate is still around 0.9, showing that the results are robust to the choice of fixed effects. Adding the exchange rate in column (6) hardly moves this coefficient.[11] The coefficient on the exchange rate is positive and significant, equal to 0.12, meaning that a dollar depreciation raises import prices. In fact, the expected appreciation never materialized: the dollar depreciated by an average of 8 percent over the 12 months to February 2026, so exchange rate movements did not offset the pass-through of tariffs into import prices. Most importantly, including the exchange rate does not change our conclusions about tariff pass-through.

3.2 Domestic Prices

We next analyze how the tariffs affected domestic firms' prices by changing their imported intermediate input costs (marginal cost effect) and their competitors' prices (strategic complementarity effect). Amiti, Itskhoki, and Konings (2019) show these effects can be written as a log-linear relationship.[12]

Input tariffs raise marginal costs, and hence output prices, more in industries where the value of imported inputs, V_{nk}^{M}, accounts for a larger share of total variable costs, TVC_k. We therefore assume that the effect of input tariffs on output prices is proportional to the share of imported inputs in total variable costs multiplied by the tariff change on inputs, i.e., $\beta^N s_k^N \triangle_\ell \ln \tau_{kt}^N$, where $s_k^N \equiv \sum_n V_{nk}^M / \text{TVC}_k$ is the share of imported intermediate inputs in total variable costs.[13] Because imported inputs account for a share s_k^N of variable costs, a one percent rise in their tariff-inclusive price raises marginal cost by s_k^N percent. The coefficient β^N is the elasticity of output prices to a change in marginal costs, so that the product $\beta^N s_k^N$ is the elasticity of output prices to the input tariff.

The strategic complementarity effect, which captures U.S. producers' response to price increases by their foreign competitors, is proportional to the market share of these foreign suppliers and to the tariff change they face. The market share of foreign imports, s_k, is the value of imports in industry k in 2022 divided by domestic absorption, defined as the value of shipments minus exports plus imports.[14] Thus, the impact of a tariff change in industry k on prices through the strategic complementarity channel will equal $\beta^D s_k \triangle_\ell \ln \tau_{kt}$, where $\beta^D s_k$ is a measure of the elasticity of domestic industry prices to tariff changes. Intuitively, the domestic industry will increase its price more in response to a tariff hike when the import share (s_k) is large.

11. We define the exchange rate as dollar per foreign currency unit, so that an increase denotes a U.S. dollar depreciation, and use for each foreign country in our sample the corresponding exchange rate.

12. Using Belgian data, they find that import shocks affect domestic prices through increased competition in the domestic firms' output market as well as through firms' imported intermediate input costs.

13. We impute V_{nk}^{M} by combining the IO table with import data under a proportionality assumption, and calculate TVC_k as the sum of material input expenditures and the wage bill, also reported in the IO table. Details of this calculation are provided in Appendix B.

14. Shipment values are for 2022, from the 2022 Economic Census for manufacturing, supplemented with the 2022 Census of Agriculture and Census Bureau forestry data; exports and imports are from the Census Foreign Trade Statistics.

We estimate both channels jointly in the following specification for the output-price change of NAICS6 sector k, $\triangle_\ell \ln P_{kt}^D$:

$$\triangle_\ell \ln P_{kt}^D = \beta^D s_k \triangle_\ell \ln \tau_{kt} + \beta^N s_k^N \triangle_\ell \ln \tau_{kt}^N + \delta_k + \delta_t + \epsilon_{kt}. \tag{6}$$

We include NAICS6 fixed effects, δ_k, to take account of any industry specific trends; and time fixed effects, δ_t, to take account of aggregate macro shocks hitting the whole economy. The first explanatory variable is the log change in the output tariff imposed on the imports of industry k goods, adjusted by the share of imported goods in the industry. This measure is a proxy for the strategic complementarity channel. The second explanatory variable is the share of imported inputs times the input tariff and captures the marginal cost channel. The coefficients β^D and β^N are reduced-form elasticities rather than structural parameters: each combines cost pass-through with the equilibrium markup response. As before, we estimate the specification with horizon $\ell = 12$ in our baseline.

We present the results in Table 2. In the first two columns we estimate using the full sample of NAICS6 tradable goods categories, and in the next two columns we limit the sample to consumer goods categories, i.e., those NAICS6 that can be mapped to CPI goods categories, together with those for which at least 20 percent of output is purchased directly by households in the 2017 input-output table (108 industries, of which 74 map into the 67 CPI item categories used below). We first discuss the strategic complementarity effect. In the first column, estimated with OLS for the full sample, the coefficient is 0.1, but insignificant. Instrumenting for duties with statutory tariffs in column (2) does not change this conclusion. Restricting the sample to the set of consumer goods in columns (3) and (4) increases the size of the strategic complementarity coefficients, equal to 0.22 and significant at the 5 percent level in the IV specification in column (4).[15] This result suggests that the 2025 tariffs resulted in some PPI price increases that were not caused by the tariffs' impact on intermediate inputs. Nevertheless, the magnitude is small. A 10 percent tariff in the average consumer goods industry that has an import share of 34 percent leads to a 0.7 percent increase ($10 \times 0.22 \times 0.34$) in PPI over a 12-month period, holding constant the change in the input tariff.[16]

The main channel of tariff pass-through into domestic prices is higher input costs. We obtain positive and significant coefficients in all specifications. In the full sample, the OLS coefficient, given in column (1) is 0.93, increasing slightly in the IV specification to 0.94. Restricting the sample to consumer goods yields larger coefficients. In the IV estimation in column (4), the coefficient is 1.44, which implies that for the average consumer goods industry, which uses 18 percent imported inputs (as a share of total variable costs), a 10 percent increase in duties increases the PPI by 2.6 percent($10 \times 1.44 \times 0.18$). The estimates are consistent with the theory in Amiti, Itskhoki, and Konings (2019), in which the coefficients on the strategic complementarity and marginal cost effects sum to one. In the full sample, the point estimates satisfy this restriction almost exactly (the IV coefficients sum to 1.01), and we cannot reject it in any specification. The

15. One potential concern is that our results might be biased because the tariffs may have been targeted at industries whose prices were rising. We checked for this possibility by collapsing the panel to one observation per industry and regressing the treatment—the simple average of the monthly statutory-tariff changes between 2025m1 and 2026m2—on the pre-determined average 12-month log PPI change over 2022m1–2024m12. We find that exposure is, if anything, negatively related to pre-period inflation: industries that received higher 2025 tariffs had lower inflation over 2022–24, so we reject this hypothesis (see Appendix D.2 for details).

16. This is about half the size of the effect we found for the 2018–19 tariffs in Amiti, Redding, and Weinstein (2019).

Table 2: Domestic Prices and Tariffs: 12-Month Changes

Dependent variable: 12-month log change in PPI	Full Sample		Consumer Sample	
	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)
Strategic complementarities effect (output duty)	0.102	0.064	0.194**	0.217**
	(0.093)	(0.081)	(0.095)	(0.104)
Marginal cost effect (input duty)	0.928***	0.941**	1.197*	1.442**
	(0.261)	(0.386)	(0.633)	(0.690)
N	14,535	14,535	5,226	5,226
Fixed effects:				
Industry	Yes	Yes	Yes	Yes
Date	Yes	Yes	Yes	Yes
p-value: sum of effects = 1	0.911	0.991	0.544	0.343
First stage: Dependent variables: output duty and input duty	For column (2)		For column (4)	
	Output duty	Input duty	Output duty	Input duty
Statutory output tariff	0.925***	−0.035*	0.901***	0.022
	(0.041)	(0.019)	(0.052)	(0.018)
Statutory input tariff	0.100	1.175***	0.015	0.861***
	(0.116)	(0.107)	(0.105)	(0.095)
First-stage F	69.62		44.66	
[p-value]	[0.000]		[0.000]	

Notes: The "Strategic complementarity effect" is the 12-month log change in the output duty rate, weighted by the share of imports in domestic absorption ($s_k \triangle_{12} \ln \tau_{kt}$). Its instrument is constructed using statutory tariffs, i.e., $s_k \triangle_{12} \ln \tau'_{kt}$. The "Marginal cost effect" is the 12-month log change in the input duty rate, weighted by the share of imported intermediate inputs in total variable costs (equal to material costs plus wage bill) or $s_k^N \triangle_{12} \ln \tau_{kt}^N$. Its instrument is constructed using statutory tariffs, i.e., $s_k^N \triangle_{12} \ln \tau_{kt}'^N$. See the discussion of equation (6) for details on variable construction. The p-value row reports a test that the two coefficients sum to one. Consumer sample restricts the set of NAICS6 industries to those that map to CPI goods categories, together with those for which at least 20 percent of output is purchased directly by households in the 2017 input-output table (108 industries in total); utilities are excluded. In the first-stage panel, the output duty and input duty are the two dependent variables defined above, and the statutory output tariff and statutory input tariff are their respective instruments. First-stage F is the Kleibergen-Paap F statistic for weak identification, with the p-value for the corresponding underidentification test. Standard errors in parentheses, clustered at the IO group level (which is slightly more aggregated than NAICS6). * means $p < 0.10$, ** means $p < 0.05$, and *** means $p < 0.01$.

consumer-sample coefficients are larger and much less precisely estimated: their sum of about 1.7 cannot be distinguished from one ($p = 0.34$, Table 2), but with a standard error of 0.69 on the marginal cost coefficient this test has little power.

The 2025 policy particularly affected two sectors: steel and aluminum, and motor vehicles and parts, which might bias our results if coefficients are heterogeneous across sectors. In order to deal with this potential identification challenge, we ran alternative specifications. First, we drop the motor-vehicle industries from the outcome sample. Second, we rebuilt the IO-weighted input tariff and duty with the tariff changes set to zero for the two *input* sectors. Doing so removes their variation from both the endogenous variable and the instrument, so that we identify the effect of the tariffs from variation arising from other sectors. This exercise produces estimates that differ only marginally from our baseline estimates (see Appendix Table D3).

Taken together, Tables 1 and 2 identify two main channels through which tariffs raised pre-retail prices. First, tariffs directly increased the pre-retail prices of imported goods: a 10 percent tariff raised the relative pre-retail prices by about 9 percent. Second, tariffs increased the prices of imported intermediates, which caused U.S. firms to raise the pre-retail prices by 2.6 percent for every 10 percent increase in tariffs on their intermediate inputs. Lastly, we find that U.S. producers only raised prices marginally in response to tariff-induced increases in the prices of *competing* imports.

3.3 CPI

We now turn to the effect of tariffs on CPI by estimating equation (4). We construct the change in the pre-retail price, $\triangle_\ell \ln \tilde{P}_{it}$, as shown in equation (3) using a composite of import and domestic price changes. Since the pre-retail price change is both endogenous and measured with error, we construct two instruments to identify the impact of pre-retail price changes on consumer prices.[17] These instruments correspond to the two components of the pre-retail price: an import-price term and a domestic-price term.

First, we construct an instrument for how import price changes affect the pre-retail price composite using the results from column (4) in Table 1. We multiply the 12-month log change in statutory rates by the coefficients on the first and second stages to construct the 12-month change in the predicted import prices for each HTS10-country-month cell ($\triangle_{12} \ln \hat{P}^M_{hct}$). We then aggregate these predicted import price changes to the CPI-item level using 2022 annual import value weights, defined as imports of each HTS10-country as a share of all imports within the CPI category. This procedure gives a predicted 12-month change in pre-retail import prices for item i, $\triangle_{12} \ln \hat{P}^M_{it}$ due to tariff increases. We multiply this number by s^M_i (i.e., the imports of that CPI category as a share of total expenditure in 2022) to obtain the import component of the pre-retail composite ($s^M_i \triangle_{12} \ln \hat{P}^M_{it}$).

The second instrument captures the effect of tariffs on domestic prices. We use the first and second stage coefficients from column (4) in Table 2 multiplied by the corresponding changes in output and input statutory tariff rates (i.e., $s_k \triangle_{12} \ln \tau'_{kt}$ and $s^N_k \triangle_{12} \ln \tau'^N_{kt}$, respectively) to generate the predicted change in pre-retail domestic prices of NAICS6 industry k: $\triangle_{12} \ln \hat{P}^D_{kt}$. We then aggregate these predicted NAICS6-level price changes to the CPI level using 2022 annual shipment weights, computed as shipment values in 2022 of each NAICS6 within a CPI category divided by their total, and multiply them by the share of domestically produced goods in the consumption of CPI good i (s^D_i) to obtain the domestic component of the pre-retail composite ($s^D_i \triangle_{12} \ln \hat{P}^D_{it}$).

Table 3 presents our estimates of the pass-through coefficient from pre-retail price changes into consumer price movements. In the first column, we regress the 12-month log change in the official CPI for non-oil goods categories on the pre-retail composite price change and find a small but significant coefficient of 0.15. This estimate is likely biased, both because pre-retail price changes are endogenous and because the underlying price data are measured with noise, which attenuates the OLS coefficient toward zero. Both problems motivate our IV strategy. As discussed in footnote 17, the two endogeneity channels push in

17. The endogeneity likely comes from two sources. First, higher consumer demand raises supply prices, which biases β upward in equation (4). Second, the error term contains fluctuations in distribution markups arising from temporary shocks to pre-retail prices; these are mechanically negatively correlated with pre-retail price changes and bias β downward. The two work in opposite directions, so the net sign of the endogeneity bias is ambiguous.

Table 3: CPI Pass-Through from Pre-Retail Price Changes

Dependent variable: $\triangle \ln \text{CPI}_{it}$	(1) OLS	(2) IV	(3) IV	(4) IV
Pre-retail price change	0.147***	0.560***	0.572***	0.580***
	(0.030)	(0.133)	(0.144)	(0.145)
N	3,271	3,271	3,271	3,271
Fixed effects:				
CPI item group	Yes	Yes	Yes	Yes
Date	Yes	Yes	Yes	Yes
Hansen J		0.77	0.61	0.58
[p-value]		0.380	0.436	0.445
First stage: Dependent variable: pre-retail price change				
Instruments constructed from:		Fitted P^M and P^D		Statutory Tariffs
		(consumer sample)	(full sample)	
Import price channel		1.013***	1.403***	0.838***
		(0.193)	(0.262)	(0.160)
Domestic price channel		1.776**	2.545**	3.151**
		(0.740)	(1.255)	(1.542)
First-stage F		17.40	15.33	14.33
[p-value]		0.000	0.000	0.000

Notes: Column (1) is OLS. The "Pre-retail price change" ($\triangle_{12} \ln \tilde{P}_{it}$) is defined in equation (3). Columns (2)–(4) present results from using an IV specification with the "Import price channel" ($s_i^M \triangle_{12} \ln \hat{P}_{it}^M$) and the "Domestic price channel" ($s_i^D \triangle_{12} \ln \hat{P}_{it}^D$) as instruments. These are defined in Section 3.3. Column (2) uses the fitted prices ($\hat{P}^M$ and $\hat{P}^D$) from the consumer-sample IV (i.e., the coefficients in column (4) of Table 1 and column (4) of Table 2). Column (3) uses the fitted prices ($\hat{P}^M$ and $\hat{P}^D$) from the full-sample IV (i.e., the coefficients in column (2) of Table 1 and column (2) of Table 2). Column (4) uses the statutory output tariff ($s_i^M \triangle_{12} \ln \tau'_{it}$) and the IO-weighted input tariff ($s_i^N s_i^D \triangle_{12} \ln \tau'^N_{it}$) directly. Hansen J tests the over-identifying restriction. First-stage F is the Kleibergen-Paap F statistic for weak identification. Standard errors in parentheses, clustered at the CPI group level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

opposite directions and so carry no clear net sign, whereas measurement error attenuates unambiguously. In our preferred specification, given in column (2), we construct our instruments using the coefficients obtained when we restrict our sample to imports of consumer goods in Table 1 (column (4) of that table) and the domestic production of consumer goods in Table 2 (column (4) of that table). The first-stage F statistic indicates the instruments are strong, and the Hansen J test does not reject the overidentifying restriction. Moreover, in the first stage we cannot reject a coefficient of one on either instrument in any of the IV columns, consistent with the tariff-predicted import and domestic components translating one-for-one into the observed pre-retail composite, as our two-step construction implies. Our second stage estimates indicate that a 1 percent increase in pre-retail prices increases consumer prices by 0.56 percent, and this number is significant at the 1 percent level.[18] The large gap between columns (1) and (2) points to attenuation as a main source of bias, which we test directly below.

To check the robustness of these results, we consider alternative instrument sets. In column (3), we construct similar instruments using the full-sample coefficients: column (2) from Table 1 for import prices

18. The results are robust to using the tariff panel that includes the April 2025 China spike. Import price and marginal cost pass-through are unchanged, as is the estimated CPI pass-through; the strategic complementarities coefficient attenuates somewhat and is significant only at the 10 percent level.

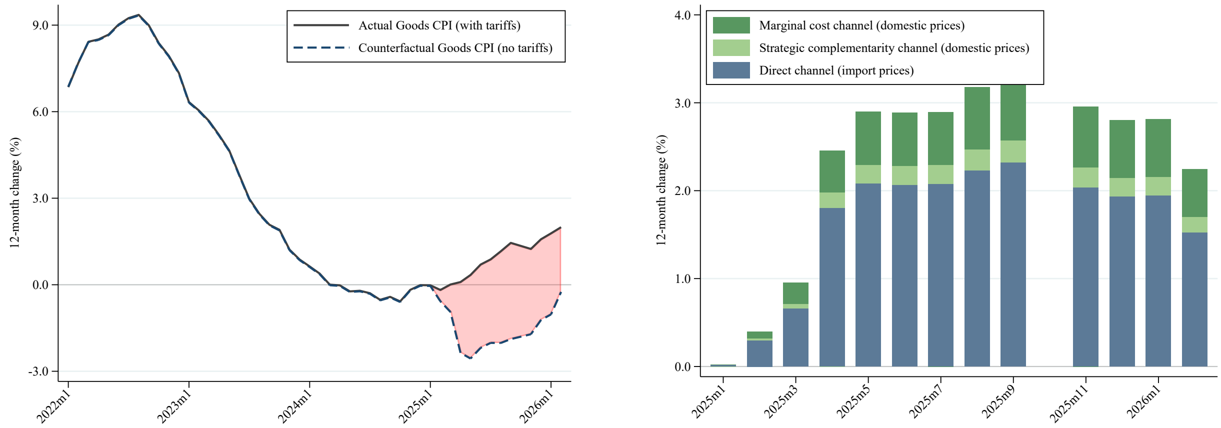
and column (2) from Table 2 for domestic prices. The estimated pass-through into CPI is almost identical. Finally, we construct both the output tariff and input tariff directly at the CPI level, bypassing the import price and domestic price regressions. We construct the output tariff as in equation (1), collapsing directly to the CPI level, using 2022 import value weights, and the input tariff as in equation (2), collapsing the IO level to the CPI level using 2022 annual shipment weights. Results, in column (4), show that again the coefficient is almost identical to the specifications where the instruments were constructed as predicted values. Because this specification instruments with statutory tariffs directly rather than with predicted prices, its instruments require no estimated coefficients from the import and domestic price regressions. The near-identical coefficient therefore indicates that our conclusions do not hinge on those upstream estimates or on their sampling error. Having these three different instrument sets yield the same results is reassuring.

We now test whether classical measurement error accounts for the gap between the OLS and IV estimates. Import unit values and producer prices are both measured with substantial noise; because our instruments are constructed from statutory tariffs rather than realized prices, they are purged of this noise, so the IV estimate is not subject to the resulting attenuation. We conduct two tests, and both are consistent with classical measurement error.

Our first test exploits the way classical measurement error responds to aggregation. The composite pre-retail price is assembled from import unit values and producer prices, both of which are measured with idiosyncratic noise unrelated to the underlying cost shock. If this noise is classical, in the sense that it is uncorrelated with the true shock and across consumer groups, it attenuates the OLS estimate toward zero (Hausman 2001), and averaging over a coarser classification should cause it to average out: attenuation in the OLS estimate should ease and the gap between OLS and IV should close. If instead the noise were systematically correlated across groups, aggregation would offer no such relief and the gap would remain. We can therefore test for classical measurement error by aggregating each consumer group to its four-character BLS expenditure-class prefix, which consolidates the 67 underlying groups into 33 broader ones, pooling for instance the various categories of apparel into a single apparel class. We aggregate the underlying variables using 2022 BLS expenditure weights. When we re-estimate the specification at this coarser level, the OLS coefficient at the twelve-month horizon rises from 0.15 to 0.21 as attenuation recedes, while the IV coefficient barely moves, from 0.56 to 0.45, a difference well within one standard error. The gap between the two estimates falls by 41 percent. This is precisely the behavior classical measurement error predicts, and it is the opposite of what correlated noise would have produced. The estimates are reported in Table D1 in Appendix D.

Our second test draws on the same logic applied across horizons rather than across levels of aggregation. If the gap reflects classical measurement error, the OLS estimate should strengthen as the horizon lengthens, because the true cost-shock signal cumulates over time while the measurement noise does not (Bound, Brown, and Mathiowetz 2001). Instead, the IV estimate, which recovers the signal directly, should remain roughly constant. We take up this test using the pass-through regressions estimated at different horizons, reported in Table 4 in the next section.

Figure 2: Aggregate tariff impact on consumer goods prices: 12-month change.



(a) Counterfactual

(b) Contributions

Notes: Panel (a) shows the actual 12-month Goods CPI change (solid line) against the counterfactual Goods CPI absent tariffs (dashed line) for the goods in our sample; the shaded gap is the predicted tariff contribution. Panel (b) shows the predicted contribution of the direct channel (import prices, blue), the marginal cost channel (domestic prices, dark green), and the strategic complementarity channel (domestic prices, light green) to 12-month Goods CPI. By February 2026, the cumulative tariff contribution was approximately 2.2 percentage points (actual Goods CPI: 2.0%; counterfactual: -0.2%). Goods CPI pass-through coefficient = 0.560 (column (2) of Table 3). In panel (b), October 2025 is missing as the government did not collect data in that month due to a government shutdown. Because the regressions include date fixed effects, this contribution is identified relative to less-exposed goods and should be read as illustrative rather than as the absolute contribution to aggregate goods CPI.

4 Interpretation of Results

The previous section estimated each channel of tariff pass-through separately. We now turn to the relative importance of each channel's contribution to the goods CPI. First, we consider the implications of the actual tariff changes over a 12-month period. Second, we explore the dynamics of these effects at different horizons, illustrating the overall effect with a uniform 10 percent tariff exercise.

4.1 12-Month Effects of the Actual Tariffs

We can obtain a sense of the economic magnitude of the tariff shocks by computing the partial equilibrium impact of the tariffs on the CPI. We plot the weighted average of the 12-month change of the 67 CPI categories in our sample, using 2022 consumption weights. These categories account for 20 percent of the total CPI (inclusive of services) and 75 percent of consumer goods expenditures. The solid line in panel (a) of Figure 2 shows that goods CPI inflation peaked in mid-2022 and then declined steadily. This trend reversed at the beginning of 2025, when tariffs started to be implemented. The dashed line in panel (a) shows what the goods CPI would have been absent these tariffs, holding all other factors fixed. To generate this line, we first predict each item's tariff-induced pre-retail price change from our import- and producer-price estimates, and then convert it into a consumer-price effect using the pass-through coefficient from equation (4). We subtract this predicted effect from the item's actual price change and aggregate across items. The tariff effect is the shaded area, with a cumulative contribution of around 2.2 percentage points by the end of the sample (February 2026). This counterfactual should be read with care. Like any regression with time fixed effects, our specifications identify the effect of tariffs on a good's price relative to less-exposed goods; the common, economy-wide component is absorbed by the date fixed effects and is not separately identified:

Table 4: Pass-Through across Horizons: Consumer IV

Regression Specification	$\ell = 1$	$\ell = 3$	$\ell = 6$	$\ell = 9$	$\ell = 12$
Import price regression					
Change in log duty rate	1.034***	1.020***	0.965***	0.900***	0.905***
	(0.075)	(0.037)	(0.030)	(0.031)	(0.033)
Domestic price regression					
Strategic complementarities effect	−0.005	0.030	0.091	0.144	0.217**
	(0.058)	(0.063)	(0.082)	(0.093)	(0.104)
Marginal cost effect	0.631	0.417	0.679	1.120*	1.442**
	(0.384)	(0.403)	(0.571)	(0.587)	(0.690)
Consumer price regression					
Pre-retail price change	0.764	0.335*	0.528**	0.539***	0.560***
	(1.981)	(0.193)	(0.230)	(0.169)	(0.133)
CPI Impact of a 10% Uniform Tariff					
Total	2.205	1.143	2.163	2.339	2.639
Direct effect	1.873	1.002	1.756	1.647	1.694
Strategic complementarities effect	−0.004	0.014	0.068	0.113	0.175
Marginal cost effect	0.337	0.127	0.339	0.578	0.770

Notes: The top three panels report pass-through coefficients, each from a separate regression at horizon ℓ (months); the bottom panel reports the predicted effect of a uniform 10 percent tariff on consumer goods prices, in percentage points, decomposed into the three channels. Import price regressions follow equation (5), with the change in the log duty rate instrumented by the change in the log statutory tariff rate. Domestic price regressions follow equation (6), with output and input duty instrumented by their statutory tariff counterparts. The CPI composite coefficient combines the import-price and domestic-price pass-through as described in Appendix C. Standard errors in parentheses, clustered by HTS8 × country (import price), IO group (domestic price), and CPI item group (consumer price). At the one-month horizon the consumer-price coefficient is estimated far too imprecisely to interpret—its standard error is more than twice the point estimate, reflecting a very weak first stage—so those estimates, including the predicted-tariff effects, are uninformative and should not be interpreted. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

the familiar missing-intercept problem. The counterfactual therefore treats these relative price effects as absolute ones, and should be read as illustrative of the magnitude of the tariff-induced price increases for the goods in our sample.

Panel (b) decomposes this shaded area into the contributions from the three different channels. As expected, the direct channel (blue bars), arising from the tariff-induced increase of prices of imported consumer goods, is most important, accounting for about 70 percent of the total effect on average. Notably, the indirect effects coming through tariffs on domestic prices are non-trivial: the marginal cost channel (dark green bars) accounts for about 23 percent of the total effect, and strategic complementarities (light green bars) for the remaining 7 percent.

4.2 Dynamic Effects

Thus far we have considered only specifications based on 12-month changes, which leave open how quickly prices respond to tariffs. We therefore re-estimate the import, domestic, and consumer price regressions at horizons of 1, 3, 6, 9, and 12 months. Table 4 reports the results, together with the implied effect of a 10 percent uniform tariff on the CPI at each horizon.[19]

19. All results are robust to using Driscoll-Kraay standard errors, which account for cross-sectional and time-series dependence.

Two pass-through patterns stand out. First, the pass-through of tariffs to import prices, shown in the first row, is essentially immediate: the coefficient in the import-price regression is close to one at every horizon, so the direct channel is largely complete on impact. Second, domestic prices adjust gradually. The coefficient on marginal costs is small and imprecisely estimated at short horizons, rising to about 1.4 and becoming significant at the 5 percent level at twelve months; the strategic complementarity coefficient follows the same pattern, reaching about 0.2 at twelve months. Pass-through of pre-retail price changes into CPI also rises over time, reaching 0.56 at twelve months.

As a result of the gradual pass-through of tariffs into U.S. producer prices, the predicted contribution of the two indirect channels to consumer prices roughly doubles between six and twelve months, while the direct contribution of the impact of tariffs on imported consumption goods is broadly stable. We show these contributions in the last four rows of the table, which decompose the impact of a 10 percent uniform tariff into the different margins. At the twelve-month horizon the total effect is 2.6 percent (the 95-percent confidence interval is [1.45, 4.38]),[20] with the direct channel contributing 1.7 percentage points and the two domestic channels the remaining 0.9 percentage points.[21] Taken together, these estimates show that pass-through to consumer prices arrives with a lag: the direct effect on imports is almost immediate, but the domestic channels keep building for the better part of a year, so the full impact emerges only nine to twelve months after the tariff takes effect.[22]

5 Conclusion

We estimate how the 2025 U.S. tariffs pass through to consumer prices, separating the direct effect on imported goods from the indirect effects on domestically produced goods. Under the assumption that tariffs did not affect the prices of goods with no direct or indirect tariff exposure, the pass-through of tariffs to consumer goods prices is about 26 percent, of which roughly 64 percent is due to the direct tariff effect on imported goods and 36 percent due to the price increase of domestic goods. Domestic goods prices increase because tariffs raise producers' input costs and weaken the competition they face from imports. The direct effect passes through quickly, since tariffs raise import prices almost immediately, while the indirect effects build over nine to twelve months, so the full pass-through is reached only after about a year, longer than the direct effect alone would suggest.

Because our results are based on differences in tariff exposure across goods, our estimates capture the relative price effects of tariff exposure rather than the economy-wide component of inflation, and they do not account for the possible tariff impact on the exchange rate, the monetary-policy response, and a host

20. We obtain the confidence interval by bootstrapping the entire tariff-to-CPI calculation with 1,000 replications. The domestic-price stage is a cluster bootstrap on IO industries, and the retail stage is a cluster bootstrap on CPI item groups, with the generated instruments rebuilt within each replication from that replication's import-price and producer-price draws, so the dependence of the retail stage on the estimated earlier stages is propagated; the import-price stage is a normal draw on its reduced form. The three stages are resampled independently because the many-to-many concordance between NAICS industries and CPI item groups admits no common resampling unit; since the cross-stage coefficient correlations are all below 0.09, this simplification has little effect on the confidence interval.

21. The channel decomposition under the uniform tariff differs from that of the actual tariffs in Figure 2 (the direct channel accounts for about 64 percent of the total here versus 70 percent there) because the 2025 tariffs were not applied uniformly: actual duties fell unevenly across products and source countries, and relatively more heavily on final goods than on inputs, so the exposure-weighted contributions of the three channels differ from those generated by a uniform shock.

22. Other work finds comparable lags for individual products: the retail price of European wine took about a year to fully reflect a tariff (Flaaen et al. 2025).

of other general equilibrium forces; quantifying those forces is left to future work. Regardless of the impact of these general equilibrium forces, our results indicate that the tariffs had economically and statistically significant effects on consumer prices.

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Appendix

A Data Appendix

This appendix provides additional detail on the data sources, sample, and concordances summarized in Section 2. Table A1 reports summary statistics for the estimation samples of the import price, producer price, and consumer price regressions.

A.1 Sample

The analysis uses a monthly panel of U.S. price indices linked to product-level information on import tariffs and duties. We combine three sets of price series, consumer prices (CPI), producer prices (P^D), and import prices (P^M), with measures of tariff exposure built from the universe of U.S. merchandise imports. Consumer prices are organized into CPI item groups, producer prices are measured for NAICS industries, and import prices, tariffs and duties are measured at the ten-digit Harmonized Tariff Schedule (HTS10) level by source country and aggregated to these groups using import-weighted concordances. Because tariffs apply to traded merchandise, the sample covers goods-producing industries and the consumer items they map into; services are excluded. The producer-price and consumer-price panels begin in January 2021 and run through February 2026. All regressions are estimated in changes over the same sample period, January 2022 through February 2026.

Table A1: Summary statistics

	Full sample				Consumer sample			
	p25	Mean	p75	SD	p25	Mean	p75	SD
Panel A: Import prices (HTS10 × country × month)								
Unit value, $\triangle \ln P^M$	-0.185	0.077	0.341	0.456	-0.193	0.051	0.292	0.438
Duty, $\triangle \ln \tau$	0.000	0.090	0.140	0.106	0.000	0.077	0.129	0.098
Statutory tariff, $\triangle \ln \tau'$	0.000	0.087	0.140	0.084	0.000	0.088	0.139	0.081
Exchange rate, $\triangle \ln e$	-0.029	0.013	0.064	0.077	-0.031	0.006	0.055	0.080
Panel B: Domestic prices (NAICS group × month)								
Domestic price, $\triangle \ln P^D$	0.010	0.030	0.048	0.062	0.004	0.022	0.042	0.067
Imported output share, s	0.092	0.326	0.491	0.263	0.107	0.339	0.512	0.280
Imported input share, s^N	0.141	0.189	0.225	0.103	0.112	0.182	0.203	0.126
Output duty, $\triangle \ln \tau$	0.024	0.087	0.128	0.075	0.024	0.077	0.121	0.061
Input duty, $\triangle \ln \tau^N$	0.031	0.084	0.124	0.063	0.029	0.069	0.105	0.047
Output tariff, $\triangle \ln \tau'$	0.034	0.083	0.123	0.057	0.040	0.089	0.132	0.059
Input tariff, $\triangle \ln \tau'^N$	0.042	0.072	0.101	0.041	0.042	0.070	0.098	0.040
Panel C: Consumer prices (CPI item group × month)								
Consumer price, $\triangle \ln \mathrm{CPI}$					-0.002	0.012	0.026	0.036
Import share, s^M					0.082	0.357	0.677	0.342
Domestic share, s^D					0.323	0.643	0.918	0.342
Composite, $s^M \triangle \ln P^M + s^D \triangle \ln P^D$					0.003	0.029	0.060	0.086
Import price instrument, $s^M \triangle \ln \widehat{P}^M$					0.002	0.027	0.034	0.039
Domestic price instrument, $s^D \triangle \ln \widehat{P}^D$					0.002	0.012	0.018	0.012
Output tariff instrument, $s^M \triangle \ln \tau'$					0.003	0.035	0.045	0.049
Input tariff instrument, $s^N s^D \triangle \ln \tau'^N$					0.001	0.007	0.011	0.007

Notes: All price, tariff, and duty variables are 12-month log changes (2025m1 onward); shares are 2022 levels. τ denotes one plus the duty rate and τ' one plus the statutory tariff rate, with superscript N for the input channel. A hat denotes a predicted (first-stage) price. Full and consumer samples are the corresponding IV estimation samples.

A.2 Import Prices, Tariffs, and Duties

Import prices. We proxy for U.S. import prices with unit values, the ratio of import value (inclusive of duties) to quantity, at the HTS10-country level, from the U.S. Census Bureau, Foreign Trade Statistics. The data cover over 16,000 distinct HTS10 codes and U.S. imports from all countries. We exclude oil products, defined by the HTS10 codes that correspond to NAICS 3-digit codes 211 and 324. We drop observations without quantities and those not reported in consistent units over the sample (0.7 percent of observations), and observations with extreme unit-value movements, defined as a ratio of unit values in t relative to $t - \ell$ greater than three or less than one-third.

Duties. We compute a duty rate for each HTS10-country-month as the ratio of total calculated duties to the value of imports, from Census Foreign Trade Statistics.

Statutory tariffs. We build a panel of statutory tariff rates at the HTS10-country-month level. We start from the rates reported by the U.S. International Trade Commission and add the tariffs imposed under U.S.-specific Acts, obtained from proclamations in the Federal Register; the sequence of policy actions over 2025 and 2026 is described in Section 2.1. About 95 percent of the tariffs are set as ad valorem rates, and we convert specific rates into ad valorem equivalents where possible. The monthly rate reflects within-month timing: a tariff that takes effect mid-month enters that month's rate scaled by the fraction of the month it is in effect, and in full thereafter. Our baseline statutory series excludes the April-May 2025 escalation of the reciprocal tariff on Chinese goods to 125 percent, holding China's reciprocal tariff at the 10 percent baseline over those two months.

Exchange rates. Monthly average bilateral exchange rates, measured as U.S. dollars per unit of foreign currency, are from the IMF International Financial Statistics.

A.3 Producer Prices (PPI)

We proxy for domestic prices with the BLS Producer Price Index (PPI), mostly available at the NAICS6 level (occasionally more aggregated). The PPI measures the average change over time in the selling prices received by domestic producers for their output, recorded at the factory gate, that is, before distribution margins and sales taxes. We keep the goods-producing industries (agriculture and forestry, mining, and manufacturing) and exclude oil and gas extraction (NAICS 211) and petroleum refining (NAICS 324), whose prices are set largely in global commodity markets and are highly volatile, generating movements unrelated to the trade-policy changes we study. The regressions use the 293 tradable goods categories for which the import data needed to construct the tariff and import-share variables are available. The consumer-sample regressions use the subset of these industries producing final consumer goods: those matched to a CPI item group by our concordance, together with those for which at least 20 percent of output is purchased directly by households in the 2017 input-output table, 108 industries in total. For each industry we use the overall industry price index and the not-seasonally-adjusted series. We use the BEA 2017 input-output table, the most recent disaggregated table available, to identify intermediate input use by industry; the table distinguishes 402 BEA detail industries, each corresponding to one or more NAICS6 industries.

A.4 Domestic Production

We measure domestic production with 2022 shipment values. Manufacturing shipments are from the 2022 Economic Census, agriculture shipments are from the 2022 Census of Agriculture, and forestry shipments are from Census Bureau data. Domestic absorption in an industry is the value of shipments minus exports plus imports in 2022, with exports and imports from the Census Foreign Trade Statistics. These shipment values enter the construction of import (absorption) shares and serve as weights when collapsing NAICS-level variables to CPI item groups.

A.5 Consumer Prices (CPI)

The Consumer Price Index (CPI) is sourced from the BLS at the item-stratum level. The CPI measures the average change over time in the prices paid by urban consumers, recorded at the retail level, that is, inclusive of distribution margins and sales taxes, and so reflects the end-point of the supply chain from which we study tariff pass-through. We use the 67 CPI item categories that match to a NAICS industry with a producer price index. Our crosswalk maps 103 CPI items to HTS10 codes; grouping items that share the same set of HTS10 codes yields 83 CPI item groups, of which 67 match to a NAICS industry with a producer price index and enter the regressions. The 2022 relative importance weights of these 67 categories sum to 20.2 percent of the total consumption basket. As a share of consumer goods expenditures the coverage is 75 percent: commodities account for 36 percent of the 2022 basket, from which we exclude energy commodities (motor fuel and fuel oil, 3.5 percent), consistent with our exclusion of oil products, and food away from home (5.4 percent), which the BLS classifies as a commodity but which is not part of our set of consumer goods, leaving 27.1 percent. We retain national, not-seasonally-adjusted monthly series from January 2021. For each item we attach the 2022 relative-importance weight from the BLS supplemental tables, which measures the item's share of total consumer expenditure in 2022.

A.6 Concordances

CPI to HTS10. The crosswalk between CPI items and HTS10 was built manually. First, each CPI item was mapped to a Harmonized System (HS) 6-digit code.[23] Second, the crosswalk was mapped to all HTS10 codes within each HS6 that are final consumer goods, identified using the Bureau of Economic Analysis (BEA) import end-use codes that correspond to consumer goods.[24] We then group CPI items that share the same set of HTS10 codes. This grouping is what makes the import-price concordance many-to-one: in the raw data a single HTS10 code can fall under several CPI items, but after grouping each HTS10 code maps to exactly one CPI group, while many HTS10 codes map to each group. The resulting CPI-to-HTS10 mapping was then checked with Claude.

CPI to NAICS. We map NAICS codes to CPI codes manually, keeping only the NAICS codes that are final consumer goods. Unlike the import-price concordance, this mapping is many-to-many: a NAICS

23. This was initially done by two research assistants independently, and then checked by a third research assistant.

24. The import end-use codes are provided by the Census Bureau (https://www.census.gov/foreign-trade/reference/codes/enduse/imeumstr.txt). The BEA import end-use codes we consider as potential consumer goods comprise: 01 - nonagricultural products; 001 - other agricultural foods; 21300 - computers; 21301 - computer accessories; 300 - passenger cars, new and used; 30020 - automotive tires and tubes; and 4 - consumer goods.

industry can map to several CPI groups, and a CPI group can draw on the output of several NAICS industries. This mapping was also checked with Claude.

NAICS to HTS10. The NAICS6 to HTS10 concordance is from Pierce and Schott (2012).

A.7 CPI Level Variables

Output tariff and import price variables at the CPI level are constructed directly from the HTS10-country level: each HTS10 code is matched to its CPI category using the concordance, and log changes are averaged within each CPI category using 2022 import values as weights.

Input tariff and producer price variables are first constructed at the NAICS-group level and then collapsed to the CPI level using 2022 shipment values as weights. When a NAICS group maps to more than one CPI category, its shipment value is divided equally across those categories before computing the within-category shipment shares. This equal division reflects the absence of data on how a single NAICS group's production is allocated across consumer goods categories.

B Construction of the Imported Input Share with the 2017 BEA IO Table

This appendix details the construction of the input tariff using the 2017 BEA IO table, the most recent disaggregated IO table available, combined with 2022 import data. As in the main text, k denotes the industry and n the intermediate-input sector; both are measured at the level of BEA IO industries, which map closely to NAICS6 industries. Where the correspondence between BEA industries and the NAICS-level groups used for the producer price data is not one-to-one, we combine industries into groups within which the correspondence is unique, giving 246 IO industry groups; these are the IO groups at which standard errors are clustered in the domestic price regressions. For this, we assume that each industry k imports input n in the same proportion as the aggregate economy i.e. the "proportionality assumption". To get the estimated imports of input n for 2017, we apply the aggregate import share for 2022 on each input n to the expenditure on n in 2017.

$$V_{nk}^{M} = V_{nk}\frac{\text{Imports}_{n,2022}}{\text{Absorption}_{n,2022}}. \tag{B1}$$

Notice that the import share on the right has no k subscript because it is at the economy-wide level. Summing these imputed imports across non-oil material inputs and dividing by total variable cost gives the import-exposure share used in the main text,

$$s_k^N = \frac{\sum_n V_{nk}^M}{\text{TVC}_k}. \tag{B2}$$

where TVC_k is total variable cost, which we measure from the 2017 IO Use table as expenditure on non-oil material inputs plus the wage bill. Material inputs are intermediate purchases from goods-producing sectors, those whose NAICS code begins with 1, 2, or 3, excluding oil and gas extraction (211) and petroleum refining (324), consistent with our exclusion of oil products elsewhere. The wage bill is compensation of employees (row V00100 of the Use table). The baseline denominator omits service inputs. Imports and absorption of each input sector in 2022 are measured from the Census Foreign Trade Statistics and the shipment values described in the data appendix.

C Predicted Tariff Effects and the Counterfactual

The counterfactual in Figure 2 and the channel decompositions in its panel (b) and in the bottom panel of Table 4 are constructed from the estimated coefficients in three steps. Throughout, we use the consumer-sample IV coefficients (column (4) of Tables 1 and 2) and the retail pass-through coefficient from column (2) of Table 3. All predictions are based on the first-stage fitted duty changes rather than realized duties, so that only the duty variation induced by the statutory tariffs enters.

First, for each HTS10-country pair we compute the fitted duty change from the first-stage regression of the duty change on the statutory tariff change, multiply it by the import-price duty coefficient from equation (5), and aggregate to CPI item groups using the 2022 import value weights of equation (1):

$$\triangle_{12} \ln \hat{P}_{it}^{M} = \hat{\beta}^{M} \sum_{h,c \in \Omega_{i,22}} w_{ihc} \, \widehat{\triangle_{12} \ln \tau_{hct}}, \tag{C3}$$

where the hat over the duty term denotes the first-stage fitted value.

Second, for each industry we compute the fitted output-duty and input-duty terms from their first stages, multiply them by the strategic complementarity and marginal cost coefficients from equation (6), and aggregate to CPI item groups using the 2022 shipment weights described above, denoted w_{ik}^{S}:

$$\triangle_{12} \ln \hat{P}_{it}^{D,SC} = \hat{\beta}^{D} \sum_{k} w_{ik}^{S} \, s_k \widehat{\triangle_{12} \ln \tau_{kt}}, \qquad \triangle_{12} \ln \hat{P}_{it}^{D,MC} = \hat{\beta}^{N} \sum_{k} w_{ik}^{S} \, s_k^{N} \widehat{\triangle_{12} \ln \tau_{kt}^{N}}. \tag{C4}$$

The two components are kept separate so that the channels can be decomposed.

Third, the predicted tariff effect on the consumer price of each item combines the two pre-retail predictions through the pre-retail shares of equation (3) and the retail pass-through coefficient of equation (4):

$$\widehat{\triangle_{12} \ln \mathrm{CPI}}_{it} = \hat{\beta}^{C} \left[s_i^{M} \triangle_{12} \ln \hat{P}_{it}^{M} + s_i^{D} \left(\triangle_{12} \ln \hat{P}_{it}^{D,SC} + \triangle_{12} \ln \hat{P}_{it}^{D,MC} \right) \right]. \tag{C5}$$

The three terms give the direct, strategic complementarity, and marginal cost contributions, respectively. The actual and predicted series are each aggregated across items using 2022 consumption weights, and the counterfactual is the aggregated actual change minus the aggregated predicted tariff effect.

The uniform-tariff exercise in the bottom panel of Table 4 applies the same chain to a hypothetical 10 percentage point statutory tariff increase on every product. Under this shock the output and input tariff regressors equal $10\, s_k$ and $10\, s_k^{N}$, the first stages convert these into predicted duty terms, and the equations above deliver the aggregate effect for the 67 categories in our sample. The table repeats the calculation at each horizon using the coefficients estimated at that horizon.

D Additional Results

D.1 Aggregation Test for Measurement Error

Section 3.3 tests whether the gap between the OLS and IV estimates of retail pass-through reflects classical measurement error by re-estimating both specifications at a coarser level of aggregation. If the measurement

Table D1: Aggregation Test for Classical Measurement Error

Dependent variable: $\triangle \ln \text{CPI}_{it}$	67 CPI item groups		33 expenditure classes	
	(1) OLS	(2) IV	(3) OLS	(4) IV
Pre-retail price change	0.147***	0.560***	0.208***	0.453***
	(0.030)	(0.133)	(0.035)	(0.096)
N	3,271	3,271	1,617	1,617
Number of groups	67	67	33	33
Fixed effects:				
Group	Yes	Yes	Yes	Yes
Date	Yes	Yes	Yes	Yes
Hansen J		0.77		0.94
[p-value]		0.380		0.332
First-stage F		17.40		13.17

Notes: Columns (1) and (2) are identical to columns (1) and (2) of Table 3. Columns (3) and (4) are estimated at the level of 33 BLS expenditure classes, aggregating with 2022 BLS expenditure weights. The IV columns instrument the pre-retail price change with the tariff-predicted import and domestic components defined in Section 3.3, rebuilt at the level of each column. Group fixed effects are at the level of each column; all columns include date fixed effects. Hansen J tests the over-identifying restriction. First-stage F is the Kleibergen-Paap F statistic for weak identification. Standard errors in parentheses, clustered at the group level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

error is classical, that is, uncorrelated with the true cost shock and across groups, it attenuates the OLS estimate toward zero but leaves the IV estimate unaffected; averaging over a coarser classification reduces the noise, so the OLS estimate should rise toward the IV estimate while the IV estimate remains roughly unchanged. This is the pattern in the table: the OLS coefficient rises from 0.147 to 0.208, the IV coefficient moves by less than one standard error, and the gap between the two falls by 41 percent. Table D1 reports the estimates. Columns (1) and (2) reproduce columns (1) and (2) of Table 3, estimated at the level of the 67 CPI item groups. Columns (3) and (4) aggregate each CPI item group to its four-character BLS expenditure-class prefix, which yields 33 broader classes, using 2022 BLS expenditure weights; the pre-retail composite and the instruments are rebuilt after aggregation so that the share and price interactions remain internally consistent.

D.2 Exposure and Pre-Period Inflation Levels

Table D2 reports the observational analogue of a balance check in a randomized experiment: we collapse the panel to one observation per industry and regress 2025–26 tariff exposure on pre-determined price behavior, where exposure is the simple average of the monthly statutory-tariff interaction terms over 2025m1–2026m2 and pre-period behavior is the average 12-month log PPI change over 2022m1–2024m12. Exposure is, if anything, negatively related to pre-period inflation: protection went to low-inflation, import-competing industries, not to industries whose prices were already rising. The sign works against our results—if exposed industries were on persistently lower inflation paths, any contamination would bias the pass-through estimates downward—and a stable level difference is in any case absorbed by the industry fixed effects.

Table D2: Balance test: 2025–26 tariff exposure and pre-period price growth

Dependent variable: 2025–26 tariff exposure	Output tariff × import share	Input tariff × input share
	(1)	(2)
Average 2022–2024 PPI growth	-0.245^{**}	-0.066^{*}
	(0.103)	(0.038)
N (industries)	105	108

Notes: Cross-sectional regressions of 2025–26 tariff exposure on pre-period price growth, one observation per industry, consumer sample. Exposure is the simple average of the monthly statutory-tariff interaction terms over 2025m1–2026m2; pre-period price growth is the simple average of the monthly 12-month log PPI changes over 2022m1–2024m12. The input-side exposure is available for three additional industries. Standard errors, clustered by IO industry, in parentheses. Significance: * 10 percent, ** 5 percent, *** 1 percent.

D.3 Sensitivity to the Most Heavily Targeted Sectors

U.S. tariffs particularly targeted steel and aluminum (primary metals, NAICS 331) and motor vehicles and parts (NAICS 3361–3363). Table D3 shows that the baseline consumer-sample IV estimates of Table 2, column (4), are stable both when we drop the motor-vehicle industries from the outcome sample and when we rebuild the IO-weighted input tariff and duty with the input tariff changes set to zero for these two sectors, removing that variation symmetrically from the endogenous variable and the instrument. The marginal cost effect remains significant with the metals input variation zeroed (1.56), the autos variation zeroed (1.50), or both (1.59), and the strategic complementarities effect moves little in every column, indicating that the marginal cost channel is not driven solely by the steel and aluminum tariffs.

Table D3: Sensitivity to the most heavily targeted sectors

Dependent variable: 12-month log change in PPI		Drop from sample:	Zero input-tariff contribution of:		
	Baseline	Autos	Metals	Autos	Both
	(1)	(2)	(3)	(4)	(5)
Strategic complementarities effect (output duty)	0.217^{**}	0.216^{**}	0.243^{**}	0.203^{*}	0.234^{**}
	(0.104)	(0.107)	(0.103)	(0.107)	(0.106)
Marginal cost effect (input duty)	1.442^{**}	1.494^{**}	1.557^{**}	1.501^{**}	1.588^{**}
	(0.690)	(0.703)	(0.694)	(0.708)	(0.695)
First-stage F	44.66	44.39	78.87	46.02	93.52
N	5,226	5,076	5,226	5,226	5,226

Notes: All columns are the consumer-sample IV specification of Table 2, column (4). Metals refers to primary metals (NAICS 331); autos to motor vehicles, bodies, and parts (NAICS 3361–3363). The consumer sample contains no primary-metals industries, so dropping them from the outcome sample leaves the baseline unchanged; column (2) drops the three motor-vehicle industry groups. Columns (3)–(5) keep the estimation sample fixed and instead set the targeted input sectors' tariff changes to zero when rebuilding the IO-weighted input tariff and duty (IO weights and the imported-input share unchanged), removing that variation symmetrically from the endogenous variable and the instrument. Standard errors, clustered by IO industry, in parentheses. Significance: * 10 percent, ** 5 percent, *** 1 percent.