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ABSTRACT

Did trade integration suppress inflation? Conventional wisdom says yes, based on the disinflationary supply-side impacts of trade. These supply-side arguments are incomplete however, because trade dynamics also influence aggregate demand. We analyze how trade dynamics shape inflation in New Keynesian models, depending on whether trade is changing for inputs versus final goods, whether shocks are anticipated versus unanticipated, and whether they are transitory versus persistent. Specifically, we stress that anticipated and persistent increases in future trade raise inflation today. Consistent with this channel, we show that inflation increases before and after countries adopt free trade agreements, which contain news about future increases in trade. Embedding this mechanism into extended models with pro-competitive and distributional effects of trade, we find that rising trade in the United States led to higher inflation between 1995 and 2010, with a reversal thereafter as trade integration stalled.

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Recent decades have seen increased trade integration. At the same time, inflation has been low in most advanced countries. Both academics and policymakers have frequently connected these two developments: the conventional wisdom is that trade integration has suppressed inflation. For example, Carney (2019) succinctly states that "the integration of low-cost producers into the global economy has imparted a steady disinflationary bias."[1] This conventional wisdom is plausible, in that increased possibilities for trade are like a beneficial supply shock, which directly lowers domestic production costs and consumer prices alike. It has been buttressed by evidence that import penetration reduces price inflation at the industry level, as well as work on globalization-induced changes in the Phillips Curve.[2] Applying this logic in reverse, policymakers are now concerned that unwinding international integration, triggered by trade wars and geopolitical shocks, may let the inflation genie back out of the bottle.

While parts of this narrative ring true, its exclusive emphasis on supply-side channels omits important demand-side effects of trade integration. In particular, many past shocks – whether changes in exogenous fundamentals or policy – have led to anticipated and persistent changes in trade. For example, an announced trade liberalization is a signal that trade will grow over time, stabilizing at a higher level in the medium run. When agents are forward looking, anticipation of the gains from trade should raise aggregate demand prior to their realization, which drives inflation up. These demand-side effects are then a counterweight to any direct impacts of trade on inflation that work through the supply side.

In this paper, we develop a framework to analyze the joint supply and demand-side effects of trade on inflation. We first illustrate the core mechanisms in a small open economy New Keynesian model, where we describe how the channels net out for final goods versus input trade, depending on whether shocks are anticipated versus unanticipated, and whether they are transitory versus persistent. In particular, we show that anticipated and persistent increases in future trade raise inflation today. Building on this insight, we then show empirically that inflation increases in years surrounding (before and after) the adoption of free trade agreements, which contain news about future increases in trade. Finally, we embed the mechanisms into extended models that include pro-competitive effects of trade on markups, large open economy feedback mechanisms, and distributional effects of trade with heteroge-

[1] In a similar vein, Greenspan (2005) remarks: "cross-border trade in recent decades has been expanding...The consequent significant additions to world production and trade have clearly put downward pressure on prices in the United States...globalization...would appear to be [an] essential [element] of any paradigm capable of explaining the events of the past ten years." Yellen (2006), IMF (2006), Bean (2007), and Bernanke (2007) all echo these conclusions.

[2] See Auer and Fischer (2010), Bai and Stumpner (2019), Amiti et al. (2020), and Jaravel and Sager (2024) on relative prices across sectors. Carney (2017), Forbes (2019), Stock and Watson (2021), Hottman and Reyes-Heroles (2023), and others have analyzed shifts in, and changes in the slope of, the Phillips Curve.

neous agents. Simulating these models, we find that rising trade in the United States led to higher inflation. All together, these findings argue for rethinking the conventional narrative.

In Section 1, we start with a benchmark New Keynesian (NK) model that features trade in intermediate inputs and final goods.[3] Applying ideas from the international trade and macroeconomics literatures [Costinot and Rodríguez-Clare (2014); Baqaee and Farhi (2024)], we use "domestic sourcing shares" – the share of expenditure allocated to domestic goods – as "sufficient statistics" to characterize how inflation responds to trade shocks. Further, we distinguish between anticipated versus unanticipated shocks, where an anticipated shock is known to agents today, but only changes domestic sourcing tomorrow. We also analyze how the effects depend on whether the shocks are transitory or persistent.

To provide a broad summary, we find that unanticipated and transitory changes in domestic sourcing (whether for inputs or final goods) operate like "cost-push" shocks, where an increase in domestic sourcing (less trade) raises inflation on impact. This accords well with conventional wisdom. In contrast, an anticipated and persistent increase in domestic sourcing lowers inflation. Put differently, an anticipated increase in future trade, which is perceived to be long-lasting, raises inflation today. This is a manifestation of the demand-side effects of anticipated changes in trade. In Section 1.3, we explore how our results are modified when agents are less forward looking than in the baseline NK model. We find that an anticipated, persistent increase in trade still raises inflation in this modified setting, as long as agents are sufficiently forward looking, with a meaning we make precise below.

With these results in hand, we turn to data to gauge the empirical relevance of anticipated and persistent trade shocks. Starting with raw data, we show that domestic sourcing data features strong persistence, where domestic sourcing falls slowly over the course of decades, with long-lasting changes in levels. Further, there are important medium term dynamics in the data as well, with faster versus slower changes over decade-long intervals. While various geopolitical, policy, and technological forces may account for these changes, we focus our attention on one specific policy tool: free trade agreements (FTAs).

Over time, many countries have liberalized trade through adoption of FTAs. These agreements are usually negotiated over many years to achieve long-term political and economic objectives. They are also typically announced in advance of their entry into force and then phased in slowly over time. An extensive literature has documented that they increase trade slowly over time, with persistent long run effects [Baier and Bergstrand (2007); Limão (2016)]. Further, the change in domestic sourcing due to any given FTA depends on the

[3] Many recent NK models also include input trade (e.g., Gopinath et al. (2020) and Auray, Devereux and Eyquem (forthcoming)). Distinguishing trade by end use is important conceptually, because imported final goods and inputs influence inflation through different channels. From an empirical perspective, increases in input trade are large in the data, which matters for quantitative applications.

particular foreign partners included in it. As a result, FTAs are a source of time series variation in news about persistent future increases in trade, which is plausibly-exogenous with respect to inflation outcomes.

Exploiting these observations, we study the dynamic response of inflation to FTA adoption in a panel local projections framework. We show that inflation rises in years both prior to and immediately after the date at which FTAs enter into force. For an agreement of typical size, inflation is between 25 and 100 basis points higher in those years, with larger effects for emerging markets than advanced countries. These results suggest that anticipated trade shocks matter for real-world inflation dynamics. As we discuss in Section 2.3, evidence from the literature on the recent Brexit and Trump tariff shocks points in the same direction.

Building on these findings in Section 3, we develop two extended models, which embed the core mechanisms alongside additional channels linking trade to inflation, and we apply them in quantitative analysis. The first model introduces variable markups with dollar currency pricing in a large open economy setting. This extension accounts for global feedback effects. It also allows us to evaluate the pro-competitive effects of trade on domestic markups, which directly lower inflation and simultaneously improve allocative efficiency.[4] In the model, we also enrich the stochastic process to include both unanticipated shocks and temporary growth shocks, which yield anticipated changes in future trade. Calibrating the model to data for the United States and the rest of the world, we find that the core results from the baseline model hold in this extended framework. Further, simulating model responses to shocks consistent with historical data, we show that rising trade between 1995 and 2010 raised the US price level by 10%, with a reversal thereafter due to retrenchment in trade after 2010.

The second extension focuses on the potential for distributional effects of trade to modify the trade-inflation nexus in a multi-sector economy. The model features heterogeneous agents, due to both labor and asset market frictions. The labor market frictions impede worker mobility across sectors, so sector-specific wages depend on import penetration. Further, some agents in the model consume hand to mouth, so consumption is sensitive to how trade impacts contemporaneous wages. We show that these combined mechanisms yield realistic sector-level responses to rising trade, and that trade increases consumption inequality. Taking these channels into account does not alter the fundamental macro-dynamics of the model, however. Again simulating data given historical shocks, we show that anticipation of rising trade increased inflation during the 1995-2005 decade, while the trade reversal reduced it after 2010. A takeaway is that the sector-level impacts of globalization are surprisingly uninformative about how trade may have impacted inflation.

[4] Feenstra and Weinstein (2017) and Jaravel and Sager (2024) have both stressed the importance of pro-competitive effects in evaluating the impact of trade on consumer prices in the United States.

Our work is related to a large prior literature on globalization and inflation.[5] As noted above, many contributions have studied supply-side mechanisms through which trade influences inflation dynamics by altering the Phillips Curve; see Obstfeld (2020) for a recent survey. Relative to this literature, we re-focus attention on how trade dynamics impact inflation through aggregate demand.

In some important respects, our results are also related to the literature on "news shocks" in New Keynesian models. From a theoretical perspective, anticipated changes in trade have reduced-form effects that resemble productivity news in NK models, though the detailed mechanics differ.[6] From an empirical perspective, we link inflation outcomes to FTA adoption, an observable proxy for news about anticipated trade, inspired by Arezki, Ramey and Sheng (2017) who study news associated with oil discoveries.[7] Further, our finding that anticipated trade raises inflation echoes Cascaldi-Garcia and Vukotić (2022), who find inflation rises after patent-based news shocks. In contemporaneous work, Alessandria and Mix (2025) also study the macro-impacts of trade news in a non-monetary model, in which good news is contractionary; instead, we use NK models to study inflation, with attention to identifying conditions under which good news is expansionary. In Section 2.3, we discuss recent work on Brexit and Trump policy announcements that document responses to trade-related news, which are broadly consistent with our main findings.

The remainder of the paper proceeds as follows. In Section 1, we provide the baseline model and analytical results. We investigate the empirical link between anticipated trade and inflation in Section 2. We develop two extended quantitative models and conduct historical simulation analysis in Section 3, and Section 4 concludes.

1 Theory in a SOE New Keynesian Model

This section presents a baseline model to organize thinking about the static and dynamic channels through which trade impacts inflation. We describe the setup in Section 1.1. We then provide a sequence of propositions in Section 1.2 that isolate the roles that persistence and anticipation play in governing how inflation responds to changes in domestic sourcing. We study the role of discounting in these results in Section 1.3.

[5] Romer (1993) and Rogoff (2003, 2007) studied how trade affects long-run (trend) inflation, by altering the inflation-output trade-off faced by central banks. In contrast, our model features a credible, rule-based policy environment, with zero long run inflation and stable policy rule.

[6] See Sims (2012), Barsky, Basu and Lee (2015), and Beaudry and Portier (2014).

[7] On forecasting more generally, Bombardini, Li and Trebbi (2023) use Congressional voting records to show that US politicians correctly predicted the impacts of granting China permanent normal trade relations. This supports our view that many impacts of trade may be anticipated in advance.

1.1 Baseline Model

The model draws on the standard small open economy New Keynesian structure, as exposited by Galí (2015). We deviate from the textbook model by replacing Calvo-style pricing with Rotemberg pricing, which has no first order consequences for the questions we address. More importantly, we alter the production structure to allow for trade in both final goods and inputs. Further, we develop a sufficient statistics approach to model analysis.

1.1.1 Consumers

Consumer preferences over labor supply L_t and consumption C_t are represented by:

$$U\left(\{C_t, L_t\}_{t=0}^{\infty}\right) = E_0 \sum_{t=0}^{\infty} \beta^t \left[\frac{C_t^{1-\rho}}{1-\rho} - \mu \frac{L_t^{1+\psi}}{1+\psi}\right] \tag{1}$$

$$C_t = \left(\nu^{1/\eta} C_{Ht}^{(\eta-1)/\eta} + (1-\nu)^{1/\eta} C_{Ft}^{(\eta-1)/\eta}\right)^{\eta/(\eta-1)} \tag{2}$$

$$C_{Ht} = \left(\int_0^1 C_{Ht}(i)^{(\epsilon-1)/\epsilon} di\right)^{\epsilon/(\epsilon-1)}, \tag{3}$$

where C_{Ft} is a composite foreign consumption good. The elasticity $\epsilon > 1$ controls substitution among domestic varieties, while η controls substitution between domestic and foreign goods. The parameter $\nu \in (0, 1)$ controls relative demand for home goods, conditional on prices. The parameters $\rho \geq 0$ and $\psi > 0$ govern intertemporal substitution and labor supply.

Financial markets are complete, such that the consumer has access to Arrow-Debreu securities that are traded internationally. The representative consumer's budget constraint is then:

$$\int_0^1 P_{Ht}(i) C_{Ht}(i) di + P_{Ft} \tau_{Ct} C_{Ft} + E_t\left[Q_{t,t+1} B_{t+1}\right] \leq B_t + W_t L_t, \tag{4}$$

where B_t is the nominal, domestic currency payoff in period t of the consumer's asset portfolio and $Q_{t,t+1}$ is the stochastic discount factor for nominal payments. The price of the foreign consumption good in domestic currency is P_{Ft}, and $\tau_{Ct} > 1$ is an iceberg trade cost paid on consumption imports. The prices of individual domestic goods are $\{P_{Ht}(i)\}$ and the nominal wage is W_t.

Given prices $\{\{P_{Ht}(i)\}, P_{Ft}, Q_{t,t+1}, W_t\}$ and initial asset holdings B_0, the consumer chooses consumption $\{C_t, \{C_{Ht}(i)\}, C_{Ft}\}$, labor supply $\{L_t\}$, and asset holdings $\{B_{t+1}\}$ to maximize Equations (1)-(3) subject to Equation (4) and the standard transversality condition.

1.1.2 Production

The production function for individual domestic varieties is:

$$Y_t(i) = Z_t \left(L_t(i)\right)^{1-\alpha} \left(M_t(i)\right)^{\alpha} \tag{5}$$

$$M_t(i) = \left[\xi^{1/\eta} M_{Ht}(i)^{(\eta-1)/\eta} + (1-\xi)^{1/\eta} M_{Ft}(i)^{(\eta-1)/\eta}\right]^{\eta/(\eta-1)} \tag{6}$$

$$M_{Ht}(i) = \left(\int_0^1 M_{Ht}(j,i)^{(\varepsilon-1)/\epsilon} dj\right)^{\epsilon/(\epsilon-1)}, \tag{7}$$

where $L_t(i)$ and $M_t(i)$ are quantities of labor and a composite input used by firm i. The composite input is a nested CES composite of inputs sourced from home and abroad: $M_{Ht}(j,i)$ is the quantity of inputs from Home firm j purchased by firm i, $M_{Ht}(i)$ is the composite home input used by firm i, and $M_{Ft}(i)$ is the quantity of a foreign composite input purchased by firm i. Similar to consumption, $\epsilon > 1$ controls substitution among domestic varieties, while η controls substitution across country sources for inputs. The parameter $\xi \in (0,1)$ controls relative demand for home inputs, conditional on prices.

Producers set the prices of their goods under monopolistic competition, and they select the input mix to satisfy the implied demand. These two problems can be analyzed separately.

Pricing Each Home firm sets its price in domestic currency, which applies to both output sold domestically and exports. It chooses a sequence for $P_{Ht}(i)$ to maximize the present discounted value of profits, inclusive of quadratic adjustment costs incurred when it changes prices, as in Rotemberg (1982). Letting $MC_t(i)$ be the firm's marginal cost of production (defined below), the present value of profits is:

$$E\sum_{t=0}^{\infty} \beta^t \frac{C_t^{-\rho}}{C_0^{-\rho}} \frac{1}{P_{Ct}} \left[P_{Ht}(i)Y_t(i) - MC_t(i)Y_t(i) - \frac{\phi}{2}\left(\frac{P_{Ht}(i)}{P_{H,t-1}(i)} - 1\right)^2 P_{Ht}Y_t\right],$$

where the last term records the quadratic price adjustment costs. In this adjustment cost term, ϕ is a parameter that controls the degree of price rigidity, $Y_t = \int_0^1 Y_t(i)di$ is total home output, and $P_{Ht} = \left(\int_0^1 P_{Ht}(i)^{(1-\epsilon)/\epsilon} di\right)^{1/(1-\epsilon)}$ is the price of the CES bundle of home output.

Input Demand Firm i in sector s chooses $\{L_t(i), M_t(i), M_{Ht}(i), M_{Ft}(i), M_{Ht}(j,i)\}$ to minimize the cost of producing output $Y_t(i)$. Firms pay iceberg trade costs τ_{Mt} on inputs they import from abroad, so variable production costs are $W_tL_t(i) + P_{Mt}M_t(i)$, with $P_{Mt}M_t(i) = P_{Ht}M_{Ht}(i) + \tau_{Mt}P_{Ft}M_{Ft}(i)$ and $P_{Ht}M_{Ht}(i) = \int_0^1 P_{Ht}(j)M_{Ht}(j,i)dj$. Here $P_{Mt} = \left[\xi P_{Ht}^{1-\eta} + (1-\xi)\left(\tau_{Mt}P_{Ft}\right)^{1-\eta}\right]^{1/(1-\eta)}$ is the price of the composite input.

1.1.3 Closing the Model

Demand for exports of individual domestic varieties $X_t(i)$ has a CES structure:

$$X_t(i) = \left(\frac{p_{Ht}(i)}{P_{Ht}}\right)^{-\epsilon} X_t \quad \text{with} \quad X_t = \left(\frac{P_{Ht}}{S_t P^*_{Ct}}\right)^{-\eta} C^*_t, \tag{8}$$

where S_t is the nominal exchange rate (units of domestic currency to buy 1 unit of foreign currency), P^*_{Ct} is the foreign price index in foreign currency, and C^*_t is foreign consumption.

The market clearing conditions for output of each variety and the labor market are:

$$Y_t(i) = C_{Ht}(i) + \int_0^1 M_{Ht}(i,j)dj + X_t(i) + \frac{\phi}{2}\left(\frac{P_{Ht}(i)}{P_{H,t-1}(i)} - 1\right)^2 Y_t \tag{9}$$

$$\int_0^1 L_t(i)di = L_t. \tag{10}$$

With trade in stage-contingent assets, the usual international risk sharing condition applies:

$$\left(\frac{C_t}{C^*_t}\right)^{-\rho}\left(\frac{S_t P^*_{Ct}}{P_{Ct}}\right) = \Upsilon, \tag{11}$$

where Υ is a constant, which depends on initial (steady-state) conditions. Finally, we specify an inflation-targeting monetary policy rule to close the model:

$$1 + i_t = (1 + i_0)\left(\frac{P_{Ct}}{P_{C,t-1}}\right)^{\omega}, \tag{12}$$

where i_0 is the steady state (date 0) interest rate.

1.1.4 Equilibrium with Domestic Sourcing Shares as Sufficient Statistics

We redefine variables to highlight trade openness as a key variable. Let $\Lambda^C_{Ht} \equiv \frac{P_{Ht}C_{Ht}}{P_{Ct}C_t}$ and $\Lambda^M_{Ht} = \frac{P_{Ht}M_{Ht}}{P_{Mt}M_t}$ be the share of spending on home produced goods in final and input expenditure. In the trade literature, these are commonly referred to as "domestic sourcing shares."[8] Inverting consumer and producer demand curves, we can write:

$$\frac{P_{Ht}}{P_{Ct}} = \left(\frac{\Lambda^C_{Ht}}{\nu}\right)^{1/(1-\eta)} \tag{13}$$

$$\frac{P_{Ht}}{P_{Mt}} = \left(\frac{\Lambda^M_{Ht}}{\xi}\right)^{1/(1-\eta)}. \tag{14}$$

Domestic sourcing shares, together with the trade elasticity (η), are sufficient to infer the price of home goods relative to the final goods and input composites.

Applying this result, we replace these relative prices throughout the equilibrium system. The log-linearized equilibrium conditions for the model are then presented in Table 1. Taking

[8] See Arkolakis, Costinot and Rodríguez-Clare (2012) and Costinot and Rodríguez-Clare (2014).

Table 1: Log-Linearization of the Baseline Model

Consumption-Leisure	$\hat{l}_t = -\frac{\rho}{\psi}\hat{c}_t + \frac{1}{\psi}\widehat{rw}_t - \frac{1}{\psi(\eta-1)}\hat{\lambda}^C_{Ht}$
Consumption Allocation	$\hat{c}_{Ht} = \frac{\eta}{\eta-1}\hat{\lambda}^C_{Ht} + \hat{c}_t$
Euler Equation	$\hat{c}_t = E_t\hat{c}_{t+1} - \frac{1}{\rho}\left(\hat{r}_t - E_t\pi_{Ct+1}\right)$
Input Choices	$\hat{l}_t = \widehat{rmc}_t + \hat{y}_t - \widehat{rw}_t$ $\hat{m}_t = \widehat{rmc}_t + \hat{y}_t - \frac{1}{\eta-1}\hat{\lambda}^M_{Ht}$ $\hat{m}_{Ht} = \frac{\eta}{\eta-1}\hat{\lambda}^M_{Ht} + \hat{m}_t$
Real Marginal Cost	$\widehat{rmc}_t = (1-\alpha)\widehat{rw}_t + \frac{\alpha}{\eta-1}\hat{\lambda}^M_{Ht} - \hat{z}_t$
Domestic Price Inflation	$\pi_{Ht} = \left(\frac{\epsilon-1}{\phi}\right)\widehat{rmc}_t + \beta E_t\left(\pi_{Ht+1}\right)$
Consumer Price Index	$\pi_{Ct} = \pi_{Ht} + \frac{1}{(\eta-1)}\left(\hat{\lambda}^C_{Ht} - \hat{\lambda}^C_{Ht-1}\right)$
Market Clearing	$\hat{y}_t = \left(\frac{C_{H0}}{Y_0}\right)\hat{c}_{Ht} + \left(\frac{M_{H0}}{Y_0}\right)\hat{m}_{Ht} + \left(\frac{X_0}{Y_0}\right)\hat{x}_t$ $\hat{x}_t = \frac{\eta}{\eta-1}\hat{\lambda}^C_{Ht} + \eta\hat{q}_t + \hat{c}^*_t$ $\hat{c}_t = \hat{c}^*_t + \frac{1}{\rho}\hat{q}_t$
Monetary Policy Rule	$\hat{r}_t = \omega\pi_{Ct}$

Note: All variables are expressed as log deviations from steady state, so $\hat{x}_t = \ln(X_t) - \ln(X_0)$ for variable X and the subscript 0 indexes an initial steady state. $\widehat{rmc}_t \equiv \widehat{mc}_t - \hat{p}_{Ht}$ is real marginal costs and $\widehat{rw}_t \equiv \hat{w}_t - \hat{p}_{Ht}$ is the real wage. $\hat{r}_t \equiv \ln(1+i_t) - \ln(1+i_0) \approx i_t - i_0$, and $\hat{q}_t \equiv \hat{s}_t + \hat{p}^*_{Ct} - \hat{p}_{Ct}$ is the consumption real exchange rate. Inflation rates are given by: $\pi_{Ht} = \hat{p}_{Ht} - \hat{p}_{H,t-1}$ and $\pi_{Ct} = \hat{p}_{Ct} - \hat{p}_{C,t-1}$.

domestic sourcing shares $\{\hat{\lambda}^C_{Ht}, \hat{\lambda}^M_{Ht}\}$ and exogenous shocks $\{\hat{z}_t, \hat{c}^*_t\}$ as given, an equilibrium is a path for prices $\{\hat{q}_t, \hat{e}_t, \pi_{Ct}, \pi_{Ht}, \widehat{rw}_t, \widehat{rmc}_t, \hat{r}_t\}$ and quantities $\{\hat{c}_t, \hat{y}_t, \hat{l}_t, \hat{x}_t, \hat{c}_{Ht}, \hat{m}_{Ht}\}$ that satisfies the equilibrium conditions in Table 1.

Writing the equilibrium in this way makes clear that we do not need to directly track trade costs, or the price of foreign goods, over time. The benefit of this is that we sidestep a host of difficult data and theoretical issues. On the data side, we avoid needing to directly measure trade costs or foreign prices. In terms of theory, we do not need to make assumptions about currency invoicing or pass-through of foreign cost shocks into import prices. Instead, we lean on the model result that the domestic sourcing share – agents' responses to implicit price changes – tells us everything we need to know about relative international prices to study domestic equilibrium outcomes.[9]

Before proceeding, we note that this sufficient statistics approach is best suited to study-

[9]Our approach is identical to the following alternative approach. Suppose we instead make assumptions on import pricing (e.g., dollar invoicing of imports under monopolistic competition), which link the domestic currency price of imports to foreign currency marginal costs and trade costs. Then, let us infer the value of trade costs to exactly match the observed share of imports in expenditure over time. Simulating the model with this imputed trade cost series would exactly replicate simulation of the model taking the domestic source share as given. Further, different assumptions about currency invoicing would alter the imputed trade cost series, but not the impact of those shocks on inflation.

ing the inflationary impacts of "external shocks" on inflation, such as changes in foreign prices (P_{Ft}) or trade costs (τ_{Ct}, τ_{Mt}), because these shocks influence inflation exclusively through domestic sourcing shares. It is less well suited to analyzing "domestic shocks" (e.g., productivity shocks) that impact inflation both directly and indirectly through domestic sourcing shares.[10] Given our focus on the effects of trade shocks on inflation, the sufficient statistics approach has benefits that outweigh this cost. First, it facilitates algebraic analysis of the model, which sharpens the key insights. Second, in our empirical context, changes in foreign prices (e.g., Chinese productivity growth) and/or trade frictions (e.g., falling tariffs, increases in logistics efficiency, etc.) are the most important determinants of declines in domestic sourcing over time.

1.1.5 Channels from Domestic Sourcing to Inflation

To organize our thinking about how domestic sourcing shares affect inflation, it is useful to work backwards from consumer price inflation. Consumer price inflation depends on domestic price inflation (π_{Ht}) and changes in the relative price of imports, which are embedded in domestic sourcing shares for consumption: $\hat{\lambda}^C_{Ht} - \hat{\lambda}^C_{Ht-1}$. When domestic sourcing is lower today than yesterday, we infer that the price of imports has fallen relative to domestic goods, which implies lower consumer price inflation.

Next, turn attention to domestic price inflation. Solving the domestic price Phillips Curve forward, domestic price inflation equals the discounted value of present and future real marginal costs: $\pi_{Ht} = \left(\frac{\epsilon-1}{\phi}\right) \sum_{s=0}^{\infty} \beta^s E_t \left(\widehat{rmc}_{t+s}\right)$. Real marginal costs in turn depend on the domestic sourcing share for inputs, because higher imported input use is associated with lower production costs. Recognizing this imported input cost channel, together with the direct benefits of consumer-side imports, it is tempting to stop here and conclude that increased trade will lower inflation. In fact, these two supply-side cost channels are where the conventional wisdom about trade and inflation comes from, but we are not done.

In addition to these direct effects, imports also indirectly impact real wages and thus real marginal costs. Equating labor demand and supply, we solve for real wages:

$$\widehat{rw}_t = \omega_1 \hat{\lambda}^M_{Ht} + \omega_2 \hat{\lambda}^C_{Ht} + \omega_3 \hat{c}_t, \tag{15}$$

where $\omega_1 > 0$, $\omega_2 > 0$, and $\omega_3 > 0$ for conventional parameter values.[11] Conditional on $\hat{c}_t$, reduced domestic sourcing for either consumption goods or inputs – i.e., increased import penetration – reduces real wages. The reason is that import penetration reduces labor de-

[10] To study domestic shocks, one would need to directly model the endogenous evolution of the domestic sourcing shares, which in turn requires assumptions about import pricing.

[11] We have set $\hat{z}_t = \hat{c}^*_t = 0$ to simplify the expression. See Appendix A for expressions that link the ω's to structural parameters and steady-state values.

mand.[12] These static impacts of import competition on labor demand have been emphasized in the "China shock" literature [Autor, Dorn and Hanson (2016)]. Through this channel, higher import penetration reduces inflation in our model.

While both the cost and import competition channels provide reasons why inflation may fall due to rising trade, the analysis is yet incomplete. The obvious (yet often overlooked) point is that they together lower inflation *holding aggregate consumption constant*. Yet, aggregate consumption also naturally depends on trade openness. Because consumption is forward looking, it depends on both current and future anticipated levels of domestic sourcing. Further, consumption responses today depend on the dynamics of domestic sourcing – whether changes in domestic sourcing are temporary or permanent, and whether they are unexpected or anticipated. To make these points carefully, we now provide an explicit solution to the model.

1.1.6 Solving the Model

To develop an analytical solution, we condense down the equilibrium equations in Table 1 into seven equations. The first four are the Euler equation, the definition of consumer price inflation, the dynamic equation for domestic price inflation, and the monetary policy rule. The fifth is a solution for real marginal costs, which builds off the expression for real wages (Equation (15)) discussed above:

$$\widehat{rmc}_t = \phi_1 \hat{\lambda}^M_{Ht} + \phi_2 \hat{\lambda}^C_{Ht} + \phi_3 \hat{c}_t - \phi_4 \hat{z}_t + \phi_5 \hat{c}^*_t, \tag{16}$$

where $\phi_1 > 0$, $\phi_2 > 0$, $\phi_3 > 0$, $\phi_4 > 0$, $\phi_5 > 0$.[13] For intuition, note that domestic sourcing for both consumption goods and inputs enters real marginal costs like productivity, where decreases in domestic sourcing raise real marginal costs. In what follows, we set $\hat{z}_t = 0$ and $\hat{c}^*_t = 0$ in all periods, to focus on domestic sourcing.

Following Christiano et al. (2010), we adopt a simple stochastic process for domestic sourcing shares that includes both anticipated and unanticipated shocks:

$$\hat{\lambda}^C_{Ht} = \rho_C \hat{\lambda}^C_{Ht-1} + \xi^0_{Ct} + \xi^1_{Ct-1} \tag{17}$$

$$\hat{\lambda}^M_{Ht} = \rho_M \hat{\lambda}^M_{Ht-1} + \xi^0_{Mt} + \xi^1_{Mt-1}, \tag{18}$$

where $\rho_C \in [0, 1)$ and $\rho_M \in [0, 1)$ govern the autoregressive persistence of each series. The

[12] On the consumer side, $\hat{\lambda}^C_{Ht} < 0$ lowers demand for domestically produced goods ($\hat{c}_{Ht}$), which lowers demand for domestic output ($\hat{y}_t$), and ultimately demand for labor. On the production side, $\hat{\lambda}^M_{Ht} < 0$ lowers demand for domestically produced inputs ($\hat{m}_{Ht}$), which also lowers demand for domestic output and labor. Conditional on real wages, real marginal costs also fall when $\hat{\lambda}^M_{Ht} < 0$, so this too lowers labor demand.

[13] See the appendix for derivation. The parameters ϕ_1, ϕ_2, and ϕ_3 are linked to the ω-parameters in Equation 15 and inherit those same signs.

shocks ξ_t^{C0} and ξ_t^{M0} are unanticipated innovations in each domestic sourcing share. The shocks ξ_{t-1}^{C1} and ξ_{t-1}^{M1} are instead anticipated (news) shocks, in that they are determinants of domestic sourcing at date t that are revealed to agents at date $t-1$.

We proceed to solve the model using the method of undetermined coefficients. The policy functions take the form:

$$\pi_{Ht} = \varsigma_\pi \hat{\lambda}_{Ht-1}^C + \eta_\pi \hat{\lambda}_{Ht}^C + \gamma_\pi \xi_{Ct}^1 + \varpi_\pi \hat{\lambda}_{Ht}^M + \varrho_\pi \xi_{Mt}^1 \tag{19}$$

$$\hat{c}_t = \varsigma_C \hat{\lambda}_{Ht-1}^C + \eta_C \hat{\lambda}_{Ht}^C + \gamma_C \xi_{Ct}^1 + \varpi_C \hat{\lambda}_{Ht}^M + \varrho_C \xi_{Mt}^1, \tag{20}$$

where $\{\varsigma_\pi, \eta_\pi, \gamma_\pi, \varsigma_C, \eta_C, \gamma_C\}$ govern the response of consumption and domestic price inflation to $\hat{\lambda}_{Ht}^C$ and ξ_{Ct}^1, while $\{\varpi_\pi, \varrho_\pi, \varpi_C, \varrho_C\}$ control reactions to $\hat{\lambda}_{Ht}^M$ and ξ_{Mt}^1. We provide the full solution for these coefficients in Appendix A.[14]

1.2 Analytical Results

We now provide four propositions that demonstrate the roles for persistence and anticipation in shaping how domestic sourcing impacts inflation, with proofs collected in Appendix A.

Proposition 1. *Consider the model in Table 1 with the stochastic processes in Equations* (17)-(18) *and policy functions in Equations* (19)-(20).

(i) When shocks to domestic input sourcing are transitory, such that $\rho_M < 1$, an increase in domestic sourcing ($\hat{\lambda}_{Ht}^M > 0$) raises domestic price inflation (π_{Ht}) and reduces consumption ($\hat{c}_t$) on impact: $\varpi_\pi > 0$ and $\varpi_C < 0$.

(ii) As the persistence of shocks to domestic input sourcing increases, such that $\rho_M \to 1$, an increase in domestic sourcing ($\hat{\lambda}_{Ht}^M > 0$) has a negligible impact on domestic price inflation (π_{Ht}) and reduces consumption ($\hat{c}_t$) on impact: $\varpi_\pi \to 0$ and $\varpi_C < 0$.

Part (i) of the proposition says that inflation rises when domestic input sourcing increases today, when that increase is transitory. Higher domestic sourcing directly increases real marginal costs, as $\phi_1 > 0$ in Equation (16). It also reduces consumption ($\varpi_C < 0$), which attenuates inflation, but the consumption channel isn't enough to overturn the direct effects. Thus, a temporary increase in domestic sourcing is a stagflationary ("cost-push" type) shock, leading to higher inflation and lower consumption, consistent with conventional wisdom.

As $\rho_M \to 1$, innovations to domestic sourcing are long lasting. An increase in current domestic sourcing then has no effect on inflation, because consumption jumps to its new (lower) long-run level. Comparing parts (i) and (ii) of the proposition highlights that the

[14] To interpret the propositions, it is useful to note that the solution is modular, in that one can solve for the coefficients on $\hat{\lambda}_{Ht}^M$ and ξ_{Mt}^1 separately from the coefficients on $\hat{\lambda}_{Ht}^C$ and ξ_{Ct}^1.

persistence of shocks matters for how inflation responds to changes in domestic sourcing, which sets up the second proposition about anticipated shocks.

Proposition 2. *Consider the model in Table 1 with the stochastic processes in Equations* (17)-(18) *and policy functions in Equations* (19)-(20)*.*

(i) When shocks to domestic input sourcing are transitory, such that $\rho_M < 1$, an anticipated increase in domestic sourcing ($\xi^1_{Mt} > 0$) has an ambiguous effect on domestic price inflation (π_{Ht}): the sign of ϱ_π is indeterminate. In contrast, the consumption ($\hat{c}_t$) falls on impact: $\varrho_C < 0$.

(ii) As the persistence of shocks to domestic input sourcing increases, such that $\rho_M \to 1$, an anticipated increase in domestic sourcing ($\xi^1_{Mt} > 0$) lowers domestic price inflation (π_{Ht}) and consumption ($\hat{c}_t$) on impact: $\varrho_\pi < 0$ and $\varrho_C < 0$.

Here "bad news" about domestic sourcing – the anticipation that it will rise in the future – has ambiguous effects on inflation when shocks are transitory. This ambiguity reflects two offsetting effects: an anticipated increase in domestic sourcing raises expected inflation, but it also reduces real marginal costs today, by lowering current consumption.[15] When the decline in consumption today is stronger, the inflation is prone to fall – in particular, as domestic sourcing shocks become more persistent (ρ_M increases), the pressure on inflation to decline increases. In the limit ($\rho_M \to 1$) the ambiguity resolves entirely: an anticipated rise in domestic sourcing reduces inflation today.

Proposition 3. *Consider the model in Table 1 with the stochastic processes in Equations* (17)-(18) *and policy functions in Equations* (19)-(20)*.*

(i) When shocks to domestic sourcing for consumption goods are transitory, such that $\rho_C < 1$, an increase in domestic sourcing ($\hat{\lambda}^C_{Ht} > 0$) has an ambiguous impact on domestic price inflation (π_{Ht}): the sign of η_π is indeterminate. In contrast, consumption ($\hat{c}_t$) falls on impact: $\eta_C < 0$.

(ii) As the persistence of shocks to domestic sourcing for consumption goods, such that $\rho_C \to 1$, an increase in domestic sourcing ($\hat{\lambda}^C_{Ht} > 0$) lowers domestic price inflation (π_{Ht}) and reduces consumption ($\hat{c}_t$): $\eta_\pi < 0$ and $\eta_C < 0$.

[15] Consumption today falls first because expected consumption tomorrow declines. The impact of the news shock on the real interest rate is ambiguous: while expected inflation rises, the nominal interest rate reacts to current inflation, so its response depends both on whether inflation rises/falls overall and the strength of the monetary policy response to inflation.

When domestic sourcing for final goods increases, real marginal costs increase, which pushes domestic price inflation up. At the same time, increased domestic sourcing also raises consumer price inflation today, which triggers an increase in the policy interest rate, while also lowering expected inflation. Together, consumption is lower today, which feeds back into lower real marginal costs and domestic price inflation. These offsetting effects mean that π_{Ht} may either rise, or fall, on impact. As changes in $\hat{\lambda}^C_{Ht}$ become more persistent, part (ii) of the proposition says that domestic price inflation falls. Rising persistence leads to a larger negative consumption response, which negates the direct impacts of $\hat{\lambda}^C_{Ht}$ on real marginal costs.

Turning to consumer price inflation, recall that an increase in $\hat{\lambda}^C_{Ht}$ signals a terms-of-trade depreciation, which raises π_{Ct} conditional on π_{Ht}. If π_{Ht} rises when $\hat{\lambda}^C_{Ht}$ increases, then the domestic price and terms of trade channels reinforce each other. If π_{Ht} instead falls, then the channels work against one another. Nonetheless, we can prove the following useful corollary.

Corollary 1. *As $\rho_C \to 1$, an increase in domestic sourcing for consumption goods ($\hat{\lambda}^C_{Ht} > 0$) raises consumer price inflation on impact: $\pi_{Ct} > 0$.*

While π_{Ht} falls when shocks are persistent ($\rho_C \to 1$), the direct terms-of-trade channel dominates. The resulting increase in consumer price inflation accords with conventional wisdom. We now evaluate how things change when shocks are anticipated.

Proposition 4. *Consider the model in Table 1 with the stochastic processes in Equations* (17)-(18) *and policy functions in Equations* (19)-(20)*.*

(i) When shocks to domestic sourcing for consumption goods are transitory, such that $\rho_C < 1$, an anticipated increase in domestic sourcing ($\xi^1_{Ct} > 0$) has an ambiguous effect on domestic price inflation (π_{Ht}) and consumption ($\hat{c}_t$), which may either rise or fall on impact: the signs of γ_π and γ_C are indeterminate.

(ii) As the persistence of shocks to domestic sourcing for consumption goods increases, such that $\rho_C \to 1$, an anticipated increase in domestic sourcing ($\xi^1_{Ct} > 0$) lowers domestic price inflation (π_{Ht}) on impact: $\gamma_\pi < 0$. However, consumption ($\hat{c}_t$) may either rise or fall: the sign of γ_C is indeterminate.

Part (i) of the proposition says that effects of domestic sourcing news shocks are ambiguous. Again, there are offsetting channels. The direct effect of the news is to raise expected inflation, which raises consumption and thus real marginal costs. When the news is realized in the future, however, it may either push consumption and domestic price inflation up or down, as reflected in Proposition 4(i). As shocks are made more persistent ($\rho_C \to 1$) in part (ii), the ambiguity again resolves: π_{Ht} falls when agents expect domestic sourcing for consumption goods will be higher in the future. The main reason is that future consumption decreases when the sourcing news is realized (i.e., when λ^C_{Ht+1} increases due to $\xi^1_{Ct} > 0$), and lower future consumption leads future inflation (π_{Ht+1}) to fall. The resulting decline in expected inflation ($E_t(\pi_{Ht+1})$) leads π_{Ht} to fall, through the Phillips Curve.[16]

Corollary 2. *As $\rho_C \to 1$, an anticipated increase in domestic sourcing for consumption goods ($\xi^1_{Ct} > 0$) lowers consumer price inflation on impact: $\pi_{Ct} < 0$.*

Summary The propositions and corollaries crystallize several broad points. The first point is that changes in domestic sourcing for inputs versus consumption goods work differently. Changes in input sourcing manifest like changes in productivity in reduced form, influencing inflation entirely through domestic price inflation. Consumption sourcing has similar effects on the supply side (via real marginal costs), but it also directly enters consumer price inflation via the terms of trade. The second point is that anticipated future changes in sourcing have different effects than unanticipated, immediate changes. The third point is that persistence matters too; e.g., an anticipated, persistent decrease in future domestic sourcing (trade liberalization) will raise inflation, which is surprising in light of conventional wisdom.

1.3 Extension: Discounted Euler and Phillips Curve Equations

A recent literature on the "forward guidance puzzle" has argued that the benchmark New Keynesian model yields implausibly large reactions to anticipated future interest rates [Del Negro, Giannoni and Patterson (2023)]. In response, researchers have introduced mechanisms that dampen the sensitivity of agents to future events, which manifest as discounted Euler equations and Phillips Curves. We now consider how the propositions can be generalized when forward-looking behavior is dampened.

To do so, we introduce cognitive discounting into the baseline model. Following Gabaix (2020), we assume that agents form expectations about the future by following a behavioral rule that discounts the future more heavily than under rational expectations. For variable $\hat{x}_t$ expressed as log deviation from steady state, Gabaix posits that $E^{BR}_t[\hat{x}_{t+1}] = \Omega E_t[\hat{x}_{t+1}]$, where $\Omega \in (0, 1]$ is a parameter that controls the degree of myopia, E_t is the expectations operator for fully rational agents, and E^{BR}_t is the expectations operator for behavioral agents. Since $\Omega < 1$, behavioral agents effectively shrink their expectations, such that they expect

[16] The increase in λ^C_{Ht+1} due to $\xi^1_{Ct} > 0$ also has a direct negative effect on expected inflation, because $\eta_\pi < 0$ when $\rho_C \to 1$. This also pushes π_{Ht} down. Finally, a third effect of the change in λ^C_{Ht+1} works through the real interest rate. As higher expected λ^C_{Ht+1} leads to a lower expected π_{Ht+1}, the expected real interest rate rises lowering contemporaneous consumption, and real marginal costs with it.

$\hat{x}_{t+1}$ to be closer to the steady state than would rational agents. With these assumptions, one obtains the following modified (discounted) Euler equation and Phillips Curve:

$$\hat{c}_t = \Omega E_t \hat{c}_{t+1} - \frac{1}{\rho}\left(\hat{r}_t - E_t \pi_{Ct+1}\right) \tag{21}$$

$$\pi_{Ht} = \left(\frac{\epsilon - 1}{\phi}\right)\widehat{rmc}_t + \Omega\beta E_t\left(\pi_{Ht+1}\right) \tag{22}$$

The rest of the baseline model is unchanged.[17]

In Appendix A, we present versions of Propositions 1-4 for this modified model. To summarize, part (i) of each proposition (responses to transitory shocks) continues to hold. Then, preserving the impacts of persistent shocks in part (ii) requires additional conditions, which impose lower bounds on how much the future is discounted. For example, consider the following two assumptions: (a) $\frac{\widetilde{\phi}_3}{\rho}\left(\frac{\Omega\omega-1}{1-\Omega}\right) > \Omega\beta$ and (b) $\Omega\omega - 1 > 0$.[18] Then, part (ii) of Proposition 2 is modified as follows: as the persistence of shocks to domestic input sourcing increases ($\rho_M \to 1$), an anticipated increase in domestic sourcing ($\xi^1_{Mt} > 0$) lowers π_{Ht} on impact if (a) holds, and lowers consumption on impact if (b) holds. Intuitively, an anticipated increase in domestic sourcing has two opposing effects on inflation. First, it increases π_{Ht} by raising future real marginal cost of production, which raise current inflation through the Phillips curve. Second, it lowers π_{Ht} by lowering expected future consumption, which lowers current aggregate demand through the Euler equation. Assumption (a) ensures that the second force dominates the first.

This discussion reinforces the basic economic logic of the argument. Forward-looking agents respond to anticipated and persistent changes in trade, so those changes affect inflation today. Whether the predictions of these simple NK models are realistic is an empirical question, to which we now turn.

2 A First Look at Domestic Sourcing and Inflation

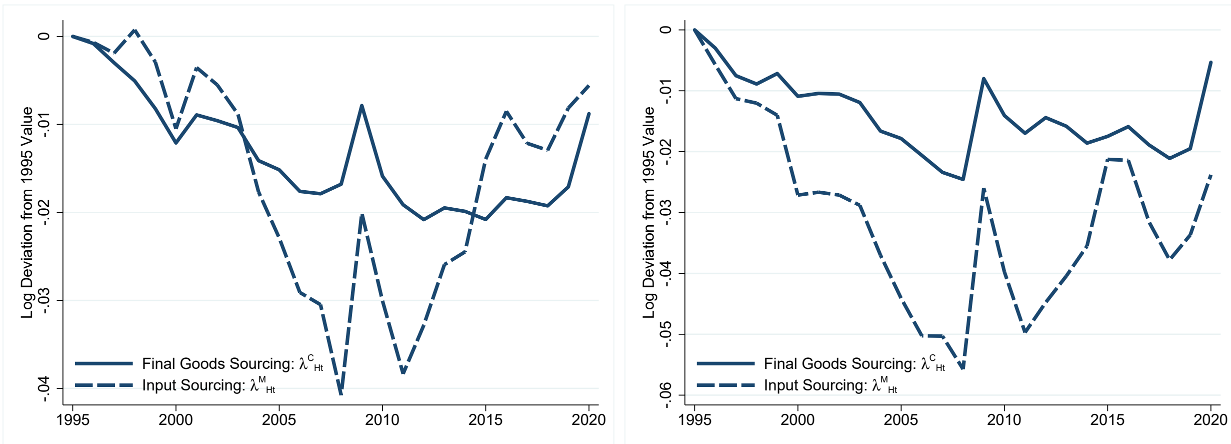
The analysis of the baseline model suggests that three elements play important roles in mapping trade to inflation: composition (inputs vs. final goods), persistence, and anticipation. In this section, we take a first empirical look at all three issues. In Section 2.1, we present domestic sourcing data to fix ideas. In Section 2.2, we examine the dynamic response of inflation to domestic sourcing news generated by the adoption of trade agreements. In Section 2.3, we discuss a related literature on Brexit and Trump policy announcements.

[17] For simplicity, we assume the degree of cognitive discounting is the same for consumers and firms.

[18] These conditions are more likely to be satisfied for higher values of Ω, with $\Omega \to 1$ nesting (weak) restrictions used to prove the original propositions.

Figure 1: Domestic Sourcing Shares in the United States and Rest of World

(a) United States (b) Composite Foreign Country



Note: Data from the OECD Inter-Country Input-Output Tables and authors' calculations.

2.1 Data on Domestic Sourcing Shares

To measure changes in domestic sourcing over time, we use annual data from the OECD Intercountry Input-Output Tables from 1995 to 2020.[19] In Figure 1, we plot domestic sourcing for the United States in Panel 1a and a representative composite foreign (non-US) country in Panel 1b. In each figure, final goods sourcing includes consumption, investment, and government spending.[20] We draw attention to four aspects of these data.

First, domestic sourcing shares decline for both final goods and inputs, and these changes are phased in over time. For the United States, domestic sourcing for inputs falls by about 1 percentage point for inputs from 1995 to 2019, and closer to two percentage points for final goods. For the rest of the world, domestic sourcing falls by about 3 percentage points for inputs, and 2 percentage points for final goods (excluding the pandemic bounce in 2020). Thus, there is a long run opening up of the global economy over time.[21]

[19]These data cover 76 individual countries, including the OECD, major emerging markets, and selected developing countries. We sum expenditure by end use across countries to form the composite foreign series, which implies that it captures expenditure weighed-average changes in domestic sourcing for countries in the rest of the world. As a cross check, US sourcing dynamics in this OECD data are similar to comparable data from the Input-Output Accounts of the Bureau of Economic Analysis.

[20]Though investment and government expenditure are omitted in the baseline model, we include them here so the data match macroeconomic aggregates. In practice, the dynamics of overall final goods sourcing correspond closely to consumption goods sourcing.

[21]Though we do not press this point, the narrative record suggests it was well understood that the economy was slowly becoming more globalized in the 1990s and early 2000s, and that globalization would have important macroeconomic effects. For example, see debates in the United States about NAFTA and China's accession to the WTO, policymakers attention to rising trade (e.g., Greenspan (2005)), and media narratives about how the world was becoming "flatter" due to changes in both policy and technology.

Second, in addition to these long run changes in openness, there are important medium-term dynamics. In both the US and the rest of the world, there is a pronounced U-shape in input sourcing. Domestic input sourcing fell rapidly from the 1995 to 2008, with the domestic sourcing share falling by 4 percentage points in the United States and over 5 percentage points in the rest of the world. Input sourcing then reversed course after the Great Recession, partially (not completely) unwinding the prior decline.

Third, there is evidently high frequency (year-on-year) variation in sourcing as well. In particular, there were abrupt adjustments in sourcing shares coincident with the Great Recession in 2008-2011 and the COVID pandemic in 2020. While the medium and long-term dynamics of the sourcing shares likely have important forecastable components, it is reasonable to allow for unanticipated changes as well.

Fourth, it is remarkable how similar the dynamics of domestic sourcing were in the US and the rest of the world during this period. In this sense, the US experience is representative of broader global developments. Further, while we will focus exclusively on the United States in quantitative applications of the model to follow, the similarity of US and foreign data suggests that it may be possible to extrapolate our findings for the United States to the rest of the world. Before getting to those findings, however, we will exploit data for many countries in the empirical application to follow.

As a closing note, we highlight the central challenge in interpreting the domestic sourcing data in the context of the model. What we observe are realized changes in domestic sourcing, which combine both persistent and transitory components, and which may be anticipated or unanticipated. What the model makes clear is that we should be careful in how these elements are extracted from the data, as they have different implications for inflation. In particular, anticipated, persistent declines in domestic sourcing push current inflation up, which is an understudied channel via which trade impacts inflation. To build up evidence on this channel, we now turn to using the adoption of trade agreements to isolate predictable and long-lasting changes in trade.

2.2 Trade Agreements and Inflation

We exploit the spread of bilateral (sometimes regional) free trade agreements over time to identify predictable, persistent changes in domestic sourcing and study how those changes impact inflation. Three insights highlighted by prior literature on FTAs are useful to us.

First, bilateral agreements have large and persistent effects on bilateral trade [Baier and Bergstrand (2007), Limão (2016)].[22] Moreover, because agreements are often adopted by

[22] FTAs may increase trade through several channels: direct tariff reductions, reductions in non-tariff

countries that are large natural trade partners (e.g., the US & Canada), many bilateral agreements induce appreciable changes in multilateral (aggregate) openness.

Second, free trade agreements trigger increases in trade that may be anticipated in advance. For one, the agreements take time to negotiate and ratify, these processes are visible to the public, and news about them is widely reported in the media. As a result, agreements are public knowledge prior to the date they enter into force.[23] Then, the agreements themselves often include schedules for phased implementation of policy changes over time. Lastly, trade itself adjusts sluggishly to those changes in policy. As an empirical matter, free trade agreements have historically led trade to expand slowly over time [Baier and Bergstrand (2007)]. Put differently, long run elasticities of trade to policy changes exceed short run elasticities [Alessandria, Arkolakis and Ruhl (2021); Boehm, Levchenko and Pandalai-Nayar (2021)]. So, forecasts that take this fact into account would predict rising trade over time.

Third, trade agreements are adopted primarily to achieve long run economic and political objectives; they are not generally used as macro-policy tools to achieve short run objectives. Further, a given country adopts FTAs with different partners at different points in time. Thus, each importing country potentially experiences many liberalization events, of variable sizes depending on whether agreements are struck with large or small trade partners. The timing of agreements also differs across countries. Together, these observations imply that one can control for both unobserved country and time fixed effects in a panel of countries. Conditional on these fixed effects and other controls, when countries adopt agreements with particular partners is plausibly exogenous with respect to unobserved shocks that determine country-level inflation outcomes.[24]

With this background, we proceed to outline an empirical strategy that ties inflation outcomes to anticipated changes in domestic sourcing induced by trade agreements. To start, we assemble data from the IMF and OECD to measure consumer price inflation and bilateral sourcing for a panel of 42 countries, including advanced countries and major emerging markets from 1980 to 2019. We combine this with data on bilateral trade agreements from the Economic Integration Agreements Database. Details about the data and sample are

barriers included in the agreements, and reductions in trade policy uncertainty due to binding commitments.

[23]In terms of process, trade agreements are typically negotiated over several years, then they are ratified by legislatures and/or signed by the executive, and finally they enter into force at a later specified date. As an example, Mexico and the US entered into talks about the North American Free Trade agreement in 1990. The agreement was signed by the presidents of the U.S. and Mexico in 1992, then ratified by legislatures in the US and Mexico in 1993. It finally entered into force in 1994, and tariffs were phased out on an announced schedule thereafter. In terms of the anticipated salience of the agreement, recall that the NAFTA agreement was a key issue in the 1992 US presidential election, several years before it was to take effect.

[24]Recall that trade agreements take time to negotiate and implement, and then policy changes have only slow impacts on trade. Given this, the prospect that country A negotiates an agreement with country B (and not country C) because country A expects inflation shocks to arrive in 5-10 years time seems remote.

included in Appendix B.

To motivate an empirical proxy for anticipated changes in domestic sourcing, we recall the baseline model. When shocks are persistent ($\rho_C, \rho_M \to 1$), news revealed today about domestic sourcing tomorrow (ξ_t^1) is equal to the anticipated growth in domestic sourcing from date t to $t+1$. Generalizing this simple one-period ahead news specification to allow for news about periods $t+s$ for $s > 1$, we construct the discounted growth in domestic sourcing over horizon t to $t+S$:

$$T_{it} = \sum_{s=1}^{S} \kappa^s \left[\ln \tilde{\Lambda}_{i,t+s} - \ln \Lambda_{i,t} \right], \tag{23}$$

where $\ln \tilde{\Lambda}_{i,t+s}$ is the domestic sourcing share for country i at date $t+s$, and the tilde notation indicates these are projected future shares.[25] The parameter $\kappa < 1$ is a discount rate, normalized so that $\sum_{s=0}^{S} \kappa^s = 1$, which allows for changes in the near future to matter more than changes in the distant future.

Constructing this proxy from the perspective of date t then requires taking a stand on the value of projected future domestic sourcing shares $\tilde{\Lambda}_{i,t+s}$, for $s > 0$. We form an estimate for it using data on sourcing patterns and trade agreements at date t, together with information about the typical response of trade to adoption of trade agreements. We describe the procedure briefly here, with details in Appendix B.

Let the subset of foreign countries with which i enters a free trade agreement at date t be $\mathbb{FTA}_{it}$. And let β_s be the increase in log domestic sourcing for FTA partners for whom an agreement has been in force for s periods; this is obtained by estimating a panel bilateral gravity regression in our sample, which allows for phase-in effects for bilateral trade agreements. Further, we assume that any increase in bilateral sourcing from $j \in \mathbb{FTA}_{it}$ is entirely due to a reduction in domestic sourcing by i, rather than trade diversion from non-FTA countries.[26] The projected domestic sourcing share at date $t+s$ for i is then:

$$\tilde{\Lambda}_{i,t+s} = 1 - \sum_{k \notin FTA_{i,t+1}} \Lambda_{kit} - \left(\sum_{j \in FTA_{i,t+1}} \Lambda_{jit} \right) \exp(\beta_s), \tag{24}$$

where Λ_{jit} is the share of expenditure allocated by i on imports on goods from j as a share of total expenditure. Note as a matter of convention, $s = 1$ is the first year an agreement

[25] The domestic sourcing shares may be constructed for final goods, inputs, or the composite of the two. In the empirical regressions reported below, we opt for the composite, because projected sourcing growth for inputs and final goods are highly correlated. We describe results in Appendix B that split inputs from final goods as a robustness check. We also discuss robustness to defining the treatment using realized, rather than projected, changes in domestic sourcing in the same appendix.

[26] While trade diversion is possible in theory – i.e., H might increase its sourcing from country A entirely by reducing its sourcing from country B – it is not likely to be a major concern in practice. The literature has found that FTAs lead to substantial trade creation, rather trade diversion [Freund and Ornelas (2010)].

is in force, so the treatment ($s = 0$) is defined in the year preceding the year in which the agreement enters into force. We then use $\tilde{\Lambda}_{i,t+s}$ in Equation (24) to construct $\tilde{T}_{it}$.

It is useful to point out there are two key sources of variation in the time series of treatments for each country. The first is the timing of agreements: whether FTA_{it} is empty or not, and how many bilateral partners are included in agreements at date t. The second is the importance of pre-existing trade with the set of countries with whom H signs an agreement at date t. That is, domestic sourcing will be anticipated to decline more if a country adopts FTAs with large (natural) trade partners, for which Λ_{jit} is large.

We embed this empirical proxy for anticipated trade growth into a panel local projections framework to estimate its impact on inflation at various horizons. Letting i denote countries and h denote the horizon, the empirical specification is:

$$\pi_{i,t+h,t-1} = \alpha_i^h + \delta_t^h + \sum_{j=-J_1}^{J_2} \beta^{hj} T_{it-j} + \sum_{k=1}^{K} \gamma^{hk} \pi_{i,t-k-1} + \kappa^h X_{it} + \varepsilon_{i,t+h}^h. \tag{25}$$

On the left, we have cumulative inflation (the long difference in price levels) at horizon h: $\pi_{i,t+h,t-1} = \ln P_{i,t+h} - \ln P_{i,t-1}$.[27] On the right, we have country and time fixed effects, which are horizon specific. We then include leads and lags of the FTA treatment variable, with $J_1 = 2$ and $J_2 = 1$ in the baseline estimation; the leads account for the likelihood that news about trade agreements arrives prior to the date at which they enter into force. We then also control for lags of inflation (with $K = 4$), which is a standard dynamic control for auto-regression in the dependent variable. The baseline specification includes country-regime indicator variables (X_{it}), which absorb level changes in average inflation as countries engage in two types of monetary reforms: adopting inflation targets, or joining the euro.

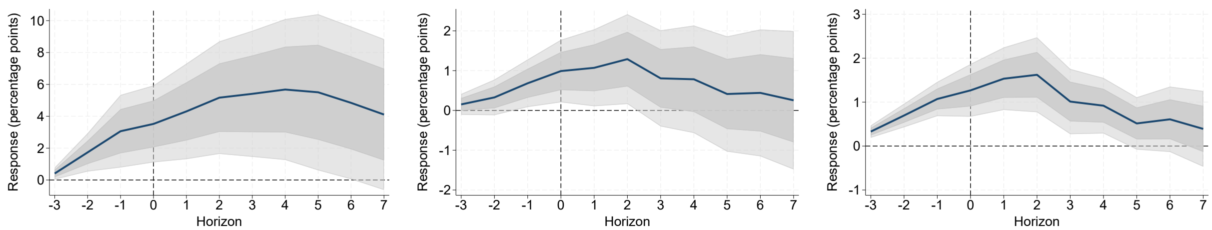
In Figure 2, we present impulse response functions (IRFs) that trace out the cumulative response of inflation to "good news" – anticipated reductions in domestic sourcing – generated by trade agreements. Panel 2a presents the IRF for the full sample, Panel 2b restricts the sample to include only twenty-two "advanced countries" (see the appendix for the list), and Panel 2c includes only G7 countries. To interpret the magnitudes, we plot the responses to a shock – i.e., liberalization event – that is comparable to New Zealand's FTA with Australia in 1983, or South Korea's FTA with the United States in 2012.[28] For context, the shock is about 25% of the magnitude the liberalization experienced by Canada due to CUSFTA in 1989, 30% of the shock for Mexico due to NAFTA in 1994, and half the size of

[27] While Jordà and Taylor (2025) argue that long differences are usually a good baseline, we report complementary results for year-on-year inflation (the first difference of log prices) at different horizons in Appendix B, which are qualitatively similar.

[28] We plot the responses to a shock equal to 0.005, and then multiply by 100 to convert to percentage points: the reported IRF values are $\beta^{h-J_1} \times 0.005 \times 100$ out to $h = 10$. The exact value of the shock itself is essentially meaningless due to how it is scaled.

Figure 2: Impulse Response of Cumulative Inflation to FTA Treatment

(a) All Countries (b) Advanced Countries (c) G7 Countries



Note: Each figure plots the impulse response for cumulative inflation (in percentage points) for a shock of magnitude .005 (see the text for discussion of shock magnitudes). The dark shaded area corresponds to the (+/-) one standard deviation confidence interval on the cumulative inflation response. The lighter shaded area corresponds to the 90% confidence interval. The value 0 on the x-axis corresponds to the year in which the free trade agreement enters into force. We allow the shock to impact inflation up to 3 years ahead of the date the agreement enters into force.

Spain's shock due to entry into the European Economic Community in 1986.

In the figures, the date the FTA enters into force is indicated by the vertical line, so we allow for the arrival of trade news up to three years in advance. A common feature across the figures is that the price level starts to rise prior to when the FTA takes effect; it increases by about 5 percentage points (pp) from the arrival of the news until two years after the agreement is implemented in the full sample, by 1.25 pp in the advanced countries sample and by 1.5 pp in the G7 sample. Inflation then abates during the post-FTA period. In the full sample, the price level is permanently higher in the long run. In the advanced country and G7 samples, the price level falls during the latter years of the post-FTA period, which implies the price level is unchanged over the long horizon, consistent with stronger price level anchoring over the long run in these groups of countries. These results suggest that anticipated, persistent increases in trade tend to raise inflation, broadly consistent with Propositions 2 and 4.

2.3 Discussion: Brexit and Trump

Increases in trade restrictions are rare in the modern historical record, but the UK's exit from the European Union and tariffs imposed during the first Trump administration are two recent examples. We pause to discuss how related work that has studied these policies is connected to our analysis of inflation.

The UK's 2016 Brexit referendum is a salient episode in which an anticipated increase in trade barriers had significant macro-economic impacts. Summarizing the literature, Dhingra and Sampson (2022) argue that "Brexit can be conceptualized as a shock to expectations about future economic policy."[29] Consistent with our model, in which bad trade news may stall the macro-economy, Born et al. (2019) find that the Brexit vote caused a loss of UK output prior to implementation, driven by a downward revision of growth expectations and corresponding slowdown in consumption growth after the Brexit vote.

Similarly, Broadbent et al. (2023) argue that Brexit news triggered macroeconomic adjustments in the UK that parallel various effects in our model. Nonetheless, our analysis differs in several key respects. First, whereas Broadbent et al. model Brexit as an anticipated decrease in productivity for the tradable sector, we instead analyze changes in domestic sourcing shares holding productivity constant. In our view, domestic sourcing shares are the more direct channel linking trade and macro-outcomes. Nonetheless, there are broad similarities: an anticipated decline in future productivity reduces consumption today through wealth effects, just like an anticipated increase in domestic sourcing. Second, while Broadbent et al. focus entirely on the real economy, we study inflation in a New Keynesian setting.

While it is tempting to directly examine inflation outcomes after the Brexit vote, we sound a note of caution. The impact of Brexit on UK inflation is muddled by the Bank of England's (almost) immediate response to the Brexit vote; it lowered interest rates at its August meeting after the June 2016 vote, likely pushing inflation up.[30] In a careful time series analysis, Geiger and Güntner (2024) argue that events that raised the likelihood of hard Brexit depressed UK inflation in the short run, but raised it in the medium run. Further, they also find that the Bank of England's endogenous monetary response significantly dampened the short run fall in inflation due to "bad news." The fact that the Bank of England apparently loosened in response to Brexit events is indirect evidence that policymakers were concerned that inflation would fall in anticipation of Brexit. Whether the Bank of England calibrated its response correctly to stabilize inflation is a separate matter, which we shan't address. A strength of the empirical evidence that we developed above is that it abstracts from any one central bank's response to a small set of events, pooling evidence about the systematic response of inflation to trade liberalization events across countries and time.

Beyond the Brexit episode, trade policy has also become more restrictive in the United States. In 2018, the administration of President Donald Trump introduced a raft of new protectionist policies, and these policies were typically announced prior to implementation. Amiti et al. (2025) study asset market responses to policy announcements associated with the US-China trade war. They show that stock prices decrease in response to the announce-

[29] Dhingra and Sampson (2022) collect references that documents the change in private sector expectations.

[30] The British pound suddenly depreciated after the Brexit vote, which raised consumer prices in product groups with large import shares relative to less exposed categories [Breinlich et al. (2022)]. This amounts to a change in relative prices, but says little about the overall response of aggregate inflation.

ments, while bond prices increase. Most directly relevant for our paper, they also find real interest rates fell at all maturities, as they would in our model following bad trade news. Further, nominal yields fell more than real yields, implying that breakeven (expected) inflation declined following the announcements. That is, the announcement of higher future tariffs led to lower expected inflation, consistent with bad trade news lowering inflation.

Recently, on "Liberation Day" (April 2, 2025), the Trump administration announced that it would impose markedly higher tariffs on virtually all US trade partners, which surprised financial markets. In a tight window around the announcement, five-year breakeven expected inflation (at an annual rate) fell by 20 basis points.[31] While some caution is warranted in interpreting this single and complex event, this response fits the Amiti et al. pattern. It confirms again that markets seem to expect lower inflation when trade is anticipated to be lower (tariffs are expected to be higher) in the medium term.

While no single piece of evidence is definitive on the link between anticipated changes in trade and inflation, we have shown that plausibly anticipated increases in trade due to free trade agreements seem to drive inflation higher. Moreover, recent de-globalization news events suggest that the relationship may hold in reverse as well.

3 Theoretical Extensions and Quantitative Analysis

We now extend the behavioral model introduced in Section 1.3 in two directions for quantitative analysis, each of which introduces additional channels through which trade may impact inflation beyond those in the baseline model. In Section 3.1, we develop a model that features two large (asymmetric) open economies, with variable markups and dominant currency pricing. In Section 3.2, we study a multisector model, with imperfect labor mobility across sectors and hand-to-mouth consumers, which together introduce a role for the distributional impacts of trade to influence inflation outcomes.

3.1 Large Open Economy with Variable Markups

We start by describing the main changes in the economic environment and results that follow from them in Section 3.1.1. We then calibrate the model and present impulse response functions to highlight key model mechanisms in Sections 3.1.2 and 3.1.3. In Section 3.1.4, we use the model to interpret how historical changes in domestic sourcing influenced inflation. Details on various aspects of the model and analysis are included in Appendix C.

[31] See the event at https://fred.stlouisfed.org/graph/?g=1JGBy.

3.1.1 Model Overview

There are now two "large" countries, Home (H) and Foreign (F and $*$). Following Gopinath et al. (2020), we assume that Home exports and imports are priced in Home currency, while each country's sales to itself are priced in its own currency. Further, Home and Foreign goods markets are segmented, so prices are set independently in each sales destination, and there are iceberg trade costs applied to international sales. As in the baseline model, prices are set subject to Rotemberg adjustment costs, and international financial markets are complete. Home and Foreign central banks set their respective nominal interest rates to target inflation in their own country.

To introduce variable markups, we adopt non-constant elasticity aggregators for final goods and inputs, as in Kimball (1995). For Home, these take the form:

$$\nu \int_0^1 \Upsilon\left(\frac{C_{Ht}(i)}{\nu C_t}\right) di + (1-\nu) \int_0^1 \Upsilon\left(\frac{C_{Ft}(i)}{(1-\nu)C_t}\right) di = 1 \tag{26}$$

$$\xi \int_0^1 \Upsilon\left(\frac{M_{Ht}(i)}{\xi M_t}\right) di + (1-\xi) \int_0^1 \Upsilon\left(\frac{M_{Ft}(i)}{(1-\xi)M_t}\right) di = 1, \tag{27}$$

where $C_{ct}(i)$ and $M_{ct}(i)$ for $c \in \{H, F\}$ are consumption of individual Home and Foreign varieties, the parameters ν and ξ govern home bias, and the function $\Upsilon(\cdot)$ satisfies $\Upsilon(1) = 1$, $\Upsilon'(\cdot) > 0$, and $\Upsilon''(\cdot) < 0$. Following Klenow and Willis (2016) and Gopinath et al. (2020), we parameterize $\Upsilon(\cdot)$ using a flexible functional form:

$$\Upsilon(x) = 1 + (\sigma - 1)\exp\left(\frac{1}{\varepsilon}\right)\varepsilon^{\sigma/\varepsilon - 1}\left(\Gamma\left(\frac{\sigma}{\varepsilon}, \frac{1}{\varepsilon}\right) - \Gamma\left(\frac{\sigma}{\varepsilon}, \frac{x^{\epsilon/\sigma}}{\varepsilon}\right)\right), \tag{28}$$

where $\Gamma(u, z) = \int_z^\infty s^{u-1}e^{-s}ds$ is the incomplete gamma function, with $\sigma > 1$ and $\varepsilon > 0$. Foreign aggregators for inputs and final goods are similar.

With this setup, optimal flexible-price markups vary with aggregate market conditions. To illustrate this, we log-linearize the first-order condition for prices set by Home firms selling in the Home country:

$$\pi_{Ht} = -\frac{1}{\phi}\hat{\epsilon}_{Ht} + \left(\frac{\epsilon_{H0} - 1}{\phi}\right)\widehat{rmc}_t + \beta E_t\left(\pi_{Ht+1}\right), \tag{29}$$

where $\widehat{rmc}_t = \widehat{mc}_t - \hat{p}_{Ht}$. In this Phillips Curve for domestic prices, ϵ_{H0} is the elasticity of demand faced by Home firms for sales to domestic buyers in steady state, and $\hat{\epsilon}_{Ht}$ is the log deviation in this elasticity at date t from its steady state value. When the elasticity of demand is larger than its steady state value ($\hat{\epsilon}_{Ht} > 0$), then Home firms reduce their desired (flexible price) markups and π_{Ht} is lower all else equal. In turn, the demand elasticity depends on domestic sourcing shares as follows:

$$\hat{\epsilon}_{Ht} = \frac{C_{H0}}{Y_{H0}}\hat{\epsilon}^C_{Ht} + \frac{M_{H0}}{Y_{H0}}\hat{\epsilon}^M_{Ht} \tag{30}$$

$$\text{with} \quad \hat{\epsilon}^C_{Ht} = -\left(\frac{\varepsilon}{\sigma - 1}\right)\hat{\lambda}^C_{Ht} \quad \text{and} \quad \hat{\epsilon}^M_{Ht} = -\left(\frac{\varepsilon}{\sigma - 1}\right)\hat{\lambda}^M_{Ht}. \tag{31}$$

Elasticities by end use ($\hat{\epsilon}^C_{Ht}$ and $\hat{\epsilon}^M_{Ht}$) are decreasing functions of domestic sourcing, where the parameter ε controls the elasticity of markups to relative prices. This is the import competition channel: stronger import competition (lower domestic sourcing) raises the demand elasticity for Home firms, which restrains the markups they set and leads the Phillips Curve to shift down.

While these results speak to one important channel through which import competition influences inflation on the supply side of the model, there is an important additional role for markup dynamics in shaping aggregate demand. As in standard monopolistic competition models, markups depress equilibrium output in our model, by lowering both input use and labor supply. Further, an expected decline in domestic sourcing would reduce expected future markups for Home firms selling in the Home market. As a result, expected output and consumption in the future would be higher relative to the present, which raises the natural interest rate today. Put differently, aggregate demand rises today when markups are expected to fall in the future, because reduced markups in the future raise future allocative efficiency. This channel will be important for interpreting simulation results below.

3.1.2 Model Calibration

We treat the United States as the Home country and Foreign is a composite rest-of-the-world region. We calibrate country sizes, the share of inputs in production, home-bias in consumption and input use at home and abroad to be consistent with trade and production data from the OECD-ICIO data for 1995. Macro-parameters governing labor supply, risk aversion, price adjustment, and monetary policy are calibrated to standard values from the literature. In the Kimball aggregators, we set $\sigma = 3$, which yields a steady-state elasticity of substitution that is in the middle of the range estimates in the macroeconomics and trade literatures.[32] We then set $\varepsilon = 1$ following Gopinath et al. (2020), which controls the elasticity of the elasticity of demand to relative prices. See Appendix C for further calibration details.

Like in Section 1.3, we assume agents discount the future as in Gabaix (2020), and we calibrate the cognitive discounting parameter ($\Omega = 0.99$) to approximately match the

[32] The elasticity between home and foreign goods is equal to the micro-elasticity between domestic varieties, consistent with Feenstra et al. (2018), which fails to reject equality of these elasticities for most goods.

inflation response to an anticipated trade shock that we have estimated in the data.[33] The ratio of the cumulative inflation at peak (5 years after the news arrives) to the magnitude of the treatment is 3 for the G7 sample (2.6 for all advanced countries and 10 for the all country sample). When we set Ω equal to 0.99, the equivalent statistic for an anticipated shock to sourcing is 2.64 for final goods and 3.9 for inputs. We have explored robustness to this parameter; lowering Ω to 0.98 would lead the model significantly under-predict (by about 40%) the cumulative inflation impacts we estimate. Further, it does not qualitatively change the core results below about increased inflation during the 1995-2010 period.

Building on our analysis of the baseline model in Section 1, we specify stochastic processes for US domestic sourcing shares: $\hat{\lambda}_t^C$ and $\hat{\lambda}_t^M$. However, we now extend the stochastic process to include persistent anticipated shocks, analogous to shocks to trend.[34] For $x \in \{C, M\}$, we assume:

$$\hat{\lambda}_{Ht}^x = \rho_{\lambda,x}\hat{\lambda}_{Ht-1}^x + \xi_t^x + g_{t-1}^x, \tag{32}$$

$$\text{with} \quad g_t^x = \rho_{g,x} g_{t-1}^x + \varrho_t^x \tag{33}$$

Here $\hat{\lambda}_{Ht}^x$ depends on its past value (λ_{Ht-1}^x), a transitory shock (ξ_t^x), and a persistent component (g_{t-1}^x) known to agents in advance. The persistent component itself follows an autoregressive process, ϱ_t^x represents a 'news shock' that delivers information about future growth in $\hat{\lambda}_{Ht}^x$. Specifically, if $\rho_{g,x} \in (0, 1)$, then a negative innovation to ϱ_t^x represents news that $\hat{\lambda}_{Ht}^x$ will gradually decline in the medium run. Moreover, when $\rho_{\lambda,x} \in (0, 1)$ also holds, then an innovation to ϱ_t^x induces a long-lasting, hump-shaped path for $\hat{\lambda}_{Ht}^x$.

To calibrate the stochastic process and extract shocks from data, we proceed in three steps.[35] First, we use data on $\hat{\lambda}_t^x$ to estimate $\rho_{\lambda,x}$ in Equation (32) and predict the composite residual $\xi_t^X + g_{t-1}^X$. Second, we then decompose the residual into anticipated (g_{t-1}^x) and unanticipated (ξ_t^x) components. To do so, we assume that agents may anticipate long duration fluctuations in domestic sourcing, such as those associated with trade agreements and globalization more generally, while transitory changes are instead unanticipated. To isolate these persistent versus transitory changes in sourcing, we use the bandpass filter to extract g_{t-1}^x from the composite residual, as the components of the residual with periods longer than

[33] With $\Omega = 0.99$ and $\beta = 0.995$, the compound discount rate is $\Omega\beta = 0.985$. This is nearly identical to the preferred compound discount parameter of 0.987 for the consumption Euler equation calibrated by Del Negro, Giannoni and Patterson (2023) in a perpetual youth framework. It is also not far from values used by McKay, Nakamura and Steinsson (2017).

[34] If $\rho_{\lambda,x} = 1$, then g_{t-1}^x is a persistent growth shock, as in Barsky and Sims (2012) and Barsky, Basu and Lee (2015). As discussed below, we calibrate a value for $\rho_{\lambda,x}$ that near one, but strictly less than one. So, g_{t-1}^x is a quasi-trend shock in our model.

[35] The raw data we use to compute domestic sourcing is available at an annual frequency, but model parameters are calibrated to values appropriate for quarterly data. Therefore, as a preliminary step, we temporally disaggregate the annual data using an algorithm provided in Appendix C.

40 quarters. We then assume shorter-term fluctuations (associated with periods less than 40 quarters) are unanticipated by agents and correspond to ξ_t^x. For reference, we plot filtered values for ξ_t^X and g_{t-1}^X when we analyze historical simulation results below. Third, we fit Equation (33) to the resulting series for g_{t-1}^x in order to estimate $\rho_{g,x}$ and recover shocks ϱ_t^x to simulate the model.

Applying this procedure, we obtain the following values for the auto-regressive parameters: $\rho_{\lambda,C} = 0.9665$, $\rho_{\lambda,M} = 0.9821$, $\rho_{g,C} = .9948$ and $\rho_{g,M} = .9975$. Evidently, there is substantial persistence in the data. Nonetheless, because $\rho_{\lambda,x}$ and $\rho_{g,x}$ are less than one, the stochastic process is stationary. Therefore, the economic model admits a unique steady-state, so standard stochastic solution and simulations techniques are applicable.

3.1.3 Impulse Response Functions

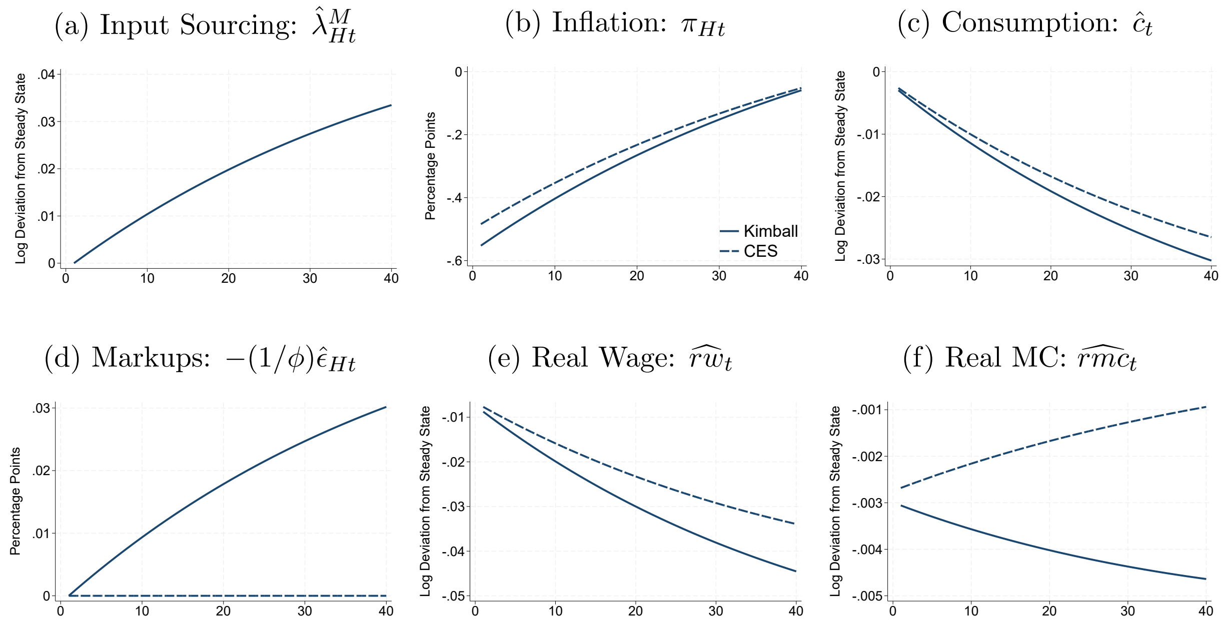
To illustrate the mechanics of the model, we simulate impulse responses. Here in the main text, we trace the effects of shocks to anticipated growth in Home's domestic sourcing share for inputs (ϱ_t^M), holding all other sourcing shares constant. In Figure 3a, we plot the path of $\hat{\lambda}_{Ht}^M$ in response to a one-time shock in ϱ_t^M, which temporarily raises the growth rate of input sourcing.[36] Figure 3b plots the response of Home's domestic price inflation (π_{Ht}) to the shock, and Figure 3c plots Home consumption ($\hat{c}_t$). In each of these figures, the first (solid) line presents results for the baseline calibration of the model with variable markups. The second (dashed) line illustrates model responses for an alternative parameterization that sets $\varepsilon = 0$ to eliminate the pro-competitive effects of trade.

As is evident, an anticipated increase in domestic sourcing lowers domestic price inflation on impact. Because domestic sourcing for final goods is held constant in this exercise, then $\pi_{Ct} = \pi_{Ht}$, so consumer price inflation falls as well. Consumption also falls on impact, in anticipation of the rise in domestic sourcing. It then continues to decline over time, as the trade shock slowly manifests over time. The responses for consumption and inflation on impact echo the results in Proposition 2, which demonstrates the intuition developed there carries over to the quantitative framework here.

As a second result, note that the fall in inflation is larger in the model with variable demand elasticities than the alternative with constant elasticity (CES) aggregators. This might be surprising at first glance, since higher domestic sourcing (diminished import competition) enables domestic firms to increase their markups. To illustrate this, we plot the evolution of the reduced-form 'markup shock' in the domestic price Phillips Curve – driven by changes in the effective elasticity of demand faced by Home firms selling in the domestic

[36] The shock is $\varrho_t^M = .0125$. Given other parameters, this yields an increase of roughly 5% for $\hat{\lambda}_{Ht}^M$ at peak, which occurs beyond the window depicted in the figure.

Figure 3: IRFs for Anticipated Growth in Domestic Input Sourcing in the LOE Model



Note: The figures plot responses for one-time shock in ϱ^M_t.

market – in Figure 3d. Optimal flexible-price markups are unchanged initially, but then they rise over time as import competition diminishes. Working backwards, anticipation of higher future markups raises expected inflation (all else equal), and thus realized inflation, today.

Despite the impact of markup changes on inflation through the Phillips Curve, inflation actually falls overall in the model. The reason is that consumption falls, which leads real wages and marginal costs to fall, as depicted in Figures 3e and 3f. Comparing responses in the model with variable markups relative to the CES benchmark, note that consumption and real wages fall more in the variable markups case. This speaks to a separate role that the pro-competitive effects of trade play in the model.

Recalling the discussion above, higher markups reduce allocative efficiency. Thus, anticipation of higher future markups and the correspondingly lower future efficiency and output they bring, reduces consumption by more in the model with variable elasticities than in the CES benchmark. As a result, real wages and marginal costs fall more in the model with variable elasticities, both on impact and over time as the allocative efficiency effects are manifest.[37] Overall, variable markups amplify the disinflation associated with an anticipated

[37]Note also the dynamics of real marginal costs differ across model specifications. While real marginal costs initially fall then start rising in the CES case, they fall on impact and decline over time with variable elasticities. These differences are due to how changes in real wages and domestic sourcing net out differently in the two models. In both models, real wages fall on impact and decline over time, but the effects are stronger in the model with variable markups. These real wage dynamics dominate the role of rising domestic input sourcing (which pushes real marginal costs up) in the variable elasticity model. In contrast, rising real

increase in domestic sourcing.

3.1.4 Historical Simulation

We now use the model to study how historical shocks to domestic sourcing have influenced inflation. Following the procedure described in Section 3.1.2, we exact ξ_t^C, ξ_t^M, ϱ_t^C, and ϱ_t^M from time series data on $\hat{\lambda}_t^C$ and $\hat{\lambda}_t^M$ for the United States and simulate how inflation responses to these shocks.[38]

To start, let us examine how variation in domestic sourcing is accounted for by unanticipated, transitory shocks (ξ_t^C and ξ_t^M) versus growth shocks (ϱ_t^C and ϱ_t^M) that lead to persistent, anticipated changes in domestic sourcing. Referring to Equations (32) and (33), one can write realized domestic sourcing as a function of past shocks: $\hat{\lambda}_{Ht}^x = (1-\rho_{\lambda,x}L)^{-1}\xi_t^x + (1-\rho_{\lambda,x}L)^{-1}g_{t-1}^x$ with $g_{t-1}^x = (1-\rho_{g,x}L)^{-1}\varrho_{t-1}^x$. The impact of past unanticipated, transitory shocks is then given by $(1-\rho_{\lambda,x}L)^{-1}\xi_t^x$. The impact of past growth shocks is summarized by $(1-\rho_{\lambda,x}L)^{-1}(1-\rho_{g,x}L)^{-1}\varrho_{t-1}^x$. We plot these two terms in Figure 4 together with the data, for $\hat{\lambda}_{Ht}^C$ in the left panel and $\hat{\lambda}_{Ht}^M$ in the right panel. As is evident, growth shocks account for the medium and long-term fluctuations in the data, while unanticipated shocks account for variation from the longer term trends.

Feeding the underlying shocks through the model, we plot simulated US inflation in Figure 5. In Figure 5a, we plot simulated consumer and domestic price inflation separately for unanticipated shocks versus anticipated (growth) shocks. We emphasize three findings.

First, anticipated changes in sourcing drive inflation up between 1995 and 2010, coincident with the increasing globalization of the US economy during this period. Inflation then turns negative after 2010, as agents perceive the turn in the trend toward higher levels of domestic sourcing. Adding up inflation due to anticipated growth in sourcing over time, the price level rises by about 10% between 1995 and 2010. Thereafter, the post-2010 deflation is sufficiently strong to more than offset the pre-2010 period, so the price level ends up about 5% lower overall all in 2020 relative to 1995.

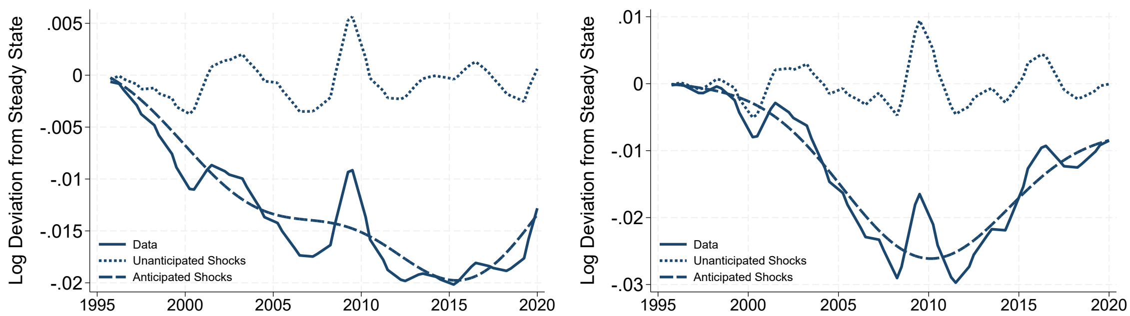
The second finding is that unanticipated shocks have relatively small, transitory impacts

marginal costs due to rising input sourcing are more important in the constant elasticity case.

[38] In the simulations, we hold sourcing shares for Foreign (i.e., $\hat{\lambda}_{Ft}^{C*}$ and $\hat{\lambda}_{Ft}^{M*}$) constant. Unlike US data, there is no medium/long-term trend in domestic sourcing for the rest-of-the-world region. As such, there are effectively no anticipated changes in Foreign's domestic sourcing to analyze. This does not imply that there was no globalization abroad, however. As we showed in Figure 1b, the *representative* foreign country looks much like the United States. Nonetheless, from the US perspective, trade among individual countries in the rest of the world is counted as domestic sourcing by Foreign from itself. Holding $\hat{\lambda}_{Ft}^{C*}$ and $\hat{\lambda}_{Ft}^{M*}$ constant then amounts to saying that the share of Foreign's purchases from the US in total Foreign spending is constant, which is approximately true in the data. All values for $\hat{\lambda}_{Ft}^{C*}$ lie between -0.004 and 0.003, while $\hat{\lambda}_{Ft}^{C*}$ is bounded by -0.007 and 0.003.

Figure 4: Decomposing Domestic Sourcing into Anticipated vs. Unanticipated Components

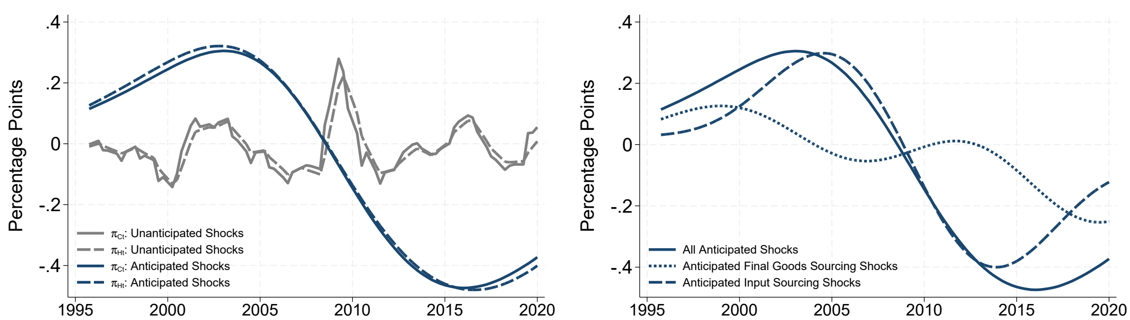
(a) Final Goods Sourcing (b) Input Sourcing



Note: As discussed in the text, $\hat{\lambda}^x_{Ht} = (1-\rho_{\lambda,x}L)^{-1}\xi^x_t + (1-\rho_{\lambda,x}L)^{-1}(1-\rho_{g,x}L)^{-1}\varrho^x_{t-1}$. The unanticipated shocks series plots the first term in this expression, and the anticipated shocks series plots the second term.

Figure 5: Historical Simulation of Inflation: Two Country Model with Variable Markups

(a) Anticipated vs. Unanticipated Shocks (b) Input vs. Final Goods Sourcing



Note: The left panel contains simulated paths of consumer and domestic price inflation. The right panel contains the simulated path of consumer price inflation (π_{Ct}) for anticipated shocks only, split by type.

on inflation. Further, these effects conform to standard intuition: temporary shocks that raise domestic sourcing push inflation up. For example, the unanticipated collapse of trade during the Great Recession is associated with higher inflation, all else equal. As a third point, note that domestic price inflation and consumer price inflation are similar in both simulations. That is, domestic sourcing primarily impacts consumer price inflation through the prices set by US producers in the US market.

Turning to Figure 5b, we plot the evolution of inflation in response to anticipated changes in sourcing separately for inputs versus final goods. We find that anticipated changes in input sourcing play the largest role in accounting for the dynamics of simulated inflation. As domestic input sourcing declines after 2000, inflation rises rapidly. Inflation then falls when the trend in input sourcing reverses. The relatively steady decline in domestic sourcing of final goods leads to moderate inflationary pressure between 1995-2005; inflation attributable to final goods dynamics then hovers close to zero from 2005-2015, only turning substantially negative after 2015.

3.2 Multi-Sector TANK Model with Labor Market Frictions

Thus far, we have analyzed models with a single aggregate sector. We now consider a multi-sector setting, distinguishing manufacturing and non-manufacturing sectors. Over time in the United States, import penetration has increased most in the manufacturing sector. Further, much policy attention has focused on how these manufacturing imports may have hurt manufacturing workers [Autor, Dorn and Hanson (2016)]. To account for these distributional effects of trade, and their potential impacts on inflation outcomes, we develop a multi-sector model with frictions in labor and financial markets.

3.2.1 Model Overview

We now return to a small open economy setting, in order to focus on three new aspects of the economic environment. First, we expand the model to have two sectors, which are connected by input-output linkages in production. Second, we introduce frictions that impede labor reallocation across sectors; because workers cannot immediately move away from the sector in which they are currently working, they may be harmed by rising imports. Third, we assume a subset of consumers do not have access to financial markets, so these hand-to-mouth consumers spend all their current income. The remaining (Euler) consumers have access to complete international financial markets, as in prior models. The existence of hand-to-mouth consumers attenuates forward-looking behavior in the model, and it implies income losses due to import competition translate into lower consumption. We provide an overview of these elements of the model here, with details in Appendix D.

Sectors are indexed by $s = \{1, 2\}$, where sector 1 is manufacturing and 2 is non-manufacturing (agriculture, natural resources, and services). In each sector, there is a continuum of differentiated varieties, indexed by i, produced via the nested-CES function:

$$Y_t(s,i) = Z_t(s)\left(L_t(s,i)\right)^{1-\alpha(s)}\left(M_t(s,i)\right)^{\alpha(s)}, \tag{34}$$

$$M_t(s,i) = \left(\sum_{s'}\left(\alpha(s',s)/\alpha(s)\right)^{1/\kappa} M_t(s',s,i)^{(\kappa-1)/\kappa}\right)^{\kappa/(\kappa-1)}, \tag{35}$$

$$M_t(s',s,i) = \left[\xi(s',s)^{\frac{1}{\eta(s')}} M_{Ht}(s',s,i)^{\frac{\eta(s')-1}{\eta(s')}} + (1-\xi(s',s))^{\frac{1}{\eta(s')}} M_{Ft}(s',s,i)^{\frac{\eta(s')-1}{\eta(s')}}\right]^{\frac{\eta(s')}{\eta(s')-1}}, \tag{36}$$

where $M_t(s,i)$ is a composite input used by firm i in sector s, with Cobb-Douglas share $\alpha(s) \in [0,1)$. That composite input is an aggregate of inputs purchased from sector $s^{'}$ used by firm i in sector s, denoted $M_t(s^{'},s,i)$, which are substitutable among themselves with elasticity $\kappa \in [0,\infty)$. Then these sector-to-sector composite inputs are themselves an aggregate of inputs sourced from home and abroad, denoted $M_{Ht}(s^{'},s,i)$ and $M_{Ft}(s^{'},s,i)$, with substitution elasticity $\eta(s^{'}) \in [0,\infty)$. In the aggregators, we impose $\sum_{s'} \alpha(s^{'},s) = \alpha(s)$ and $\xi(s^{'},s) \in [0,1]$.

Without loss of generality, let us normalize the mass of workers in the economy to 1. We assume that a fraction $\bar{s}$ of these workers are hand-to-mouth consumers, and the complementary share have access to complete financial markets. All sectors employ some workers of each type, and worker types are perfectly substitutable in production for all firms. Let s^h_{1t} be the share of hand-to-mouth consumers and s^e_{1t} be the share of Euler consumers employed in sector 1.

We introduce labor market frictions in a simple reduced-form way. Given an initial allocation of workers to sectors, changes in domestic sourcing alter the relative return to working in manufacturing versus non-manufacturing. Over time, workers will move in response to sectoral wage differentials, but we assume that reallocation occurs slowly. As a result, wage differentials persist across sectors for some time. To capture these dynamics, we assume that the share of workers by type $u = \{h,e\}$ in sector 1 satisfies the following dynamic equation:

$$\frac{s^u_{1,t+1}}{s^u_{1t}} = \left(\frac{W_t(1)}{W_t(2)}\right)^{\chi}, \tag{37}$$

where $W_t(s)$ is the prevailing wage in sector $s \in \{1,2\}$. The parameter $\chi \in (0,\infty)$ governs how strongly employment shares respond to wage differentials, where higher values of χ imply faster adjustment in employment shares, and correspondingly less persistent wage differentials across sectors.[39]

Turning to consumption, we introduce the two-dimensional index $a = (u,s)$ to track consumption by consumer type (u) employed in sector (s). All consumers have the same preferences, which take a standard nested-CES form:

$$C^a_t = \left(\sum_s \zeta(s)^{1/\vartheta} C^a_t(s)^{(\vartheta-1)/\vartheta}\right)^{\vartheta/(\vartheta-1)} \tag{38}$$

$$C^a_t(s) = \left(\nu(s)^{1/\eta(s)} C^a_{Ht}(s)^{(\eta(s)-1)/\eta_C(s)} + (1-\nu(s))^{1/\eta(s)}\, C^a_{Ft}(s)^{(\eta(s)-1)/\eta(s)}\right)^{\eta(s)/(\eta(s)-1)}, \tag{39}$$

[39] In the limit, if $\chi \to 0$, then sectoral employment shares are constant over time. If $\chi \to \infty$ instead, then adjustment is instantaneous, so a single wage prevails in the labor market. With intermediate values of χ, this specification allows temporary wage differentials to emerge across sectors, but wages are equalized across worker-types and sectors in the long run, since labor types are homogeneous from the firm's perspective.

where C_t^a is real consumption by agent-type a and $C_t^a(s)$ is consumption of the sector-s composite good. The sector composite good combines domestic ($C_{Ht}^a(s)$) and foreign ($C_{Ft}^a(s)$) final goods. In the system, $\vartheta \in [0, \infty)$ is the elasticity of substitution across sector composites, and $\eta(s) \in [0, \infty)$ is the sector-specific elasticity of substitution between home and foreign composites. The CES weights satisfy $\sum_s \zeta(s) = 1$ and $\nu(s) \in [0, 1]$.

Labor supply by the representative agent in group a satisfies $(C_t^a)^{-\rho} \frac{W_t(s)}{P_{Ct}} = \mu (L_t^a)^{\psi}$, as we assume each agent has consumption-leisure preferences like the baseline model. Demand for labor in sector s is the aggregate of firm-level labor demands, given by $L_t(s) = \int L_t(s, i)di$. Then, labor markets clear according to:

$$L_t(1) = \bar{s}s_{1t}^h L_t^{h,1} + (1 - \bar{s})s_{1t}^e L_t^{e,1}, \tag{40}$$

$$L_t(2) = \bar{s}(1 - s_{1t}^h)L_t^{h,2} + (1 - \bar{s})(1 - s_{1t}^e)L_t^{e,2}. \tag{41}$$

where $\bar{s}s_{1t}^h$ is the total share of hand-to-mouth consumers in manufacturing, and similar interpretations hold for $(1 - \bar{s})s_{1t}^e$, $\bar{s}(1 - s_{1t}^h)$, and $(1 - \bar{s})(1 - s_{1t}^e)$. Goods markets and asset markets for Euler consumers clear in the standard way (see the appendix).

3.2.2 Model Calibration

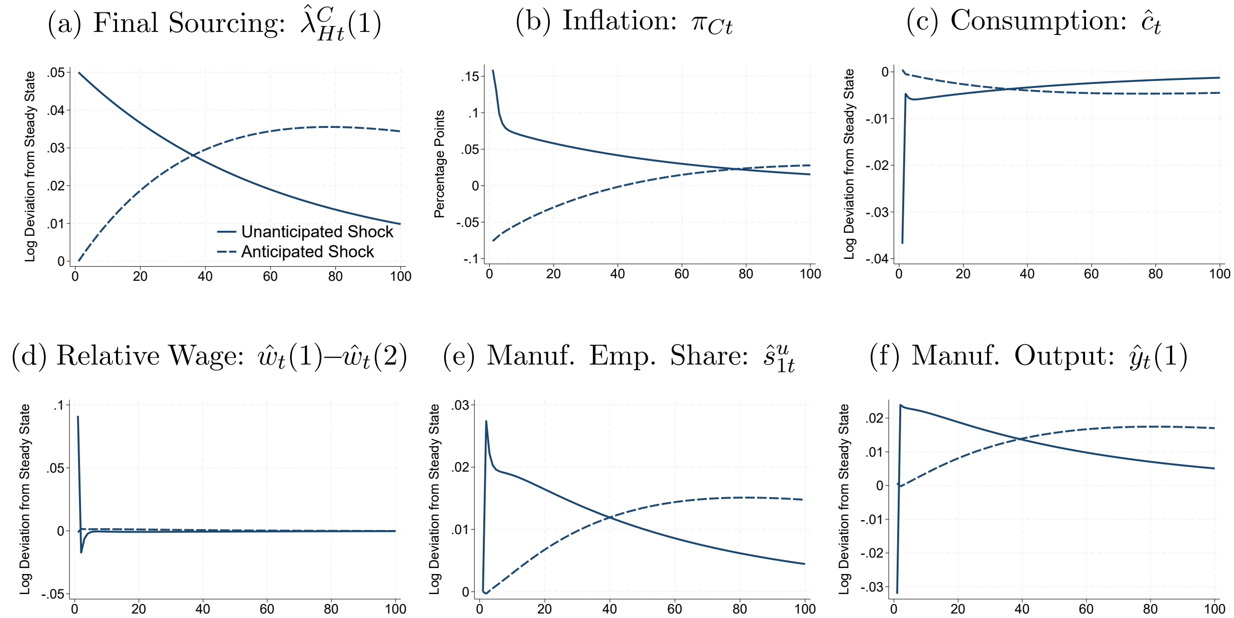
The broad contours of the calibration are as follows, with details in Appendix D. We calibrate the model so the United States is the Home country. Parameters governing input use by sector, input linkages across sectors, and the allocation of sectoral input spending to domestic goods versus imports are set to match OECD-ICIO data for 1995. Likewise, the sectoral allocation of consumption spending and the share of consumption expenditure on domestic goods match final expenditure data from the same source.

Regarding the TANK aspects of the model, we set the share of hand-to mouth consumers in the economy to 0.5. This share is high relative to the literature, but serves to accentuate the potential role for shocks that change the distribution of income. Given this share, together with other structural parameters, we calibrate the steady-state shares of workers by type in manufacturing (s_{10}^u) to match the sectoral composition of output in steady state. This procedure implies that 9.12% of hand-to-mouth and 19.26% of Euler agents work in manufacturing, so about 1/3 of manufacturing workers consume hand to mouth.

In the labor market, we set $\chi = 0.3$, which implies it takes about 8 quarters for wages to equalize across sectors after an immediate, one-time shock to domestic sourcing for final goods in a given sector. As we discuss below and in Appendix D, our main inflation results are robust to alternative values for this parameter.

Finally, we again specify stochastic processes that describe the evolution of domestic sourcing shares over time, decomposing them into anticipated and unanticipated components

Figure 6: IRFs for Shocks to Sourcing of Final Manufacturing Goods in the Two-Sector TANK Model



Note: The unanticipated shock is an increase in ξ^C_{1t}. The anticipated shock is an increase in ϱ^C_{1t}.

as in Equations (32)-(33). We model the evolution of four domestic sourcing shares for inputs ($\hat{\lambda}^M_{Ht}(s', s)$) and two domestic sourcing shares for consumption ($\hat{\lambda}^C_{Ht}(s)$) separately. We again find that there is substantial persistence in the data, with autocorrelation parameters reported in the appendix.

3.2.3 Impulse Response Functions

In the model, there are three new elements: sectoral shocks, labor frictions, and hand-to-mouth consumers. To illustrate their role, we start by comparing model responses to unanticipated versus anticipated changes in domestic sourcing.

In Figure 6, we plot impulse responses for shocks that affect domestic sourcing of final manufacturing goods. We plot two scenarios: the first scenario is an immediately, unanticipated shock to $\hat{\lambda}^C_{Ht}(1)$, which raises it immediately and then fades out over time, and the second is a growth shock, which induces an anticipated increase in $\hat{\lambda}^C_t(1)$ over time.

Starting with the punchline in Figure 6b, the unanticipated shock raises consumer price inflation, while the anticipated shock persistently lowers it. This inflation response is obviously consistent with the prior models we've analyzed. To parse the dynamics, the unanticipated shock leads to a discrete jump up in inflation in the first period, which reflects the sudden increase in the relative price of imports implied by the immediate increase in $\hat{\lambda}^C_t(1)$.

Then, after that initial period, positive consumer price inflation reflects sustained positive (albeit low) domestic price inflation. For the growth shock scenario, domestic price inflation falls in both sectors on impact, so consumer price inflation remains below zero throughout, despite the fact that $\hat{\lambda}_t^C(1)$ rising over time pushes consumer price inflation above domestic price inflation. Aggregating consumption responses for agents of different types, Figure 6c shows that aggregate real consumption jumps down following the sudden increase in domestic sourcing. It falls only gradually in response to the anticipated increase in $\hat{\lambda}_t^C(1)$, like in the one sector RANK model discussed above.

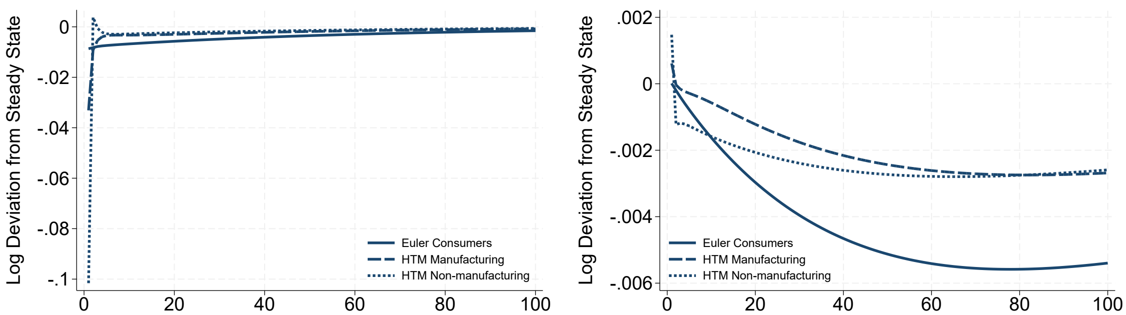
Focusing on differential impacts across sectors, we plot responses of the relative wage in manufacturing (vs. non-manufacturing), the share of workers allocated to manufacturing, and total gross manufacturing output in Figures 6d, 6e, and 6f. The unanticipated innovation to $\hat{\lambda}_t^C(1)$ drives up the relative wage in manufacturing, because labor cannot be reallocated across sectors immediately. In contrast, the anticipated increase in $\hat{\lambda}_t^C(1)$ has only a small impact on the wage differential across sectors, in either the short or long run. The reason is that the realized value of $\hat{\lambda}_t^C(1)$ increases gradually, so the share of workers in manufacturing also only needs to rise gradually, meaning that both supply and demand for labor in manufacturing increase in tandem. Thus, the speed of the shock matters: gradual de-globalization implies that adjustment frictions do not lead to large sectoral wage differentials.

Turning to the differential responses across consumer types, Figure 7 plots consumption responses for Euler consumers (whose response is independent of the sector in which they work), and hand-to-mouth consumers (split by the sector in which they work). The consumption path for Euler consumers is similar to aggregate consumption, because their share of total aggregate consumption is high.[40] However, the consumption response of hand-to-mouth consumers is quite different.

In response to the immediate, unanticipated increase in $\hat{\lambda}_t^C(1)$, hand-to-mouth consumers employed in sector 2 experience a large decline in consumption, while those employed in sector 1 experience a much smaller decrease. These differential responses are explained by the (temporarily) higher relative wage in manufacturing induced by the shock (Figure 6d), which serves to insulate consumption of manufacturing workers in the short run. As time passes, and workers are reallocated to sector 1, real wages across sectors converge, as does consumption of hand-to-mouth consumers employed in each sector. Finally, note that hand-to-mouth consumers suffer lower consumption in the medium term, due to the negative

[40]Though the share of Euler consumers is set to 0.5, Euler consumers have higher levels of consumption in steady state than hand-to-mouth consumers. Intuitively, whereas hand-to-mouth agents have labor income, Euler consumers capture both labor income and profits in steady state, which supports higher steady-state consumption levels. This aligns well with the standard intuition that access to financial markets is positively correlated with income and consumption levels.

Figure 7: Consumption Responses to Final Manufacturing Goods Sourcing Shocks in the Two-Sector TANK Model



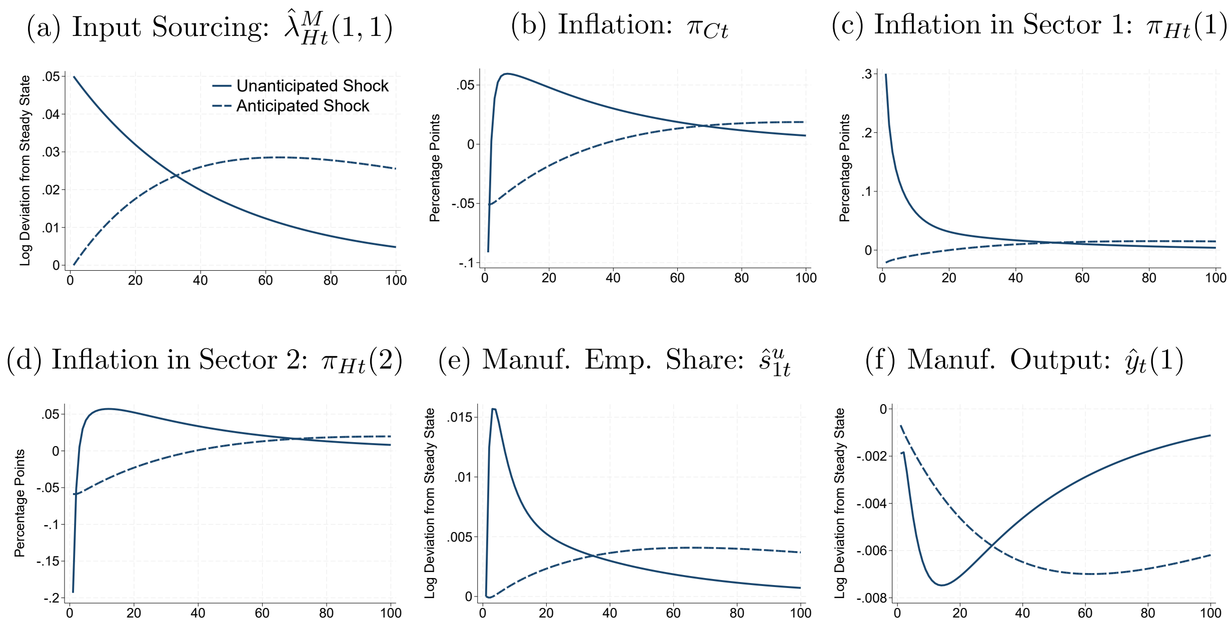
impact of the shock on the aggregate labor market.

Turning to growth shock scenario, consumption responses for all consumer types are modest on impact. Then, consumption gradually decreases for all agents as domestic sourcing rises. Interestingly, a gap emerges between consumption for hand-to-mouth consumers in manufacturing and non-manufacturing, where workers in manufacturing are able to consume more due to the persistent (though modest) increase in the relative wage in manufacturing. However, recall that the real wage falls in levels as globalization unwinds, so both consumer types adjust consumption down in tandem. In this sense, the manufacturing biased shock insulates manufacturing workers relative to non-manufacturing workers, but lost gains from trade are costly for them both. At longer horizons, the consumption of Euler consumers actually falls the most. The reason is that they are forward looking, so they perceive that the economy will continue to deteriorate over time (even beyond the 40 quarter horizon depicted in the figures), so they cut back on consumption to smooth. In contrast, consumption for hand-to-mouth consumers is buoyed by the current state of the deteriorating (but not yet bottomed out) economy.

Pivoting now to an alternative shock scenario, we replicate the analysis of unanticipated versus (anticipated) growth shocks for domestic sourcing of manufactured inputs by the manufacturing sector ($\lambda^M_{Ht}(1,1)$) in Figure 8. Various features of the responses are similar, so we highlight a couple differences.

The first difference is that inflation falls on impact in both scenarios, but then turns positive after the initial periods for the unanticipated shock. This initial fall is due to the two-sector structure in the model: domestic price inflation is positive throughout in manufacturing (Figure 8c), while it is initially negative on impact in non-manufacturing (Figure 8d), and this disinflation in the non-manufacturing sector wins out initially.

Figure 8: IRFs for Shocks to Input Sourcing by Manufacturing Sector in the Two-Sector TANK Model



Note: The unanticipated shock is an increase in ξ^C_{11t}. The anticipated shock is an increase in ϱ^C_{11t}.

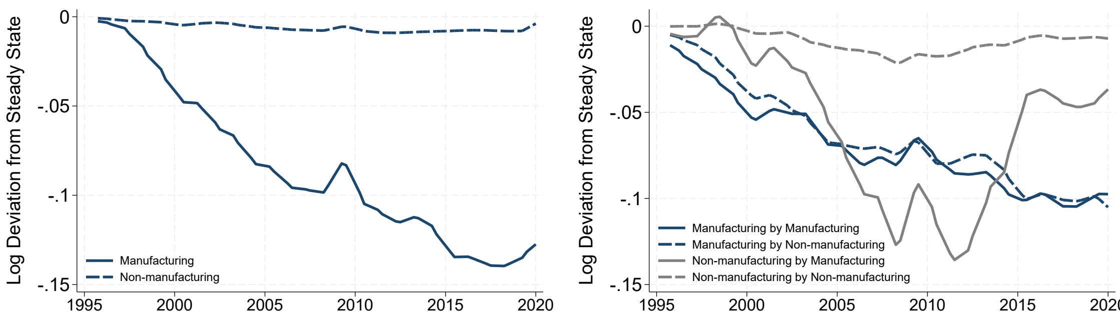
A second interesting difference is that there is a divergence between labor allocations and production levels; while workers are drawn into sector 1 (Figure 8e) following both shocks, output declines in both cases in the medium term. The reason is that $\lambda^M_{Ht}(1,1)$ is both a demand shock for manufacturing output and a cost shock for manufacturing firms that use imported inputs. In the medium run, the cost shock wins out, so manufacturing output declines. Nonetheless, manufacturing firms substitute labor for inputs, leading the share of workers in manufacturing to rise. This highlights the distinct role for shocks that alter sourcing for imported inputs versus imported final goods in the manufacturing sector.

3.2.4 Historical Simulation

We now turn again to historical simulations of the model. For reference, we plot the data on domestic sourcing shares for this two-sector setting in Figure 9. In Figure 9a, domestic sourcing of final goods falls by about 14 percent in manufacturing, while it is nearly unchanged in non-manufacturing. In Figure 9b, there is a steady decline in domestic sourcing of manufacturing inputs by both the manufacturing and non-manufacturing sectors, of about 10 percent each. There is initially a large decline in domestic sourcing of non-manufacturing inputs by the manufacturing sector, and then a rebound after 2010. In contrast, sourcing of non-manufacturing inputs by the non-manufacturing sector is little changed. As before, we

Figure 9: Domestic Sourcing for the Two-Sector TANK Model

(a) Final Goods Sourcing (b) Input Sourcing



Note: Data from the OECD Inter-Country Input-Output Tables and authors' calculations.

filter these data to extract unanticipated shocks and anticipated growth shocks, and we plot the resulting decomposition in Appendix D.

Proceeding directly to simulation results in Figure 10a, we plot consumer price inflation for four scenarios. The first scenario allows only unanticipated shocks, while the second plots inflation when anticipated (growth) shocks are the only active shocks. Like the previous model, anticipated shocks lead to large medium-term fluctuations in inflation; inflation is above zero from 1995 through 2007, and it is below zero thereafter. At peak in the early 2000s, there is almost 40 basis points in excess inflation per quarter due to the trade dynamics.

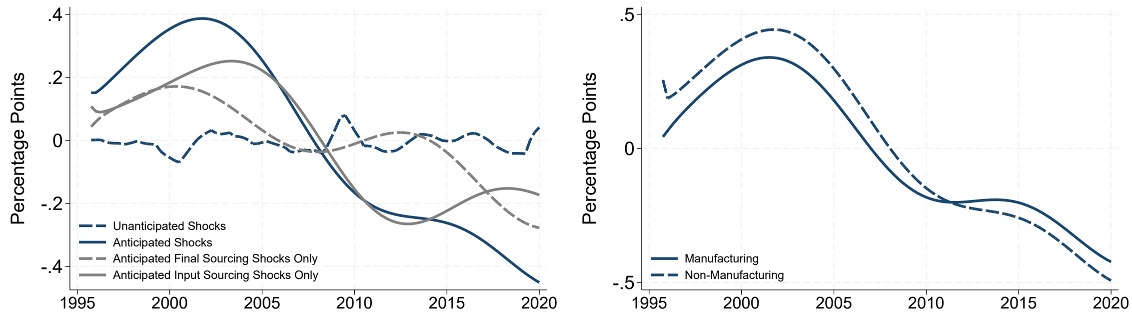
The third and fourth scenarios split the effects of anticipated shocks for final goods sourcing from anticipated shocks for input sourcing. Both sets of anticipated shocks contribute positively to inflation overall. Input sourcing accounts for the most of the dynamic rise and fall of consumer price inflation, owing to the U-shaped dynamics of the underlying input sourcing series.

Unpacking inflation at the sector level, Figure 10b illustrates the evolution of domestic price inflation in each sector when all anticipated shocks are active in the model. Between 1995 and 2011, inflation in manufacturing industries is lower than inflation in non-manufacturing, by about 0.1 percentage points per quarter. This inflation differential reflects the direct effects of falling domestic sourcing on marginal costs across sectors, as imported inputs play a larger role in manufacturing in non-manufacturing, and domestic sourcing of inputs by the manufacturing sector falls faster than for non-manufacturing. After 2011, domestic price inflation is modestly higher in manufacturing than non-manufacturing, driven by the reversal in the manufacturing sector's domestic sourcing of non-manufacturing inputs (measured in $\hat{\lambda}^{M}_{Ht}(2,1)$).

Reflecting on sectoral inflation, we note two related points. First, the model replicates

Figure 10: Historical Simulation of Inflation: Two-Sector TANK Model

(a) Consumer Price Inflation (b) Domestic Price Inflation



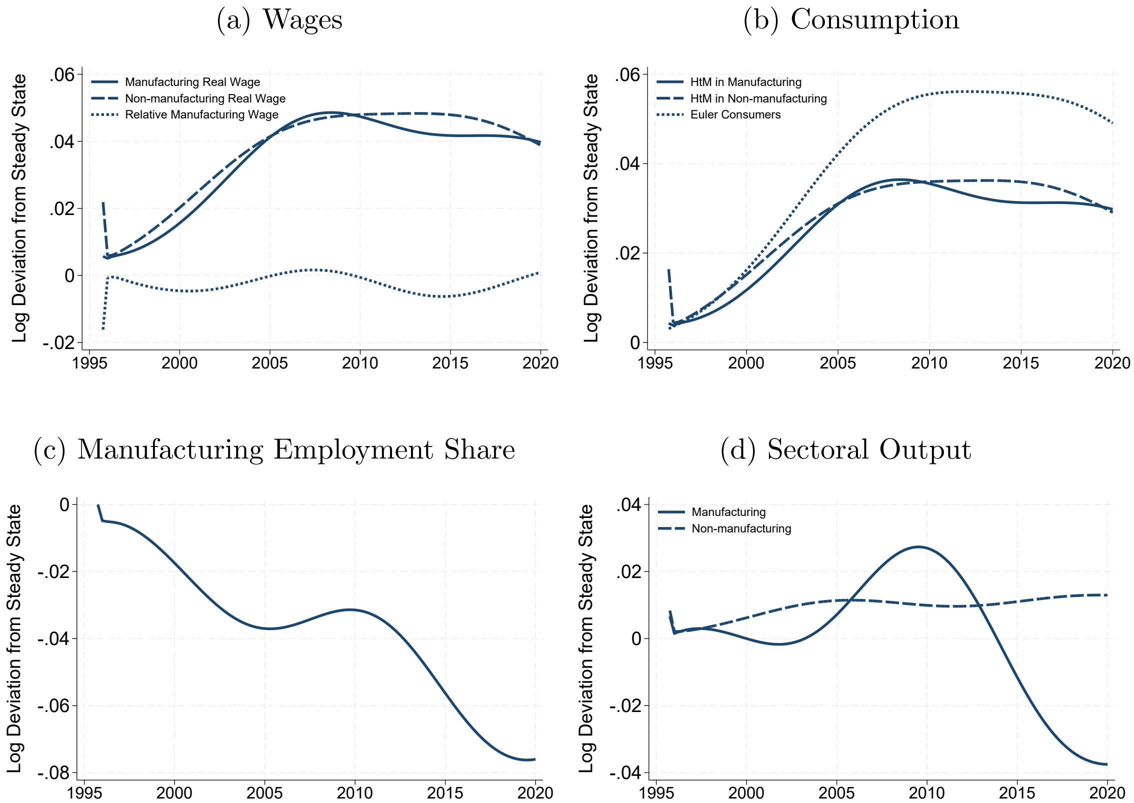
Note: Panel (a) plots consumer price inflation for four simulation scenarios, in which subsets of shocks are fed into the model (indicated in the legend). Panel (b) plots domestic price inflation for manufacturing and non-manufacturing sectors when all anticipated shocks are included.

a basic empirical fact: the relative price of manufacturing output declines in the model, coincident with the offshoring shock that affected manufacturing industries more intensively than non-manufacturing industries. Put differently, rising trade appears to have restrained manufacturing price inflation. This observation is consistent with empirical studies that have estimated the impact of changes in trade on relative producer prices at the sectoral level, through differences-in-differences identification strategies, such as Auer and Fischer (2010), Amiti et al. (2020), Jaravel and Sager (2024). Second, this cross-sectional fact does not imply that lower domestic sourcing reduces aggregate inflation; the impact of sourcing on inflation hinges on its effects on aggregate demand, which is absent in cross-sectoral analyses.

We return to the real side of the economy to close the analysis. To frame this discussion, we recall that an important literature has assessed how import competition has shaped manufacturing wages, employment, and output in the United States; for example, see Autor, Dorn and Hanson (2016) for a survey of work on the "China shock." Motivated by this literature, we plot sector-level responses to anticipated changes in domestic sourcing in Figure 11. In Figure 11a, real wages increase over time in both sectors. However, the increase was persistently larger in the non-manufacturing sector than in manufacturing, leading to a decline in the relative manufacturing wage, though the magnitude of this gap is modest. These real wage gains translate into consumption gains for hand-to-mouth consumers in Figure 11b, though forward-looking Euler consumers experience larger consumption increases. This implies that consumption gains from trade were unevenly distributed: consumption gains were largest for Euler consumers, who had initially higher consumption. This aligns with common concerns about the distributional effects of globalization.

Turning to employment, Figure 11c illustrates that rising trade reduces the share of

Figure 11: Historical Simulation of Real Outcomes: Two-Sector TANK Model



Note: Panel (a) plots real wages by sector and the relative wage of manufacturing workers. Panel (b) plots real consumption. Panel (c) plots the manufacturing share of employment. Panel (d) plots output by sector.

manufacturing workers over time. The employment share of manufacturing declines by approximately 1.1 percentage points (i.e., 8% of the steady state share of 14.2%). In reality, the share of manufacturing employment in total US employment fell by about 6.4 percentage points from 1995 to 2020, so anticipated trade shocks in the model capture about 17% of the true decline.[41] This figure is plausible, in that Acemoglu et al. (2016) argue that Chinese imports alone accounted for 10% of the reduction in US manufacturing employment.

In Appendix D.2, we explore how the results change when we increase reallocation frictions, lowering $\chi = .01$ in the model. Higher reallocation frictions lead to a larger decrease in the relative manufacturing wage and a smaller increase in the real wage for manufacturing workers. They also are associated with a smaller decrease in the employment share of manufacturing. These results are intuitive, as higher frictions lead to more adjustment occurring through prices than quantities. Despite these differences, inflation is virtually the same with

[41] Note that we do not intend to provide a full account of the evolution of sectoral output, wages, and employment, as we have both ignored non-trade driving forces and important propagation mechanisms, such as non-homotheticities in demand [Comin, Lashkari and Mestieri (2021)].

higher versus low reallocation frictions. The reason is that anticipated trade shocks primarily affect inflation through consumption responses by Euler agents, and their response is insensitive to the reallocation frictions.

The final point concerns output: while the manufacturing employment share declines throughout the 1995-2020 period, manufacturing output does not. In Figure 11d, manufacturing employing is little changed over the 1995-2005 interval, and then it actually increases between 2005-2010. It then falls precipitously after 2010. The disconnect between manufacturing employment and output is evidently related to the rising share of imported intermediates in production, which substitute for labor in producing output. As the domestic sourcing share for inputs declines prior to 2010, this boosts manufacturing output; the reversal in domestic sourcing (specifically, the increase in $\lambda_{Ht}^{M}(2,1)$) after 2010 is associated then with a decline in manufacturing employment. In contrast to manufacturing, sectoral output grows steadily in non-manufacturing over time.

To summarize, this two-sector TANK model captures various salient aspects of the real economic adjustment to trade, in relative prices, wages, employment, and output. Nonetheless, the same shocks that drive those outcomes in our model also lead to inflation. Thus, we caution that the large literature on real economic adjustment to trade shocks may be surprisingly uninformative about the relationship between rising trade and inflation outcomes.

4 Conclusion

The impact of trade on inflation is a venerable topic in international economics, with heightened resonance today due to the shifting trade policy landscape. In this paper, we have highlighted an important role for trade dynamics in shaping inflation outcomes. Specifically, anticipated changes in trade trigger adjustments in inflation before they are realized, where an anticipated trade liberalization would increase inflation.

Embedding this channel in models that allow for competing impacts of trade through supply-side cost channels, pro-competitive effects of trade on markups, and distributional impacts of trade, we find anticipation to have quantitatively important effects on inflation. From a quantitative perspective, changes in offshoring (the domestic sourcing of inputs) play a large role in explaining inflation dynamics in the model; while increased foreign sourcing of inputs directly lowers costs, the anticipation of future cost reductions mimics the effects of productivity news. Further, we corroborate this emphasis on anticipation by showing that inflation is elevated as free trade agreements come into force, which augur increased trade.

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Online Appendix

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A Baseline Model

Focusing on a symmetric equilibrium in which all domestic producers are identical, we drop the firm/variety index. The equilibrium conditions for the baseline model in Section 1 are collected in Table A1. We proceed to define the equilibrium taking foreign variables as given, including the price of foreign goods in domestic currency.[1] Given exogenous variables $\{P_{Ft}, C_t^*, P_t^*, Z_t, \tau_{Ct}, \tau_{Mt}\}$, an equilibrium (up to a normalization) is a collection of prices $\{W_t, P_{Ht}, P_{Ct}, P_{Mt}, MC_t, S_t, i_t\}$ and quantities $\{C_t, C_{Ht}, C_{Ft}, L_t, X_t, Y_t, M_t, M_{Ht}, M_{Ft}\}$ that solve the consumer's utility maximization problem, the producer's pricing and input demand problems (maximize profits), and clear the markets for goods, labor, and assets. Further, interest rates are set based on the monetary policy rule. Log-linear approximation of the equations in Table A1 yields the equilibrium system in Table 1.

A.1 Proofs for Propositions 1 and 2

After substituting the policy functions into the model equilibrium equations, evaluating expectations, and collecting terms, the coefficients attached to $\hat{\lambda}_{Ht}^M$ and ξ_{Mt}^1 solve four equations in four unknowns. The first two restrictions come from the domestic price Phillips curve:

$$\varpi_\pi = \tilde{\phi}_1 + \tilde{\phi}_3 \varpi_C + \beta \varpi_\pi \rho_M \tag{A1}$$

$$\varrho_\pi = \tilde{\phi}_3 \varrho_C + \beta \varpi_\pi, \tag{A2}$$

where $\tilde{\phi}_i = \left(\frac{\epsilon-1}{\phi}\right)\phi_i$ for $i \in \{1,2,3\}$, where the ϕ_i's correspond to the coefficients in Equation (16). In Equation A1, the term $\tilde{\phi}_1 + \tilde{\phi}_3 \varpi_C$ captures the impact of $\hat{\lambda}_{Ht}^M$ on real marginal costs, while $\beta \varpi_\pi \rho_M$ corresponds to the impact of $\hat{\lambda}_{Ht}^M$ on expected inflation due to the persistence of shocks. In Equation A2, ξ_{Mt}^1 impacts inflation through expected inflation, via future marginal costs ($\tilde{\phi}_3 \varrho_C$) and expected inflation ($\beta \varpi_\pi$).

[1] Ordinarily, the domestic price of foreign goods (P_{Ft}) would be an equilibrium object in a small open economy model, and its behavior would depend on pricing assumptions. We treat it as exogenous, since it is not needed when we define the equilibrium taking sourcing shares as given.

Table A1: Baseline Model Summary

Consumption-Leisure	$C_t^{-\rho}\frac{W_t}{P_{Ct}} = \mu L_t^{\psi}$
Consumption Allocation	$C_{Ht} = \nu\left(\frac{P_{Ht}}{P_{Ct}}\right)^{-\eta} C_t$
	$C_{Ft} = (1-\nu)\left(\frac{\tau_{Ct}P_{Ft}}{P_{Ct}}\right)^{-\eta} C_t$
Euler Equation	$1 = E_t\left[\beta\left(\frac{C_{t+1}}{C_t}\right)^{-\rho}\frac{P_{Ct}}{P_{C,t+1}}(1+i_t)\right]$
Input Choices	$W_tL_t = (1-\alpha)MC_tY_t$
	$P_{Mt}M_t = \alpha MC_tY_t$
	$M_{Ht} = \xi\left(\frac{P_{Ht}}{P_{Mt}}\right)^{-\eta} M_t$
	$M_{Ft} = (1-\xi)\left(\frac{\tau_{Mt}P_{Ft}}{P_{Mt}}\right)^{-\eta} M_t$
Marginal Cost	$MC_t = \frac{W_t^{1-\alpha}P_{Mt}^{\alpha}}{\alpha^{\alpha}(1-\alpha)^{(1-\alpha)}Z_t}$
Price Setting	$(1-\epsilon)+\epsilon\frac{MC_t}{P_{Ht}} - \phi\left(\frac{P_{Ht}}{P_{H,t-1}}-1\right)\frac{P_{Ht}}{P_{H,t-1}}$
	$+E_t\left[\beta\frac{C_{t+1}^{-\rho}}{C_t^{-\rho}}\frac{P_{Ct}}{P_{C,t+1}}\phi\left(\frac{P_{H,t+1}}{P_{H,t}}-1\right)\frac{P_{H,t+1}Y_{t+1}}{P_{Ht}Y_t}\frac{P_{H,t+1}}{P_{Ht}}\right] = 0$
Price Indexes	$P_{Ct} = \left[\nu P_{Ht}^{1-\eta} + (1-\nu)\left(\tau_{Ct}P_{Ft}\right)^{1-\eta}\right]^{1/(1-\eta)}$
	$P_{Mt} = \left[\xi P_{Ht}^{1-\eta} + (1-\xi)\left(\tau_{Mt}P_{Ft}\right)^{1-\eta}\right]^{1/(1-\eta)}$
Market Clearing	$Y_t = C_{Ht} + M_{Ht} + X_t + \frac{\phi}{2}\left(\frac{P_{Ht}}{P_{H,t-1}}-1\right)^2 Y_t$
	$X_t = \left(\frac{P_{Ht}}{S_tP_{Ct}^*}\right)^{-\eta} C_t^*$
	$\left(\frac{C_t}{C_t^*}\right)^{-\rho}\left(\frac{S_tP_{Ct}^*}{P_{Ct}}\right) = \Upsilon$
Monetary Policy Rule	$1+i_t = (1+i_0)\left(\frac{P_{Ct}}{P_{C,t-1}}\right)^{\omega}$

The second two restrictions are from the Euler equation:

$$\varpi_C = \varpi_C\rho_M - \frac{1}{\rho}\left(\omega\varpi_\pi - \varpi_\pi\rho_M\right) \tag{A3}$$

$$\varrho_C = \varpi_C - \frac{1}{\rho}\left(\omega\varrho_\pi - \varpi_\pi\right). \tag{A4}$$

The $\varpi_C\rho_M$ term in Equation A3 is the impact of $\hat{\lambda}_{Ht}^M$ on expected consumption, and the second captures the impact of the shock on the policy rate and expected inflation. Equation A4 captures the impact of the news shock, working through expected future consumption (the ϖ_C term) and the real interest rate.

Proof for Proposition 1 For part (i), use Equations (A1) and (A3) to solve for

$$\varpi_\pi = \frac{\tilde{\phi}_1(1-\rho_M)}{(1-\beta\rho_M)(1-\rho_M)+\tilde{\phi}_3(\omega-\rho_M)\rho} \tag{A5}$$

Then, $\varpi_\pi > 0$ holds since $\tilde{\phi}_1 > 0$, $\tilde{\phi}_3 > 0$, $\beta < 1$, $\omega > 1$, and $\rho_M < 1$.[2] Plugging this result into Equation (A1) yields $\varpi_C = -\left(\frac{\omega-\rho_M}{(1-\rho_M)\rho}\right)\varpi_\pi < 0$ under the same parameter restrictions.

For part (ii), use Equation (A1) to solve for $\varpi_C = \left(\frac{1-\beta\rho_M}{\tilde{\phi}_3}\right)\varpi_\pi - \frac{\tilde{\phi}_1}{\tilde{\phi}_3}$. Then, take the limit: $\lim_{\rho_M\to 1}\varpi_C = -\frac{\tilde{\phi}_1}{\tilde{\phi}_3} < 0$, since $\lim_{\rho_M\to 1}\varpi_\pi = 0$.

Proof for Proposition 2 For part (i), use Equations (A2) and (A4) to solve for:

$$\varrho_\pi = \left(\beta + \frac{\tilde{\phi}_3}{\rho} - \frac{\tilde{\phi}_3(\omega-\rho_M)}{(1-\rho_M)\rho}\right)\frac{\varpi_\pi}{1+\tilde{\phi}_3\omega/\rho} \tag{A6}$$

While $1+\tilde{\phi}_3\omega/\rho > 0$ and $\varpi_\pi > 0$ under the maintained parameter restrictions, the sign of the term in parentheses is indeterminate. On the other hand, $\varrho_C < 0$ for all admissible parameters. To see this, manipulate Equation (A2) to write $\varrho_C = \frac{1}{\tilde{\phi}_3}(\varrho_\pi - \beta\varpi_\pi)$, plug in the solution for ϱ_π, and simplify to obtain:

$$\varrho_C = -\left(\frac{\omega-1}{(1-\rho_M)\rho}\right)\varpi_\pi < 0, \tag{A7}$$

since $\varpi_{pi} > 0$ was demonstrated above for maintained parameters.

For part (ii), it is helpful to combine Equations (A2) and (A4) to yield $(1+\tilde{\phi}_3\omega/\rho)\varrho_\pi = \tilde{\phi}_3\varpi_C + (\tilde{\phi}_3/\rho)\varpi_\pi + \beta\varpi_\pi$. Then take the limit, where $\varpi_\pi \to 0$ and $\varpi_C \to -\tilde{\phi}_1/\tilde{\phi}_3$ as $\rho_M \to 1$:

$$\lim_{\rho_M\to 1}\varrho_\pi = -\left(\frac{\tilde{\phi}_1}{1+\tilde{\phi}_3\omega/\rho}\right) < 0. \tag{A8}$$

Using Equation (A2) and results from above, we obtain:

$$\lim_{\rho_M\to 1}\varrho_C = -\left(\frac{\tilde{\phi}_1/\tilde{\phi}_3}{1+\tilde{\phi}_3\omega/\rho}\right) < 0. \tag{A9}$$

[2] In the special case where there is no persistence in domestic sourcing, such that $\rho_M = 0$, then $\varpi_\pi = \frac{\tilde{\phi}_1}{1+\tilde{\phi}_3\omega/\rho} > 0$. Here $\hat{\lambda}^M_{Ht}$ has no impact on expected inflation, or consumption tomorrow. However, $\hat{\lambda}^M_{Ht}$ still raises real marginal costs, captured by $\tilde{\phi}_1$. Therefore, domestic price inflation rises. While the resulting monetary contraction attenuates this increase, inflation rises overall.

A.2 Proofs for Propositions 3 and 4

There are three restrictions that are obtained by combining the conjectured policy functions with the domestic price Phillips Curve:

$$\varsigma_\pi = \tilde{\phi}_3 \varsigma_C \tag{A10}$$

$$\eta_\pi = \tilde{\phi}_2 + \tilde{\phi}_3 \eta_C + \beta \varsigma_\pi + \beta \eta_\pi \rho_C \tag{A11}$$

$$\gamma_\pi = \tilde{\phi}_3 \gamma_C + \beta \eta_\pi . \tag{A12}$$

Three additional restrictions come from the Euler equation:

$$\varsigma_C = \frac{\omega}{\rho} \frac{1}{(\eta - 1)} - \frac{\omega}{\rho} \varsigma_\pi \tag{A13}$$

$$\eta_C = \varsigma_C + \eta_C \rho_C - \frac{1}{\rho} \omega \left(\eta_\pi + \frac{1}{(\eta - 1)} \right) + \frac{1}{\rho} (\varsigma_\pi + \eta_\pi \rho_C) + \frac{1}{\rho} \frac{1}{(\eta - 1)} (\rho_C - 1) \tag{A14}$$

$$\gamma_C = \eta_C - \frac{\omega}{\rho} \gamma_\pi + \frac{1}{\rho} \left(\eta_\pi + \frac{1}{(\eta - 1)} \right) . \tag{A15}$$

Together these six equations pin down $\{\varsigma_\pi, \eta_\pi, \gamma_\pi, \varsigma_C, \eta_C, \gamma_C\}$.

As a preliminary step, we solve and sign $\{\varsigma_\pi, \varsigma_C\}$ as follows:

$$\varsigma_C = \left(1 + \frac{\omega}{\rho} \tilde{\phi}_3 \right)^{-1} \frac{\omega}{\rho} \frac{1}{(\eta - 1)} > 0 \tag{A16}$$

$$\varsigma_\pi = \tilde{\phi}_3 \varsigma_C > 0, \tag{A17}$$

where the inequalities hold because $\tilde{\phi}_3 > 0$, $\rho > 0$, $\omega > 1$, and $\eta > 1$.

Proof of Proposition 3 Combine Equations (A11) and (A14) to solve for η_π:

$$\eta_\pi = (1 - \rho_C) \left(\frac{(\tilde{\phi}_2 + \beta \varsigma_\pi)}{\Xi (1 - \beta \rho_C)} \right) + \left(\frac{\tilde{\phi}_3 (\varsigma_C + \frac{1}{\rho} \varsigma_\pi)}{\Xi (1 - \beta \rho_C)} \right) - \left(\frac{\tilde{\phi}_3 (\omega + (1 - \rho_C))}{\Xi (1 - \beta \rho_C) \rho} \right) \frac{1}{(\eta - 1)} . \tag{A18}$$

where $\Xi \equiv (1 - \rho_C) + \left(\frac{\tilde{\phi}_3}{1 - \beta \rho_C} \right) \left(\frac{\omega - \rho_C}{\rho} \right) > 0$.

For part (i) of Proposition 3, each of the individual terms is positive under the maintained parameter restrictions, and the third term is subtracted from the first two, so the overall sign of η_π is indeterminate.

Turning to η_C, we can write $\eta_C = \left(\frac{1 - \beta \rho_C}{\tilde{\phi}_3} \right) \eta_\pi - \left(\frac{\tilde{\phi}_2 + \beta \varsigma_\pi}{\tilde{\phi}_3} \right)$. Substituting for η_π, and then

ς_π and ς_C where needed to simplify, we can write:

$$\eta_C = -\left[\left(\frac{(\omega-\rho_C)(\tilde{\phi}_2+\beta\varsigma_\pi)}{\Xi(1-\beta\rho_C)\rho}\right)+\left(\frac{\frac{\omega\tilde{\phi}_3}{\rho}(\omega-1)}{1+\frac{\omega}{\rho}\tilde{\phi}_3}\right)+(1-\rho_C)\right]\frac{1}{\Xi\rho(\eta-1)}<0. \quad \text{(A19)}$$

The composite term in brackets is unambiguously positive, which pins down the sign.[3]

For part (ii) of Proposition 3, we take the limit:

$$\lim_{\rho_C\to 1}\eta_\pi = \left(\frac{\rho}{\omega-1}\right)(\varsigma_C+\frac{1}{\rho}\varsigma_\pi)-\left(\frac{\omega}{\omega-1}\right)\frac{1}{(\eta-1)} \quad \text{(A20)}$$

where we use $\lim_{\rho_C\to 1}\Xi=\left(\frac{\tilde{\phi}_3}{1-\beta}\right)\left(\frac{\omega-1}{\rho}\right)$ and then simplify terms. Substituting for ς_C and ς_π using Equations (A16)-(A17), and then simlifying terms yields:

$$\lim_{\rho_C\to 1}\eta_\pi = -\left(\frac{\omega\tilde{\phi}_3/\rho}{1+\omega\tilde{\phi}_3/\rho}\right)\left(\frac{1}{\eta-1}\right)<0, \quad \text{(A21)}$$

where the inequality holds under the maintained parameter restrictions.

Using Equation (A11), we can then compute the limit of η_C:

$$\lim_{\rho_C\to 1}\eta_C = \left(\frac{1-\beta}{\tilde{\phi}_3}\right)\lim_{\rho_C\to 1}\eta_\pi-\left(\frac{\tilde{\phi}_2+\beta\varsigma_\pi}{\tilde{\phi}_3}\right) \quad \text{(A22)}$$

Substituting for $\lim_{\rho_C\to 1}\eta_\pi$ using the result above and simplifying yields:

$$\lim_{\rho_C\to 1}\eta_C = -\left[\frac{\omega/\rho}{1+\omega\tilde{\phi}_3/\rho}\right]\frac{1}{(\eta-1)}-\frac{\tilde{\phi}_2}{\tilde{\phi}_3}<0, \quad \text{(A23)}$$

where the inequality again holds under the maintained parameter restrictions.

Proof of Corollary 1 Recall that consumer price inflation is given by $\pi_{Ct}=\pi_{Ht}+\frac{1}{(\eta-1)}\left(\hat{\lambda}^C_{Ht}-\hat{\lambda}^C_{Ht-1}\right)$, so $\frac{\partial\pi_{Ct}}{\partial\hat{\lambda}^C_{Ht}}=\frac{\partial\pi_{Ht}}{\partial\hat{\lambda}^C_{Ht}}+\frac{1}{\eta-1}=\eta_\pi+\frac{1}{\eta-1}$. Then, take the limit as $\rho_C\to 1$: $\lim_{\rho_C\to 1}\frac{\partial\pi_{Ct}}{\partial\hat{\lambda}^C_{Ht}}=\lim_{\rho_C\to 1}\eta_\pi+\frac{1}{\eta-1}$. Plugging in the limit value of η_π obtained above and simplifying yields:

$$\lim_{\rho_C\to 1}\frac{\partial\pi_{Ct}}{\partial\hat{\lambda}^C_{Ht}} = \left(\frac{1}{1+\omega\tilde{\phi}_3/\rho}\right)\frac{1}{\eta-1}>0. \quad \text{(A24)}$$

Thus, π_{Ct} increases because the direct positive impact of $\hat{\lambda}^C_{Ht}$ on π_{Ct} dominates the indirect negative impact of $\hat{\lambda}^C_{Ht}$ on π_{Ht}.

[3] Substitute for ς_π using results above to write η_C in terms of primitive parameters.

Proof of Proposition 4 Using Equations (A12) and (A15), solve for γ_π:

$$\gamma_\pi = \left(\frac{\tilde{\phi}_3}{1+\tilde{\phi}_3\omega/\rho}\right)\eta_C + \left(\frac{\beta+\tilde{\phi}_3/\rho}{1+\tilde{\phi}_3\omega/\rho}\right)\eta_\pi + \left(\frac{\tilde{\phi}_3/\rho}{1+\tilde{\phi}_3\omega/\rho}\right)\frac{1}{\eta-1}, \tag{A25}$$

where this solution depends on the solutions for η_C and η_π from Proposition 3. Plugging back into Equation (A15) provides the solution for γ_C:

$$\gamma_C = \left(\frac{1}{1+\tilde{\phi}_3\omega/\rho}\right)\eta_C - \frac{1}{\rho}\left(\frac{\omega\beta-1}{1+\tilde{\phi}_3\omega/\rho}\right)\eta_\pi + \frac{1}{\rho}\left(\frac{1}{1+\tilde{\phi}_3\omega/\rho}\right)\frac{1}{(\eta-1)} \tag{A26}$$

For part (i), the ambiguity in the sign of η_π is the source of the ambiguous sign for γ_π, as the terms in parentheses are all positive, as is $1/(\eta-1)$.

For part (ii), take the limit using Equation (A25):

$$\lim_{\rho_C\to 1}\gamma_\pi = \left(\frac{\tilde{\phi}_3}{1+\tilde{\phi}_3\omega/\rho}\right)\lim_{\rho_C\to 1}\eta_C + \left(\frac{\beta+\tilde{\phi}_3/\rho}{1+\tilde{\phi}_3\omega/\rho}\right)\lim_{\rho_C\to 1}\eta_\pi + \left(\frac{\tilde{\phi}_3/\rho}{\left(1+\tilde{\phi}_3\omega/\rho\right)}\right)\frac{1}{(\eta-1)}. \tag{A27}$$

Substitute in the limits for η_C and η_π from above, and then simplify to get:

$$\lim_{\rho_C\to 1}\gamma_\pi = -\left(\frac{\omega\,(1+\beta)-1}{1+\tilde{\phi}_3\omega/\rho}\right)\left(\frac{\tilde{\phi}_3}{\rho(1+\tilde{\phi}_3\omega/\rho)}\right)\frac{1}{\eta-1} - \left(\frac{\tilde{\phi}_3}{1+\tilde{\phi}_3\omega/\rho}\right)\frac{\tilde{\phi}_2}{\tilde{\phi}_3} < 0, \tag{A28}$$

under the maintained parameter restrictions.

$$lim_{\rho_C\to 1}\gamma_c = \frac{1}{1+\frac{\omega}{\rho}\widetilde{\phi}_3}lim_{\rho_C\to 1}\eta_c - \frac{(\omega\beta-1)}{\rho(1+\frac{\omega}{\rho}\widetilde{\phi}_3)}lim_{\rho_C\to 1}\eta_\pi + \frac{1}{\rho(\eta-1)(1+\frac{\omega}{\rho}\widetilde{\phi}_3)} \tag{A29}$$

$$= (\rho(1+\frac{\omega}{\rho}\widetilde{\phi}_3))^{-1}\left(\left(\frac{\rho(1-\beta)}{\widetilde{\phi}_3} - (\omega\beta-1)\right)\eta_\pi - \left(\frac{\rho\widetilde{\phi}_2}{\widetilde{\phi}_3} - \frac{1}{\eta-1}\right)\right) \tag{A30}$$

$$= (\rho(1+\frac{\omega}{\rho}\widetilde{\phi}_3))^{-1}\left(\left(\frac{\rho(1-\beta)}{\widetilde{\phi}_3} - (\omega\beta-1)\right)\eta_\pi - \frac{1}{\eta-1}\left(\frac{(\eta+1/\psi)}{\eta\frac{s_C/(\eta\rho)+s_X}{1-s_M}+\frac{1}{\psi}} - 1\right)\right) \tag{A31}$$

The term inside the last bracket is positive because $S_C + S_X = 1 - S_M$ and $\eta\rho > 1$. However, the sign of the term that multiplies η_π is indeterminate because for ω large enough, it can be negative. Intuitively, an increase in $\hat{\lambda}^C_{Ht}$ reduces inflation because $\eta_\pi < 0$ in the limit. If the nominal interest rate (i_t) responds sufficiently strong to the lower inflation caused by an increase in $\hat{\lambda}^C_{Ht}$, consumption may increase upon the arrival of news about a future increase in the home share (ξ^1_{Ct}). Hence the ambiguity in the sign of γ_c.

Proof of Corollary 2 Since $\lim_{\rho_C \to 1} \gamma_\pi < 0$, then $\xi^1_{Ct} > 0$ lowers π_{Ht}. Since λ^C_{Ht} does not depend on ξ^1_{Ct}, then π_{Ht} is the only channel through which ξ^1_{Ct} affects consumer price inflation, so π_{Ct} falls on impact.

A.3 The Behavioral New Keynesian Model

With the modification of the Euler Equation and Phillips Curve discussed in Section 1.3, we posit the following policy functions:

$$\pi_{Ht} = \varsigma^b_\pi \hat{\lambda}^C_{Ht-1} + \eta^b_\pi \hat{\lambda}^C_{Ht} + \gamma^b_\pi \xi^1_{Ct} + \varpi^b_\pi \hat{\lambda}^M_{Ht} + \varrho^b_\pi \xi^1_{Mt} \tag{A32}$$

$$\hat{c}_t = \varsigma^b_c \hat{\lambda}^C_{Ht-1} + \eta^b_c \hat{\lambda}^C_{Ht} + \gamma^b_c \xi^1_{Ct} + \varpi^b_c \hat{\lambda}^M_{Ht} + \varrho^b_c \xi^1_{Mt}. \tag{A33}$$

The coefficient restrictions implied by the model are:

$$\varsigma^b_\pi = \widetilde{\phi}_3 \varsigma^b_c \tag{A34}$$

$$\eta^b_\pi = \widetilde{\phi}_2 + \widetilde{\phi}_3 \eta^b_c + \Omega\beta \left(\varsigma^b_\pi + \eta^b_\pi \rho_C \right) \tag{A35}$$

$$\gamma^b_\pi = \widetilde{\phi}_3 \gamma^b_c + \Omega\beta\eta^b_\pi \tag{A36}$$

$$\varpi^b_\pi = \widetilde{\phi}_1 + \widetilde{\phi}_3 \varpi^b_c + \Omega\beta\varpi^b_\pi \rho_M \tag{A37}$$

$$\varrho^b_\pi = \widetilde{\phi}_3 \varrho^b_c + \Omega\beta\varpi^b_\pi \tag{A38}$$

$$\varsigma^b_c = -\frac{\omega}{\rho} \left(\varsigma^b_\pi - 1/(\eta - 1) \right) \tag{A39}$$

$$\eta^b_c = \Omega(\varsigma^b_c + \eta^b_c \rho_C) - \frac{\omega}{\rho}(\eta^b_\pi + \frac{1}{\eta - 1}) + \frac{1}{\rho} \left(\varsigma^b_\pi + \rho_C \eta^b_\pi - \frac{1 - \rho_C}{\eta - 1} \right) \tag{A40}$$

$$\gamma^b_c = \Omega\eta^b_c + \frac{1}{\rho}(\eta^b_\pi + \frac{1}{(\eta - 1)} - \omega\gamma^b_\pi) \tag{A41}$$

$$\varpi^b_c = \Omega\varpi^b_c \rho_M - \frac{\varpi^b_\pi}{\rho}(\omega - \rho_M) \tag{A42}$$

$$\varrho^b_c = \Omega\varpi^b_c - \frac{1}{\rho}(\omega\varrho^b_\pi - \varpi^b_\pi) \tag{A43}$$

We then impose two restrictions to write revised propositions for this model. The first restriction is mild: we assume that $\Omega\omega > 1$. Since $\omega > 1$ is imposed in the monetary policy rule to ensure equilibrium determinacy, then this restriction requires that Ω is not "too small" – for a typical value $\omega = 1.5$ then we would only require $\Omega > 1/1.5 \approx 0.66$. The second restriction is Condition 1: $\frac{\widetilde{\phi}_3}{\rho} \left(\frac{\Omega\omega - 1}{1 - \Omega} \right) > \Omega\beta$. With these in hand, we'll compactly state results in combined analogs to the propositions.

Equivalent to Propositions 1 & 2 : (i) for $\rho_M < 1$, $\varpi_\pi^b > 0$, $\varpi_c^b < 0$, the sign of ϱ_π^b is indeterminate, and $\varrho_c^b < 0$. (ii) In the limit as $\rho_M \to 1$, $\varpi_\pi^b > 0$, $\varpi_c^b < 0$, $\varrho_c^b < 0$. Additionally, $\varrho_\pi^b < 0$ if Condition 1 holds.

The algebraic proof proceeds to solve for and sign the coefficients:

$$\varpi_\pi^b = \frac{\widetilde{\phi}_1}{1 - \Omega\beta\rho_M + \frac{\widetilde{\phi}_3}{\rho}\frac{(\omega-\rho_M)}{1-\Omega\rho_M}} > 0 \tag{A44}$$

$$\varpi_c^b = \frac{-(\omega-\rho_M)}{\rho(1-\Omega\rho_M)}\frac{\widetilde{\phi}_1}{1 - \Omega\beta\rho_M + \frac{\widetilde{\phi}_3}{\rho}\frac{(\omega-\rho_M)}{1-\Omega\rho_M}} < 0 \tag{A45}$$

$$\varrho_\pi^b = \left(\Omega\beta - \frac{\widetilde{\phi}_3}{\rho}\left(\frac{\Omega\omega-1}{1-\Omega\rho_M}\right)\right)\frac{\varpi_\pi^b}{\left(1+\frac{\widetilde{\phi}_3\omega}{\rho}\right)} \tag{A46}$$

$$\varrho_c^b = -\frac{\frac{\widetilde{\phi}_3\omega}{\rho}}{\left(1+\frac{\widetilde{\phi}_3\omega}{\rho}\right)}\frac{\Omega\beta\varpi_\pi^b}{\widetilde{\phi}_3} - \frac{(\Omega\omega-1)\,\varpi_\pi^b}{\rho(1-\Omega\rho_M)\left(1+\frac{\widetilde{\phi}_3\omega}{\rho}\right)} < 0 \tag{A47}$$

Taking limits as $\rho_M \to 1$, we obtain:

$$lim_{\rho_M\to1}\varpi_\pi^b = \frac{\widetilde{\phi}_1}{1 - \Omega\beta + \frac{\widetilde{\phi}_3}{\rho}\frac{(\omega-1)}{1-\Omega}} > 0 \tag{A48}$$

$$lim_{\rho_M\to1}\varpi_c^b = \frac{-(\omega-1)}{\rho(1-\Omega)}\frac{\widetilde{\phi}_1}{1 - \Omega\beta + \frac{\widetilde{\phi}_3}{\rho}\frac{(\omega-1)}{1-\Omega}} < 0 \tag{A49}$$

$$lim_{\rho_M\to1}\varrho_c^b = -\frac{\frac{\widetilde{\phi}_3\omega}{\rho}}{\left(1+\frac{\widetilde{\phi}_3\omega}{\rho}\right)}\frac{\Omega\beta\varpi_\pi^b}{\widetilde{\phi}_3} - \frac{(\Omega\omega-1)\,\varpi_\pi^b}{\rho(1-\Omega)\left(1+\frac{\widetilde{\phi}_3\omega}{\rho}\right)} < 0 \tag{A50}$$

$$lim_{\rho_M\to1}\varrho_\pi^b = \left(\Omega\beta - \frac{\widetilde{\phi}_3}{\rho}\left(\frac{\Omega\omega-1}{1-\Omega}\right)\right)\frac{\varpi_\pi^b}{\left(1+\frac{\widetilde{\phi}_3\omega}{\rho}\right)} < 0 \quad \text{if Condition 1 holds.} \tag{A51}$$

Proceeding to Propositions 3 and 4, we impose two additional conditions. Condition 2 is: $\frac{\omega\widetilde{\phi}_3}{\rho(\eta-1)(1-\Omega)} > \widetilde{\phi}_2 + \frac{\omega\widetilde{\phi}_3\left(\Omega(1+\beta)+\frac{\widetilde{\phi}_3}{\rho}\right)}{\rho(\eta-1)\left(1+\frac{\omega}{\rho}\widetilde{\phi}_3\right)}$. Condition 3 is: $\rho\Omega|lim_{\rho_C\to1}\eta_c^b| > 1/(\eta-1)$.

Equivalent to Propositions 3 & 4 : (i) When $\rho_C < 1$, $\eta_c^b < 0$ and the signs of η_π^b, γ_π^b, and γ_c^b are indeterminate. (ii) In the limit as $\rho_C \to 1$, $\eta_\pi^b < 0$ and $\eta_c^b < 0$ if Condition 2 holds, and $\gamma_\pi^b < 0$ if Conditions 2 and 3 hold. The sign of γ_c^b is indeterminate.

As a preliminary step, solve and sign ς_c^b and ς_π^b:

$$\varsigma_c^b = \frac{\omega}{\rho(\eta-1)\left(1+\frac{\omega}{\rho}\widetilde{\phi}_3\right)} > 0 \tag{A52}$$

$$\varsigma_\pi^b = \frac{\omega\widetilde{\phi}_3}{\rho(\eta-1)\left(1+\frac{\omega}{\rho}\widetilde{\phi}_3\right)} = \widetilde{\phi}_3\varsigma_c^b > 0 \tag{A53}$$

Then, solutions for the η-coefficients are as follows.

$$\eta_\pi^b = \Xi^{-1}\left(\widetilde{\phi}_2 - \frac{\widetilde{\phi}_3(\omega+1-\rho_C)}{\rho(1-\Omega\rho_C)(\eta-1)} + \left(\Omega\beta + \frac{\Omega+\frac{\widetilde{\phi}_3}{\rho}}{(1-\Omega\rho_C)}\right)\varsigma_\pi^b\right), \tag{A54}$$

where $\Xi = (1-\Omega\beta\rho_C + \frac{\widetilde{\phi}_3(\omega-\rho_C)}{\rho(1-\Omega\rho_C)}) > 0$. The sign of η_π^b is indeterminate because the second term inside the brackets in (A54) is negative while the first and second are positive. Then the solution for η_c^b is:

$$\eta_c^b = -\frac{(1-\Omega\beta\rho_C)}{\Xi(1-\Omega\rho_C)\rho(\eta-1)}\left(\frac{\omega\left(1-\Omega+(\omega-1)\frac{\omega}{\rho}\widetilde{\phi}_3\right)}{\left(1+\frac{\omega}{\rho}\widetilde{\phi}_3\right)} + (1-\rho_C)\right) - \frac{(\widetilde{\phi}_2+\Omega\beta\varsigma_\pi^b)(\omega-\rho_C)}{\Xi\rho(1-\Omega\rho_C)} < 0, \tag{A55}$$

where the inequality holds because both terms can be verified to be negative.

Turning to the γ-coefficients:

$$\gamma_\pi^b = \left(\frac{\Omega\beta+\frac{\widetilde{\phi}_3}{\rho}}{1+\frac{\omega}{\rho}\widetilde{\phi}_3}\right)\eta_\pi^b + \frac{\widetilde{\phi}_3\Omega}{1+\frac{\omega}{\rho}\widetilde{\phi}_3}\eta_c^b + \frac{\frac{\widetilde{\phi}_3}{\rho}}{(\eta-1)(1+\frac{\omega}{\rho}\widetilde{\phi}_3)} \tag{A56}$$

$$\gamma_c^b = -(\frac{\Omega\beta\omega-1}{\rho(1+\frac{\omega}{\rho}\widetilde{\phi}_3)})\eta_\pi^b + \frac{\Omega}{1+\frac{\omega}{\rho}\widetilde{\phi}_3}\eta_c^b + \frac{1}{\rho(\eta-1)(1+\frac{\omega}{\rho}\widetilde{\phi}_3)} \tag{A57}$$

The sign of γ_π^b is indeterminate because the sign of η_π^b is indeterminate, the sign of η_c^b is negative and the third term in (A56) is positive. The sign of γ_c^b is indeterminate because the sign of η_π^b is indeterminate, the sign of η_c^b is negative and the third term in (A57) is positive.

Taking limits as $\rho_C \to 1$, we obtain:

$$lim_{\rho_C\to 1}\eta_\pi^b = \Xi_1^{-1}\left(\widetilde{\phi}_2 - \frac{\omega\widetilde{\phi}_3}{\rho(\eta-1)(1+\frac{\omega}{\rho}\widetilde{\phi}_3)(1-\Omega)}\left(1+\frac{\omega}{\rho}\widetilde{\phi}_3-(1-\Omega)(\Omega\beta+\Omega+\frac{\widetilde{\phi}_3}{\rho})\right)\right) \tag{A58}$$

where $\Xi_1 = lim_{\rho_C \to 1}\Xi = 1-\Omega\beta+\frac{\widetilde{\phi}_3}{(1-\Omega)}\frac{(\omega-1)}{\rho} > 0$. Then η_π^b is negative in the limit if Condition 2 holds.

For η_c^b, we get:

$$lim_{\rho_C \to 1}\eta_c^b = -\frac{(\widetilde{\phi}_2+\Omega\beta\varsigma_\pi^b)(\omega-1)}{\Xi\rho(1-\Omega)} - \frac{(1-\Omega\beta)}{\Xi(1-\Omega)\rho(\eta-1)}\left(\frac{\omega\left(1-\Omega+(\omega-1)\frac{\omega}{\rho}\widetilde{\phi}_3\right)}{\left(1+\frac{\omega}{\rho}\widetilde{\phi}_3\right)}\right) < 0 \quad \text{(A59)}$$

For γ_π^b:

$$lim_{\rho_C \to 1}\gamma_\pi^b = \left(\frac{\Omega\beta + \frac{\widetilde{\phi}_3}{\rho}}{1+\frac{\omega}{\rho}\widetilde{\phi}_3}\right) lim_{\rho_C \to 1}\eta_\pi^b + \frac{\widetilde{\phi}_3\Omega}{1+\frac{\omega}{\rho}\widetilde{\phi}_3} lim_{\rho_C \to 1}\eta_c^b + \frac{\frac{\widetilde{\phi}_3}{\rho}}{(\eta-1)(1+\frac{\omega}{\rho}\widetilde{\phi}_3)} \quad \text{(A60)}$$

If Condition 2 holds, the first term is negative, and if Condition 3 holds, the second term (which is negative) is larger in absolute value than the third. Therefore, these two conditions suffice to ensure that in the limit $\gamma_\pi^b < 0$.

For γ_c^b:

$$\gamma_c^b = -\left(\frac{\Omega\beta\omega - 1}{\rho(1+\frac{\omega}{\rho}\widetilde{\phi}_3)}\right)\eta_\pi^b + \left(\frac{\Omega}{1+\frac{\omega}{\rho}\widetilde{\phi}_3}\right)\eta_c^b + \frac{1}{\rho(\eta-1)(1+\frac{\omega}{\rho}\widetilde{\phi}_3)}. \quad \text{(A61)}$$

The sign of γ_c^b is indeterminate, because both η_c^b and η_π^b are negative in the limit.

B FTAs and Inflation

B.1 Data

Data on consumer price inflation is taken from the International Monetary Fund's World Economic Outlook Database, which covers 1980 to the present. Data is missing for some countries and years in this data, principally during periods of hyperinflation or prior to countries transition to market status.

We use the OECD inter-country input-output tables to measure bilateral sourcing of final goods and inputs from 1995 to 2000.[1] We then combine this with data from Johnson and Noguera (2017) to backcast sourcing data to 1980.[2] If $F_{ij,1995}^{OECD}$ and $M_{ij,1995}^{OECD}$ are the bilateral shipments of final goods and inputs in 1995, as measured by the OECD, and F_{ijt}^{JN} and M_{ijt}^{JN} are shipments of final goods and inputs in the Johnson-Noguera data for $t =$

[1]See https://www.oecd.org/en/data/datasets/inter-country-input-output-tables.html.
[2]See https://doi.org/10.7910/DVN/RZU4WX.

$\{1980, \ldots, 1994\}$, then we set $F_{ijt} = \left(F_{ijt}^{JN}/F_{ij,1995}^{JN}\right) F_{ij,1995}^{OECD}$ and $M_{ijt} = \left(M_{ijt}^{JN}/M_{ij,1995}^{JN}\right) F_{ij,1995}^{OECD}$ for 1980-1994. Due to missing data for trade with former communist countries prior to their transition, the data is an unbalanced panel.

Data on bilateral trade agreements come from the Economic Integration Agreements Database, assembled by Scott Baier and Jeffrey Bergstrand, with agreements recorded through 2017.[3] We code a country as having a free trade agreement in place if it has an agreement that registers ≥ 3 in the Baier-Bergstrand coding; this includes free trade agreements, customs unions, and common markets.

There are 42 countries with data available in all three sources, so these constitute the country set. We use the full set of countries and years to estimate the impact of free trade agreements. We then use a subset of the available countries and years to estimate the impulse responses. We drop Argentina in all years, due both to missing data and their extreme inflation outcomes. We also drop several high inflation episodes from the data, which our theory is not designed to explain. We use data for 1980-2019 for the following countries: Australia (*), Austria (*), Belgium (*), Canada (*), Chile, China, Denmark (*), Finland (*), France (*), Germany (*), Greece (*), Hungary, India, Indonesia, Ireland (*), Italy (*), Japan (*), Korea, Netherlands (*), New Zealand (*), Norway (*), Portugal (*), South Africa, Spain (*), Sweden (*), Switzerland (*), Thailand, United Kingdom (*), United States (*). After cleaning, the following countries have shorter time series, starting in the year in parentheses and ending in 2019: Brazil (2000), Czech Republic (1995), Estonia (2000), Israel (2000,*), Mexico (1990), Poland (2000), Romania (2006), Russia (2000), Slovak Republic (1993), Slovenia (1992), Turkey (2000), and Vietnam (1993). The countries included in the advanced country subgroup are indicated by stars in parentheses, and the G7 group definition is standard.

Lastly, we use data from Borio and Chavaz (2025) on the dates that countries adopted inflation targets to allow for changes in mean inflation when countries adopt inflation targets. We also allow for changes in mean inflation before/after the original eleven euro members adopt the common currency. In the regressions, these appear in the form of regime-specific country fixed effects.

B.2 Estimating the Impact of Trade Agreements

We use a standard fixed effects gravity specification to estimate how free trade agreements alter domestic sourcing, building on Baier and Bergstrand (2007) and many others.[4] The

[3]See https://sites.nd.edu/jeffrey-bergstrand/database-on-economic-integration-agreements/.

[4]While the gravity regression is typically specified for log bilatereral trade flows, one can straightforwardly replace the log of bilateral trade with the log of the share of spending on imports from source j in total

specification we use is:

$$\ln \Lambda_{ijt} = \phi_{it} + \phi_{jt} + \phi_{ij} + \sum_{s=1}^{15} \beta_s \text{FTA}_{ijt}(s) + \varepsilon_{ijt}, \tag{B1}$$

where $\text{FTA}_{ijt}(s)$ for $s \leq 15$ are binary indicator variables that takes the value one if countries i and j have a reciprocal (free) trade agreement that has been in force for s periods. So, $\text{FTA}_{ijt}(1)$ percentage change in the share of i's expenditure allocated to source j in the year the agreement enters into force, $\text{FTA}_{ijt}(2)$ would be the effect in the second year in force, and so on. $\text{FTA}_{ijt}(15)$ takes the value 1 if the agreement has been in force for fifteen years or more, so captures the long run effect. These estimates are partial effects, of course, as we control for importer-year, exporter-year, and importer-exporter pair fixed effects.[5]

We estimate this regression using data from 1980-2020, as described above.[6] The estimated β_s coefficients are presented in Figure B1. As is evident, the impact of the FTA builds slowly for about a decade after it enters into force, and then levels off thereafter. This result in our dataset replicates standard results in the literture (e.g., see Limão (2016) and Johnson and Noguera (2017)).

We use these point estimates to construct the treatment, as described in Section 2.2. Equation (24) serves to construct the projected trade share, and we use Equation (23) to construct the FTA treatment (T_{it}), setting $\kappa = 0.9$ and $S = 15$. As a note on timing conventions, we set event date t to be the calendar year before the agreement enters into force; because trade increases in the year the agreement enters into force, the difference in trade from one year prior to the year the agreement enters into force is captured at date t. Because we include both leads and lags, this convention can be adjusted with no substantive implications.

B.3 Panel Local Projections: Robustness

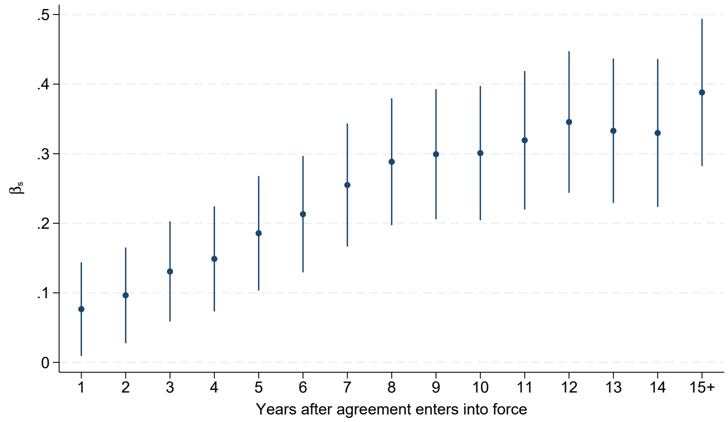
In Figure B2, we provide supplementary results that change the dependent variable in Equation (25) to be inflation at horizon h: $\pi_{i,t+h}$. The resulting regression is the "first difference" analog to the long differences (cumulative inflation) specification presented in Figure 2, and

expenditure, because there is an importer-year fixed effect included in the regression.

[5] Baier and Bergstrand (2007) popularized this importer-exporter fixed effects specification, where the pair fixed effect controls for time-invariant characteristics that determine whether countries i and j form an FTA (e.g., shared borders, history, etc.). Further, note that the importer-year fixed effect purges the domestic sourcing share of all time-varying characteristics of the importer; most importantly, inflation in the importing country, which is the outcome in our local projections.

[6] To be consistent with the literature, we use only international sourcing shares (with $i \neq j$) to estimate the effect of adopting the FTA. The estimated FTA effects are slightly larger if one incorporates domestic sourcing ($\ln \Lambda_{iit}$) in the regression as well, but not significantly so.

Figure B1: Regression Coefficients for Phased Impact of FTA



Note: The figure contains estimated β_s coefficients and 90% confidence intervals for Equation (B1). β_1 is the log increase in bilateral sourcing in the first year the FTA is in force; similar interpretations apply to β_s for $s \leq 14$. β_{15} is the impact of an FTA that has been in place for 15 years or more.

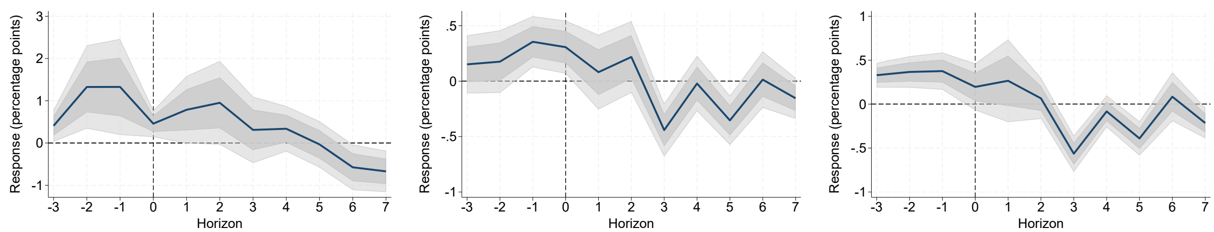
the coefficients can be interpreted as the change in annual inflation rate at horizon $t + h$ due to the FTA shock. Consistent with the baseline, we find that inflation is higher in years leading up to and immediately after the FTA enters into force, with magnitudes consistent with those implied by the long difference specifications. In this specification, we have also explored the impact of adding a fourth lead in T_{it}: we find the point estimation at β^{gj} for $j = -4$ is small and not significantly different than zero, which supports the choice to restrict the anticipation interval to three periods in our baseline specifications.

In the baseline specifications, we have defined domestic sourcing without distinguishing sourcing for final goods from input sourcing. In the data, both input sourcing and final goods sourcing rise slowly over time in response to FTA adoption. Input sourcing rises almost 8% on impact and plateaus just over 30% after 10 years, while final goods sourcing rises by about 4% on impact and levels off a few percentage points lower around 27%. So, the overall dynamics are very similar. Once these effects are fed into Equations (23) and (24) to form the FTA treatment separately for inputs and final goods results, the resulting FTA treatment for input sourcing is generally larger than for final goods for two reasons: the dynamic impact of FTAs on input sourcing is larger, and the initial domestic sourcing shares are lower for inputs than final goods. Nonetheless, the correlation between these separate input and final goods treatments is very high: the raw correlation is literally 0.98. Thus, we are not able to identify the effects of final goods sourcing separately from input sourcing, given the quasi-experiments available to us. That said, we have confirmed that we get qualitatively similar dynamic responses to each treatment separately.

As an additional robustness check, we have constructed an alternative version of the

Figure B2: Impulse Response of Inflation to Anticipated Changes in Domestic Sourcing

(a) All Countries (b) Advanced Countries (c) G7 Countries



Note: Each figure plots the impulse response for annual inflation (in percentage points) for a shock of magnitude .005 (see the text for discussion of shock magnitudes). The dark shaded area corresponds to the (+/-) one standard deviation confidence interval on the cumulative inflation response. The lighter shaded area corresponds to the 90% confidence interval. The value 0 on the x-axis corresponds to the year in which the free trade agreement enters into force. We allow the shock to impact inflation up to 3 years ahead of the date the agreement enters into force.

treatment based on ex post realized values of bilateral trade with FTA partners, rather than projections based on the average phased impact of FTA adoption. Specifically, in Equation (24), one replaces $\exp(\beta_s)$ with the ratio $\Lambda_{j,t+s}/\Lambda_{jt}$, where $\Lambda_{j,t+s}$ is the realized share of expenditure on goods from country j at date $t+s$. Using ex post realized trade requires agents to have perfect foresight in forming their assessment of the impacts of RTA adoption, which is a strong assumption. Further, realized trade may respond to shocks that also directly influence inflation, which is a threat to identification. Nonetheless, repeating the main local projections exercise with this alternative treatment, we obtain qualitatively similar results. The straightforward reason is that predicted trade and realized trade are positively correlated with one another, with an unconditional correlation of 0.62 in the full sample.

C Large Open Economy with Variable Markups

Drawing on Section 3.1, we briefly describe new equilibrium conditions for the model with Kimball demand and dollar currency pricing. We focus on the Home country, noting differences for Foreign where needed.

Home agents choose consumption of individual home and foreign varieties to minimize expenditure with the consumption aggregator given by Equation 26. In a symmetric firm equilibrium, this yields the following equilibrium conditions:

$$C_{Ht} = \nu\Psi\left(\frac{D_{Ct}P_{Ht}}{P_{Ct}}\right)C_t \tag{C1}$$

$$C_{Ft} = (1-\nu)\Psi\left(\frac{D_{Ct}\tau_{Ct}P_{Ft}}{P_{Ct}}\right)C_t \tag{C2}$$

$$\nu\Upsilon\left(\frac{C_{Ht}}{\nu C_t}\right) + (1-\nu)\Upsilon\left(\frac{C_{Ft}}{(1-\nu)C_t}\right) = 1 \tag{C3}$$

$$P_{Ct}C_t = P_{Ht}C_{Ht} + \tau_{Ct}P_{Ft}C_{Ft}, \tag{C4}$$

where $\Psi(x) \equiv \Upsilon'^{-1}(x)$.

On the production side, Home producers choose home and foreign input use to minimize costs given the input aggregator in Equation 27, and they set prices (in Home currency) for sales to domestic buyers and export buyers. Cost minimization yields the following equilibrium conditions for a representative firm:

$$M_{Ht} = \xi\Psi\left(\frac{D_{Mt}P_{Ht}}{P_{Mt}}\right)M_t \tag{C5}$$

$$M_{Ft} = (1-\xi)\Psi\left(\frac{D_{Mt}\tau_{Mt}P_{Ft}}{P_{Mt}}\right)M_t \tag{C6}$$

$$\xi\Upsilon\left(\frac{M_{Ht}}{\xi M_t}\right) + (1-\xi)\Upsilon\left(\frac{M_{Ft}}{(1-\xi)M_t}\right) = 1 \tag{C7}$$

$$P_{Mt}M_t = P_{Ht}M_{Ht} + \tau_{Mt}P_{Ft}M_{Ft}. \tag{C8}$$

Turning to price setting, the Home firm's profits from sales at home are:

$$\text{Profits}_{Ht} = P_{Ht}(i)Y_{Ht}(i) - MC_t(i)Y_{Ht}(i) - \frac{\phi}{2}\left(\frac{P_{Ht}(i)}{P_{H,t-1}(i)} - 1\right)^2 P_{Ht}Y_{Ht} \tag{C9}$$

where $Y_{Ht}(i) = C_{Ht}(i) + M_{Ht}(i) + A_{Ht}(i)$, with $A_{Ht}(i)$ denoting demand for the firm's good used to cover aggregate adjustment costs (which is exogenous to the measure zero firm). The (symmetric) firm's optimal prices in the domestic market then satisfy the following dynamic equation:

$$\begin{aligned} 0 = 1 - \epsilon_{Ht}\left(1 - \frac{MC_t}{P_{Ht}}\right) - \phi\left(\Pi_{Ht} - 1\right)\left(\Pi_{Ht}\right) \\ + \beta E_t^{BR}\left[\left(\frac{C_{t+1}}{C_t}\right)^{-\rho}\frac{1}{\Pi_{Ct+1}}\phi\left(\Pi_{Ht+1} - 1\right)\Pi_{Ht+1}^2\frac{Y_{Ht+1}}{Y_{Ht}}\right] \end{aligned} \tag{C10}$$

where $\Pi_{Ht} = \frac{P_{Ht}}{P_{Ht-1}}$ and $Y_{Ht} = C_{Ht} + M_{Ht} + \frac{\phi}{2}\left(\frac{P_{Ht}}{P_{H,t-1}} - 1\right)^2 Y_{Ht}$. The elasticity of demand is $\epsilon_{Ht} = -\left[\Xi_\Psi\left(\frac{D_{Ct}P_{Ht}}{P_{Ct}}\right)\frac{C_{Ht}}{Y_{Ht}} + \Xi_\Psi\left(\frac{D_{Mt}P_{Ht}}{P_{Mt}}\right)\frac{M_{Ht}}{Y_{Ht}}\right]$, with $\Xi_\Psi(x) \equiv \frac{\Psi'(x)}{\Psi(x)}x$.[1] As in Gabaix (2020), the firm sets prices with behavioral expectations, which are denoted by the superscript BR.

For Home firms selling to the foreign market, let P^*_{Ht} be the price of Home output sold in Foreign denominated in Home currency, then profits are:

$$\text{Profits}^*_{Ht} = P^*_{Ht}(i)Y^*_{Ht}(i) - MC_t(i)Y^*_{Ht}(i) - \frac{\phi}{2}\left(\frac{P^*_{Ht}(i)}{P^*_{H,t-1}(i)} - 1\right)^2 P^*_{Ht}Y^*_{Ht} \tag{C11}$$

where $Y^*_{Ht}(i) = \tau^*_{Ct}C^*_{Ht}(i) + \tau^*_{Mt}M^*_{Ht}(i) + A^*_{Ht}(i)$, with $\tau^*_{Ct} > 1$ and $\tau^*_{Mt} > 1$ denoting iceberg trade costs. In the symmetric firm equilibrium, optimal prices satisfy:

$$0 = 1 - \epsilon^*_{Ht}\left(1 - \frac{MC_t}{P_{Ht}}\frac{P_{Ht}}{P^*_{Ht}}\right) - \phi\left(\Pi^*_{Ht} - 1\right)\Pi^*_{Ht} + \beta E^{BR}_t\left[\left(\frac{C_{t+1}}{C_t}\right)^{-\rho}\frac{1}{\Pi_{Ct+1}}\phi\left(\Pi^*_{Ht+1} - 1\right)\left(\Pi^*_{Ht+1}\right)^2\frac{Y^*_{Ht+1}}{Y^*_{Ht}}\right] \tag{C12}$$

where $\Pi^*_{Ht} = \frac{P^*_{Ht}}{P^*_{Ht-1}}$, $\epsilon^*_{Ht} = -\left[\Xi_\Psi\left(D^*_{Ct}\frac{\tau^*_{Ct}P^*_{Ht}}{E_tP^*_{Ct}}\right)\frac{\tau^*_{Ct}C^*_{Ht}}{Y^*_{Ht}} + \Xi_\Psi\left(D_{Mt}\frac{\tau_{Mt}P^*_{Ht}}{E_tP^*_{Mt}}\right)\frac{\tau^*_{Mt}M^*_{Ht}}{Y^*_{Ht}}\right]$, and $Y^*_{Ht} = \tau^*_{Ct}C^*_{Ht} + \tau^*_{Mt}M^*_{Ht} + \frac{\phi}{2}\left(\Pi^*_{Ht} - 1\right)^2 Y^*_{Ht}$.

With this overview of pricing in the model, we rely on previous model descriptions to jump to model equilibrium conditions in Tables C1, C2, and C3. We log-linearize the model and manipulate it to write the equilibrium in terms of domestic sourcing shares in Tables C4, C5, and C6. Taking domestic sourcing shares and productivities as given, these equations are sufficient to solve for model dynamics.[2]

C.1 Calibration

Adding to the discussion in Section 3.1.2, we provide additional details on model calibration. This discussion is summarized in Table C7.

Starting with standard structural parameters, we set $\psi = 2$ and $\rho = 2$, which imply that the Frisch elasticity of labor supply and the intertemporal elasticity of substitution are both

[1] With the Klenow-Willis Υ-function, the elasticity of demand for Home goods by Home buyers is: $\epsilon_{Ht} = \frac{C_{Ht}}{Y_{Ht}}\epsilon^C_{Ht} + \frac{M_{Ht}}{Y_{Ht}}\epsilon^M_{Ht}$, with $\epsilon^C_{Ht} = \sigma\left(1 + \varepsilon\ln\frac{\sigma-1}{\sigma} - \varepsilon\ln\frac{D_{Ct}P_{Ht}}{P_{Ct}}\right)^{-1}$ and $\epsilon^M_{Ht} = \sigma\left(1 + \varepsilon\ln\frac{\sigma-1}{\sigma} - \varepsilon\ln\frac{D_{Mt}P_{Ht}}{P_{Mt}}\right)^{-1}$.

[2] In this, note that we solve for changes in iceberg trade costs as a function of prices and domestic sourcing shares, because the iceberg costs of trade appear in the market clearing conditions. If trade costs instead take the form of tariffs, then they would carry no real resource costs and the system could be simplified.

Table C1: Home with Kimball Demand and Dominant (Dollar) Currency Pricing

Consumption-Leisure	$C_t^{-\rho}\frac{W_t}{P_{Ht}}\frac{P_{Ht}}{P_{Ct}} = \mu L_t^{\psi}$
Consumption Allocation	$C_{Ht} = \nu\Psi\left(D_{Ct}\frac{P_{Ht}}{P_{Ct}}\right)C_t$ $C_{Ft} = (1-\nu)\Psi\left(D_{Ct}\tau_{Ct}\frac{P_{Ft}}{P_{Ct}}\right)C_t$ $\nu\Upsilon\left(\frac{C_{Ht}}{\nu C_t}\right) + (1-\nu)\Upsilon\left(\frac{C_{Ft}}{(1-\nu)C_t}\right) = 1$
Euler Equation	$1 = E_t^{BR}\left[\beta\left(\frac{C_{t+1}}{C_t}\right)^{-\rho}\frac{1}{\Pi_{Ct+1}}(1+i_t)\right]$
Input Choices	$\frac{W_t}{P_{Ht}}L_t = (1-\alpha)\frac{MC_t}{P_{Ht}}Y_t$ $\frac{P_{Mt}}{P_{Ht}}M_t = \alpha\frac{MC_t}{P_{Ht}}Y_t$ $M_{Ht} = \xi\Psi\left(D_{Mt}\frac{P_{Ht}}{P_{Mt}}\right)M_t$ $M_{Ft} = (1-\xi)\Psi\left(D_{Mt}\tau_{Mt}\frac{P_{Ft}}{P_{Ht}}\frac{P_{Ht}}{P_{Mt}}\right)M_t$ $\xi\Upsilon\left(\frac{M_{Ht}}{\xi M_t}\right) + (1-\xi)\Upsilon\left(\frac{M_{Ft}}{(1-\xi)M_t}\right) = 1$
Marginal Cost	$\frac{MC_t}{P_{Ht}} = \frac{1}{Z_t}\left(\frac{W_t/P_{Ht}}{(1-\alpha)}\right)^{1-\alpha}\left(\frac{P_{Mt}/P_{Ht}}{\alpha}\right)^{\alpha}$
Domestic Price Setting	$0 = 1 - \epsilon_{Ht}\left(1 - \frac{MC_t}{P_{Ht}}\right) - \phi\left(\Pi_{Ht}-1\right)\left(\Pi_{Ht}\right)$ $+\beta E_t^{BR}\left[\left(\frac{C_{t+1}}{C_t}\right)^{-\rho}\frac{1}{\Pi_{Ct+1}}\phi\left(\Pi_{Ht+1}-1\right)\Pi_{Ht+1}^2\frac{Y_{Ht+1}}{Y_{Ht}}\right]$
Export Price Setting	$0 = 1 - \epsilon_{Ht}^*\left(1 - \frac{MC_t}{P_{Ht}}\frac{P_{Ht}}{P_{Ht}^*}\right) - \phi\left(\Pi_{Ht}^*-1\right)\Pi_{Ht}^*$ $+\beta E_t^{BR}\left[\left(\frac{C_{t+1}}{C_t}\right)^{-\rho}\frac{1}{\Pi_{Ct+1}}\phi\left(\Pi_{Ht+1}^*-1\right)\left(\Pi_{Ht+1}^*\right)^2\frac{Y_{Ht+1}^*}{Y_{Ht}^*}\right]$
Elasticities	$\epsilon_{Ht} = -\left[\Xi_\Psi\left(D_{Ct}\frac{P_{Ht}}{P_{Ct}}\right)\frac{C_{Ht}}{Y_{Ht}} + \Xi_\Psi\left(D_{Mt}\frac{P_{Ht}}{P_{Mt}}\right)\frac{M_{Ht}}{Y_{Ht}}\right]$ $\epsilon_{Ht}^* = -\left[\Xi_\Psi\left(D_{Ct}^*\frac{\tau_{Ct}^*P_{Ht}^*}{E_tP_{Ct}^*}\right)\frac{\tau_{Ct}^*C_{Ht}^*}{Y_{Ht}^*} + \Xi_\Psi\left(D_{Mt}\frac{\tau_{Mt}P_{Ht}^*}{E_tP_{Mt}^*}\right)\frac{\tau_{Mt}^*M_{Ht}^*}{Y_{Ht}^*}\right]$ with $\Xi_\Psi(x) \equiv \frac{\Psi'(x)}{\Psi(x)}x$
Price Indexes	$C_t = \left(P_{Ht}/P_{Ct}\right)C_{Ht} + \left(\tau_{Ct}P_{Ft}/P_{Ct}\right)C_{Ft}$ $M_t = \left(P_{Ht}/P_{Mt}\right)M_{Ht} + \left(\tau_{Mt}P_{Ft}/P_{Mt}\right)M_{Ft}$
Market Clearing	$Y_t = Y_{Ht} + Y_{Ht}^*$ $Y_{Ht} = C_{Ht} + M_{Ht} + \frac{\phi}{2}\left(\Pi_{Ht}-1\right)^2 Y_{Ht}$ $Y_{Ht}^* = \tau_{Ct}^*C_{Ht}^* + \tau_{Mt}^*M_{Ht}^* + \frac{\phi}{2}\left(\Pi_{Ht}^*-1\right)^2 Y_{Ht}^*$
Monetary Policy Rule	$1 + i_t = (1+i_0)\left(\Pi_t\right)^{\omega}$

Table C2: Foreign with Kimball Demand and Dominant (Dollar) Currency Pricing

Consumption-Leisure	$(C_t^*)^{-\rho}\frac{W_t^*}{P_{Ft}^*}\frac{P_{Ft}^*}{P_{Ct}^*}=\mu\left(L_t^*\right)^{\psi}$
Consumption Allocation	$C_{Ft}^* = \nu\Psi\left(D_{Ct}^*\frac{P_{Ft}^*}{P_{Ct}^*}\right)C_t^*$
	$C_{Ht}^*=(1-\nu)\Psi\left(D_{Ct}^*\tau_{Ct}^*\frac{P_{Ht}^*}{E_tP_{Ft}^*}\frac{P_{Ft}^*}{P_{Ct}^*}\right)C_t^*$
	$\nu\Upsilon\left(\frac{C_{Ft}^*}{\nu C_t^*}\right)+(1-\nu)\Upsilon\left(\frac{C_{Ht}^*}{(1-\nu)C_t^*}\right)=1$
Euler Equation	$1=E_t^{BR}\left[\beta\left(\frac{C_{t+1}^*}{C_t^*}\right)^{-\rho}\frac{1}{\Pi_{Ct+1}^*}(1+i_t^*)\right]$
Input Choices	$\frac{W_t^*}{P_{Ft}^*}L_t^*=(1-\alpha)\frac{MC_t^*}{P_{Ft}^*}Y_t^*$
	$\frac{P_{Mt}^*}{P_{Ft}^*}M_t^*=\alpha\frac{MC_t^*}{P_{Ft}^*}Y_t^*$
	$M_{Ft}^*=\xi\Psi\left(D_{Mt}^*\frac{P_{Ft}^*}{P_{Mt}^*}\right)M_t^*$
	$M_{Ht}^*=(1-\xi)\Psi\left(D_{Mt}^*\tau_{Mt}^*\frac{P_{Ht}^*}{E_tP_{Ft}^*}\frac{P_{Ft}^*}{P_{Mt}^*}\right)M_t^*$
	$\xi\Upsilon\left(\frac{M_{Ft}^*}{\xi M_t^*}\right)+(1-\xi)\Upsilon\left(\frac{M_{Ht}^*}{(1-\xi)M_t^*}\right)=1$
Marginal Cost	$\frac{MC_t^*}{P_{Ft}^*}=\frac{1}{Z_t}\left(\frac{W_t^*/P_{Ft}^*}{(1-\alpha)}\right)^{1-\alpha}\left(\frac{P_{Mt}^*/P_{Ft}^*}{\alpha}\right)^{\alpha}$
Domestic Price Setting	$0=1-\epsilon_{Ft}^*\left(1-\frac{MC_t^*}{P_{Ft}^*}\right)-\phi\left(\Pi_{Ft}^*-1\right)\Pi_{Ft}^*$
	$+\beta E_t^{BR}\left[\left(\frac{C_{t+1}^*}{C_t^*}\right)^{-\rho}\frac{1}{\Pi_{Ct+1}^*}\phi\left(\Pi_{Ft+1}^*-1\right)\left(\Pi_{Ft+1}^*\right)^2\frac{Y_{Ft+1}^*}{Y_{Ft}^*}\right]$
Export Price Setting	$0=1-\epsilon_{Ft}\left(1-\frac{E_tP_{Ft}^*}{P_{Ft}}\frac{MC_t^*}{P_{Ft}^*}\right)-\phi\left(\Pi_{Ft}-1\right)\left(\Pi_{Ft}\right)$
	$+\beta E_t^{BR}\left[\left(\frac{C_{t+1}^*}{C_t^*}\right)^{-\rho}\frac{Q_t}{Q_{t+1}}\frac{1}{\Pi_{Ct+1}}\phi\left(\Pi_{Ft+1}-1\right)\Pi_{Ft+1}^2\frac{Y_{Ft+1}}{Y_{Ft}}\right]$
Elasticities	$\epsilon_{Ft}^*=-\left[\Xi_\Psi\left(D_{Ct}^*\frac{P_{Ft}^*}{P_{Ct}^*}\right)\frac{C_{Ht}^*}{Y_{Ft}^*}\frac{\tau_{Ct}^*C_{Ht}^*}{Y_{Ht}^*}+\Xi_\Psi\left(D_{Mt}^*\frac{P_{Ft}^*}{P_{Mt^*}}\right)\frac{M_{Ft}^*}{Y_{Ft}^*}\right]$
	$\epsilon_{Ft}=-\left[\Xi_\Psi\left(D_{Ct}\frac{\tau_{Ct}P_{Ft}}{P_{Ct}}\right)\frac{\tau_{Ct}C_{Ft}}{Y_{Ft}}+\Xi_\Psi\left(D_{Mt}\frac{\tau_{Mt}P_{Ft}}{P_{Mt}}\right)\frac{\tau_{Mt}M_{Ft}}{Y_{Ft}}\right]$
	with $\Xi_\Psi(x)\equiv\frac{\Psi'(x)}{\Psi(x)}x$
Price Indexes	$C_t^*=\left(P_{Ft}^*/P_{Ct}^*\right)C_{Ft}^*+\left(\tau_{Ct}^*P_{Ht}^*/E_tP_{Ct}^*\right)C_{Ht}^*$
	$M_t^*=\left(P_{Ft}^*/P_{Mt}^*\right)M_{Ft}^*+\left(\tau_{Mt}^*P_{Ht}^*/E_tP_{Mt}^*\right)M_{Ht}^*$
Market Clearing	$Y_t^*=Y_{Ft}^*+Y_{Ft}$
	$Y_{Ft}^*=C_{Ft}^*+M_{Ft}^*+\frac{\phi}{2}\left(\Pi_{Ft}^*-1\right)^2Y_{Ft}^*$
	$Y_{Ft}=\tau_{Ct}C_{Ft}+\tau_{Mt}M_{Ft}+\frac{\phi}{2}\left(\Pi_{Ht}^*-1\right)^2Y_{Ft}$
Monetary Policy Rule	$1+i_t=(1+i_0)\left(\Pi_t\right)^{\omega}$

Table C3: Closing the Model

Risk Sharing	$\left(\frac{C_t}{C_t^*}\right)^{-\rho}(Q_t) = \Theta$
Auxiliary Price Definitions	$\Pi_{Ht} = \left(\frac{P_{Ht}/P_{Ct}}{P_{Ht-1}/P_{Ct-1}}\right)\Pi_{Ct}$
	$\Pi_{Ht}^* = \left(\frac{P_{Ht}^*/P_{Ht}}{P_{Ht-1}^*/P_{Ht-1}}\right)\Pi_{Ht}$
	$\Pi_{Ft}^* = \left(\frac{P_{Ft}^*/P_{Ct}^*}{P_{Ft-1}^*/P_{Ct-1}^*}\right)\Pi_{Ct}^*$
	$\Pi_{Ft} = \left(\frac{P_{Ft}/P_{Ht}}{P_{Ft-1}/P_{Ht-1}}\right)\Pi_{Ht}$
	$\Pi_{Ht}^* = \left(\frac{P_{Ht}^*/E_t P_{Ft}^*}{P_{Ht-1}^*/E_{t-1} P_{Ft-1}^*}\right)\left(\frac{E_t}{E_{t-1}}\right)\Pi_{Ft}^*$

Table C4: Home with Kimball Demand and Dominant (Dollar) Currency Pricing

Consumption-Leisure	$\hat{l}_t = -\frac{\rho}{\psi}\hat{c}_t + \frac{1}{\psi}\widehat{rw}_t - \frac{1}{\psi(\sigma-1)}\hat{\lambda}_{Ht}^C$
Consumption Allocation	$\hat{c}_{Ht} = \frac{\sigma}{\sigma-1}\hat{\lambda}_{Ht}^C + \hat{c}_t$
	$\hat{c}_{Ft} = -\frac{\sigma}{\sigma-1}\frac{\Lambda_{F0}^C}{\Lambda_{H0}^C}\hat{\lambda}_{Ht}^C + \hat{c}_t$
Euler Equation	$\hat{c}_t = \Omega E_t\hat{c}_{t+1} - \frac{1}{\rho}\left(\hat{r}_t - E_t\pi_{Ct+1}\right)$
Input Choices	$\hat{l}_t = \widehat{rmc}_t + \hat{y}_t - \widehat{rw}_t$
	$\hat{m}_t = \widehat{rmc}_t + \hat{y}_t - \frac{1}{\sigma-1}\hat{\lambda}_{Ht}^M$
	$\hat{m}_{Ht} = \frac{\sigma}{\sigma-1}\hat{\lambda}_{Ht}^M + \hat{m}_t$
	$\hat{m}_{Ft} = -\frac{\sigma}{\sigma-1}\frac{\Lambda_{F0}^M}{\Lambda_{H0}^M}\hat{\lambda}_{Ht}^M + \hat{m}_t$
Marginal Cost	$\widehat{rmc}_t = (1-\alpha)\widehat{rw}_t + \frac{\alpha}{\sigma-1}\hat{\lambda}_{Ht}^M - \hat{z}_t$
Price Setting	$\pi_{Ht} = -\frac{1}{\phi}\hat{\epsilon}_{Ht} + \left(\frac{\epsilon_{H0}-1}{\phi}\right)\widehat{rmc}_t + \Omega\beta E_t\left(\pi_{Ht+1}\right)$
	$\pi_{Ht}^* = -\frac{1}{\phi}\hat{\epsilon}_{Ht}^* + \frac{(\epsilon_{H0}^*-1)}{\phi}\left[\widehat{rmc}_t + (\hat{p}_{Ht} - \hat{p}_{Ht}^*)\right] + \Omega\beta E_t\left(\pi_{Ht+1}^*\right)$
Elasticities	$\hat{\epsilon}_{Ht} = \frac{C_{H0}}{Y_{H0}}\hat{\epsilon}_{Ht}^C + \frac{M_{H0}}{Y_{H0}}\hat{\epsilon}_{Ht}^M$
	with $\hat{\epsilon}_{Ht}^C = -\left(\frac{\varepsilon}{\sigma-1}\right)\hat{\lambda}_{Ht}^C$ and $\hat{\epsilon}_{Ht}^M = -\left(\frac{\varepsilon}{\sigma-1}\right)\hat{\lambda}_{Ht}^M$
	$\hat{\epsilon}_{Ht}^* = \left(\frac{\tau_{Ct}^* C_{Ht}^*}{Y_{Ht}^*}\right)\hat{\epsilon}_{Ht}^{C*} + \left(\frac{\tau_{Mt}^* M_{Ht}^*}{Y_{Ht}^*}\right)\hat{\epsilon}_{Ht}^{M*}$
	with $\hat{\epsilon}_{Ht}^{C*} = \left(\frac{\varepsilon}{\sigma-1}\right)\frac{\Lambda_{H0}^{C*}}{\Lambda_{F0}^{C*}}\hat{\lambda}_{Ft}^{C*}$ and $\hat{\epsilon}_{Ht}^{M*} = \left(\frac{\varepsilon}{\sigma-1}\right)\frac{\Lambda_{H0}^{M*}}{\Lambda_{F0}^{M*}}\hat{\lambda}_{Ft}^{M*}$
Market Clearing	$\hat{y}_t = \frac{Y_{H0}}{Y_0}\hat{y}_{Ht} + \frac{Y_{H0}^*}{Y_0}\hat{y}_{Ht}^*$
	$\hat{y}_{Ht} = \frac{C_{H0}}{Y_{H0}}\hat{c}_{Ht} + \frac{M_{H0}}{Y_{H0}}\hat{m}_{Ht}$
	$\hat{y}_{Ht}^* = \frac{\tau_{C0}^* C_{H0}^*}{Y_{H0}^*}\left(\hat{\tau}_{Ct}^* + \hat{c}_{Ht}^*\right) + \frac{\tau_{Mt}^* M_{Ht}^*}{Y_{H0}^*}\left(\hat{\tau}_{Mt}^* + \hat{m}_{Ht}^*\right)$

Table C5: Foreign with Kimball Demand and Dominant (Dollar) Currency Pricing

Consumption-Leisure	$\widehat{l}_t^* = -\frac{\rho}{\psi}\widehat{c}_t^* + \frac{1}{\psi}\widehat{rw}_t^* - \frac{1}{\sigma-1}\hat{\lambda}_{Ft}^{C*}$
Consumption Allocation	$\hat{c}_{Ft}^* = \frac{\sigma}{\sigma-1}\hat{\lambda}_{Ft}^{C*} + \hat{c}_t^*$ $\hat{c}_{Ht}^* = -\frac{\sigma}{\sigma-1}\frac{\Lambda_{H0}^{C*}}{\Lambda_{F0}^{C*}}\hat{\lambda}_{Ft}^{C*} + \hat{c}_t^*$
Euler Equation	$\hat{c}_t^* = \Omega E_t\hat{c}_{t+1}^* - \frac{1}{\rho}\left(\hat{r}_t^* - E_t\pi_{Ct+1}^*\right)$
Input Choices	$\hat{l}_t^* = \widehat{rmc}_t^* + \hat{y}_t^* - \widehat{rw}_t^*$ $\hat{m}_t^* = \widehat{rmc}_t^* + \hat{y}_t^* - \frac{1}{\sigma-1}\hat{\lambda}_{Ht}^{M*}$ $\hat{m}_{Ft}^* = \frac{\sigma}{\sigma-1}\hat{\lambda}_{Ft}^{M*} + \hat{m}_t^*$ $\hat{m}_{Ht}^* = -\frac{\sigma}{\sigma-1}\frac{\Lambda_{H0}^{M*}}{\Lambda_{F0}^{M*}}\hat{\lambda}_{Ft}^{M*} + \hat{m}_t^*$
Marginal Cost	$\widehat{rmc}_t^* = (1-\alpha)\widehat{rw}_t^* + \frac{\alpha}{\sigma-1}\hat{\lambda}_{Ft}^{M*} - \hat{z}_t^*$
Price Setting	$\pi_{Ft}^* = -\frac{1}{\phi}\hat{\epsilon}_{Ft}^* - \left(\frac{\epsilon_{F0}^*-1}{\phi}\right)\widehat{rmc}_t^* + \Omega\beta E_t\left(\pi_{Ft+1}^*\right)$ $\pi_{Ft} = -\frac{1}{\phi}\hat{\epsilon}_{Ft} + \left(\frac{\epsilon_{F0}-1}{\phi}\right)\left[\widehat{rmc}_t^* + (\hat{e}_t^* + \hat{p}_{Ft}^* - \hat{p}_{Ft})\right] + \Omega\beta E_t\pi_{Ft+1}$
Elasticities	$\hat{\epsilon}_{Ft}^* = \frac{C_{F0}^*}{Y_{F0}^*}\hat{\epsilon}_{Ft}^{C*} + \frac{M_{F0}^*}{Y_{F0}^*}\hat{\epsilon}_{Ft}^{M*}$ with $\hat{\epsilon}_{Ft}^{C*} = -\left(\frac{\varepsilon}{\sigma-1}\right)\hat{\lambda}_{Ft}^{C*}$ and $\hat{\epsilon}_{Ft}^{M*} = -\left(\frac{\varepsilon}{\sigma-1}\right)\hat{\lambda}_{Ft}^{M*}$ $\hat{\epsilon}_{Ft} = \left(\frac{\tau_{Ct}C_{Ft}}{Y_{Ft}}\right)\hat{\epsilon}_{Ft}^{C} + \left(\frac{\tau_{Mt}M_{Ft}}{Y_{Ft}}\right)\hat{\epsilon}_{Ft}^{M}$ with $\hat{\epsilon}_{Ft}^{C} = \left(\frac{\varepsilon}{\sigma-1}\right)\frac{\Lambda_{F0}^{C}}{\Lambda_{H0}^{C}}\hat{\lambda}_{Ht}^{C}$ and $\hat{\epsilon}_{Ft}^{M} = \left(\frac{\varepsilon}{\sigma-1}\right)\frac{\Lambda_{F0}^{M}}{\Lambda_{H0}^{M}}\hat{\lambda}_{Ht}^{M}$
Market Clearing	$\hat{y}_t^* = \frac{Y_{F0}^*}{Y_0^*}\hat{y}_{Ft}^* + \frac{Y_{F0}}{Y_0^*}\hat{y}_{Ft}$ $\hat{y}_{Ft}^* = \frac{C_{F0}^*}{Y_{F0}^*}\hat{c}_{H0}^* + \frac{M_{F0}^*}{Y_{F0}^*}\hat{m}_{Ht}^*$ $\hat{y}_{Ft} = \frac{\tau_{C0}C_{F0}}{Y_{F0}}\left(\hat{\tau}_{C0} + \hat{c}_{F0}\right) + \frac{\tau_{M0}M_{F0}}{Y_{F0}}\left(\hat{\tau}_{Mt} + \hat{m}_{Ft}\right)$

Table C6: Closing the Model

Risk Sharing	$\hat{c}_t = \hat{c}_t^* + \frac{1}{\rho}\hat{q}_t$
Monetary Policy	$\hat{r}_t = \omega\pi_{Ct}$ $\hat{r}_t^* = \omega\pi_{Ct}^*$
Model-Implied Trade Costs	$\hat{\tau}_{Ct} = \frac{1}{\sigma-1}\frac{\Lambda_{F0}^{C}}{\Lambda_{H0}^{C}}\hat{\lambda}_{Ht}^{C} - (\hat{p}_{Ft} - \hat{p}_{Ct})$ $\hat{\tau}_{Mt} = (\hat{p}_{Ht} - \hat{p}_{Ft}) + \frac{1}{\sigma-1}\left[\frac{\Lambda_{F0}^{M}}{\Lambda_{H0}^{C}} + 1\right]\hat{\lambda}_{Ht}^{M}$ $\hat{\tau}_{Ct}^* = \hat{q}_t - (\hat{p}_{Ht}^* - \hat{p}_{Ct}) + \frac{1}{\sigma-1}\frac{\Lambda_{H0}^{C*}}{\Lambda_{F0}^{C*}}\hat{\lambda}_{Ft}^{C*}$ $\hat{\tau}_{Mt}^* = \hat{q}_t - (\hat{p}_{Ht}^* - \hat{p}_{Ct}) - \frac{1}{\sigma-1}\hat{\lambda}_{Ft}^{C*} + \frac{1}{\sigma-1}\left[\frac{\Lambda_{H0}^{M*}}{\Lambda_{F0}^{M*}} + 1\right]\hat{\lambda}_{Ft}^{M*}$
Consumer Price Inflation	$\pi_{Ct} = \pi_{Ht} + \frac{1}{\sigma-1}\left(\hat{\lambda}_{Ht}^{C} - \hat{\lambda}_{Ht-1}^{C}\right)$ $\pi_{Ct}^* = \pi_{Ft}^* + \frac{1}{\sigma-1}\left(\hat{\lambda}_{Ht}^{C*} - \hat{\lambda}_{Ht-1}^{C*}\right)$
Auxiliary Equations to Track Prices	$\pi_{Ht} - \pi_{Ft} = (\widehat{p}_{Ht} - \widehat{p}_{Ft}) - (\widehat{p}_{Ht-1} - \widehat{p}_{Ft-1})$ $\pi_{Ht} - \pi_{Ht}^* = (\widehat{p}_{Ht} - \widehat{p}_{Ht}^*) - (\widehat{p}_{Ht-1} - \widehat{p}_{Ht-1}^*)$ $\pi_{Ct} - \pi_{Ft} = (\widehat{p}_{Ct} - \widehat{p}_{Ft}) - (\widehat{p}_{Ct-1} - \widehat{p}_{Ft-1})$ $\pi_{Ct} - \pi_{Ht}^* = (\widehat{p}_{Ct} - \widehat{p}_{Ht}^*) - (\widehat{p}_{Ct-1} - \widehat{p}_{Ht-1}^*)$

0.5, which are reasonable values from the literature. We then set $\beta = 0.995$; since this is a quarterly discount factor, it implies that the annual risk-free interest rate is 2% in steady state. We set $\omega = 1.5$ in the monetary policy rule, following the literature [Clarida, Gali and Gertler (1999)]. We set $\sigma = 3$ and $\varepsilon = 1$ in the Kimball aggregators.[3]

In production, we set $\alpha = 0.651$ to target the steady-state expenditure share for inputs in gross output in steady state. Specifically, the input share is $P_{M0}M_0/P_{H0}Y_0 = \alpha MC_0/P_{H0}$, with $MC_0/P_{H0} = (\epsilon_{H0} - 1)/\epsilon_{H0}$, in the same steady state. Setting $\sigma = 3$ as above, we then solve for α to match the share of inputs in gross output for the US in 1995, which was 0.434 according to the OECD ICIO data.

To calibrate price adjustment frictions, we rely on a first-order equivalence result for Calvo versus Rotemberg pricing. As shown by Sims and Wolff (2017), the Rotemberg adjustment cost parameter ϕ can be linked to the frequency of price adjustment in the Calvo setting: $\phi = \frac{\kappa(\epsilon-1)}{(1-\kappa)(1-\beta\kappa)}$, where $1 - \kappa$ is the share of firms that adjust their prices each period in a Calvo-style model and ϵ is the elasticity of demand. Using a standard value of $\kappa = .75$ to match the average duration of prices, together with $\epsilon = 3$ (consistent our calibration of the Kimball aggregators) and the discount rate above, we arrive at $\phi = 23.6453$.

We calibrate structural home bias parameters to match data on domestic sourcing shares from the OECD ICIO data in 1995. We set $\nu = 0.9495$ and $\nu^* = 0.985$ to match the expenditure share on domestic goods in consumption for the US and the rest of the world. Similarly, $\xi = 0.93$ and $\xi^* = 0.985$ to match the share of spending on domestic inputs in total input expenditure for the US and rest of the world. Differences in population and productivity between the US and the ROW introduce asymmetries that affect the trade balance. We normalize the population in the US to 1, and set the constant population in the ROW to 20.64 to match the relative population of ROW to US in 1995. We then set the productivity in the ROW, Z^* equal to 32.89% of the US productivity level in steady state, so that the US trade deficit as a share of gross output matches the OECD data for 1995 (0.655%). Finally, we set normalize Z so that the price of output in the US is 1 in steady state and solve for the value of Υ that sets real exchange to one in steady state.

As a final point, we noted in the main text that we temporally disaggregate annual data in order to estimate the stochastic process on domestic sourcing. To construct the quarterly series, we first we compute log deviations of the annual home shares from steady state, which yields $\hat{\lambda}^x_{Hy}$ where y indexes the year. We then interpolate quarterly values as follows: $\hat{\lambda}^x_{Ht.Q1} = 0.4\hat{\lambda}^x_{H,y-1} + 0.6\hat{\lambda}^x_{Hy}$, $\hat{\lambda}^x_{Ht.Q2} = 0.2\hat{\lambda}^x_{H,y-1} + 0.8\hat{\lambda}^x_{Hy}$, $\hat{\lambda}^x_{Ht.Q3} = 0.8\hat{\lambda}^x_{Hy} + 0.2\hat{\lambda}^x_{H,y+1}$, and $\hat{\lambda}^x_{Ht.Q4} = 0.6\hat{\lambda}^x_{Hy} + 0.4\hat{\lambda}^x_{H,y+1}$, where subscript $t.Qv$ denotes the value for year t and quarter v.

[3]Note $\epsilon_{H0} = \epsilon^*_{H0} = \epsilon_{F0} = \epsilon^*_{F0} = \sigma$ in the steady state, which implies $P_{H0} = P^*_{H0}$ and $P_{F0} = P^*_{F0}$.

Table C7: Calibration of Large Open Economy with Variable Markups

Parameter	Value	Reference/Target
ψ	2	Labor supply elasticity of 0.5
ρ	2	Intertemporal elasticity of substitution of 0.5
β	.995	Annual risk-free real rate of 2%
Ω	.99	Approximately match inflation response to anticipated trade shock in Figure 2
σ	3	Elasticity of substitution between varieties and between home and foreign in steady state
ε	1	Super-elasticity [Gopinath et al. (2020)]
ν	0.9495	Domestic share in US consumption in 1995
ν^*	0.985	Domestic share in ROW consumption in 1995
α	0.651	To match 1995 input share in US
ξ	.93	Domestic share in US input spending in 1995
ξ^*	.985	Domestic share in ROW input spending in 1995
N	1	Normalization
N^*	20.64	ROW population relative to the US in 1995
Z	$\frac{(\sigma-1)/\sigma}{\alpha^{\alpha}(1-\alpha)^{(1-\alpha}}$	Normalization to set US output price to 1
Z^*	$Z * 0.3289$	To match US trade balance to gross output ratio in 1995
ϕ	23.6453	To yield first order equivalence to Calvo pricing with average price duration of 4 quarters [Sims and Wolff (2017)].
ω	1.5	Clarida, Gali and Gertler (1999)
Υ	0.0216	To normalize the real exchange rate in steady state to 1

D Multi-Sector Model with Hand-to-Mouth Consumers and Labor Market Frictions

Building on the description of the multi-sector model in Section 3.2, we make only a few additional notes here. Firms solve standard cost minimization problems to determine their input demands, and they set prices under monopolistic competition with Rotemberg adjustment costs. Both sets of problems are standard, so we omit further discussion and simply present the solutions below. We assume there is a constant elasticity demand for each sector's composite export good, which we write as $X_t(s) = \left(\frac{P_{Ht}(s)}{P_{Ct}Q_t}\right)^{-\eta(s)} \frac{\gamma^*(s)P_t^*C_t^*}{P_t^*(s)}$, where Q_t is the real exchange rate and $\gamma^*(s)P_t^*C_t^*/P_t^*(s)$ is real foreign demand at the sector level, taken as exogenous.

On the consumer side, while preferences are identical for all agents, recall that we need to track consumption by each type of agent ($a = (u, s)$), denoted C_t^a. For hand-to-mouth agents, this is pinned down by their budget constraints. For Euler consumers, their consumption satisfies the usual inter-temporal equilibrium conditions associated with their consumptionsavings problem under complete international financial markets. Then, it is further useful to define aggregate consumption (C_t) by summing over agents:

$$C_t = \bar{s}s^h_{1t}C^{h,1}_t + \bar{s}(1 - s^h_{1t})C^{h,2}_t + (1 - \bar{s})s^e_{1t}C^{e,1}_t + (1 - \bar{s})(1 - s^e_{1t})C^{e,2}_t, \tag{D1}$$

with weights that combine their population shares ($\bar{s}$) with sectoral employment shares (s^h_{1t} and s^e_{1t}). Using this definition of aggregate consumption, together with the homogeneity of preferences across types, we can define sector-level consumption: $C_t(s) = \zeta(s)\left(\frac{P_{Ct}(s)}{P_{Ct}}\right)^{-\vartheta} C_t$. Further, we can break that down into consumption of domestic and foreign goods: $C_{Ht}(s) = \nu(s)\left(\frac{P_{Ht}(s)}{P_{Ct}(s)}\right)^{-\eta(s)} C_t(s)$ and $C_{Ft}(s) = (1 - \nu(s))\left(\frac{\tau_{Ct}(s)P_{Ft}(s)}{P_{Ct}(s)}\right)^{-\eta(s)} C_t(s)$. These aggregates serve to define demand for the sectoral goods in the goods market clearing conditions.

Using these results, the equilibrium conditions for the model, with symmetric firms within each sector, are collected in Table D1. As in the baseline model, we can rewrite the model equilibrium in terms of domestic sourcing shares: $\Lambda_{Ct}(s) \equiv \frac{P_{Ht}(s)C_{Ht}(s)}{P_{Ct}(s)C_t(s)}$ and $\Lambda_{Mt}(s', s) = \frac{P_{Ht}(s')M_{Ht}(s',s)}{P_{Mt}(s',s)M_t(s',s)}$. Using first order conditions, we relate equilibrium prices to these shares:

$$\frac{P_{Ht}(s)}{P_{Ct}(s)} = \left(\frac{\Lambda^C_{Ht}(s)}{\nu(s)}\right)^{1/(1-\eta(s))} \tag{D2}$$

$$\frac{P_{Ht}(s')}{P_{Mt}(s', s)} = \left(\frac{\Lambda^M_{Ht}(s', s)}{\xi(s', s)}\right)^{1/(1-\eta(s'))}. \tag{D3}$$

We then swap out for $\frac{P_{Ht}(s)}{P_{Ct}(s)}$ and $\frac{P_{Ht}(s')}{P_{Mt}(s',s)}$ throughout the equilibrium system. We take a log-linear approximation to these equations and rewrite the resulting approximate equilibrium in terms of domestic sourcing shares, as in prior models. The log-linear equilibrium equations are collected in Table D2.

D.1 Model Calibration

We calibrate macro-parameters in the two-sector model to match the one sector model. In the main text, we discussed new parameters related the share of hand-to-mouth agents, labor market frictions, and the allocation of worker-types across sectors. Finally, we calibrate parameters that govern the allocation of expenditure across sectors, the input-output structure, and sector-level trade to match US input-output, expenditure, and production data from the OECD in 1995. For reference, we present the parameters in Table D3.

Following the approach we used in the one sector framework, we assume each domestic sourcing series in this two sector model evolves according to a stochastic process like Equa-

Table D1: Equilibrium Conditions for the Multisector Model

Consumption-Leisure	$(C_t^a)^{-\rho}\frac{W_t(s)}{P_{Ct}} = \mu\,(L_t^a)^{\psi}$
Aggregate Consumption	$C_t = \bar{s}s_{1t}^h C_t^{h,1} + \bar{s}(1-s_{1t}^h)C_t^{h,2} + (1-\bar{s})s_{1t}^e C_t^{e,1} + (1-\bar{s})(1-s_{1t}^e)C_t^{e,2}$
	$C_t(s) = \zeta(s)\left(\frac{P_{Ct}(s)}{P_{Ct}}\right)^{-\vartheta} C_t$
Consumption Allocation	$C_{Ht}(s) = \nu(s)\left(\frac{P_{Ht}(s)}{P_{Ct}(s)}\right)^{-\eta(s)} C_t(s)$
	$C_{Ft}(s) = (1-\nu(s))\left(\frac{\tau_{Ct}(s)P_{Ft}(s)}{P_{Ct}(s)}\right)^{-\eta(s)} C_t(s)$
Euler Equation	$1 = E_t^{BR}\left[\beta\left(\frac{C_{t+1}^{e,1}}{C_t^{e,1}}\right)^{-\rho}\frac{P_{Ct}}{P_{C,t+1}}(1+i_{t+1})\right]$
Hand-to-Mouth Cons.	$C_t^{h,s} = L_t^{h,s}\frac{W_t(s)}{P_{Ct}}$
Sectoral reallocation	$\frac{s_{1,t+1}^u}{s_{1,t}^u} = \left(\frac{W_t(1)}{W_t(2)}\right)^{\chi}$
	$W_t(s)L_t(s) = (1-\alpha(s))MC_t(s)Y_t(s)$
	$P_{Mt}(s)M_t(s) = \alpha(s)MC_t(s)Y_t(s)$
Input Choices	$M_t(s',s) = \frac{\alpha(s',s)}{\alpha(s)}\left(\frac{P_t(s',s)}{P_{Mt}(s)}\right)^{-\kappa} M_t(s)$
	$M_{Ht}(s',s) = \xi(s',s)\left(\frac{P_{Ht}(s')}{P_t(s',s)}\right)^{-\eta(s')} M_t(s',s)$
	$M_{Ft}(s',s) = (1-\xi(s',s))\left(\frac{\tau_{Mt}(s')P_{Ft}(s')}{P_t(s',s)}\right)^{-\eta_M(s')} M_t(s',s)$
Marginal Cost	$MC_t(s) = Z_t(s)^{-1}\left(\frac{W_t(s)}{\alpha(s)}\right)^{1-\alpha(s)}\left(\frac{P_{Mt}}{1-\alpha(s)}\right)^{\alpha(s)}$
Input Prices	$P_{Mt}(s) = \left(\sum_{s'}\left(\frac{\alpha(s',s)}{\alpha(s)}\right)P_t(s',s)^{1-\kappa}\right)^{1/(1-\kappa)}$
	$P_t(s',s) = \left[\xi(s',s)P_{Ht}(s')^{1-\eta(s')} + (1-\xi(s',s))\left(\tau_{Mt}(s')P_{Ft}(s')\right)^{1-\eta(s')}\right]^{1/(1-\eta(s'))}$
	$0 = (1-\epsilon(s)) + \epsilon(s)\frac{MC_t(s)}{P_{Ht}(s)} - \phi\left(\frac{P_{Ht}(s)}{P_{H,t-1}(s)} - 1\right)\frac{P_{Ht}(s)}{P_{H,t-1}(s)}$
Domestic Pricing	$+ E_t^{BR}\left[\beta\frac{C_{t+1}^{-\rho}}{C_t^{-\rho}}\frac{P_{Ct}}{P_{C,t+1}}\phi\left(\frac{P_{H,t+1}(s)}{P_{H,t}(s)} - 1\right)\frac{P_{H,t+1}(s)Y_{t+1}(s)}{P_{Ht}(s)Y_t(s)}\frac{P_{H,t+1}(s)}{P_{Ht}(s)}\right]$
Consumer Prices	$P_{Ct} = \left(\sum_s \zeta(s)P_{Ct}(s)^{1-\vartheta}\right)^{1/(1-\vartheta)}$
	$P_{Ct}(s) = \left(\nu(s)P_{Ht}(s)^{1-\eta(s)} + (1-\nu(s))\left(\tau_{Ct}(s)P_{Ft}(s)\right)\right)^{1/(1-\eta(s))}$
	$Y_t(s) = C_{Ht}(s) + \sum_{s'} M_{Ht}(s,s') + X_t(s) + \frac{\phi}{2}\left(\frac{P_{Ht}(s)}{P_{H,t-1}(s)} - 1\right)^2 Y_t(s)$
Market Clearing	$X_t(s) = \left(\frac{P_{Ht}(s)}{P_{Ct}Q_t}\right)^{-\eta(s)}\frac{\gamma^*(s)P_t^*C_t^*}{P_t^*(s)}$
	$\left(\frac{C_t^{e,s}}{C_t^*}\right)^{-\rho} Q_t = \Upsilon$
	$L_t(1) = \bar{s}s_{1t}^h L_t^{h,1} + (1-\bar{s})s_{1t}^e L_t^{e,1}$
	$L_t(2) = \bar{s}(1-s_{1t}^h)L_t^{h,2} + (1-\bar{s})(1-s_{1t}^e)L_t^{e,2}$
Monetary Policy Rule	$1+i_t = (1+i_0)\left(\frac{P_{Ct}}{P_{C,t-1}}\right)^{\omega}$

Note: $a = (u,s)$ is a duple that indexes agent types $u \in \{e,h\}$ and sectors $s \in \{1,2\}$.

Table D2: Log-Linearized Equilibrium Conditions for the Multisector Model

Consumption-Leisure	$\hat{l}_t^a = -\frac{\rho}{\psi}\hat{c}_t^a + \frac{1}{\psi}\widehat{rwc}_t(s)$
Aggregate consumption	$\hat{c}_t = \frac{\overline{s}s_1^h C^{h,1}}{C}(\hat{c}_t^{h,1} + \hat{s}_{1t}^h) + \frac{\overline{s}(1-s_1^h)C^{h,1}}{C}(\hat{c}_t^{h,2} - \frac{s_1^h}{(1-s_1^h)}\hat{s}_{1t}^h)$
	$+ \frac{(1-\overline{s})s_1^e C^{e,1}}{C}(\hat{c}_t^{e,1} + \hat{s}_{1t}^e) + \frac{(1-\overline{s})(1-s_1^e)C^{e,2}}{C}(\hat{c}_t^{e,2} - \frac{s_1^e}{(1-s_1^e)}\hat{s}_{1t}^e)$
Consumption Allocation	$\hat{c}_t(s) = -\vartheta\widehat{rp}_{Ct}(s) + \hat{c}_t$
	$\hat{c}_{Ht}(s) = -\frac{\eta(s)}{\eta(s)-1}\hat{\lambda}_{Ht}^C(s) + \hat{c}_t(s)$
Euler Equation	$\hat{c}_t^{e,1} = \Omega E_t\left(\hat{c}_{t+1}^{e,1} - (r_t - \pi_{Ct+1})/\rho\right)$
Hand-to-mouth consumption	$\hat{c}_t^{h,s} = \widehat{rwc}_t(s) + \hat{l}_t^{h,s}$
Sectoral Employment Shares	$\hat{s}_{1t+1}^u - \hat{s}_{1t}^u = \chi(\widehat{rwc}_t(1) - \widehat{rwc}_t(2))$
Input Choices	$\widehat{rwc}_t(s) + \hat{l}_t(s) = \widehat{rmc}_t(s) - \frac{1}{\eta(s)-1}\hat{\lambda}_{Ht}^C(s) + \widehat{rp}_{Ct}(s) + \hat{y}_t(s)$
	$\widehat{rpmc}_t(s) + \hat{m}_t(s) = \widehat{rmc}_t(s) - \frac{1}{\eta(s)-1}\hat{\lambda}_{Ht}^C(s) + \widehat{rp}_{Ct}(s) + \hat{y}_t(s)$
	$\hat{m}_t(s',s) = -\kappa\widehat{rp}_t(s',s) + \hat{m}_t(s)$
	$\hat{m}_{Ht}(s',s) = -\frac{\eta(s')}{\eta(s')-1}\hat{\lambda}_{Ht}^M(s',s) + \hat{m}_t(s',s)$
Real Marginal Cost	$\widehat{rmc}_t(s) - \frac{1}{\eta(s)-1}\hat{\lambda}_{Ht}^C(s) + \widehat{rp}_{Ct}(s) = (1-\alpha(s))\,\widehat{rwc}_t + \alpha(s)\widehat{rpmc}_t(s) - \hat{z}_t(s)$
Input Prices	$0 = \sum_{s'}\left(\frac{P_{M0}(s',s)M_0(s',s)}{P_{M0}(s)M_0(s)}\right)\widehat{rp}_t(s',s)$
	$\widehat{rp}_t(s',s) = \left(\frac{1}{\eta(s')-1}\right)\hat{\lambda}_{Ht}^M(s',s) - \frac{1}{\eta(s)-1}\hat{\lambda}_{Ht}^C(s) - \widehat{rp}_{Ct}(s)$
Domestic Pricing	$\pi_{Ht}(s) = \frac{(\epsilon(s)-1)}{\phi}\widehat{rmc}_t(s) + \Omega\beta E_t\left[\pi_{Ht+1}(s)\right]$
Consumer Prices	$0 = \sum_s\left(\frac{P_{C0}(s)C_0(s)}{P_{C0}C_0}\right)\widehat{rp}_{Ct}(s)$
	$\widehat{rp}_{Ct}(s) = \frac{1}{\eta(s)-1}\hat{\lambda}_{Ht}^C(s) + (\widehat{p}_{Ht}(s) - \widehat{p}_{Ct})$
	$\pi_{Ht}(s) = -\frac{1}{\eta(s)-1}\left(\hat{\lambda}_{Ht}^C(s) - \hat{\lambda}_{Ht-1}^C(s)\right) + \widehat{rp}_{Ct}(s) - \widehat{rp}_{Ct-1}(s) + \pi_{Ct}$
Market Clearing	$\hat{y}_t(s) = \frac{C_{H0}(s)}{Y_0(s)}\hat{c}_{Ht}(s) + \sum_{s'}\frac{M_{H0}(s,s')}{Y_0(s)}\hat{m}_{Ht}(s,s') + \frac{X_0(s)}{Y_0(s)}\hat{x}_t(s)$
	$\hat{x}_t(s) = \frac{\eta(s)}{\eta(s)-1}\hat{\lambda}_{Ht}^C(s) - \eta(s)\widehat{rp}_{Ct}(s) + \eta(s)\hat{q}_t - (\hat{p}_t^*(s) - \hat{p}_{Ct}^*) + \hat{c}_t^*$
	$\hat{c}_t^{e,s} = \hat{c}_t^* + \frac{1}{\rho}\hat{q}_t$
	$\hat{l}_t(1) = \frac{\overline{s}s_1^h L^{h,1}}{L_1}(\hat{l}_t^{h,1} + \hat{s}_{1t}^h) + \frac{(1-\overline{s})s_1^e L^{e,1}}{L_1}(\hat{l}_t^{e,1} + \hat{s}_{1t}^e)$
	$\hat{l}_t(2) = \frac{\overline{s}(1-s_1^h)L^{h,2}}{L_2}(\hat{l}_t^{h,2} - \frac{s_1^h}{(1-s_1^h)}\hat{s}_{1t}^h) + \frac{(1-\overline{s})(1-s_1^e)L^{e,2}}{L_2}(\hat{l}_t^{e,2} - \frac{s_1^e}{(1-s_1^e)}\hat{s}_{1t}^e)$
Monetary Policy Rule	$\hat{r}_t = \omega\pi_{Ct}$

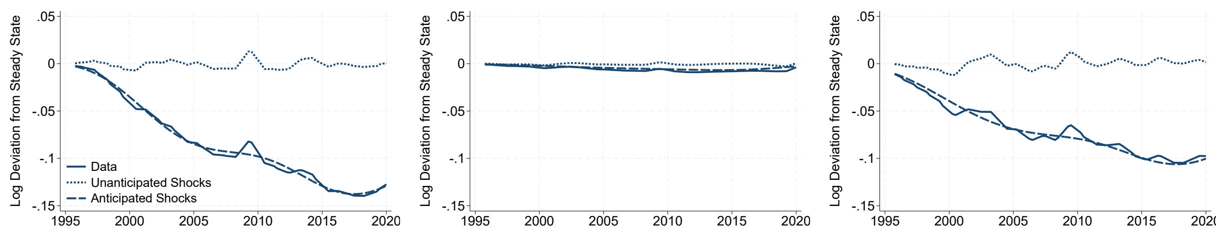
Note: $a = (u, s)$ is a duple that indexes agent types $u \in \{e, h\}$ and sectors $s \in \{1, 2\}$. We introduce auxiliary notation for relative prices as follows: $\widehat{rwc}_t(s) \equiv \hat{w}_t(s) - \hat{p}_{Ct}$, $\widehat{rp}_{Ct}(s) \equiv \hat{p}_{Ct}(s) - \hat{p}_{Ct}$, $\widehat{rmc}_t(s) \equiv \widehat{mc}_t(s) - \hat{p}_{Ht}(s)$, $\widehat{rpmc}_t(s) \equiv \hat{p}_{Mt}(s) - \hat{p}_{Ct}$, and $\widehat{rp}_t(s',s) \equiv \hat{p}_t(s',s) - \hat{p}_{Mt}(s)$.

Table D3: Calibration of Two Sector TANK Model with Labor Market Frictions

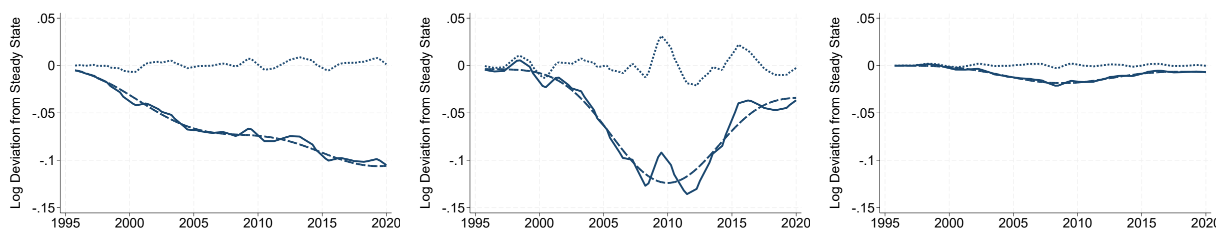
Parameter	Value	Reference/Target
ψ	2	Labor supply elasticity of 0.5
ρ	2	Intertemporal elasticity of substitution of 0.5
β	.995	Annual risk-free real rate of 2%
Ω	.99	Approximately match inflation response to anticipated trade shock in Figure 2
ϵ	3	Elasticity of substitution between home varieties
$\eta = \eta(s)$	3	Elasticity of substitution between home and foreign goods
ϑ, κ	1	Elasticity of substitution between manufacturing and non-manufacturing in consumption and input use
$\bar{s}$	0.5	Share of hand-to-mouth agents
$\begin{bmatrix} s_0^h \\ s_0^e \end{bmatrix}$	$\begin{bmatrix} .0912 \\ .1926 \end{bmatrix}$	To match the sectoral composition of gross output in 1995
χ	0.3	Speed of sectoral reallocation of workers
$\begin{bmatrix} \zeta(1) \\ \zeta(2) \end{bmatrix}$	$\begin{bmatrix} 0.2066 \\ 0.7934 \end{bmatrix}$	To match expenditure share in consumption in manufacturing and non-manufacturing in 1995
$\begin{bmatrix} \alpha(1) \\ \alpha(2) \end{bmatrix}$	$\begin{bmatrix} 0.7648 \\ 0.4480 \end{bmatrix}$	To match 1995 input shares
$\begin{bmatrix} \alpha(1,1) & \alpha(1,2) \\ \alpha(2,1) & \alpha(2,2) \end{bmatrix}$	$\begin{bmatrix} 0.4391 & 0.5609 \\ 0.6537 & 0.3463 \end{bmatrix}$	To match input-output structure for inputs in 1995
$\begin{bmatrix} \nu(1) \\ \nu(2) \end{bmatrix}$	$\begin{bmatrix} 0.8361 \\ 0.9762 \end{bmatrix}$	To match domestic shares in consumption in 1995
$\begin{bmatrix} \xi(1,1) & \xi(1,2) \\ \xi(2,1) & \xi(2,2) \end{bmatrix}$	$\begin{bmatrix} 0.8609 & 0.8951 \\ 0.9061 & 0.9715 \end{bmatrix}$	To match domestic shares for inputs in 1995
$Z(s)$	$\frac{(\epsilon-1)/\epsilon}{\alpha(s)^{\alpha(s)}(1-\alpha(s))^{(1-\alpha(s))}}$	Normalization to set sectoral output prices to 1
ϕ	23.6453	To yield first order equivalence to Calvo pricing with average price duration of 4 quarters [Sims and Wolff (2017)]
$\begin{bmatrix} \gamma^*(1) \\ \gamma^*(2) \end{bmatrix}$	$\begin{bmatrix} 0.0159 \\ .0145 \end{bmatrix}$	To match ratio of manufacturing exports relative to services in 1995, which was 1.095
C^*	.2496	Consumption of representative consumer in ROW
ω	1.5	Clarida, Gali and Gertler (1999)
Υ	0.0144	To normalize the real exchange rate in steady state to 1

Figure D1: Decomposition of Domestic Sourcing for the Two-Sector TANK Model

(a) Final Sourcing: $\lambda_{Ct}(1)$ (b) Final Sourcing: $\lambda_{Ct}(2)$ (c) Input Sourcing: $\lambda^{M}_{Ht}(1,1)$



(d) Input Sourcing: $\lambda^{M}_{Ht}(1,2)$ (e) Input Sourcing: $\lambda^{M}_{Ht}(2,1)$ (f) Input Sourcing: $\lambda^{M}_{Ht}(2,2)$



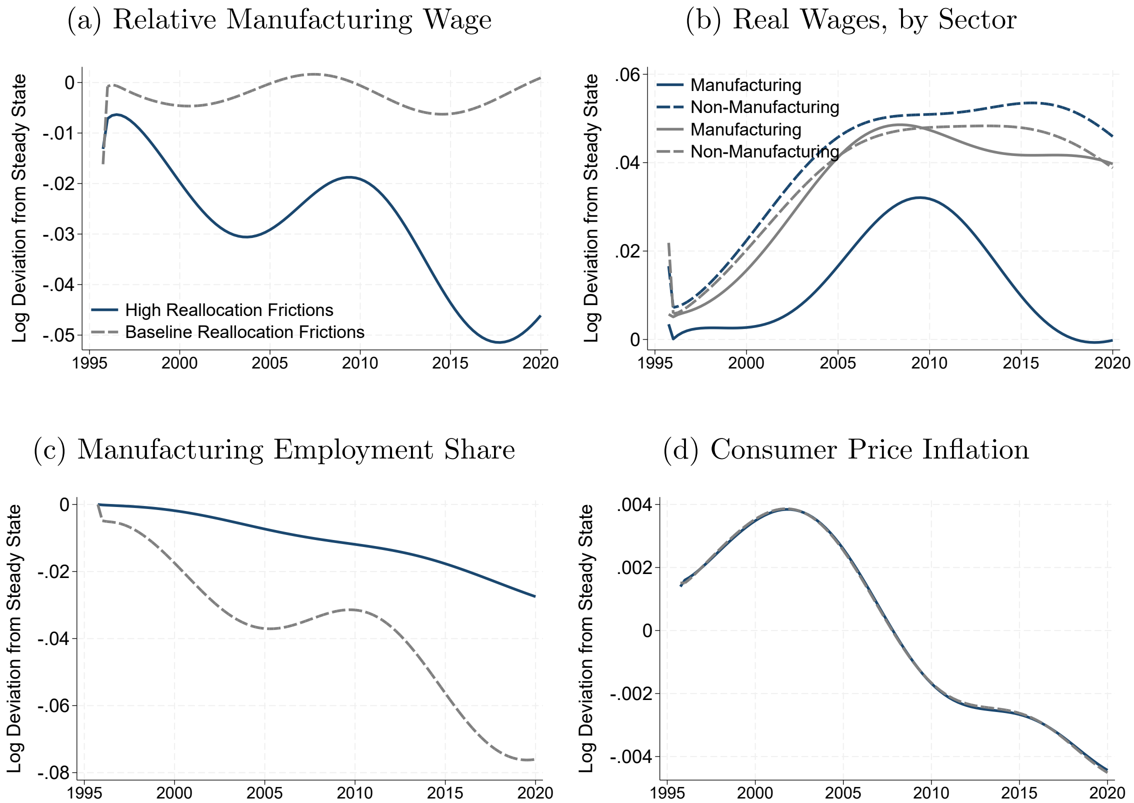
tions (32)-(33). In Figure D1, we decompose the domestic sourcing series (previously presented in Figure 9) into components attributable to unanticipated shocks versus anticipated growth shocks. For reference, the autoregressive parameter values in the stochastic processes are: $\rho_{\lambda,C1} = 0.9837$, $\rho_{\lambda,C2} = 0.9774$, $\rho_{\lambda,M11} = 0.9766$, $\rho_{\lambda,M12} = 0.9873$, $\rho_{\lambda,M21} = 0.9876$, $\rho_{\lambda,M22} = 0.9851$, and $\rho_{g,x} = .99$ for all categories x.

D.2 Labor Market Frictions

In Section 3.2.4, we simulated the model with moderate levels of labor market frictions. We made the claim in passing that higher levels of labor market frictions lead to larger adjustments in wages, but smaller adjustments in employment. Further, we argued that while this alternative calibration changes labor market outcomes, it has minimal impacts on inflation. In Figure D2, we provide historical simulations that support these claims, where the parameter governing labor market frictions is set to $\chi = .01$. In each figure, we plot simulation outcomes with baseline calibrated levels of labor market frictions, which were previously presented in Figures 10-11, for reference.

In Figure D2a, we see that high labor market frictions lead to a larger decline in the relative wage of manufacturing workers over time. Correspondingly, real wages for manufacturing workers are significantly lower than real wages for non-manufacturing workers in Figure D2b, such that manufacturing workers experience no gains in real wages between 1995-2020, though they have temporarily higher real wages in the decade between 2005-2015.

Figure D2: Historical Simulation with High Labor Market Frictions



Note: Panel (a) plots the relative wage of manufacturing workers. Panel (b) plots real wages by sector. Panel (c) plots the manufacturing share of employment. Panel (d) plots consumer price inflation. Gray lines indicate simulations with baseline levels of labor market frictions, depicted previously in Figures 10-11. Baseline frictions set $\chi = 0.3$ and high frictions set $\chi = .01$.

Thus, high labor market frictions lead to larger wage gaps in the model. On the flip side, we see that high labor market frictions impede sectoral labor reallocation in Figure D2c, so the manufacturing employment share falls less in this scenario. Despite these differences in labor market adjustment, we see that inflation is virtually the same in this simulation as in the baseline in Figure D2d, where there are two lines in the figure that overlay one another. As a result, we conclude that the reaction of inflation to the trade shocks is surprisingly robust to how trade impacts the labor market.