Appendix to:
The Incidence of Tariffs: Rates and Reality

by Gita Gopinath and Brent Neiman

May 2026

This Appendix has three sections. We start in Section A with derivations of several key theoretical results from Sections 3 and 8 of the main text. Next, Section B includes a number of figures referenced by the main text, along with annotations and description of their contents. Finally, Section C includes several tables referenced by the main text, along with annotations and descriptions of their contents.

A Theory: Details and Derivations

A.1 Pass-Through with Permanent Shocks

The derivation of tariff pass-through follows closely the derivation of exchange rate pass-through in Burstein and Gopinath (2014). We first consider the case of flexible prices. The dollar price in logs, p_F, at which an exporter sells goods to the US can be expressed generically as equal to the sum of its (log) mark-up and (log) marginal cost in dollars. We allow the mark-up to be a function of the relative price of the exporter's good in the US market, $p_F + \tau$, relative to an overall price index (log) p in the US. As discussed in Burstein and Gopinath (2014), several models with variable mark-ups can be expressed in this form. A firm's market-share varies with its relative price in the destination market, and in models with non-constant elasticity of demand this gives rise to variability in desired mark-ups.

For the marginal cost, as is standard, it can be expressed as a function of input prices, and of the quantity sold when marginal cost is variable. The quantity sold is in turn a function of the relative price of the firm's good in the destination market. The price of inputs include those costs like the wage rate in the exporter's country that

tend to be sticky in local currency, w^*, and their dollar value depends on the exchange rate e. As most exporters use imported inputs whose prices are stable in dollars, only a fraction ϕ of the input costs are affected by the exchange rate:

$$p_F = \mu(\tau + p_F - p) + mc((\tau + p_F - p), e, w^*).$$

Taking a log-linear approximation around a symmetric price point with $\tau = e = 0$, we have:

$$\Delta p_F = -\Gamma(\Delta\tau + \Delta p_F - \Delta p) - \Phi(\Delta\tau + \Delta p_F - \Delta p) + \phi\Delta e. \tag{A1}$$

Here $\Gamma \equiv -\frac{\partial\mu}{\partial(\tau+p_F-p)}$ and $\Phi = -\frac{\partial mc}{\partial q}\cdot\frac{\partial q}{\partial(\tau+p_F-p)}$. Γ captures the elasticity of the mark-up to the firm's relative price and Φ captures the elasticity of marginal cost to the relative price. The latter is a product of the extent of departure from constant returns to scale and the elasticity of demand for the exporter's good. Collecting terms:

$$\Delta p_F = \frac{-\Gamma - \Phi}{1 + \Gamma + \Phi}\Delta\tau + \frac{\phi}{1 + \Gamma + \Phi}\Delta e + \frac{\Gamma + \Phi}{1 + \Gamma + \Phi}\Delta p.$$

Pass-through, inclusive of tariffs, can then be expressed as:

$$\Delta p_F + \Delta\tau = \frac{1}{1 + \Gamma + \Phi}\Delta\tau + \frac{\phi}{1 + \Gamma + \Phi}\Delta e + \frac{\Gamma + \Phi}{1 + \Gamma + \Phi}\Delta p. \tag{A2}$$

In the paper we focus on the 'direct effect' which excludes the Δp term. The direct effect is a good approximation when the destination market is large relative to the exporting country.

A.2 Passthrough when FX Shocks are Temporary

Although empirical studies suggest that nominal exchange rates may follow random walks, surveys reveal that firms expect some nominal exchange rate changes to reverse over time. We therefore consider an environment where prices are reset infrequently with probability $(1 - \kappa)$ à la Calvo. We consider the case when $\Gamma = \Phi = 0$. The reset

price, $\bar{p}_{F,t}$ can be expressed as:

$$\bar{p}_{F,t} = (1 - \beta\kappa) \sum_{\ell=0}^{\infty} (\beta\kappa)^{\ell} E_t \left[\phi e_{t+\ell} + \text{constant}\right].$$

Suppose that the exchange rate is expected to evolve as AR(1) processes with persistent ρ_e, $e_t = \rho_e e_{t-1} + \epsilon_{e,t}$. Then it follows that:

$$\bar{p}_{F,t} + \tau_t = \tau_t + \frac{(1 - \beta\kappa)\phi}{(1 - \beta\kappa\rho_e)} e_t. \tag{A3}$$

When expressed in deviations from the last price change, this can be written as:

$$\Delta\bar{p}_{F,t} + \Delta\tau_t = \Delta\tau_t + \frac{(1 - \beta\kappa)\phi}{(1 - \beta\kappa\rho_e)} \Delta e_t. \tag{A4}$$

A.3 Impact of Tariffs on the Exchange Rate

The trade balance equals the difference between the value of exports and the ex-tariff value of imports:

$$TB_t = P_H C_H^* - P_F C_F,$$

where P_H is the dollar export price of the home good and C_H is the consumption of the home good in the foreign country. Similarly, P_F is the dollar import price and C_F is the consumption of foreign good at home. If the trade balance does not change, it must follow that the change in exports matches the change in imports.

Assuming a CES structure for demand at home with elasticity σ, the value of imports inclusive of tariffs satisfies the following relation:

$$(1 + \tau) P_F C_F = \gamma \left(\frac{(1 + \tau) P_F}{P} \right)^{1 - \sigma} PC, \tag{A5}$$

where P and C represent the overall price level and consumption level at home and γ captures the preference for imported goods. We assume P and C remain unchanged, which would be consistent with the importing country being large and mostly closed. Monetary policy is assumed to target a fixed P. Expressing (**??**) in logs and linearizing

around a zero trade balance point:

$$\Delta p_F + \Delta c_F + \Delta\tau = (1-\sigma)(\Delta\tau + \Delta p_F),$$

or:

$$\Delta p_F + \Delta c_F = -(\sigma-1)\Delta p_F - \sigma\Delta\tau.$$

Similarly, the demand in the foreign country for the home good is given by:

$$\frac{P_H C_H^*}{\varepsilon} = \gamma^* \left(\frac{P_H}{\varepsilon P^*}\right)^{1-\sigma} P^* C^*, \tag{A6}$$

where ε is the exchange rate in levels expressed as dollar per unit of foreign currency, γ^* captures preference for home goods in the foreign country. P^* and C^* are assumed fixed. Expressing equation A6 in logs we obtain:

$$\Delta p_H + \Delta c_H^* - \Delta e = (1-\sigma)(\Delta p_H - \Delta e),$$

or:

$$\Delta p_H + \Delta c_H^* = (1-\sigma)\Delta p_H + \sigma\Delta e = -(\sigma-1)\Delta p_F - \sigma\Delta\tau. \tag{A7}$$

The second equality follows from the assumption that the trade balance does not change: the change in the value of exports equals the change in the ex-tariff value of imports.

Recall equation (A2) (focusing on the direct effect so $\Delta p = 0$):

$$\Delta p_F = \frac{-(\Gamma+\Phi)}{1+\Gamma+\Phi}\Delta\tau + \frac{\phi}{1+\Gamma+\Phi}\Delta e. \tag{A8}$$

The pricing equation for the dollar export price is the same as for the dollar import price with the only difference that $\phi = 0$. This captures dollar dominance, that is for the US all of its production costs, including imported inputs, are in its home currency. Specifically, we can express the (log) US export price in dollars as:

$$p_H = \mu(p_H - e - p^*) + mc(p_H - e - p^*, e).$$

$p_H - e - p^*$ captures the relative price of US exports in foreign markets. We assume the foreign country does not impose tariffs on its imports from the US. This is consistent with the limited retaliation against US tariffs. Log-linearizing around a symmetric price point with $e = 0$, setting Δp^* to 0, and collecting terms we have:

$$\Delta p_H = \frac{\Gamma + \Phi + \phi}{1 + \Gamma + \Phi} \Delta e.$$

Accordingly, given $\phi = 0$ we have:

$$\Delta p_H = \frac{(\Gamma + \Phi)}{1 + \Gamma + \Phi} \Delta e. \tag{A9}$$

Substituting equations (A8) and (A9) into (A7) we arrive at the exchange rate response to tariffs:

$$(1 - \sigma) \left[\frac{(\Gamma + \Phi)}{1 + \Gamma + \Phi} \Delta e \right] + \sigma \Delta e = -(\sigma - 1) \left[\frac{-(\Gamma + \Phi)}{1 + \Gamma + \Phi} \Delta \tau + \frac{\phi}{1 + \Gamma + \Phi} \Delta e \right] - \sigma \Delta \tau.$$

Collecting terms, $\Delta e / \Delta \tau$ can be expressed as:

$$\frac{\Delta e}{\Delta \tau} = \frac{\frac{\Gamma + \Phi}{1 + \Gamma + \Phi} - \frac{\sigma}{\sigma - 1}}{\frac{\phi - (\Gamma + \Phi)}{1 + \Gamma + \Phi} + \frac{\sigma}{\sigma - 1}} = \frac{-(\sigma + (\Gamma + \Phi))}{\phi(\sigma - 1) + (\sigma + (\Gamma + \Phi))}.$$

B Appendix Figures

Figures A1a and A1b show the raw data underlying the pass-through calculations reported in the second and fourth columns of Panel A of Table 1. The y-axis values are constructed using price indices collected by the US Bureau of Labor Statistics' Import Price Program.

Figure A1: **Tariff Pass-through to Import Prices by Country, December 2025**

(a) Raw Price Changes (b) Detrended Price Changes

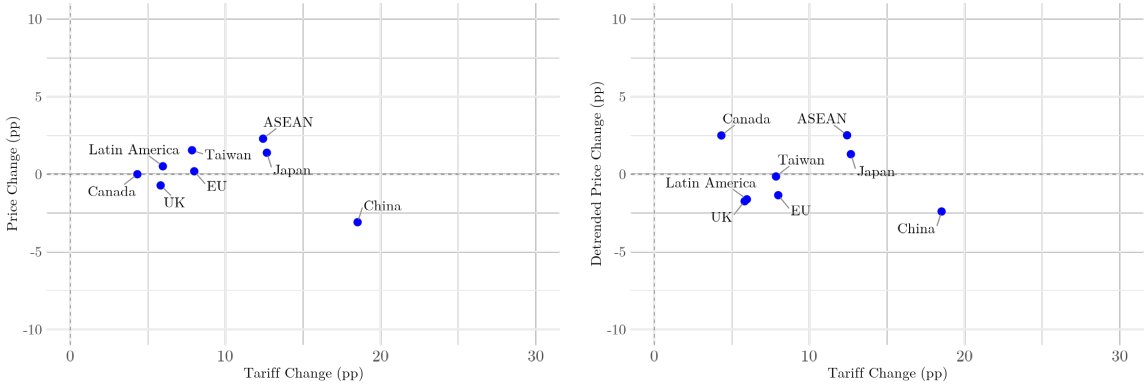
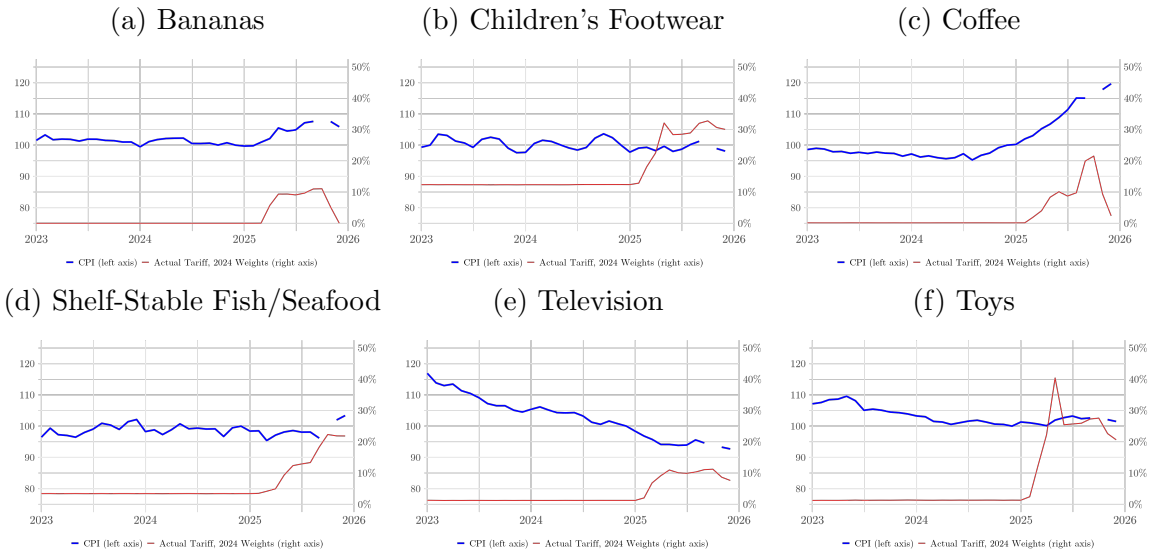


Figure A2 gives selected illustrative examples of consumption products that are largely or entirely imported as final goods. Some show increases in inflation coinciding with the timing of the imposition of tariffs. Others do not.

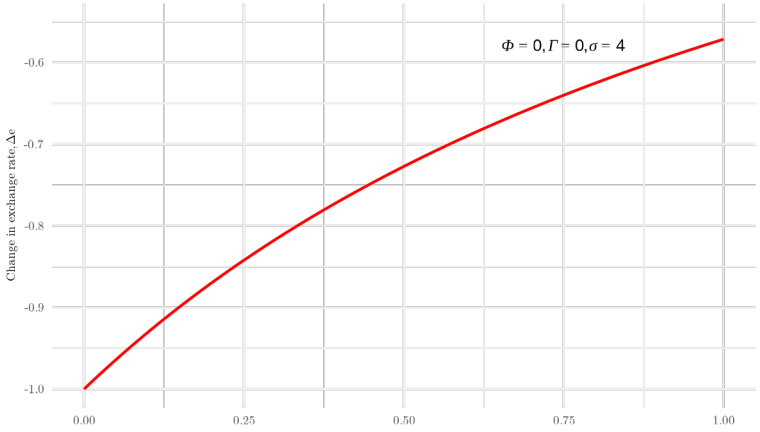
Figure A3 shows the predicted change in the value of dollar e (where an increase is a depreciation) against the increase in share of domestic inputs in production costs ϕ, based on the theoretical framework and assumptions discussed in Sections 3 and 8.

Figure A2: **Tariff pass-through to Consumer Prices, Selected Final Goods**



Note: October 2025 CPI observations are unavailable due to the 2025 lapse in federal appropriations.

Figure A3: **Theoretical Impact of 1 pp Tariff on Exchange Rate**



C Appendix Tables

Table A1: NAICS-based Sectoral Definitions

	NAICS	Definition	Share of US Imports (2024)	Actual Tariff (Dec 2025)
(1)	111	Crop Production	1.5%	3%
(2)	112	Animal Production and Aquaculture	0.4%	16%
(3)	211	Oil and Gas Extraction	5.1%	0%
(4)	212	Mining (except Oil and Gas)	0.2%	3%
(5)	311	Food Manufacturing	3.6%	10%
(6)	312	Beverage and Tobacco Product Manufacturing	1.0%	8%
(7)	313	Textile Mills	0.3%	23%
(8)	314	Textile Product Mills	0.7%	31%
(9)	315	Apparel Manufacturing	2.6%	33%
(10)	322	Paper Manufacturing	0.8%	11%
(11)	324	Petroleum and Coal Products Manufacturing	2.1%	0%
(12)	3251	Basic Chemical Manufacturing	1.8%	11%
(13)	3252	Resin, Synthetic Rubber, and Artificial & Synthetic Fibers	0.7%	11%
(14)	3253	Pesticide, Fertilizer, and Agricultural Chemicals	0.4%	4%
(15)	3254	Pharmaceutical and Medicine Manufacturing	7.6%	1%
(16)	326	Plastics and Rubber Products Manufacturing	2.2%	19%
(17)	327	Nonmetallic Mineral Product Manufacturing	0.9%	20%
(18)	331	Primary Metal Manufacturing	4.1%	20%
(19)	332	Fabricated Metal Product Manufacturing	3.0%	31%
(20)	3331	Agriculture, Construction, and Mining Machinery	1.5%	22%
(21)	3333	Commercial and Service Industry Machinery	0.5%	17%
(22)	3335	Metalworking Machinery Manufacturing	0.5%	18%
(23)	3336	Engine, Turbine, and Power Transmission Equipment	0.8%	22%
(24)	3339	Other General Purpose Machinery Manufacturing	2.4%	21%
(25)	3342	Communications Equipment Manufacturing	3.9%	7%
(26)	3343	Audio and Video Equipment Manufacturing	1.2%	14%
(27)	3344	Semiconductor and Electronic Component Manufacturing	3.6%	9%
(28)	3345	Navigational, Measuring, and Control Instruments	2.4%	12%
(29)	335	Electrical Equipment, Appliance, and Component Manufacturing	5.9%	20%
(30)	33611	Automobile and Light Duty Motor Vehicles	7.8%	15%
(31)	33631	Motor Vehicle Gasoline Engine and Engine Parts	0.6%	13%
(32)	33632	Motor Vehicle Electrical Equipment	0.8%	12%
(33)	33633	Motor Vehicle Steering and Suspension	0.6%	15%
(34)	33634	Motor Vehicle Brake Systems	0.2%	22%
(35)	33635	Motor Vehicle Transmission and Power Train Parts	0.3%	16%
(36)	33636	Motor Vehicle Seating and Interior Trim	0.3%	7%
(37)	33639	Other Motor Vehicle Parts	1.5%	16%
(38)	33641	Aerospace Product and Parts Manufacturing	1.8%	3%
(39)	33699	Other Transportation Equipment Manufacturing	0.3%	23%
(40)	337	Furniture and Related Product Manufacturing	1.2%	28%
(41)	33911	Medical Equipment and Supplies Manufacturing	1.7%	10%
(42)	33991	Jewelry and Silverware Manufacturing	1.2%	22%
(43)	33992	Sporting and Athletic Goods Manufacturing	0.3%	26%
(44)	33993	Doll, Toy, and Game Manufacturing	0.8%	19%

Table A2: Sectors with Largest Increases in Production Tariffs

NAICS	Sector	Δ Production Tariff (pp)
33612	Heavy Duty Trucks	3.2
33312	Construction Machinery	2.8
3362	Motor Vehicles	2.3
3363	Motor Vehicle Parts	2.3
33311	Agricultural Implements	2.2
33313	Oil and Gas Field Machinery	2.1
33611	Automobiles	2.1
331	Primary Metals	2.0
3332	Industrial Machinery	1.8
3333	Commercial Industry Machinery	1.8