# Appendix

## A Empirical Appendix

### A.1 Additional Figures and Tables

Table A.1: Ilzetzki, Reinhart, and Rogoff's (2019) Exchange Rate Regime Classification

| Fine Code | Coarse Code | Description |
|---|---|---|
| 1 | 1 | No separate legal tender or currency union |
| 2 | 1 | Pre announced peg or currency board |
| 3 | 1 | Pre announced horizontal band that is narrower than or equal to $\pm 2\%$ |
| 4 | 1 | De facto Peg |
| 5 | 2 | Pre announced crawling peg;<br>de facto moving band narrower than or equal to $\pm 1\%$ |
| 6 | 2 | Pre announced crawling band that is narrower than or equal to $\pm 2\%$<br>or de facto horizontal band that is narrower than or equal to $\pm 2\%$ |
| 7 | 2 | De facto crawling peg |
| 8 | 2 | De facto crawling band that is narrower than or equal to $\pm 2\%$ |
| 9 | 3 | Pre announced crawling band that is wider than or equal to $\pm 2\%$ |
| 10 | 3 | De facto crawling band that is narrower than or equal to $\pm 5\%$ |
| 11 | 3 | Moving band that is narrower than or equal to $\pm 2\%$ |
| 12 | 3 | De facto moving band $\pm 5\%$ / Managed floating |
| 13 | 4 | Freely floating |
| 13.1 | 4.1 | Other anchor and course classification 1 to that anchor |
| 13.2 | 4.2 | Other anchor and course classification 2 to that anchor |
| 13.3 | 4.3 | Other anchor and course classification 3 to that anchor |

*Note:* The table lists the exchange rate regime classification of Ilzetzki, Reinhart, and Rogoff (2019). The table excludes two categories: "freely falling" and "dual market with missing parallel market data." The bottom three rows are three categories we create in our analysis.

Table A.2: Data Series and Sources

| Variable | Source | Observations | Countries |
|---|---|---|---|
| Nominal effective exchange rate | Darvas (2021) | 5012 | 149 |
| Real effective exchange rate | Darvas (2021) | 4905 | 149 |
| Exchange rate to USD | IFS | 4997 | 150 |
| GDP | WDI | 4975 | 158 |
| Consumption | WDI | 3244 | 137 |
| Investment | WDI | 3220 | 136 |
| Export | WDI | 3319 | 142 |
| Import | WDI | 3319 | 142 |
| Net Exports | Constructed | 3319 | 142 |
| Nominal Interest Rate | IFS | 2409 | 98 |
| CPI | IFS | 4462 | 153 |
| Ex-post Real Interest Rate | Constructed | 2139 | 92 |
| Export Unit Value | UNCTAD | 3831 | 158 |
| Import Unit Value | UNCTAD | 3697 | 158 |
| Terms of Trade | Constructed | 3697 | 158 |
| Manufacturing GDP | WDI | 3773 | 146 |
| Service GDP | WDI | 3899 | 148 |
| Agriculture GDP | WDI | 4184 | 151 |
| Mining, Construction, Energy GDP | WDI | 3643 | 144 |

*Note:* This table lists the variables and data sources we use. Column 3 presents the number of observations in our baseline sample. Column 4 presents the number of countries in our baseline sample.

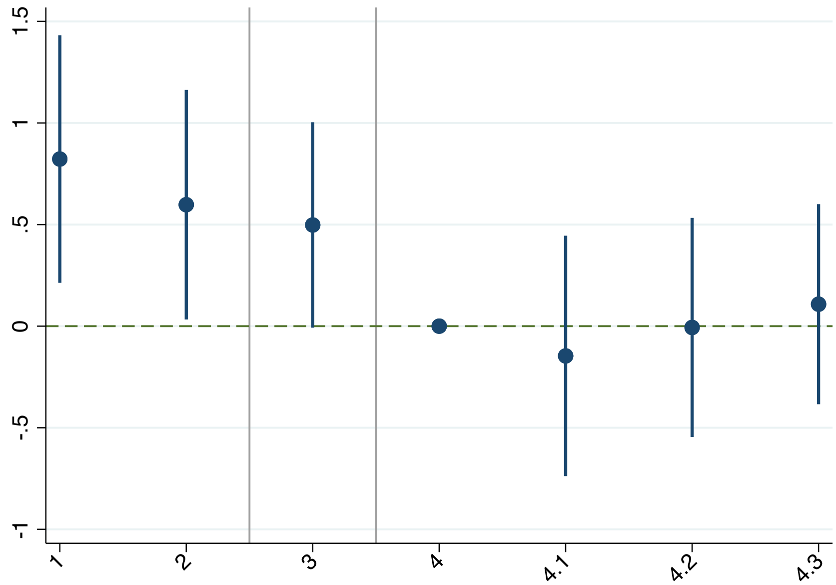


Figure A.1: Comovement with US Dollar by Category

*Note:* This figure plots our estimates of the $\gamma_k$'s from Equation (1). These are estimates of the comovement of the exchange rate of currencies with different exchange rate regimes as classified by Ilzetzki, Reinhart, and Rogoff's (2019) coarse classification. We normalize the $\gamma_k$ for category 4 (freely floating and anchored to the US dollar) to be zero. Categories 4.1 through 4.3 are currencies anchored to other currencies than the US dollar and classified in coarse categories 1 through 3, respectively, relative to their anchor currency. The vertical lines denotes the splits between categories we classify as pegs (1 and 2) and floats (4 through 4.3).

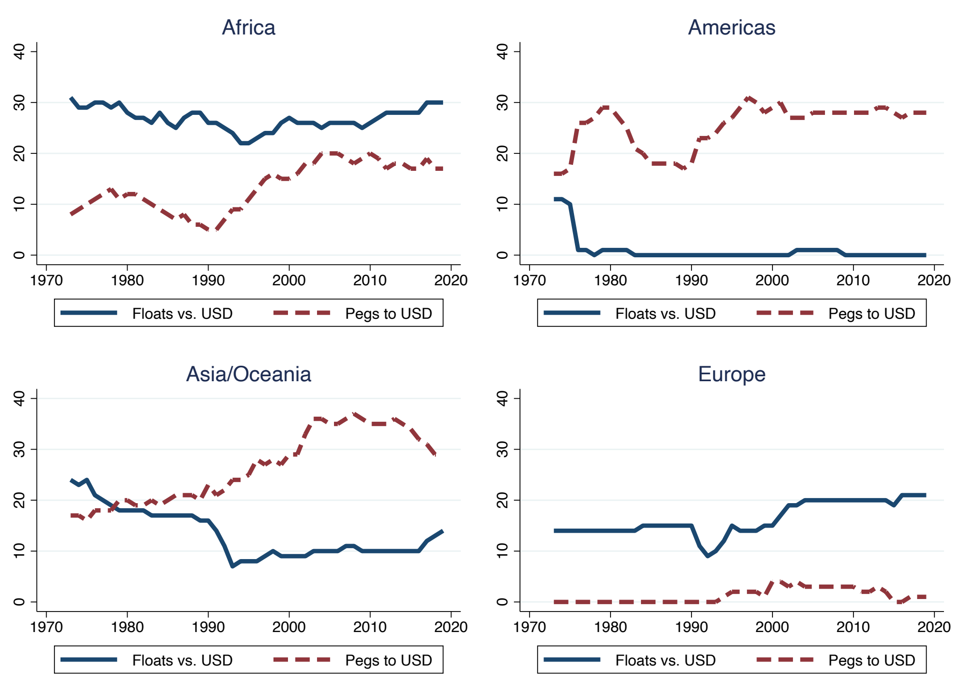


Figure A.2: Exchange Rate Regimes over Time by Region

*Note:* This figure plots the faction of countries that we classify as pegs and floats over time by region.

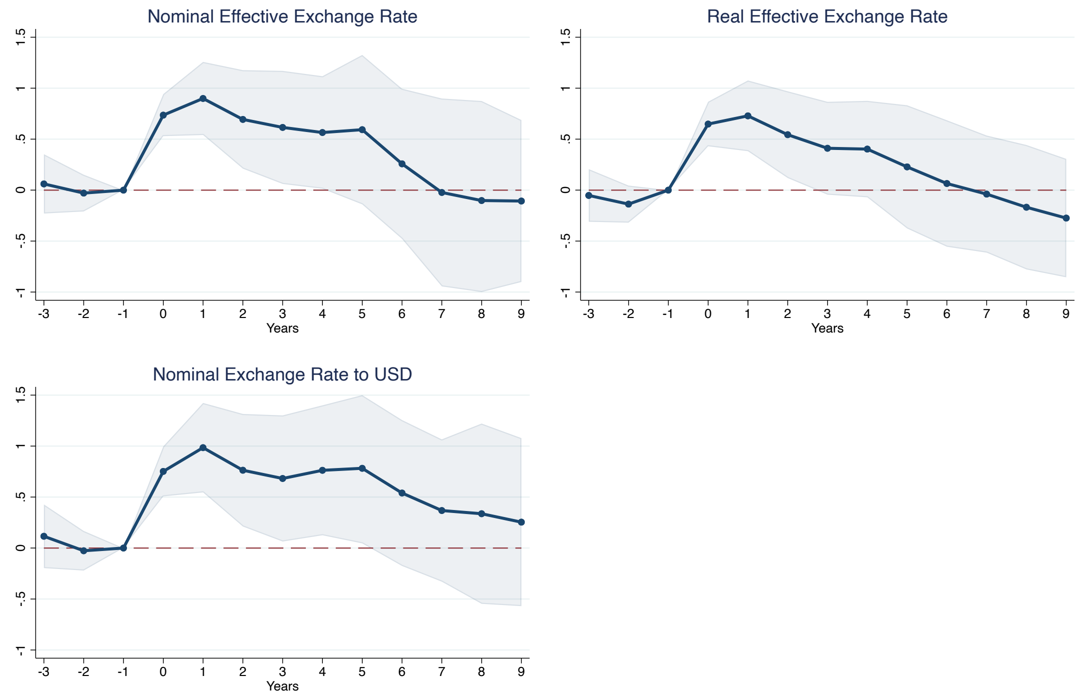


Figure A.3: Response of US Dollar Exchange Rate for Pegs vs. Floats

*Note:* This figure plots the response of the nominal effective exchange rate, real effective exchange rate, and country $i$'s US dollar exchange rate for pegs versus floats in response to a change in the US dollar nominal effective exchange rate. In all three cases the dependent variable is the change in the logarithm of the variable. These are our estimates of $\beta_h$ in Equation (2) for different horizons $h$ when these three variables are the outcome variables. These results are for the case with our baseline set of controls. The shaded areas are 95% confidence intervals.

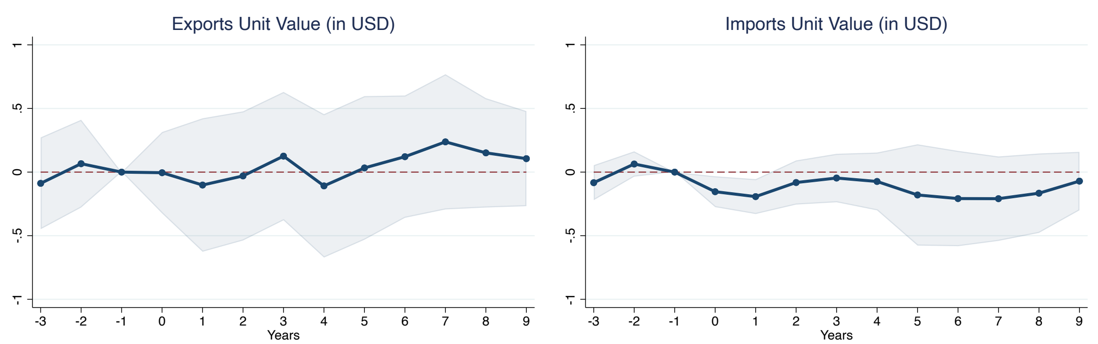


Figure A.4: Response of Pegs vs. Floats for Export and Import Prices

*Note:* This figure plots the response of export and import unit values in US dollars for pegs versus floats in response to a change in the US dollar exchange rate. For both variables, the dependent variable is the change in the logarithm of the variable. These are our estimates of $\beta_h$ in Equation (2) for different horizons $h$ when these two variables are the outcome variables. These results are for the case with our baseline set of controls. The shaded areas are 95% confidence intervals.

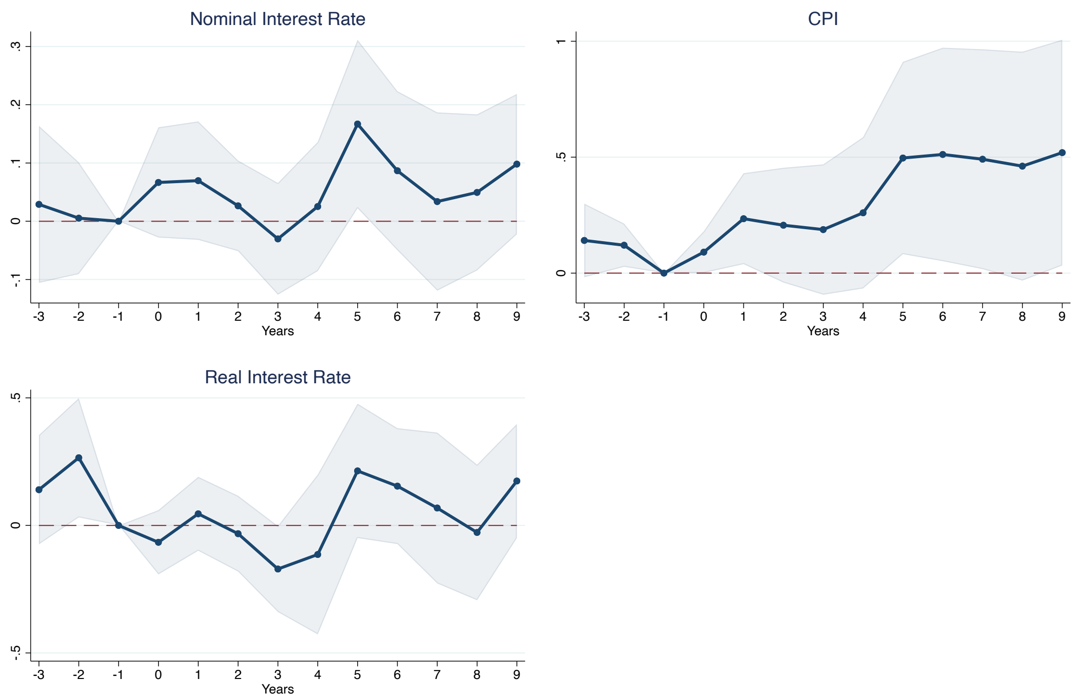


Figure A.5: Response of Interest Rates and Prices for Pegs vs. Floats

*Note:* This figure plots the response of the short term nominal interest rate, the CPI, and the ex-post real interest rate for pegs versus floats in response to a change in the US dollar nominal effective exchange rate. For the CPI, the dependent variable is the change in the logarithm of the CPI. For the nominal and real interest rates, the dependent variable is the variable in levels (i.e., 0.02 denotes 2%). These are our estimates of $\beta_h$ in Equation (2) for different horizons $h$ when these three variables are the outcome variables. These results are for the case with our baseline set of controls. The shaded areas are 95% confidence intervals.

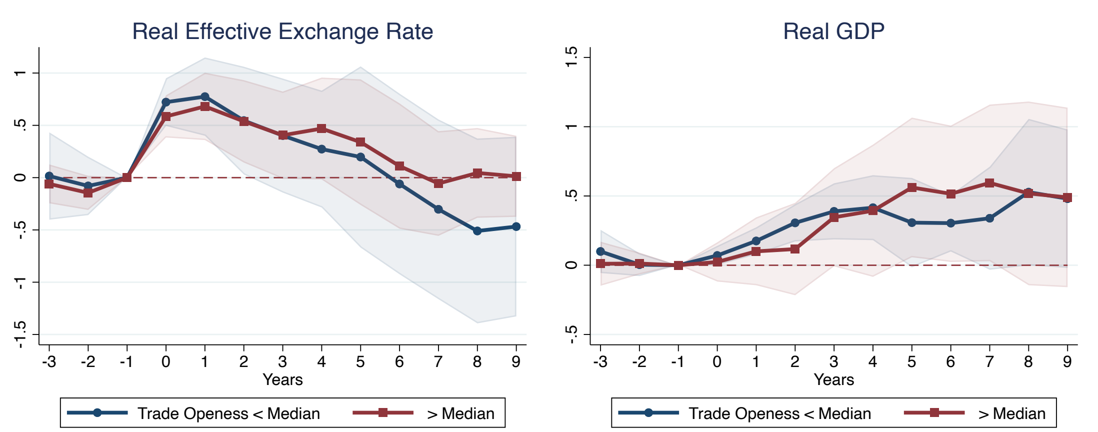


Figure A.6: Response of Pegs vs. Floats by Trade Openness

*Note:* This figure plots the response of real exchange rate and GDP for pegs versus floats in response to a change in the US dollar exchange rate. We estimate these responses separately for the sample of countries with an average trade openness below median and above median. We measure the average trade openness of a country as the sum of exports and imports divided by GDP, averaged over our sample period. For the real exchange rates, the dependent variable is the change in the logarithm of the variable. For GDP, the dependent variable is the percentage change. These are our estimates of $\beta_h$ in Equation (2) for different horizons $h$. These results are for the case with our baseline set of controls. The shaded areas are 95% confidence intervals.

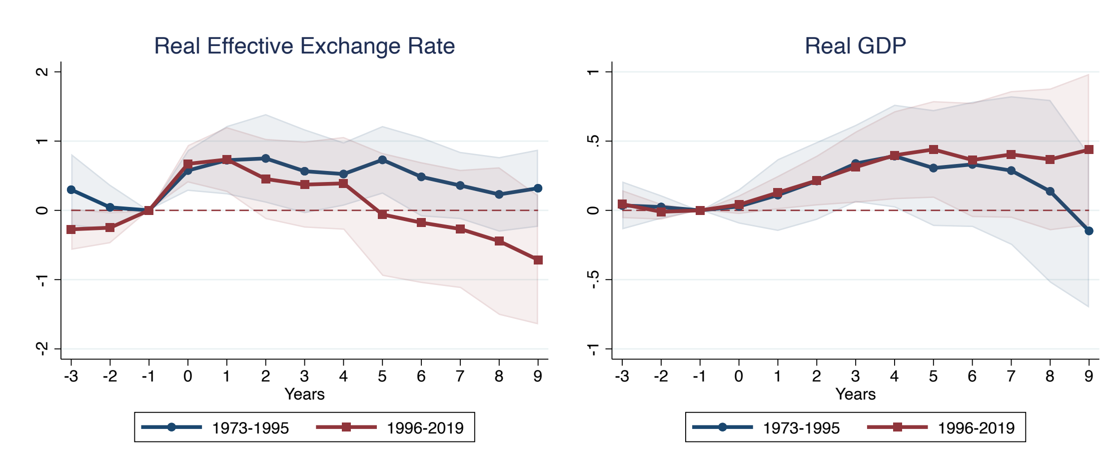


Figure A.7: Response of Pegs vs. Floats by Sample Period

*Note:* This figure plots the response of real exchange rate and GDP for pegs versus floats in response to a change in the US dollar exchange rate. We estimate these responses separately for the first and the second half of our sample period. For the real exchange rates, the dependent variable is the change in the logarithm of the variable. For GDP, the dependent variable is the percentage change. These are our estimates of $\beta_h$ in Equation (2) for different horizons $h$. These results are for the case with our baseline set of controls. The shaded areas are 95% confidence intervals.

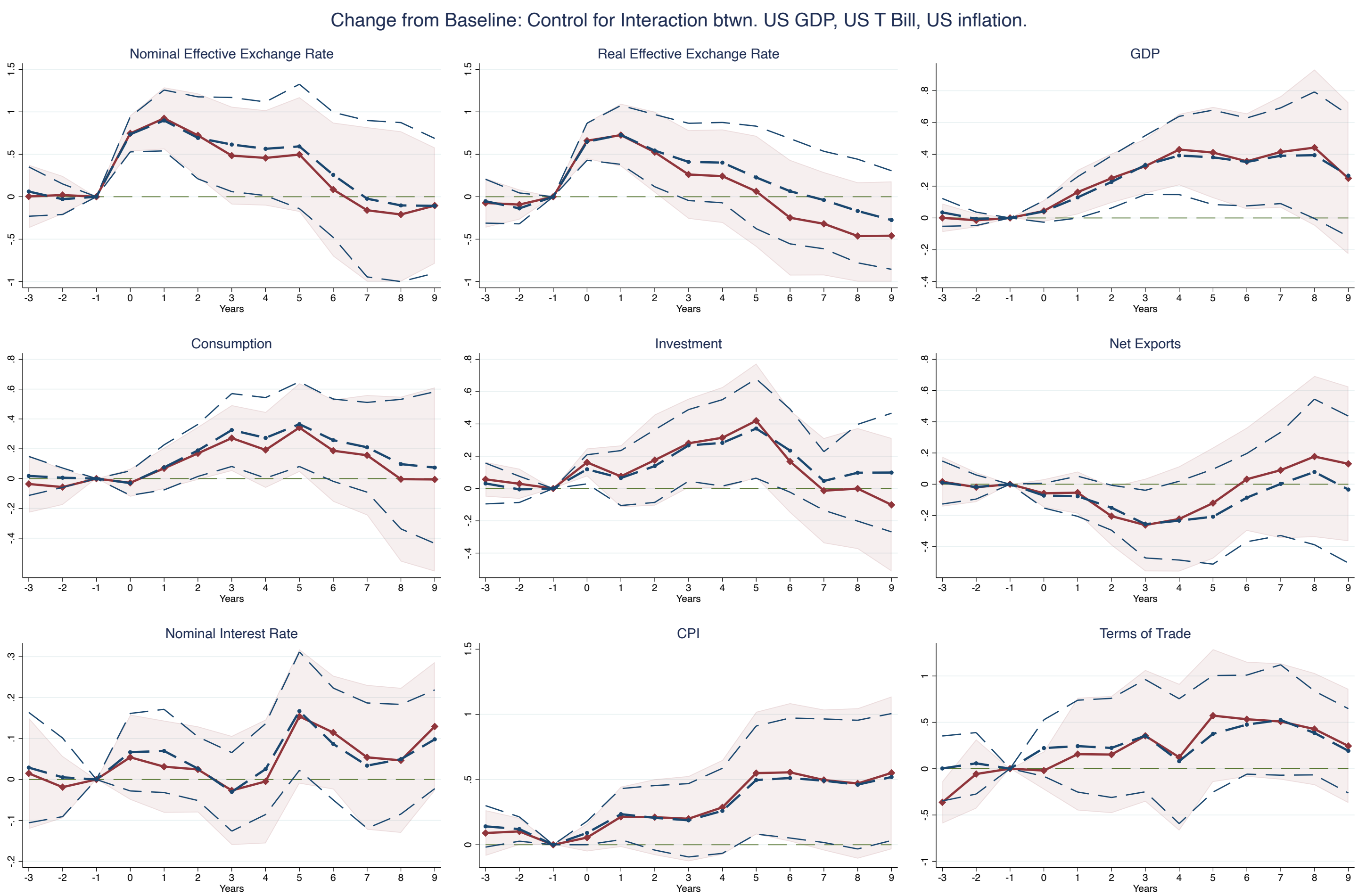


Figure A.8: Responses with Added US Controls

*Note:* This figure plots responses for a specification analogous to our baseline specification except that we add the interaction of contemporaneous US GDP growth, US inflation, and the US T-bill rate with the peg indicator variable as controls (red diamonds). We also plot the baseline responses for comparison (blue circles). The shaded areas and broken lines are 95% confidence intervals.

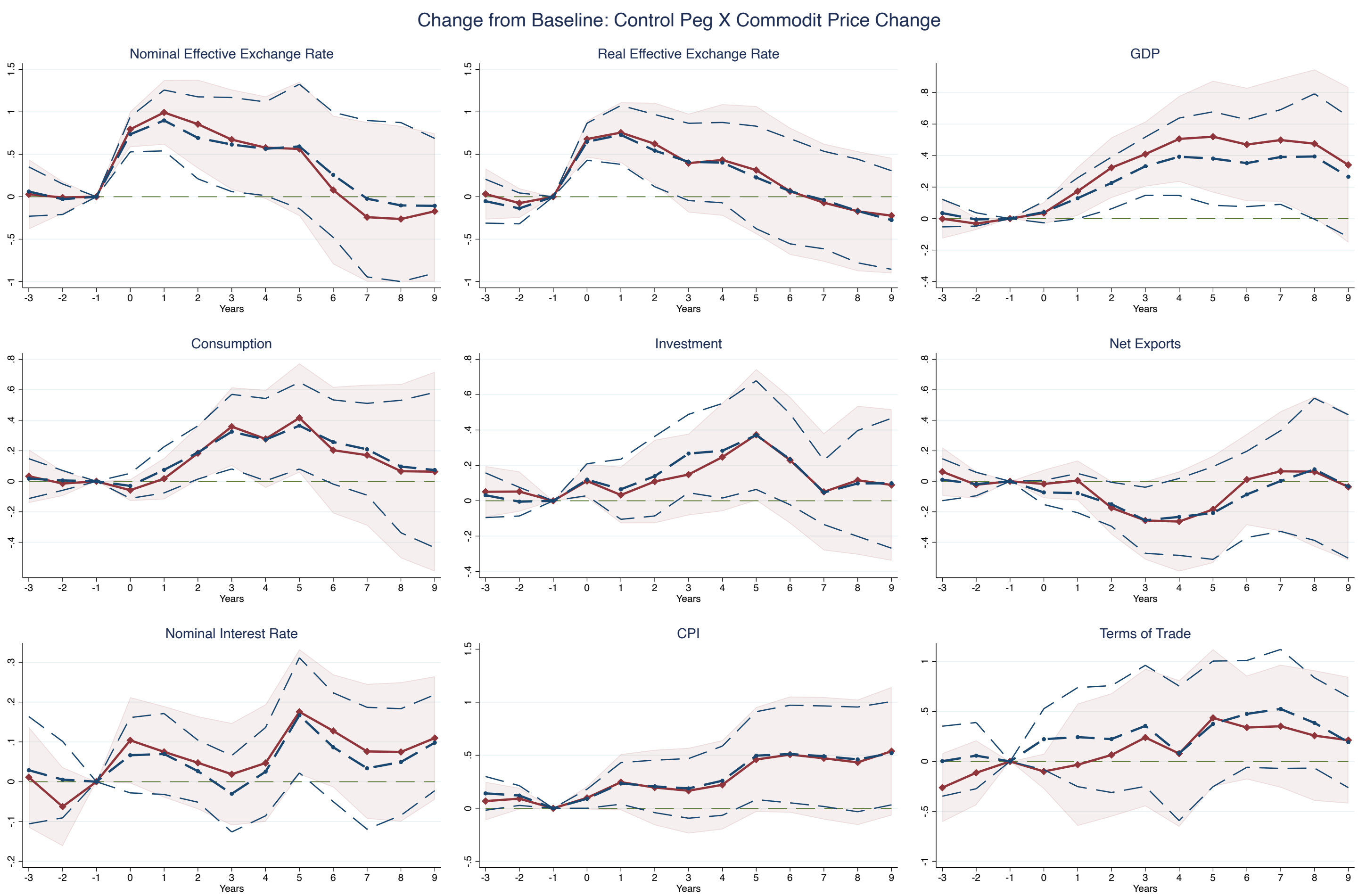


Figure A.9: Responses with Added Commodity Price Controls

*Note:* This figure plots responses for a specification analogous to our baseline specification except that we add the following control: log changes in commodity price index interacted with the peg indicator variable (red diamonds). We also plot the baseline responses for comparison (blue circles). The shaded areas and broken lines are 95% confidence intervals.

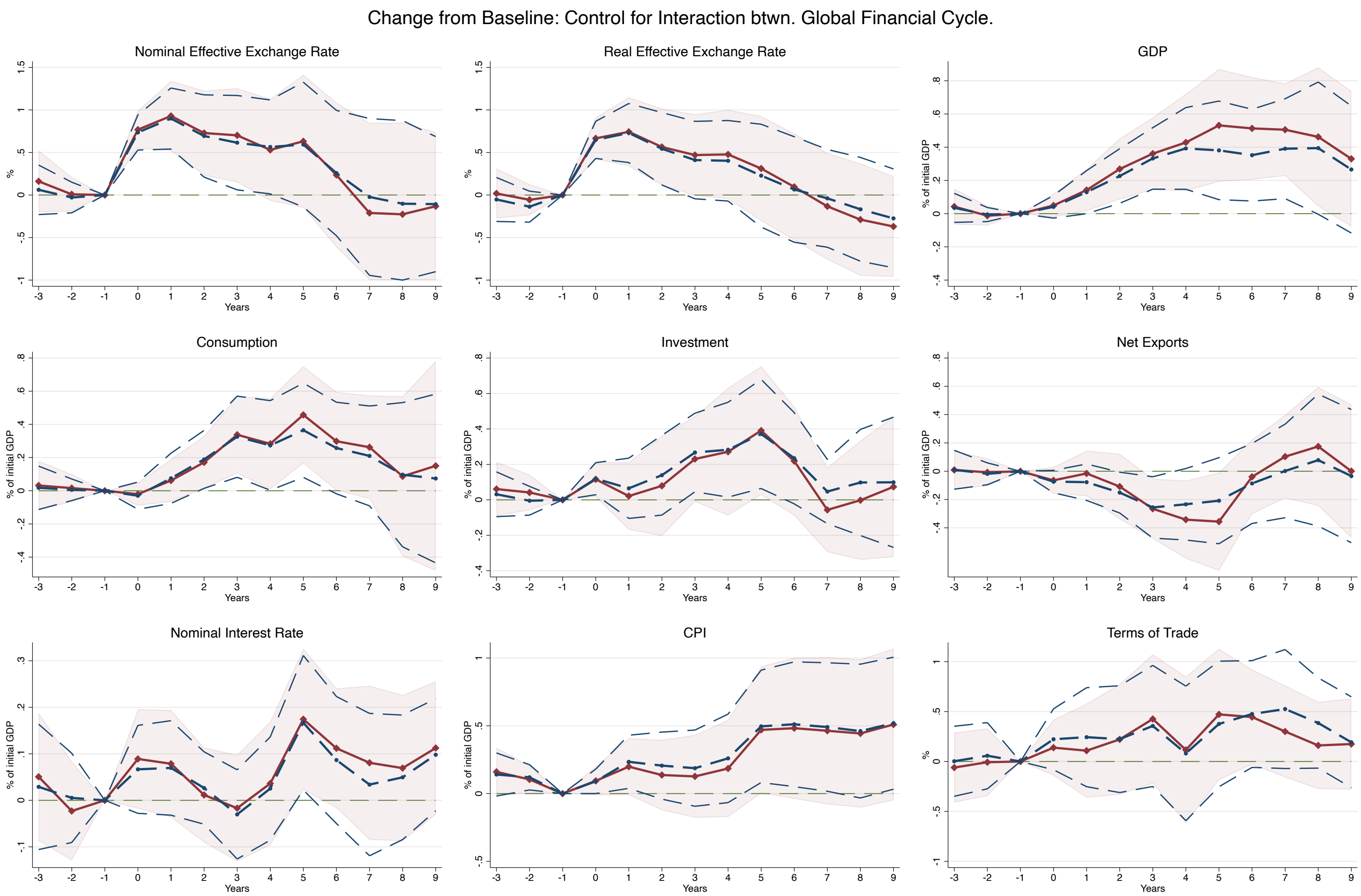


Figure A.10: Responses with Added Global Financial Cycles Controls

*Note:* This figure plots responses for a specification analogous to our baseline specification except that we add the following control: changes in Global Financial Cycle measure by Miranda-Agrippino and Rey (2015, 2020) interacted with the peg indicator variable (red diamonds). We also plot the baseline responses for comparison (blue circles). The shaded areas and broken lines are 95% confidence intervals.

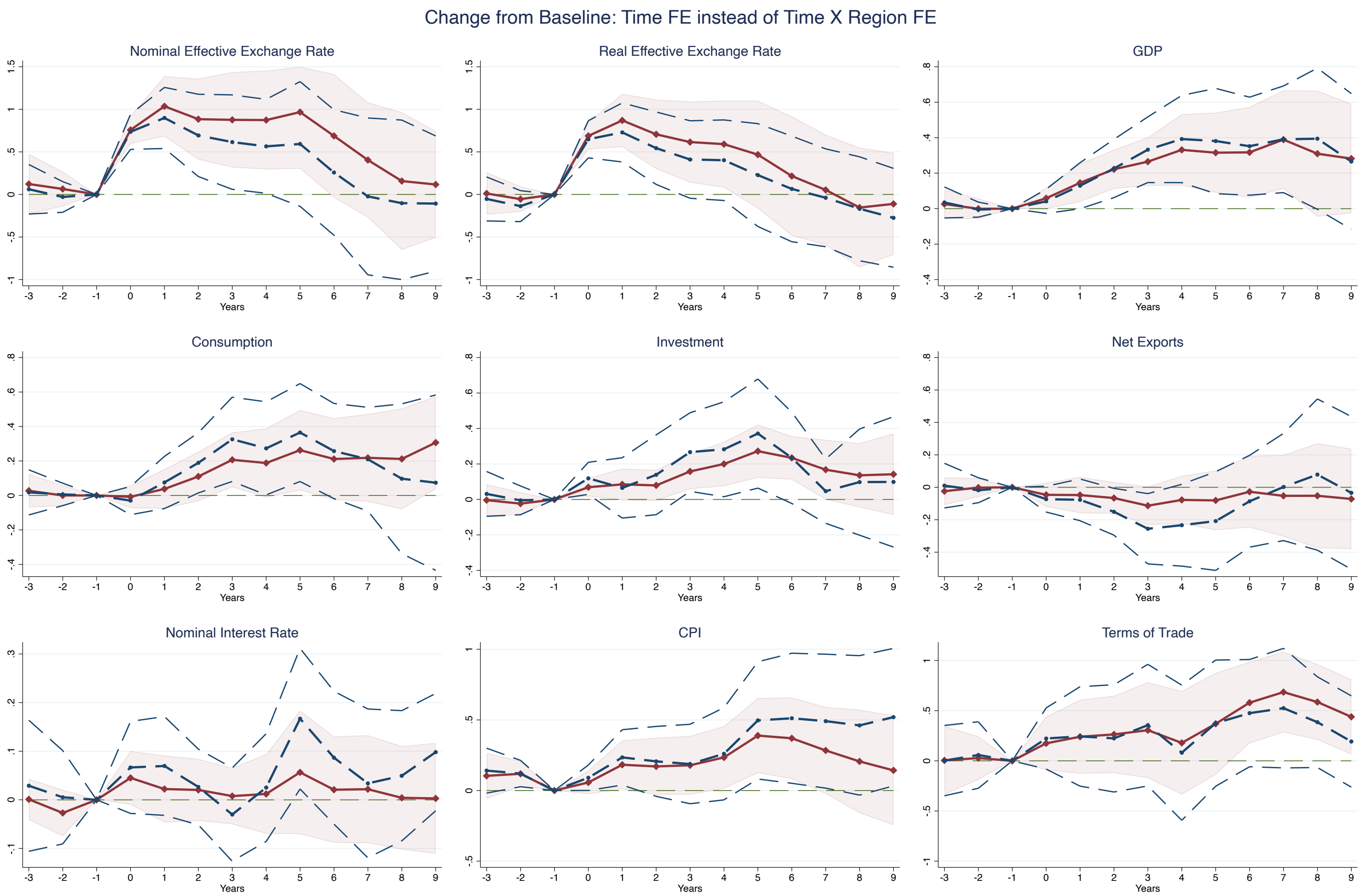


Figure A.11: Responses with Time Fixed Effects

*Note:* This figure plots responses for a specification analogous to our baseline specification except that region-by-time fixed effects have been replaced by time fixed effects (red diamonds). We also plot the baseline responses for comparison (blue circles). The shaded areas and broken lines are 95% confidence intervals.

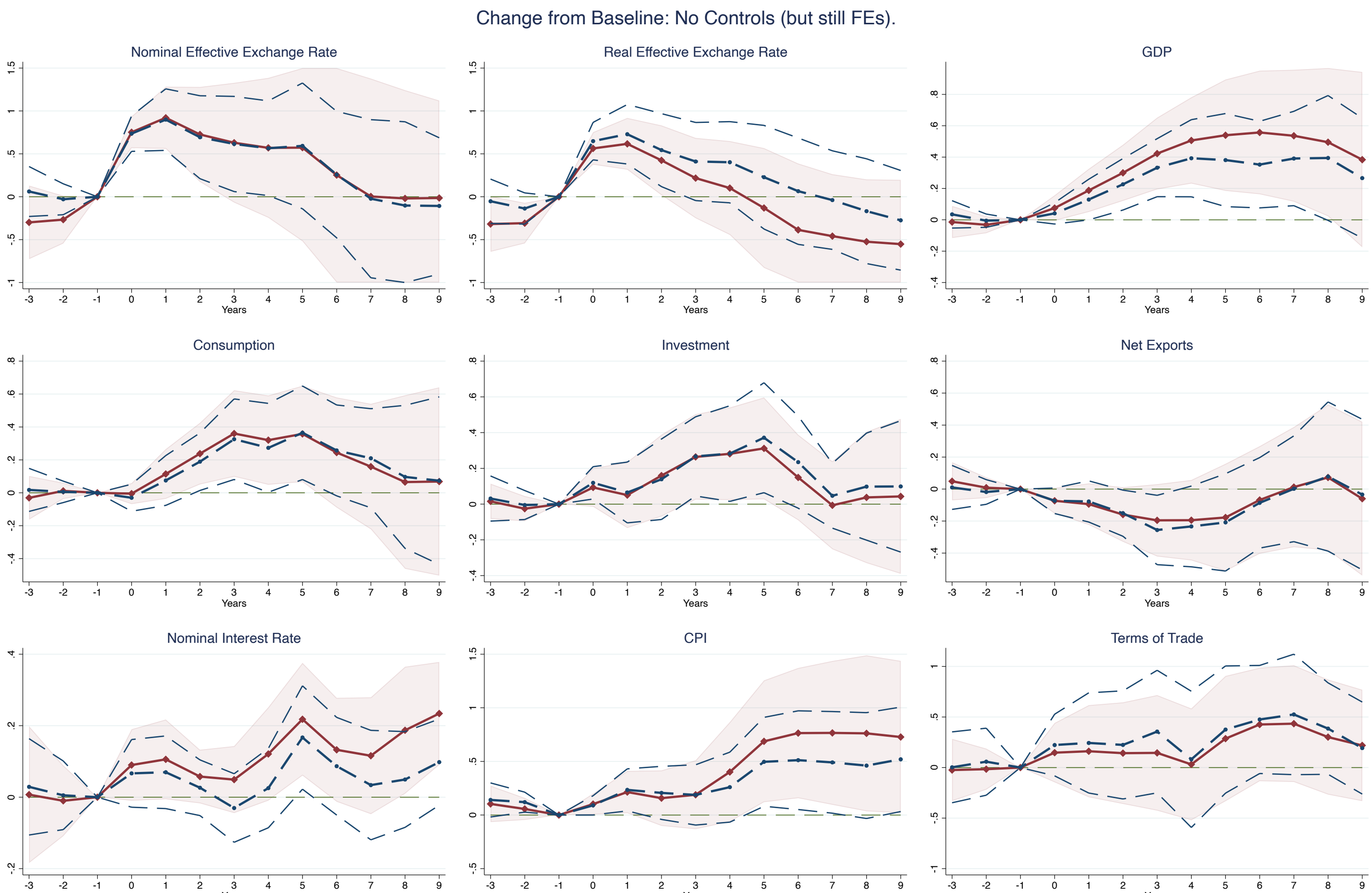


Figure A.12: Responses with No Controls Other than Fixed Effects

*Note:* This figure plots responses for a specification analogous to our baseline specification except that no controls are included other than fixed effects (red diamonds). We also plot the baseline responses for comparison (blue circles). The shaded areas and broken lines are 95% confidence intervals.

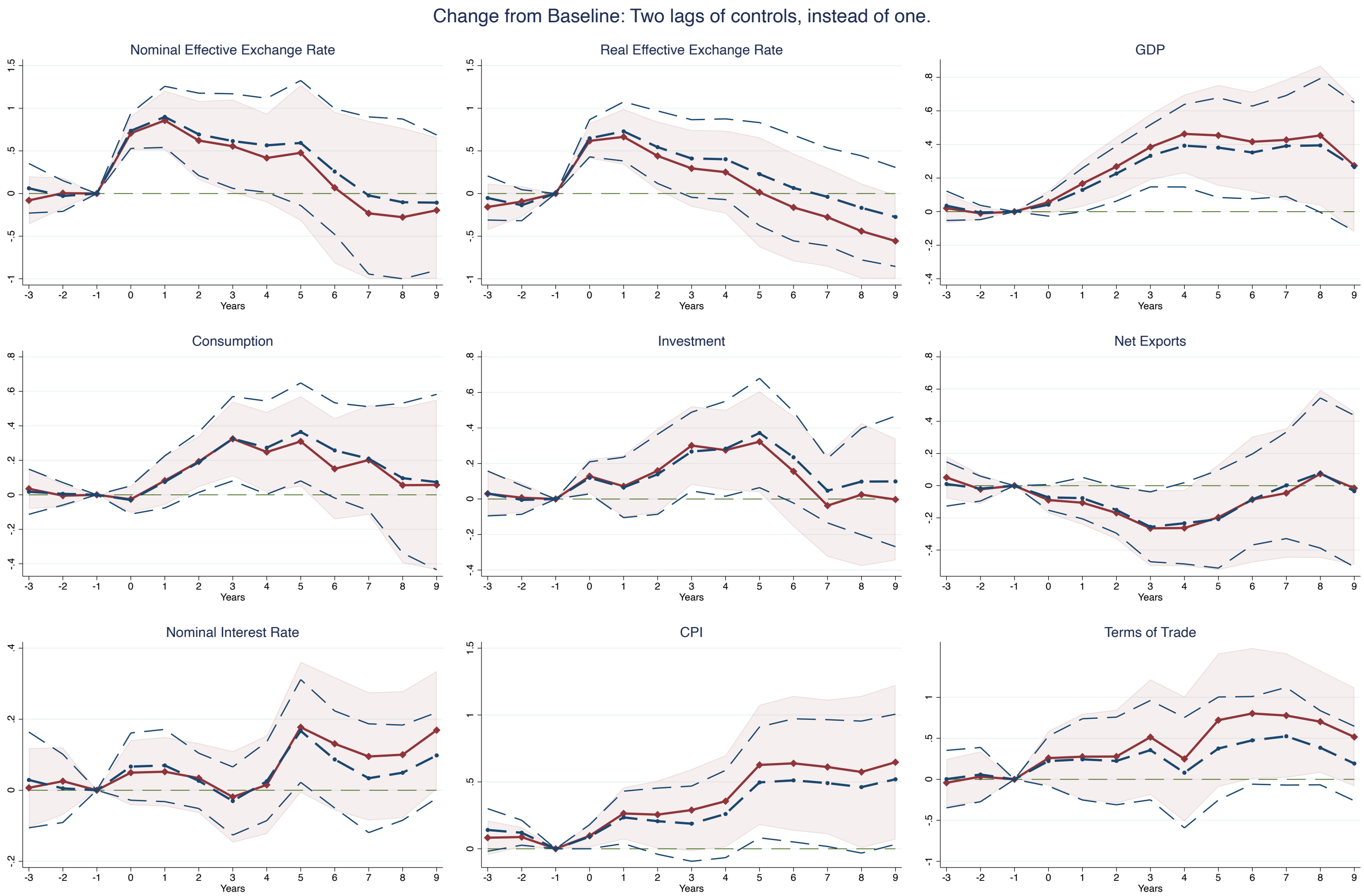


Figure A.13: Responses with Two Lags of Controls

*Note:* This figure plots responses for a specification analogous to our baseline specification except that two lags of controls are included (red diamonds). We also plot the baseline responses for comparison (blue circles). The shaded areas and broken lines are 95% confidence intervals.

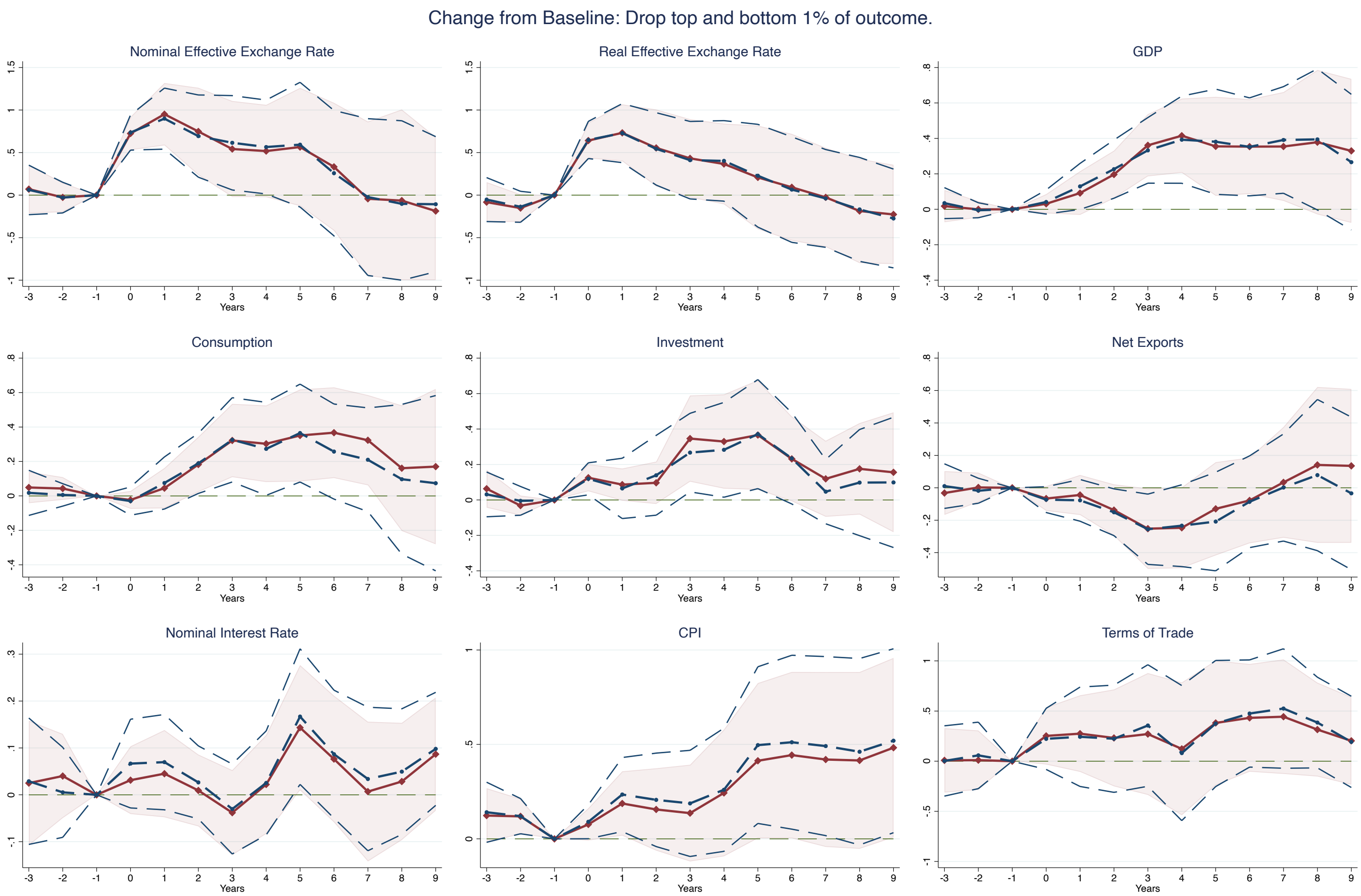


Figure A.14: Responses when Top and Bottom 1% of Observations are Dropped

*Note:* This figure plots responses for a specification analogous to our baseline specification except that we drop the top and bottom 1% of observations (red diamonds). We also plot the baseline responses for comparison (blue circles). The shaded areas and broken lines are 95% confidence intervals.

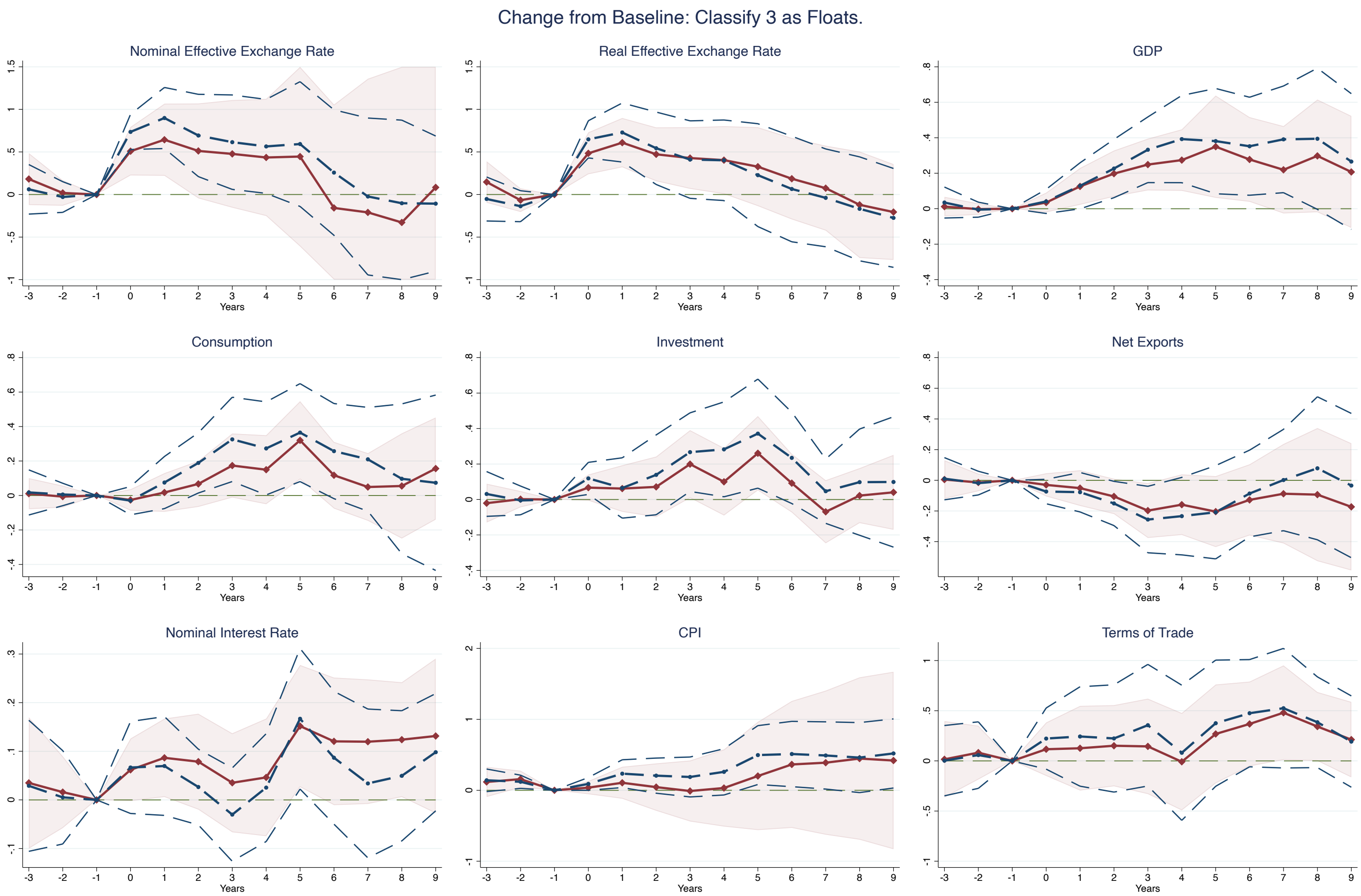


Figure A.15: Responses with Coarse Category 3 Included as Floats

*Note:* This figure plots responses for a specification analogous to our baseline specification except that we include observations in Ilzetzki, Reinhart, and Rogoff's coarse category 3 as Floats (red diamonds). We also plot the baseline responses for comparison (blue circles). The shaded areas and broken lines are 95% confidence intervals.

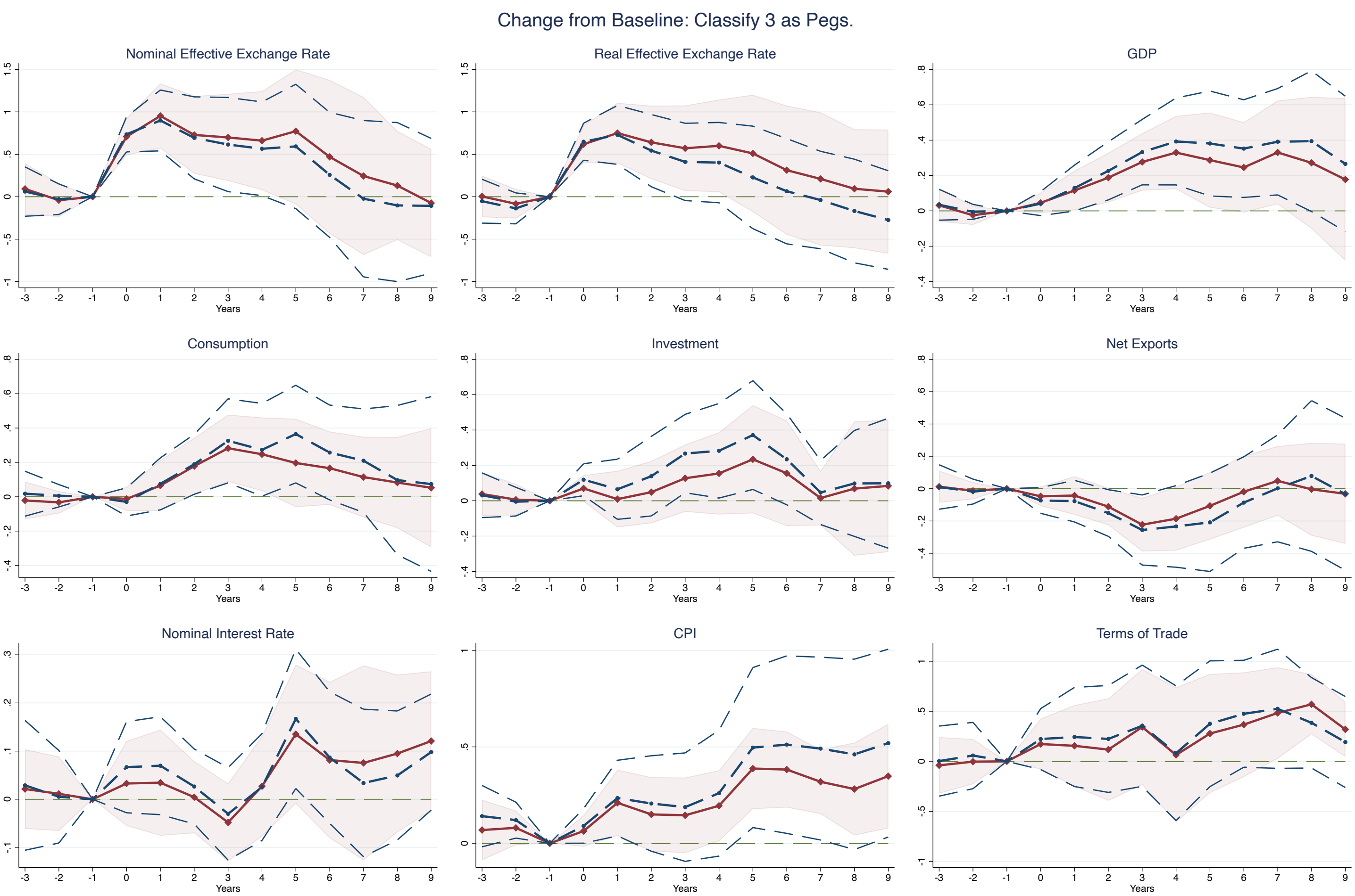


Figure A.16: Responses with Coarse Category 3 Included as Pegs

*Note:* This figure plots responses for a specification analogous to our baseline specification except that we include observations in Ilzetzki, Reinhart, and Rogoff's coarse category 3 as pegs (red diamonds). We also plot the baseline responses for comparison (blue circles). The shaded areas and broken lines are 95% confidence intervals.

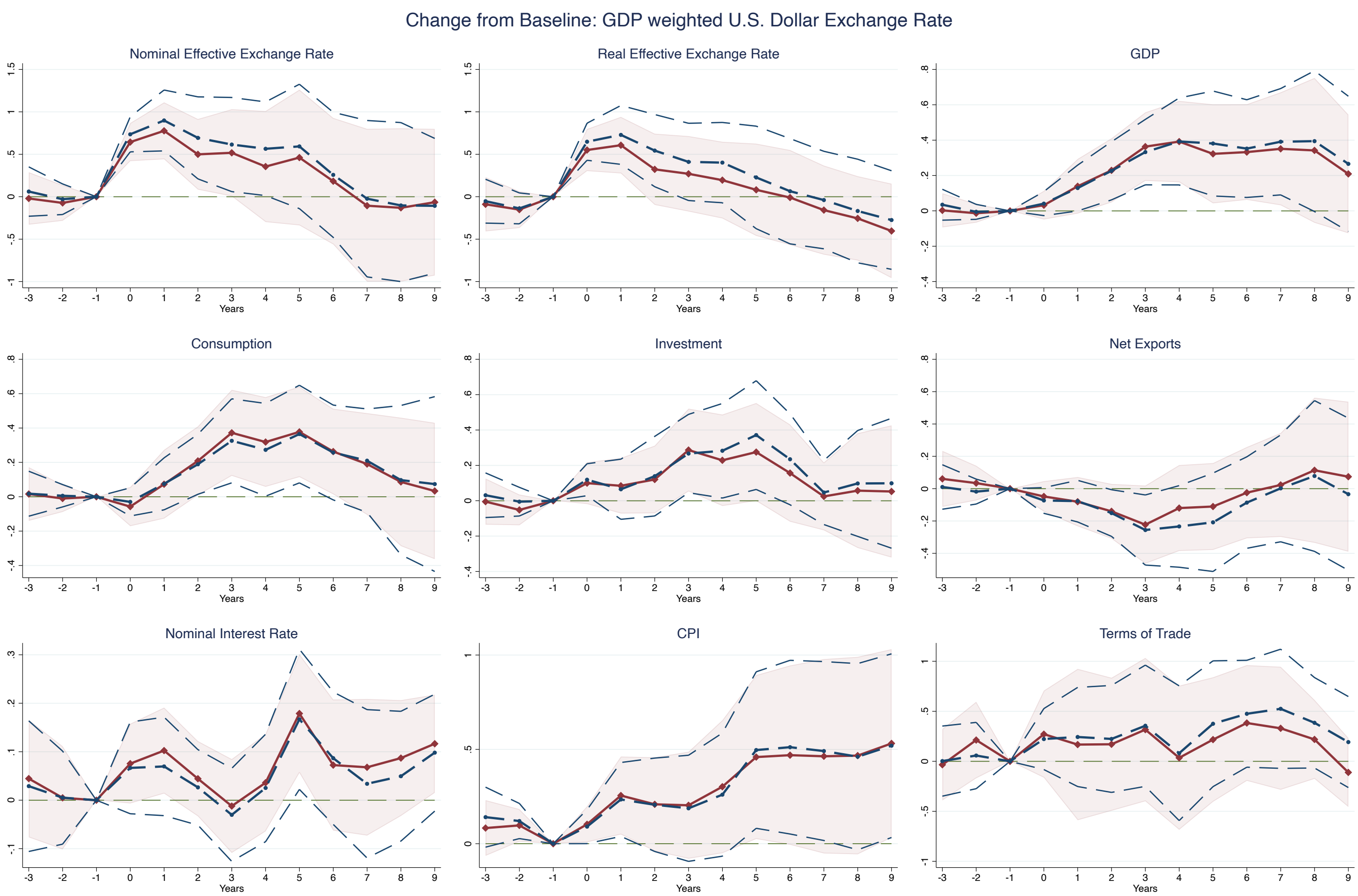


Figure A.17: Responses with a GDP-Weighted US Dollar Exchange Rate

*Note:* This figure plots responses for a specification analogous to our baseline specification except that the US dollar exchange rate is constructed using GDP weights rather than trade weights (red diamonds). We also plot the baseline responses for comparison (blue circles). The shaded areas and broken lines are 95% confidence intervals.

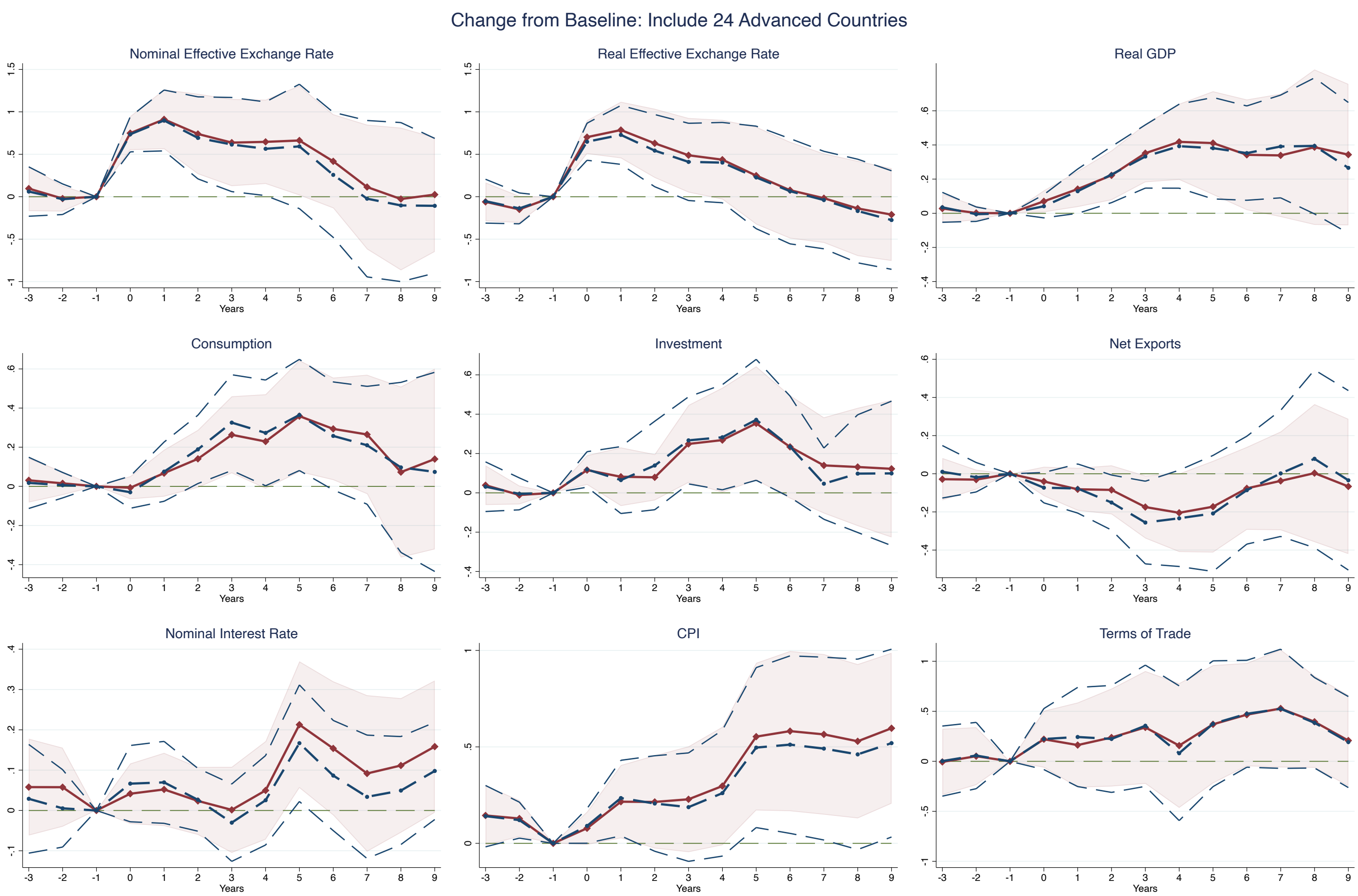


Figure A.18: Responses Including 24 "Advanced" Countries

*Note:* This figure plots responses for a specification analogous to our baseline specification except that we include the 24 countries that the BIS US trade-weighted exchange rate is defined relative to (red diamonds). We also plot the baseline responses for comparison (blue circles). The shaded areas and broken lines are 95% confidence intervals.

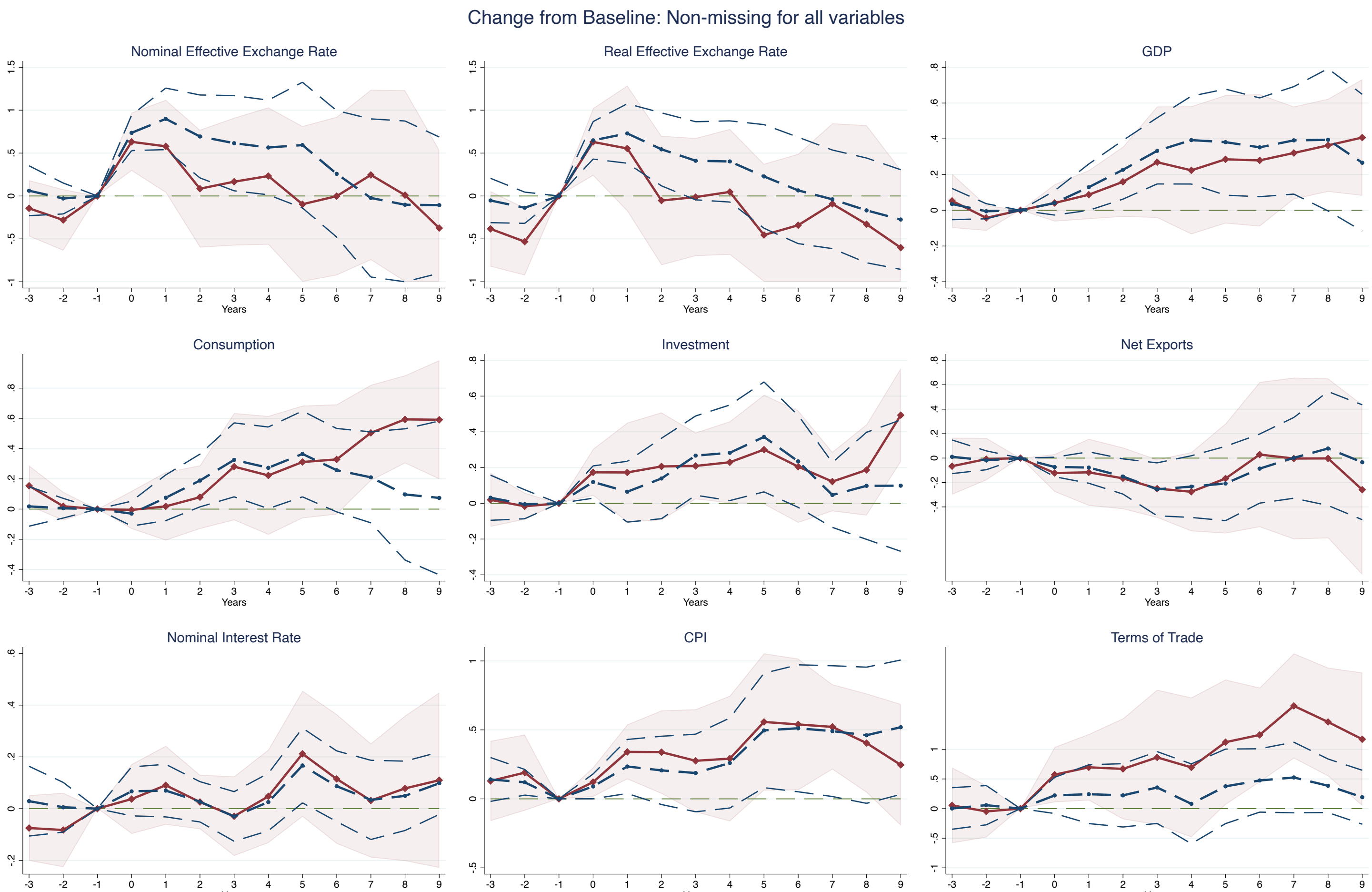


Figure A.19: Responses with Same Sample for All Variables

*Note:* This figure plots responses for a specification analogous to our baseline specification except that we estimate it on the largest sample where we have all nine variables (red diamonds). We also plot the baseline responses for comparison (blue circles). The shaded areas and broken lines are 95% confidence intervals.

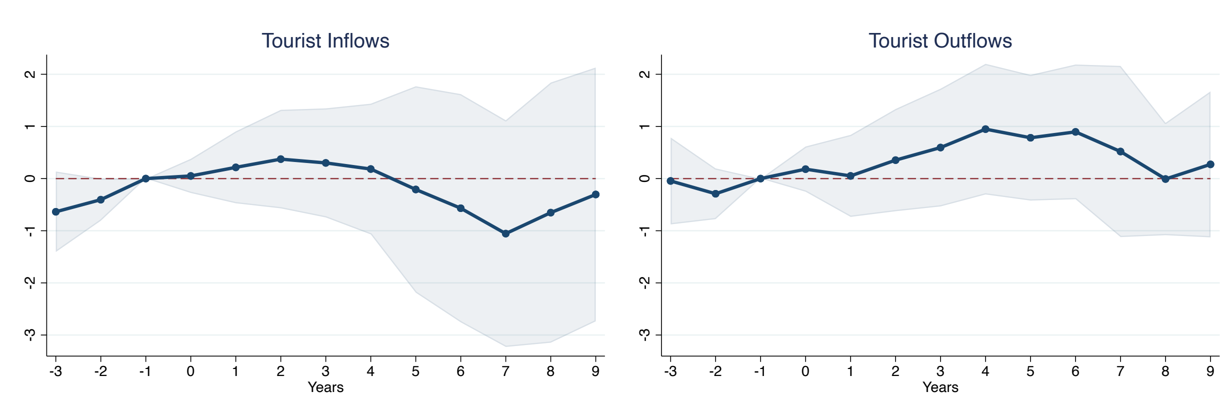


Figure A.20: Responses of Tourist Inflows and Outflows

*Note:* This figure plots the response of tourist inflows and outflows for pegs versus floats in response to a change in the US dollar exchange rate. The dependent variables are the change in the logarithm of the variable. These are our estimates of $\beta_h$ in Equation (2) for different horizons $h$. These results are for the case with our baseline set of controls. The shaded areas are 95% confidence intervals. We obtain data for tourists flow from World Bank's World Tourism Organization, Yearbook of Tourism Statistics, Compendium of Tourism Statistics and data files.

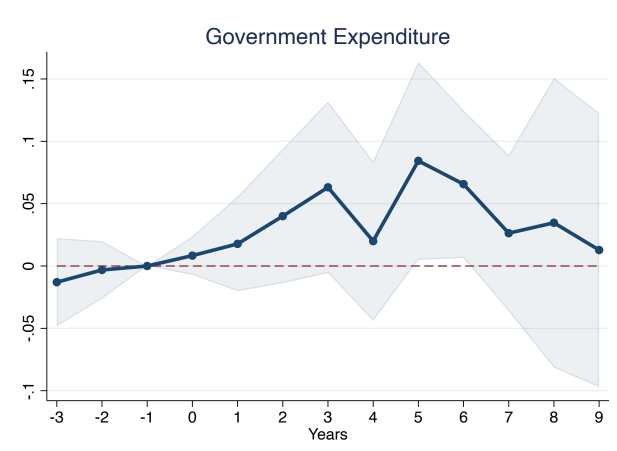


Figure A.21: Responses of Government Expenditure

*Note:* This figure plots the response of government purchases for pegs versus floats in response to a regime-driven change in the US dollar exchange rate. The dependent variable is $(G_{i,t+h} - G_{i,t-1})/Y_{i,t-1}$, where $Y$ denotes GDP and $G$ denotes government purchases, both of which are expressed in constant 2015 US Dollars. The data is from World Bank World World Development Indicators. These are our estimates of $\beta_h$ in Equation (2) for different horizons $h$ when the variable described above is the outcome variables. These results are for the case with our baseline set of controls. The shaded areas are 95% confidence intervals.

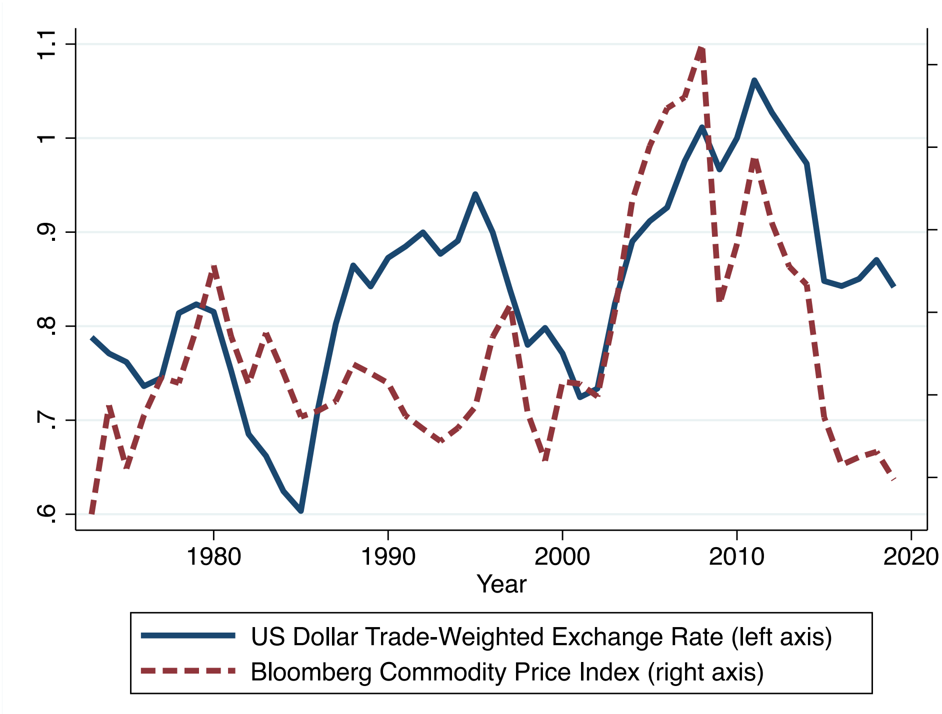


Figure A.22: US Dollar Trade-Weighted Exchange Rate and Commodity Price Index

*Note:* This figure plots the BIS's trade-weighted exchange rate of the US dollar against 24 countries and the Bloomberg Commodity Index. Lower values indicate a more appreciated US dollar.

# B Theory Appendix

## B.1 Standard Open-Economy New Keynesian Model Features

Here, we describe the features that our model shares with standard open economy New Keynesian models without financial frictions. If we set the adjustment costs in the portfolio problem of the households and the firms in our model to zero (see the description of these portfolio problems in Section 3 of the main text), our model becomes a standard open economy New Keynesian models without financial frictions in which UIP holds for all currency pairs.

### B.1.1 Households

There is a unit measure of identical households in each economy. These households derive utility from consumption and disutility from labor. They maximize

$$\mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \left[ u(C_{it} - hC_{it-1}) - \chi(n_{it}) \right], \tag{B.1}$$

where $C_{it}$ denotes consumption of households from country $i$ at time $t$ of a composite of home and foreign goods discussed below, $n_{it}$ denotes labor supplied by households in country $i$ at time $t$, $\beta$ is the households' subjective discount factor, $h$ is a parameter governing the strength of their habit formation in consumption,

$$u(C_{it} - hC_{it-1}) = \frac{(C_{it} - hC_{it-1})^{1-\sigma}}{1-\sigma}, \qquad \chi(n_{it}) = \frac{n_{it}^{1+\nu}}{1+\nu},$$

where $\sigma$ is inversely related to the household's intertemporal elastiticy of substitution, and $\nu$ is the inverse of the Frisch elasticity of labor supply.

The composite consumption good $C_{it}$ is a constant elasticity of substitution (CES) basket of goods produced in different countries

$$C_{it} = \left( (1-\alpha)^{1/\eta} (c_{iit})^{\frac{\eta-1}{\eta}} + \alpha^{1/\eta} \int_0^1 (c_{jit})^{\frac{\eta-1}{\eta}} dj \right)^{\frac{\eta}{\eta-1}},$$

where $c_{jit}$ denotes the consumption by household in country $i$ of a basket of goods produced in country $j$, $\alpha \in [0,1]$ determines the weight on foreign goods in $C_{it}$, and $\eta > 0$ is the elasticity of substitution between goods from different countries. The index $c_{jit}$ is a CES basket of a continuum of varieties $c_{jit}(v)$ produced in country $j$:

$$c_{jit} = \left( \int_0^1 (c_{jit}(v))^{\frac{\epsilon_p - 1}{\epsilon_p}} dv \right)^{\frac{\epsilon_p}{\epsilon_p - 1}},$$

where the elasticity of substitution across goods produced by country $j$ is $\epsilon_p > 1$.

Households in country $i$ maximize utility subject to the following budget constraint:

$$C_{it} + a_{it} = a_{it-1}(1 + r_{it}^h) + (1 - \tau_i^n) W_{it} N_{it} / P_{it} + T_{it}, \tag{B.2}$$

where $a_{it}$ denotes the value of the portfolio of assets that households purchase in period $t$, $r_{it}^h$ is the real return on the portfolio that households purchased in period $t-1$, $W_{it}$ is an index of the wages the households earn for supplying labor at time $t$, $N_{it}$ is the composite index of labor services the households supply to firms (described below), $P_{it}$ is the price level in country $i$ at time $t$, $\tau_i^n$ is a time-invariant labor income tax imposed by the government, and $T_{it}$ denotes transfers received from the government. We introduce the labor income tax to offset steady state markup distortions due to union power in the labor market.

Households in country $i$ optimally trade off consumption today versus consumption in the future. This gives rise to the following consumption Euler equation

$$MU_{it} = \mathbb{E}_t[(1 + r_{it+1}^h) MU_{it+1}], \tag{B.3}$$

where

$$MU_{it} = u'(C_{it} - hC_{it-1}) - \beta h u'(C_{it+1} - hC_{it}) \tag{B.4}$$

is the marginal utility from increasing consumption by one unit today.

Households optimally choose how much to consume of goods from each country. This choice gives rise to a demand function given by

$$c_{jit} = \begin{cases} \alpha \left( \frac{p_{jit}}{P_{it}} \right)^{-\eta} C_{it} & \text{for } j \neq i \\ (1 - \alpha) \left( \frac{p_{jit}}{P_{it}} \right)^{-\eta} C_{it} & \text{for } j = i \end{cases}$$

where $p_{jit}$ is the price index of goods consumed in country $i$ that were produced in country $j$. The households furthermore optimally choose how much of each variety to consume among the varieties produced in each country. This choice gives rise to a demand function given by

$$c_{jit}(v) = \left(\frac{p_{jit}(\nu)}{p_{jit}}\right)^{-\epsilon_p} c_{jit}.$$

Cost minimization by households implies that

$$p_{jit} \equiv \left[\int_0^1 p_{jit}(v)^{1-\epsilon_p} dv\right]^{1/(1-\epsilon_p)} \tag{B.5}$$

and

$$P_{it} = \left((1-\alpha)(p_{iit})^{1-\eta} + \alpha \int_0^1 (p_{jit})^{1-\eta} dj\right)^{1/(1-\eta)}. \tag{B.6}$$

**Labor Unions** Households supply labor through a continuum of labor unions, $\ell \in [0,1]$. Each union converts household labor $n_{it}$ into labor services of a specialized type $N_{it}(\ell)$. (Total household labor supply $n_{it}$ is the simple integral of $N_{it}(\ell)$ over $\ell$.) The labor types $N_{it}(\ell)$ enter the production function of firms through the CES basket

$$N_{it} = \left(\int_0^1 (N_{it}(\ell))^{\frac{\epsilon_w - 1}{\epsilon_w}} d\ell\right)^{\frac{\epsilon_w}{\epsilon_w - 1}},$$

where $\epsilon_w > 1$ is the elasticity of substitution between the labor types in production. Cost minimization by firms results in each union facing a downward sloping demand curve for its labor services

$$N_{it}(\ell) = \left(\frac{W_{it}(\ell)}{W_{it}}\right)^{-\epsilon_w} N_{it}, \quad \text{where} \quad W_{it} = \left(\int_0^1 W_{it}(\ell)^{1-\epsilon_w} d\ell\right)^{1/(1-\epsilon_w)},$$

$W_{it}(\ell)$ denotes the nominal wage for labor of type $\ell$, and $W_{it}$ denotes the nominal wage index for economy $i$.

Each labor union chooses the wage $W_{it}(\ell)$ to maximize household utility. Each period there is a constant probability $1 - \delta_w$ that union $\ell$ can reoptimize its wage, as in Erceg, Henderson, and Levin (2000). The union then supplies all labor that is demanded at this wage. This implies that in periods when it is able to reoptimize the wage, union $\ell$ chooses $\{W_{it}(\ell), N_{it}(\ell)\}$ to maximize

$$\sum_{s=0}^{\infty} (\beta\delta_w)^{s-t} \left[(u(C_{is} - hC_{is-1}) - \chi(n_{is}))\right] \qquad \text{where} \qquad n_{is} = \int_0^1 N_{is}(\ell) d\ell$$

subject to

$$N_{is}(\ell) = \left(\frac{W_{it}(\ell)}{W_{is}}\right)^{-\epsilon_w} N_{is},$$

$$C_{it} + a_{it+1} = a_{it}(1 + r^r_{it}) + (1 - \tau^n_i) \int_0^1 W_{it}(\ell) N_{it}(\ell) d\ell / P_{it} + T_{it},$$

where the wage index is given by

$$W_{it} = \left(\int_0^1 W_{it}(\ell)^{1-\epsilon_w} d\ell\right)^{1/(1-\epsilon_w)}. \tag{B.7}$$

Optimal wage setting then implies that

$$\sum_{s=0}^{\infty} (\beta\delta_w)^{s-t} \left( \chi'(n_{is}) \epsilon_w \frac{N_{is}}{W_{is}} \left(\frac{W_{it}(\ell)}{W_{is}}\right)^{-\epsilon_w - 1} + \frac{\lambda_{is}(1 - \tau^n_i)}{P_{is}} \left( N_{is}(\ell) - W_{it}(\ell) \epsilon_w \frac{N_{is}}{W_{is}} \left(\frac{W_{it}(\ell)}{W_{is}}\right)^{-\epsilon_w - 1} \right) \right) = 0,$$

where $\lambda_{is}$ is the Lagrange multiplier on the budget constraint. Household optimization implies $\lambda_{is} = MU_{is}$. We can rewrite the above expression as

$$W_{it}(\ell) = \frac{\sum_{s=t} (\beta\delta_w)^{s-t} N_{is}(\ell) MU_{is} (1 - \tau^n_i) \frac{\epsilon_w}{\epsilon_w - 1} \frac{\chi'(n_{is})}{MU_{is}}}{\sum_{s=t} (\beta\delta_w)^{s-t} N_{is}(\ell) MU_{is} (1 - \tau^n_i) \left(\frac{1}{P_s}\right)}. \tag{B.8}$$

Log-linearizing this last equation around a steady state with no inflation yields

$$\hat{W}_{it}(\ell) = (1 - \beta\delta_w) \sum_{s=t} (\beta\delta_w)^{s-t} \left(\hat{P}_s - \widehat{MU}_{is} + \nu \hat{N}_{is}\right), \tag{B.9}$$

where the hatted variables denote log-deviations from steady state of the corresponding hatless variables. Notice that $\hat{n}_{it} = \int_0^1 \hat{N}_{it}(\ell) d\ell = \hat{N}_{it}$.

Log-linearization of the wage index in equation (B.7) yields

$$\hat{W}_{it} = \delta_w \hat{W}_{it-1} + (1 - \delta_w) \hat{W}_{it}(\ell). \tag{B.10}$$

Combining equations (B.9) and (B.10), we obtain the New Keynesian Wage Phillips Curve:

$$\pi^w_{it} = \kappa_w \ln\left(\frac{(N_{it})^\nu}{MU_{it} W_{it} / P_{it}}\right) + \beta \mathbb{E}_t \pi^w_{it+1}, \tag{B.11}$$

where $\pi^w_{it} \equiv W_{it}/W_{it-1} - 1$ is wage inflation in country $i$ at time $t$ and $\kappa_w \equiv (1 - \delta_w)(1 - \beta\delta_w)/\delta_w$.

### B.1.2 Firms

There are two types of firms in the economy: production firms and price-setting firms. We describe these in turn.

**Production Firms** In each country, there are a continuum of ex-ante identical production firms. These firms produce a homogeneous country-specific good and sell this good to local price-setting firms in a competitive country-specific wholesale market at a price $p_{it}^{mc}$ that is equal to their marginal cost of production. The production firms in country $i$ operate the following Cobb-Douglas technology:

$$Y_{it} = A_{it}(K_{it}^{\varkappa} N_{it}^{1-\varkappa})^{1-\omega} X_{it}^{\omega}, \tag{B.12}$$

where $A_{it}$ denotes aggregate productivity, $K_{it}$ denotes capital, $X_{it}$ denotes intermediate inputs, and $\varkappa$ and $\omega$ are parameters. The intermediate inputs consist of the same CES basket of goods as the households in country $i$ consume. Aggregate productivity is stochastic and follows an AR(1) process in logarithms:

$$\ln A_{it} = \rho^A \ln A_{it-1} + \epsilon_{it}^A. \tag{B.13}$$

Production firms own the capital they use. Their capital stock evolves as follows:

$$K_{it+1} = K_{it}(1 - \delta_k) + I_{it}, \tag{B.14}$$

where $I_{it}$ denotes investment and $\delta_k$ is the fraction of the existing capital stock that depreciates each period. The investment good $I_{it}$ consists of the same CES basket of goods as $C_{it}$ and $X_{it}$. Investment is subject to investment adjustment costs, $S(I_{it}/I_{it-1}) = \frac{\phi_I}{2}(I_{it}/I_{it-1} - 1)^2$. We assume that the production firms own a diversified portfolio of price-setting firms.

The real earnings of production firms are given by

$$D_{it} = \frac{1}{P_{it}} \left[ p_{it}^{mc} Y_{it} - P_{it} I_{it} \left( 1 + S\left( \frac{I_{it}}{I_{it-1}} \right) \right) - W_{it} N_{it} - P_{it} X_{it} + \Pi_{it}^p \right], \tag{B.15}$$

where $\Pi_{it}^p$ denotes the profits the production firms earn from their ownership of the portfolio of price-setting firms – which is equal to the average profit of price-setting firms in each period. The production firms choose a sequence for $\{I_{it}, X_{it}, N_{it}, K_{it+1}\}$ as well as individual types of labor and varieties of investment and intermediate inputs to maximize their value

$$V_{it} = D_{it} + \mathbb{E}_t \sum_{s=t}^{\infty} \frac{1}{\prod_{k=0}^{t}(1+r^f_{ik+1})} D_{is+1}, \tag{B.16}$$

where $r^f_{it+1}$ is their discount rate between period $t$ and period $t+1$.

The firms' problem can be written recursively as

$$\begin{aligned} V_{it}(K_{it}, I_{it-1}) = \max_{I_{i,t}, K_{it+1}, N_{it}, X_{it}} \ & \frac{1}{P_{it}} \Big\{ p^{mc}_{it} A_{it} (K^{\varkappa}_{it} N^{1-\varkappa}_{it})^{1-\omega} (X_{it})^{\omega} - W_{it} N_{it} - P_{it} X_{it} \\ & - P_{it} I_{it} \left(1 + S\left(\frac{I_{it}}{I_{it-1}}\right)\right) \Big\} + \mathbb{E}_t \frac{1}{1+r^f_{it+1}} V^k_{it+1}(K_{it+1}, I_{it}) \\ \text{s.t.} \quad & K_{it+1} = (1-\delta_k) K_{it} + I_{it}. \end{aligned}$$

The first order conditions with respect to $I_{i,t}$ is

$$\begin{aligned} & \left(1 + S\left(\frac{I_{it}}{I_{it-1}}\right)\right) + S'\left(\frac{I_{it}}{I_{it-1}}\right) \frac{I_{it}}{I_{it-1}} \\ & \qquad = \mathbb{E}_t \frac{1}{(1+r^f_{it+1})} \left[ \frac{\partial V_{it+1}(K_{it+1}, I_{it})}{\partial I_{it}} + \frac{\partial V_{it+1}(K_{it+1}, I_{it})}{\partial K_{it+1}} \right]. \end{aligned}$$

The envelope conditions for $I_{it-1}$ and $K_{it}$ are

$$\begin{aligned} \frac{\partial V_{it}(K_{it}, I_{it-1})}{\partial I_{it-1}} &= S'\left(\frac{I_{it}}{I_{it-1}}\right) \frac{(I_{it})^2}{(I_{it-1})^2} \\ \frac{\partial V_{it}(K_{it}, I_{it-1})}{\partial K_{it}} &= \frac{(1-\omega)\varkappa p^{mc}_{it} A_{it} (K^{\varkappa}_{it} N^{1-\varkappa}_{it})^{1-\omega} (X_{it})^{\omega} / K_{it+1}}{P_{it}} \\ & \qquad + \mathbb{E}_t \frac{1-\delta_k}{(1+r^f_{it+1})} \frac{\partial V_{it+1}(K_{it+1}, I_{it})}{\partial K_{it+1}} \end{aligned}$$

Defining "marginal Q" as $\mathcal{J}_{it} \equiv \partial V_{it}(K_{it}, I_{it-1}) / \partial K_{it}$, the above conditions simplify to

$$1 + S\left(\frac{I_{it}}{I_{it-1}}\right) + S'\left(\frac{I_{it}}{I_{it-1}}\right) \frac{I_{it}}{I_{it-1}} = \mathbb{E}_t \left[ \frac{1}{1+r^f_{it+1}} \left( S'\left(\frac{I_{it+1}}{I_{it}}\right) \frac{(I_{it+1})^2}{(I_{it})^2} + \mathcal{J}_{it+1} \right) \right] \tag{B.17}$$

$$\mathcal{J}_{it} = \frac{(1-\omega)\varkappa p^{mc}_{it} Y_{it} / K_{it}}{P_{it}} + \mathbb{E}_t \left[ \frac{1-\delta_k}{1+r^f_{it+1}} \mathcal{J}_{it+1} \right]. \tag{B.18}$$

Optimal choice of $N_{it}$ and $X_{it}$ satisfies the following first-order conditions:

$$W_{it}N_{it} = (1-\omega)(1-\varkappa)p_{it}^{mc}Y_{it}, \qquad \text{and} \qquad P_{it}X_{it} = \omega p_{it}^{mc}Y_{it}. \tag{B.19}$$

**Price-setting Firms.** Price-setting firms in country $i$ purchase local goods from production firms and differentiate them. Each price-setting firm is then a monopoly supplier of their brand or variety. They purchase goods at a price $p_{it}^{mc}(1-\tau_i^p)$, where $\tau_i^p$ is a time-invariant tax imposed by the government to offset the steady state markup distortion of the price-setting firms.

The price-setting firms sell their varieties both domestically and abroad. They must decide at which price to sell. They face pricing frictions which imply that they can only reoptimize the price of their varieties with a probability $1-\delta_p$ each period, as in Calvo (1983). When selling domestically, they set prices in the domestic currency. When selling abroad, a fraction $\theta_{ij}^k \in [0,1]$ of price-setting firms in country $i$ selling to country $j$ set prices in currency $k$. The fractions $\theta_{ij}^k$ determine how prevalent producer currency pricing (PCP), local currency pricing (LCP), and dominant currency pricing (DCP) are in the economy.

Consider the problem of a price-setting firm selling variety $v$ from country $i$ to country $j$ with its price for these sales set in currency $k$. The optimal reset price solves

$$\max_{p_{ijt}^k(v),\{y_{ijs}^k(v)\}_{s=t}^{\infty}} \sum_{s=t}^{\infty} M_{is}(\delta_p)^{s-t}(\mathcal{E}_{kis}p_{ijt}^k(v)y_{ijs}^k(v) - (1-\tau_i^r)p_{is}^{mc}y_{ijs}^k(v)) \tag{B.20}$$

$$\text{s.t.} \quad y_{ijs}^k(v) = \left(\frac{p_{ijt}^k(v)}{p_{ijs}}\right)^{-\epsilon_p} Z_{ijs}, \tag{B.21}$$

where $Z_{ijs} \equiv C_{ijs} + X_{ijs} + I_{ijs}$ is the total demand for goods from country $i$ in country $j$ and $M_{i,s}$ is the nominal discount factor in country $i$ between period $t$ and period $s$. The nominal discount factor $M_{i,s}$ is defined as $M_{i,s} \equiv \prod_{\varsigma=t}^{s} 1/(1+i_{i\varsigma})$, where $i_{i\varsigma}$ is the nominal interest rate in country $i$ at time $\varsigma$.

Differentiation with respect to $p_{ijt}(v)$ yields the optimality condition

$$\sum_{s=t}^{\infty} M_{i,s}(\delta_p)^{s-t}\left(\mathcal{E}_{kis}p_{ijt}^k(v)y_{ijs}^k(v) - \frac{\epsilon_p}{(\epsilon_p-1)}(1-\tau_i^r)p_{is}^{mc}y_{ijs}^k(v)\right) = 0. \tag{B.22}$$

Linearizing this equation and combining it with a log-linear approximation of equation (B.5) – i.e., $\hat{p}_{ij,t} = (1-\delta_p)\hat{p}_{ij,t}(v) + \delta_p\hat{p}_{ij,t-1}$ – yields a Phillips curve for prices of goods produced in country

$i$ and sold in country $j$ that are denominated in currency $k$:

$$\hat{\pi}_{ijt}^{k} = (1-\beta\delta_p)\frac{\delta_p}{1-\delta_p}\left(\hat{p}_{it}^{mc} - \hat{p}_{ijt}^{k} - \hat{\mathcal{E}}_{kit}\right) + \beta\hat{\pi}_{ijt+1}^{k}, \tag{B.23}$$

where $\pi_{ijt}^{k} \equiv p_{ijt}^{k}/p_{ijt-1}^{k} - 1$.

We next derive a Phillips curve for the prices of all goods produced in country $i$ and sold to country $j$. This is a weighted average of equation (B.23) across currencies of denomination $k$ using the weights $\theta_{ij}^{k}$. When we take this weighted average, we denominate all prices in the currency of the destination country. This yields

$$\pi_{ijt} - \sum_k \theta_{ij}^{k}\Delta\ln\mathcal{E}_{kjt} = \kappa_p \ln\left(\frac{p_{it}^{mc}}{p_{ijt}}\mathcal{E}_{ijt}\right) + \beta\mathbb{E}_t\left[\pi_{ijt+1} - \sum_k \theta_{ij}^{k}\Delta\ln\mathcal{E}_{kjt+1}\right], \tag{B.24}$$

where $\pi_{ijt} \equiv p_{ijt}/p_{ijt-1} - 1$ and $\kappa_p \equiv (1-\beta\delta_p)(1-\delta_p)/\delta_p$. Aggregate inflation in country $j$ is given by

$$\pi_{jt} = \alpha\pi_{jjt} + (1-\alpha)\int_0^1 \pi_{ijt}di.$$

The average nominal profits of price-setting firms are, to a first-order approximation,

$$\Pi_{it}^{p} = \left[\ln(p_{iit}y_{iit}) - \ln\left(p_{it}^{mc}y_{iit}\right)\right]\bar{p}_{ii}\bar{y}_{ii} + \int_0^1 \left[\ln(\mathcal{E}_{ijt}p_{ijt}y_{ijt}) - \ln\left(p_{it}^{mc}y_{ijt}\right)\right]\bar{p}_{ij}\bar{y}_{ij}dj, \tag{B.25}$$

where $\bar{p}_{ij}\bar{y}_{ij}$ is the steady state revenue of country $i$ selling to country $j$, and

$$y_{ijt} = \begin{cases} (1-\alpha)\left(\frac{p_{iit}}{P_{it}}\right)^{-\eta}(C_{it} + I_{it} + X_{it}) & \text{for } i = j \\ \alpha\left(\frac{p_{ijt}}{P_{jt}}\right)^{-\eta}(C_{jt} + I_{jt} + X_{jt}) & \text{for } i \neq j \end{cases} \tag{B.26}$$

As described above, we assume that production firms own a diversified portfolio of price-setting firms and that the profits of price-setting firms therefore accrue as dividends to the production firms. We make this assumption for convenience, since it avoids us having to keep track of multiple asset prices in each economy.

### B.1.3 Equilibrium Definition

In each country, the government sets the steady state labor and product market taxes to offset the steady state markup distortions,

$$(1-\tau_i^n)=\mu_w, \quad (1-\tau_i^p)=1/\mu^p, \quad T_{it}=\tau_i^n W_{it}N_{it}/P_{it}+\tau_i^p p_{it}^{mc}Y_{it}/P_{it}, \tag{B.27}$$

where $\mu_w \equiv \frac{\epsilon_w}{\epsilon_w-1}$ and $\mu_p \equiv \frac{\epsilon_p}{\epsilon_p-1}$ are wage and price markups, respectively.

The goods market clearing condition is, to a first-order,

$$Y_{it}=(1-\alpha)\left(\frac{p_{iit}}{P_{it}}\right)^{-\eta}(C_{it}+I_{it}+X_{it})+\alpha\int_0^1\left(\frac{p_{ijt}}{P_{jt}}\right)^{-\eta}(C_{jt}+I_{jt}+X_{jt})dj. \tag{B.28}$$

We define the equilibrium of this economy as follows. Given a sequence of monetary, technology, UIP shocks, $\{\epsilon_{it}^m,\epsilon_{it}^A,\epsilon_{it}^\psi\}$, initial prices, $\{p_{ij,-1},W_{i,-1},\mathcal{E}_{i,-1}\}$, and the initial capital stock and investment, $\{K_{i,0},\ I_{i,-1}\}$, the equilibrium consists of the path of allocations $\{C_{it},MU_{it}Y_{it},I_{it},X_{it},y_{ijt},s_{ijt}^h,s_{it}^f,N_{it},K_{it},a_{it},D_{it},\Pi_{it}^p\}$, the path of shock processes, $\{A_{it},\psi_{it}\}$, the path of prices $\{p_{ijt},\mathcal{E}_{ijt},Q_{ijt},P_{it},W_{it},i_{it},r_{it+1},r_{ijt+1},r_{it+1}^h,r_{it+1}^f,\mathcal{J}_{it},p_{it}^{mc},\pi_{ijt},\pi_{it},\pi_{it}^w,V_{it}\}$, the path of taxes $\{\tau_i^p,\tau_i^n,T_{it}\}$ such that equations (4)-(12), (B.2), (B.3), (B.4), (B.6), (B.11), (B.12), (B.13), (B.14), (B.15), (B.17), (B.18), (B.19), (B.24), (B.25), (B.26), (B.27), and (B.28) as well as the following accounting equations hold: $\pi_{it}^w=W_{it}/W_{it-1}-1$, $\pi_{ijt}=p_{ijt}/p_{ijt-1}-1$, $\pi_{it}=P_{it}/P_{it-1}-1$.

### B.1.4 Solution Method

We compute the impulse response of the economy to a shock as follows. Starting from the deterministic and symmetric steady state, we solve for the first-order approximation of the perfect-foresight equilibrium in response to the shock in sequence space (Boppart et al., 2018). This is equivalent to the first-order approximation of the stochastic equilibrium. We truncate the transition path at 100 years and assume that the economy returns to the steady state. Given the impulse responses to the various shocks in the model, we compute the second moments of the model using analytical second moments, as in, for example, Auclert, Bardóczy, Rognlie, and Straub (2021a).

## B.2 Model Derivations

### B.2.1 Capital Structure of Goods-Producing Firms

Consider a firm in country $i$ with a sequence of corporate earnings $\{D_{it}\}$ that issues a sequence $\{b_{ijt}\}$ of debt in currency $j \neq i$. Apart from issuing foreign debt, the firm is financed with domestic equity. The share of firm's ex-dividend value financed via debt from currency $j$ per unit measure of country $j$'s size is denoted $s_{ijt}$. The firm's leverage is then given by $\frac{1}{1-\int s^f_{ij} dj}$ and total firm ex-dividend value can be written as $\frac{1}{1-\int s^f_{ij} dj} v_{it}$, where $v_{it}$ is the ex-dividend value of the firm's equity. Using this notation, the debt the firm issues in currency $j$ is $b_{ijt} = \frac{s^f_{ijt}}{1-\int s^f_{ijt} dj} v_{it}$. We assume that the firm's debt structure is sticky in the sense that the firm incurs adjustment costs when its debt structure deviates from a steady state. For mathematical simplicity, we assume that the adjustment cost is incurred in the following period and is proportional to total firm value: $\frac{1}{1-\int s^f_{ij} dj} v_{it} \Phi^f_{ij}(s^f_{ijt})$, where $\Phi^f_{ij}(s^f_{ijt}) = \frac{\Gamma^f}{2\bar{s}_{ij}}(s^f_{ijt} - \bar{s}_{ij})^2$.

The firm chooses its debt structure $\{s^f_{ijt}\}$ to maximize the sum of ex-dividend equity value and the current dividend at $t = 0$:

$$V_{i0} \equiv D_{i0} + \int b_{ij0} dj + v_{i0} \tag{B.29}$$

$$\begin{aligned} &= D_{i0} + \int \frac{s^f_{ij0}}{1-\int s^f_{ij0} dj} v_{i0} dj \\ &\quad + \mathbb{E}_0 \sum_{t=0}^{\infty} \frac{1}{\prod_{k=0}^{t}(1+r_{ik+1})} \left[ D_{it+1} - \int \frac{(1+r_{ijt+1}) s^f_{ijt} + \Phi^f_{ij}(s^f_{ijt})}{1-\int s^f_{ijt} dj} v_{it} dj + \int \frac{s^f_{ijt+1}}{1-\int s^f_{ijt+1} dj} v_{it} dj \right], \end{aligned} \tag{B.30}$$

where the last two terms in the square bracket represent the repayment of last period's foreign debt with interest and the payment of last period's adjustment costs (second-to-last term) and the funds received from issuing new debt (last term).

The solution to the above problem is equivalent to that of the following period-by-period portfolio choice problem that is analogous to the households' problem:

$$\min_{s^f_{ijt}} \left(1 - \int s^f_{ijt} dj\right)(1 + r_{it+1}) + \int \left(s^f_{ijt}(1 + r_{ijt+1}) - \Phi^f_{ij}(s^f_{ijt})\right) dj \tag{B.31}$$

The first-order optimality condition for $s^f_{ijt}$ is then given by

$$s^f_{ijt} = \bar{s}_{ij} - \bar{s}_{ij}\frac{1}{\Gamma^f}\mathbb{E}_t[(1 + r_{ijt+1}) - (1 + r_{it+1})]. \tag{B.32}$$

Let's next simplify (B.30). The definition of $v_{i0}$ implies that

$$v_{i0} = \mathbb{E}_0 \frac{1}{1 + r_{i1}} \left[ D_{i1} - \int \frac{(1 + r_{ij1})s^f_{ij0} + \Phi^f_{ij}(s^f_{ij0})}{1 - \int s^f_{ij0}dj} v_{i0}dj + \int b_{ij1}dj + v_{i1} \right].$$

This equation says that the firm's ex-dividend equity value at $t = 0$ is equal to the discounted sum of dividends at $t = 1$ (the sum of the first three terms) and the ex-dividend equity value at $t = 1$ (the last term). Solving for $v_{i0}$ gives

$$v_{i0} = \mathbb{E}_0 \frac{1 - \int s^f_{ij0}dj}{\left((1 + r_{i1})(1 - \int s^f_{ij0}dj) + \int \left\{(1 + r_{ij1})s^f_{ij0} + \Phi^f_{ij}(s^f_{ij0})\right\} dj\right)} \left[ D_{i1} + \int b_{ij1}dj + v_{i1} \right].$$

Notice also that

$$\int b_{ij0}dj = \frac{\int s^f_{ij0}dj}{1 - \int s^f_{ij0}dj} v_{i0}.$$

Substituting these last two equations back into (B.29), we obtain

$$\begin{aligned} V_{i0} &= D_{i0} + \frac{1}{1 - \int s^f_{ij0}dj} v_{i0} \\ &= D_{i0} + \frac{1}{\left((1 + r_{i1})(1 - \int s^f_{ij0}dj) + \int \left\{(1 + r_{ij1})s^f_{ij0} + \Phi^f_{ij}(s^f_{ij0})\right\} dj\right)} \left[ D_{i1} + \int b_{ij1}dj + v_{i1} \right]. \end{aligned}$$

Following the same steps as above to solve for $v_{i1}$ and substituting the resulting expression into the above equation eliminates $\{b_{ij1}\}$. This process can then be repeated for for $t = 2, 3, \ldots$. This allows us to express the firm's value as

$$V_{i0} = D_{i0} + \sum_{t=0}^{\infty} \frac{1}{\prod_{k=0}^{t}(1 + r^f_{ik+1})} D_{it+1}, \tag{B.33}$$

where

$$(1 + r^f_{it+1}) \equiv (1 + r_{it+1}) \left(1 - \int s^f_{ijt}dj\right) + \int \left\{(1 + r_{ijt+1})s^f_{ijt} + \Phi^f_{ij}(s^f_{ijt})\right\} dj$$

is the firm's discount rates.

### B.2.2 International Bond Arbitrageurs

The model we adopt for international bond arbitrageurs builds on Itskhoki and Mukhin (2021a). For each currency $j$, we assume that there is a unit measure of international bond arbitrageurs engaging in the carry trade between currency $j$ and USD. These bond traders take a long position of $B^I_{Ujt}$ dollars in bonds from country $j$ and a short position of equal value in US bonds. The nominal return from such a carry trade is $\tilde{R}_{Ujt+1} \equiv (1+i_{jt})\frac{\mathcal{E}_{jUt+1}}{\mathcal{E}_{jUt}} - (1+i_{Ut})$ per dollar invested. We assume that the international bond arbitrageurs seek to maximize the CARA utility function of the real return on this carry trade expressed in US dollars:

$$\max_{B^I_{Ujt}} -\frac{1}{\gamma}\exp\left(-\gamma\left[\tilde{R}_{Ujt+1}\frac{1}{P_{U,t+1}}B^I_{Ujt}\right]\right).$$

We can rewrite the above problem as

$$\max_{B^I_{Ujt}} -\frac{1}{\gamma}\exp\left(-\gamma\left[(1-\exp(\tilde{r}_{Ujt+1}))\exp(\pi_{Ut+1})\frac{B^I_{Ujt}}{P_{Ut}}\right]\right), \tag{B.34}$$

where $\tilde{r}_{Ujt+1} \equiv \ln(1+i_{jt}) - \ln(1+i_{Ut}) - \Delta\ln\mathcal{E}_{jUt+1}$ and $\pi_{Ut+1} = P_{Ut+1}/P_{Ut} - 1$. As in Campbell and Viceira (2002) and Itskhoki and Mukhin (2021a), we approximate the portfolio problem of the international bond arbitrageurs as the time interval gets short so that $(\tilde{r}_{Ujt+1}, \pi_{Ut+1})$ corresponds to the increment of the following diffusion process

$$\begin{pmatrix} d\mathcal{R}_{Ujt+1} \\ d\mathcal{P}_{Ut+1} \end{pmatrix} = \begin{bmatrix} \mu_R \\ \mu_\pi \end{bmatrix} dt + \begin{bmatrix} \sigma_e^2 & \sigma_{e\pi} \\ \sigma'_{e\pi} & \sigma_\pi^2 \end{bmatrix} d\mathbf{Z}_t,$$

where $\mu_R \equiv \mathbb{E}\tilde{r}_{Ujt+1}$ is mean return from carry trade, $\mu_\pi \equiv \mathbb{E}[\pi_{Ut+1}]$ is the mean US inflation rate, $\sigma_e^2 \equiv \text{var}(\tilde{r}_{Ujt+1}) = \text{var}(\Delta\ln\mathcal{E}_{jUt+1})$, $\sigma_{e\pi} \equiv [\text{cov}(\tilde{r}_{Uj,t+1}, \pi_{t+1})]_j$, and $\sigma_\pi^2 = \text{var}(\pi_{Ut+1})$ are the set of second moments.

Applying Ito's lemma, we can rewrite the objective function in (B.34) as follows

$$
\begin{aligned}
& -\frac{1}{\gamma}\exp\left(-\gamma\frac{1}{P_{Ut}}\left[(1-\exp(d\mathcal{R}_{Ujt+1}))\exp(d\mathcal{P}_{U,t+1})B^I_{jUt}\right]\right)\\
=& -\frac{1}{\gamma}\exp\left(-\gamma\frac{1}{P_{Ut}}\left[(-d\mathcal{R}_{Ujt+1}+\frac{1}{2}(d\mathcal{R}_{Ujt+1})^2+d\mathcal{R}_{Ujt+1}d\mathcal{P}_{Ut+1})B^I_{Ujt}\right]\right)\\
=& -\frac{1}{\gamma}\exp\left(\left(\gamma\frac{1}{P_{U,t}}B^I_{Ujt}(\mu_R+\frac{1}{2}\sigma_e^2+\sigma_{e\pi})-\frac{\gamma^2}{2}\frac{1}{(P_{Ut})^2}\sigma_e^2(B^I_{Ujt})^2\right)dt\right).
\end{aligned}
$$

Therefore, the optimal portfolio problem collapses to a standard mean variance portfolio problem. The optimal carry trade position is then given by

$$
B^I_{Ujt}/P_{Ut}=\frac{1}{\gamma\sigma_e^2}(\mu_R+\frac{1}{2}\sigma_e^2+\sigma_{e\pi}).
$$

We log-linearize the above condition around our steady state equilibrium where shocks are small and $P_{UT}=1$. But we also proportionally increase risk aversion, $\gamma$, so that $\gamma\sigma_e^2$ remains the same, as in Hansen and Sargent (2011). The terms $\sigma_e^2$ and $\sigma_{e\pi}$ go to zero as shocks become small. Therefore the log-linearized condition around a steady state with $P_{Ut}=1$ is

$$
B^I_{Ujt}=\frac{1}{\Gamma^B}[\ln(1+i_{jt})-\ln(1+i_{Ut})+\mathbb{E}_t\Delta\ln\mathcal{E}_{jUt+1}],
$$

where $\Gamma^B\equiv\gamma\sigma_e^2$.

### B.2.3 Equilibrium in the International Bond Market

Here, we provide a general derivation that applies to both the model in Section 3 and the model in Section 6. To recover the results for the model in Section 3, simply set $\zeta_{it}=0$ for all $i,t$. The demand for currency $j$ bonds from households and firms is

$$
B_{jt}=\left(1-\int s^h_{jit}di\right)a_{jt}-\left(1-\int s^f_{jit}di\right)\tilde{V}_{jt}+\int s^h_{ijt}a_{it}di-\int s^f_{ijt}\tilde{V}_{it}di.
$$

where $\tilde{V}_{jt}$ denotes the value of the firm in country $j$ excluding their current-period dividend. The first term is the portion of the asset position of households in country $j$ that is invested in domestic assets. Some of the household's domestic assets are equity in domestic firms as opposed to domestic bonds. The second term subtracts this amount – which is equal to the portion of firm value financed domestically. The third and fourth terms represent demand for bonds in country $j$ from foreign households and firms, respectively.

A first-order approximation of the last equation yields ($x \approx \bar{x} + \nabla x$)

$$\begin{aligned}\nabla B_{jt} = &-\int \nabla s^h_{jit} di \bar{a} + \left(1 - \int \bar{s}_{ji} di\right) \nabla a_{jt} + \int \nabla s^f_{jit} \bar{a} di + \left(1 - \int \bar{s}_{ji} di\right) \nabla \tilde{V}_{jt} \\ &+ \int \nabla s^h_{ijt} di \bar{a} + \left(1 - \int \bar{s}_{ij} di\right) \nabla a_{jt} - \int \nabla s^f_{ijt} \bar{a} di + \int \bar{s}_{ij} \nabla \tilde{V}_{it} di,\end{aligned} \tag{B.35}$$

where $\bar{a}$ denotes steady state households' wealth (which also corresponds to steady state firm value excluding current dividend, $\tilde{V}_{jt}$). First-order approximations of equations (5) and (7) give

$$\begin{aligned}\nabla s^h_{ijt} &= \bar{s}_{ij} \frac{1}{\beta \Gamma^h} \left[\nabla \ln(1 + r_{ijt+1}) - \nabla \ln(1 + r_{it})\right] \\ &= \bar{s}_{ij} \frac{1}{\beta \Gamma^h} \left[\nabla \ln(1 + i_{jt}) - \nabla \ln(1 + i_{it}) + \mathbb{E}_t \Delta \nabla \ln \mathcal{E}_{jit+1} - \nabla \zeta_{jt}\right] &\text{(B.36)} \\ \nabla s^f_{ijt} &= -\bar{s}_{ij} \frac{1}{\beta \Gamma^f} \left[\nabla \ln(1 + r_{ijt+1}) - \nabla \ln(1 + r_{it})\right] \\ &= -\bar{s}_{ij} \frac{1}{\beta \Gamma^f} \left[\nabla \ln(1 + i_{jt}) - \nabla \ln(1 + i_{it}) + \mathbb{E}_t \Delta \nabla \ln \mathcal{E}_{jit+1} - \nabla \zeta_{jt}\right], &\text{(B.37)}\end{aligned}$$

where we have used equation (16) in the second line of each equation.

Substituting equations (B.36) and (B.37) into equation (B.35), we can approximately write $B_{jt} \approx \nabla B_{jt}$ as

$$\begin{aligned}B_{jt} = &\left(1 - \int \bar{s}_{ji} di\right) NFA_{jt} + \int \bar{s}_{ij} NFA_{it} di \\ &+ \left[\frac{1}{\Gamma^h} + \frac{1}{\Gamma^f}\right] \frac{\bar{a}}{\beta} \int \bar{s}_{ji} (\ln(1 + i_{j,t}) - \ln(1 + i_{i,t}) + \mathbb{E}_t \Delta \ln \mathcal{E}_{ji,t+1} - \zeta_{jt}) di \\ &+ \left[\frac{1}{\Gamma^h} + \frac{1}{\Gamma^f}\right] \frac{\bar{a}}{\beta} \int \bar{s}_{ij} (\ln(1 + i_{j,t}) - \ln(1 + i_{i,t}) + \mathbb{E}_t \Delta \ln \mathcal{E}_{ji,t+1} + \zeta_{it}) di \\ = &\left(1 - \int \bar{s}_{ji} di\right) NFA_{jt} + \int \bar{s}_{ij} NFA_{it} di \\ &+ \left[\frac{1}{\Gamma^h} + \frac{1}{\Gamma^f}\right] \frac{\bar{a}}{\beta} \int_{i \in \{P,U\}} (\bar{s}_{ji} + \bar{s}_{ij}) (\ln(1 + i_{j,t}) - \ln(1 + i_{U,t}) + \mathbb{E}_t \Delta \ln \mathcal{E}_{jU,t+1}) di \\ &+ \left[\frac{1}{\Gamma^h} + \frac{1}{\Gamma^f}\right] \frac{\bar{a}}{\beta} \left(-\int \bar{s}_{ji} di \zeta_{jt} + \int \bar{s}_{ij} \zeta_{it} di\right)\end{aligned}$$

where $NFA_{jt} \equiv a_{jt} - \tilde{V}_{jt}$, and we have used the fact that all floaters are identical and the economies in $P$ peg their exchange rates to $U$.

Since the noise traders' position in currency $j$ bonds is $\psi_{jt}$, total bond demand for country $j \in F$ is $B^I_{Ujt} + B_{jt} + n\psi_{jt}$. These bonds are in zero net supply. This implies that the market clearing condition for these bonds is given by

$$
\begin{aligned}
0 = & \left(1 - \int \bar{s}_{ji} di\right) NFA_{jt} + \int \bar{s}_{ij} NFA_{it} di \\
& + \left( \frac{1}{\Gamma^B} + \left[ \frac{1}{\Gamma^h} + \frac{1}{\Gamma^f} \right] \frac{\bar{a}}{\beta} \int_{i \in \{P,U\}} (\bar{s}_{ji} + \bar{s}_{ij}) di \right) (\ln(1 + i_{j,t}) - \ln(1 + i_{U,t}) + \mathbb{E}_t \Delta \ln \mathcal{E}_{jU,t+1}) \\
& + \left[ \frac{1}{\Gamma^h} + \frac{1}{\Gamma^f} \right] \frac{\bar{a}}{\beta} \left(- \int \bar{s}_{ji} di \zeta_{jt} + \int \bar{s}_{ij} \zeta_{it} di\right) + \psi_{jt}.
\end{aligned}
$$

This is the same equation as equations (9) and (10) in Section 3 (when $\zeta_{jt} = 0$) and equation (18) in Section 6 of the main text.

### B.3 Steady State Characterization

In the symmetric steady state, the net foreign asset position in all countries is zero, $NFA_i = 0$. We normalize price index and exchange rates in all countries to one: $P_i = \mathcal{E}_{ij} = 1$. The aggregate variables $\{Y_i, X_i, C_i, I_i, K_i, N_i, r_i\}$ then solve

$$
\begin{aligned}
Y_i &= C_i + I_i + X_i, \\
Y &= A_i (K_i)^{\varkappa} (X_i)^{\omega} (N_i)^{1-\varkappa-\omega}, \\
X_i &= \omega Y_i, \\
(r_i + \delta) K_i &= \varkappa Y_i, \\
(N_i)^{\nu} (C_i - hC_i)^{\sigma} &= (1 - \omega - \varkappa) Y_i, \\
I_i &= \delta K_i, \\
r_i &= 1/\beta - 1,
\end{aligned}
$$

where we have imposed the fact that government subsidies offset the steady state product and labor markups.

### B.4 Calibration Details

Panel A of Table B.3 lists the parameters that we calibrate externally. We set the discount factor to $\beta = 0.96$, which implies a steady state annual real interest rate of 4%. We set the elasticity of intertemporal substitution, $1/\sigma$, to 1, and the Frisch elasticity of labor supply, $1/\nu$, to 0.5. The annual capital depreciation rate is set to $\delta_k = 0.04$, based on the average value in the Penn World Table version 10.0 (Feenstra, Inklaar, and Timmer, 2015). We set the share of intermediate inputs

Table B.3: Calibration of Parameters

| Parameter | Description | Value | Note/Source |
|---|---|---|---|
| **A. Externally Assigned Parameters** | | | |
| $\beta$ | Discount factor | 0.96 | Annual interest rate 4% |
| $1/\sigma$ | EIS | 1 | Standard |
| $1/\nu$ | Frisch elasticity | 0.5 | Standard |
| $\omega$ | Intermediate inputs share | 0.5 | Itskhoki and Mukhin (2021a) |
| $\alpha$ | Openness | 0.2 | Imports-to-GDP ratio 40% |
| $\varkappa$ | Capital share in value-added | 0.43 | Investment-to-GDP ratio 22% |
| $\delta_k$ | Capital depreciation rate | 0.04 | Penn World Table 10.0 |
| $\phi_I$ | Investment adjustment cost | 2.5 | Christiano et al. (2005) |
| $\phi_\pi$ | Taylor coefficient | 1.5 | Standard |
| $\rho_m$ | Monetary policy inertia | 0.43 | Smets and Wouters (2007) |
| $\eta$ | Trade elasticity | 1.5 | Standard |
| $\bar{s}$ | Foreign currency assets & liabilities | 0.52 | Bénétrix et al. (2015) |
| $\rho$ | Shock persistence | 0.89 | Itskhoki and Mukhin (2021a) |
| $\{\theta_{ij}^k\}$ | Pricing regime | See text | LCP |
| $\Gamma$ | Bond demand inverse elasticity | 0.001 | Itskhoki and Mukhin (2021a) |
| **B. Estimated Parameters** | | | |
| $\kappa_p$ | Price Phillips curve slope | 0.024 | (0.006) |
| $\kappa_w$ | Wage Phillips curve slope | 0.010 | (0.003) |
| $h$ | Habit | 0.819 | (0.039) |

*Note:* Panel A of the table lists the parameters are externally assigned along with the values we assign for them. Panel B of the table lists the parameters we estimate along with our estimates. Standard errors are reported in parentheses.

in gross output to 50%, $\omega = 0.5$, following Itskhoki and Mukhin (2021a). The share of capital in value added is set to 43% to match a steady state investment-to-GDP ratio of 22%, which is the average value in our sample. We set the investment adjustment cost parameter to $\phi_I = 2.5$, following the estimates of Christiano, Eichenbaum, and Evans (2005).

We set the coefficient on inflation in the monetary policy rule to $\phi_\pi = 1.5$ as suggested by Taylor (1993). Monetary policy inertia is set to $\rho_m = 0.43$, to match the estimate of 0.81 at the quarterly frequency obtained by Smets and Wouters (2007). The elasticity of substitution between goods produced in different countries is set to $\eta = 1.5$, following a large literature in international macro (e.g., Chari, Kehoe, and McGrattan, 2002). This value is also consistent with the medium-run (5-10 year) estimates in Boehm, Levchenko, and Pandalai-Nayar (2023). As described in the main texts, we set the size of each region as follows: $|U| = 0.3, |F| = 0.5, |P| = 0.2$. We choose the openness parameter, $\alpha$, to match the average imports-to-GDP ratio in our sample of 40%. Since the imports-to-GDP ratio in the steady state of our model is $\alpha/(1-\omega)$, this implies $\alpha = 0.4 \times 0.5 = 0.2$.

As mentioned in the main text, our benchmark parametrization is to assume that all prices are set in local currency: for all $i$, $\theta_{ij}^{k} = 1$ for $k = j$ and $\theta_{ij}^{k} = 0$ for $k \neq j$.

We choose the remaining parameters – the price and wage Phillips curves, $\kappa_p$ and $\kappa_w$, (or equivalently, the rigidity of prices and the wages, $\delta_p$ and $\delta_w$) and the habit parameter, $h$ – to best fit our estimated impulse responses. More specifically, we set these parameters $\Theta \equiv (\kappa_p, \kappa_w, h)$ at the solution to the following problem:

$$\hat{\Theta} = \arg\min_{\Theta} \, (IRF(\Theta) - IRF)'\Sigma^{-1}(IRF(\Theta) - IRF), \tag{B.38}$$

where $IRF$ denotes a vector of the estimated relative impulse response functions of the trade-weighted nominal and real exchange rates, GDP, consumption, investment, exports, imports, inflation, nominal interest rates, and the terms of trade. For each of these variables, we include ten elements of the impulse response ($h = 0$ to $h = 9$). $IRF(\Theta)$ is the simulated model counterpart of $IRF$ in response to a US UIP shock, which is as function of $\Theta$. The weighting matrix $\Sigma$ is a diagonal matrix containing the variance of each element of $IRF$ on the diagonal. When computing the IRF, we always set the size of the initial US UIP shock, $\epsilon_{U0}^{\psi}$, to match the initial response of the relative nominal exchange rates. We report standard errors of our estimates of $\Theta$ using the asymptotic covariance matrix of $\hat{\Theta}$: $\hat{V} = \frac{\partial IRF(\hat{\Theta})}{\partial \Theta}'\Sigma^{-1}\frac{\partial IRF(\hat{\Theta})}{\partial \Theta}$, where $\frac{\partial IRF(\hat{\Theta})}{\partial \Theta}$ is the Jacobian of the list of impulse responses evaluated at $\Theta = \hat{\Theta}$. Our parameter estimates are listed in Panel B of Table B.3.

## B.5 Varying Price and Wage Stickiness

Our baseline estimate of the price and wage rigidity parameters in our model are $\delta_p = 0.87$ and $\delta_w = 0.92$ (see Table B.3). This is a considerable degree of rigidity. Figure B.1 presents results for the case where we halve both $\delta_p$ and $\delta_w$ and contrast these results with our benchmark case. We see that the response of GDP is substantially smaller with less nominal rigidity. The reason for this is that with less nominal rigidity, the depreciation leads inflation to increase sharply, which triggers a large monetary policy response. As a consequence, real rates increase sharply, which dampens the booms in GDP. Additionally, the real exchange rate is less volatile and less persistent with less nominal rigidity. This result can be avoided by assuming sufficiently responsive monetary policy that stabilizes inflation, as shown by Itskhoki and Mukhin (2021a). However, with even more responsive monetary policy, the boom in GDP will be even weaker.

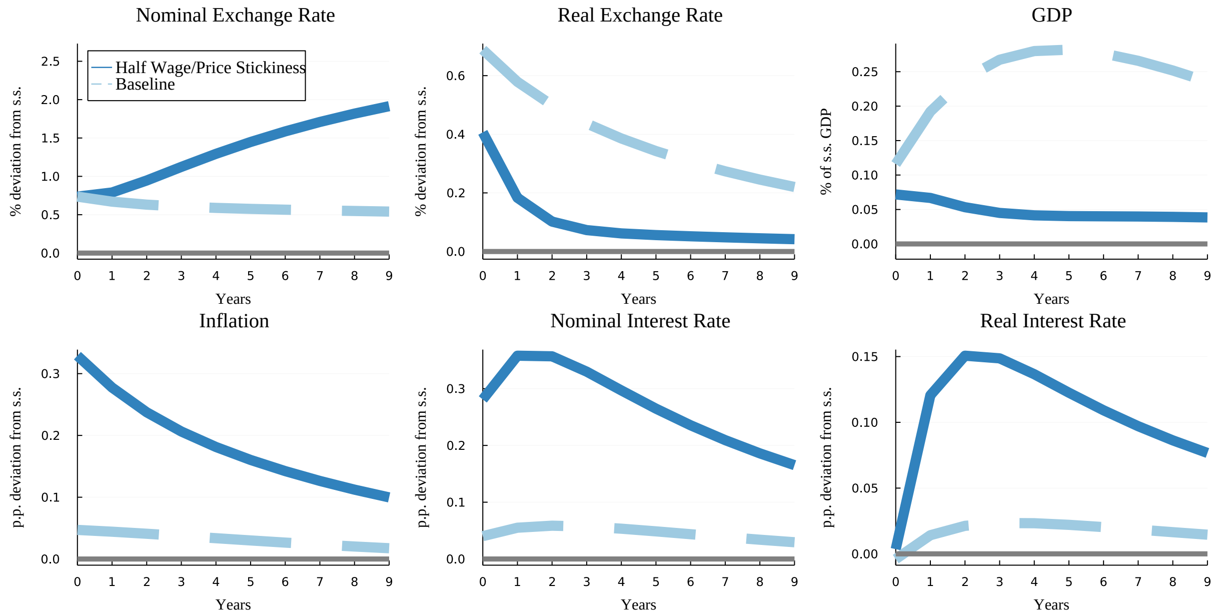


Figure B.1: Varying Price/Wage Stickiness

*Note:* This figure plots the impulse response of peggers relative to floaters in response to a US UIP shock for different price and wage stickiness parameters. The dark blue solid line is the case where we halved the size of $\delta_p$ and $\delta_w$ from our baseline estimates, while the light-blue dashed line uses our baseline parameters.

## B.6 Alternative Pricing Regimes

In the benchmark parameterization, we have assumed that firms price in local currency (LCP). Here, we explore two other commonly assumed pricing regimes: producer currency pricing (PCP) and dominant currency pricing (DCP). PCP corresponds to the following case:

$$\theta_{ij}^{k} = \begin{cases} 1 & \text{if } k = i \\ 0 & \text{otherwise.} \end{cases}$$

The DCP corresponds to the following case:

$$\theta_{ij}^{k} = \begin{cases} 1 & \text{if } k = USD \text{ and } i \neq j \\ 1 & \text{if } k = j \text{ and } i = j \\ 0 & \text{otherwise.} \end{cases}$$

Figure B.2 shows results on net exports and the terms of trade for these two cases in addition to our baseline case. We plot the response of these variable in pegging countries relative to floating countries after a US UIP shock. In the left panel, we see that with PCP and DCP net exports increase in pegging countries. This contrasts with our empirical results and our baseline LCP case

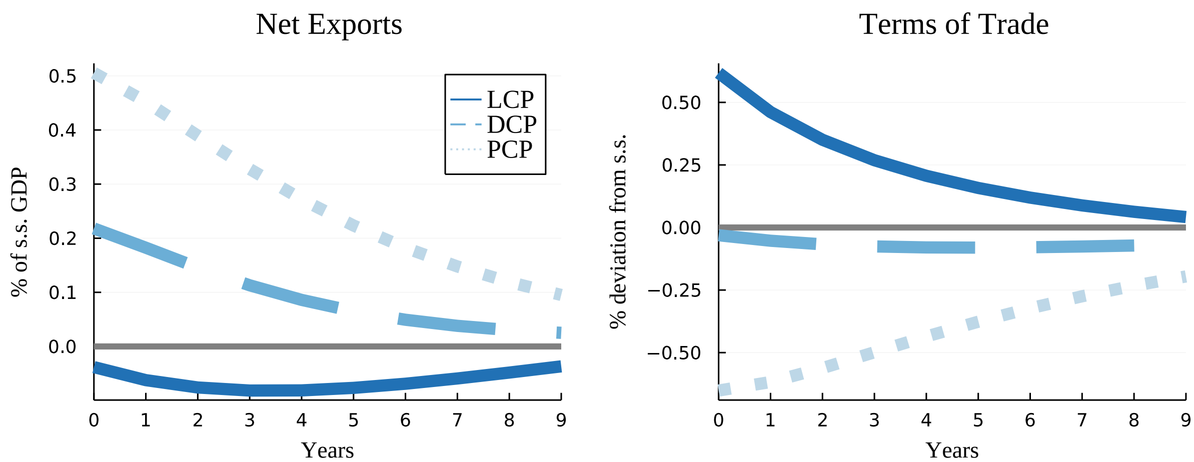


Figure B.2: Alternative Pricing Regimes

*Note:* This figure plots the response of net exports and the terms of trade for peggers relative to floaters in response to a US UIP shock for different pricing regimes.

in the model. The reason for the difference is that there is more expenditure switching under these alternative pricing regimes. In the right panel, the terms of trade response little with DCP, while the model generates a substantial deterioration in the terms of trade with PCP. In the data, we observe a mild improvement in terms of trade, which the model with LCP fits. For both net exports and the terms of trade, the model fits best when we assume LCP.

## B.7 Tradable and Non-tradable Sectors

Consider an extension of our baseline model to a case with a tradable sector and a non-tradable sector. Both tradable and non-tradable goods are produced with the same technology as in equation (B.12), and factors are freely mobile across sectors. The aggregate consumption basket is given by

$$C_{it} = \left((1-\varsigma)^{1/\iota}(C_{it}^{NT})^{\frac{\iota-1}{\iota}} + \varsigma^{1/\iota}(C_{it}^{T})^{\frac{\iota-1}{\iota}}\right), \tag{B.39}$$

where $\iota > 0$ is the elasticity of substitution between tradable and nontradable sectors, and $\varsigma \in [0,1]$ governs the share of tradable goods in the consumption basket. Tradable consumption is in turn a CES basket of goods from different countries

$$C_{it}^{T} = \left((1-\alpha)^{1/\eta}(c_{iit})^{\frac{\eta-1}{\eta}} + \alpha^{1/\eta}\int_0^1 (c_{jit})^{\frac{\eta-1}{\eta}}\, dj\right)^{\frac{\eta}{\eta-1}}. \tag{B.40}$$

As in the baseline model, $\{c_{jit}^T\}$ and $C_{it}^{NT}$ are all CES baskets of a continuum of varieties $v \in [0,1]$ with elasticity of substitution $\epsilon_p > 1$:

$$c_{jit} = \left( \int_0^1 (c_{jit}(v))^{\frac{\epsilon_p - 1}{\epsilon_p}} dv \right)^{\frac{\epsilon_p}{\epsilon_p - 1}}, \quad C_{it}^{NT} = \left( \int_0^1 (C_{it}^{NT}(v))^{\frac{\epsilon_p - 1}{\epsilon_p}} dv \right)^{\frac{\epsilon_p}{\epsilon_p - 1}}$$

The price index for aggregate consumption is given by

$$P_{it} = \left( (1-\varsigma)(P_{it}^{NT})^{1-\iota} + \varsigma (P_{it}^T)^{1-\iota} \right)^{1/(1-\iota)}, \tag{B.41}$$

$$P_i^T = \left( (1-\alpha)(p_{iit})^{1-\eta} + \alpha \int (p_{jit})^{1-\eta} dj \right)^{1/(1-\eta)}, \tag{B.42}$$

$$P_{it}^{NT} = p_{iit}, \tag{B.43}$$

where the last equation follows from the fact that factors are freely mobile across sectors, and therefore, the price index of non-tradable goods are equal to the price index of tradable goods produced domestically. Note that we assume that both the non-tradable goods and tradable goods sold domestically are priced in domestic currency.

We assume that both the intermediate inputs and the investment goods have the same nested CES structure as consumption. Therefore, the bilateral goods trade flows are given by

$$y_{ijt} = \begin{cases} \left[ (1-\alpha)\varsigma \left( \frac{p_{iit}}{P_{it}^T} \right)^{-\eta} \left( \frac{P_{it}^T}{P_{it}} \right)^{-\iota} + (1-\varsigma) \left( \frac{p_{iit}}{P_{it}} \right)^{-\iota} \right] (C_{it} + X_{it} + I_{it}) & \text{for } i = j \\ \alpha\varsigma \left( \frac{p_{ijt}}{P_{jt}^T} \right)^{-\eta} \left( \frac{P_{jt}^T}{P_{jt}} \right)^{-\iota} (C_{jt} + I_{jt} + X_{jt}) & \text{for } i \neq j \end{cases} \tag{B.44}$$

The market clearing condition for each country $i$'s goods is

$$\begin{aligned} Y_i = &\left[ (1-\alpha)\varsigma \left( \frac{p_{iit}}{P_{it}^T} \right)^{-\eta} \left( \frac{P_{it}^T}{P_{it}} \right)^{-\iota} + (1-\varsigma) \left( \frac{p_{iit}}{P_{it}} \right)^{-\iota} \right] (C_{it} + X_{it} + I_{it}) \\ &+ \int_0^1 \alpha\varsigma \left( \frac{p_{ijt}}{P_{jt}^T} \right)^{-\eta} \left( \frac{P_{jt}^T}{P_{jt}} \right)^{-\iota} (C_{jt} + X_{jt} + I_{jt}) dj. \end{aligned} \tag{B.45}$$

The equilibrium definition of this economy modifies the definition in Section B.1.3 by replacing equations (B.6) with (B.41)-(B.43), (B.26) with (B.44), and (B.28) with (B.45).

We calibrate this economy as follows. We first set the elasticity of substitution between tradable and non-tradable goods to $\iota = 1$. We then set $\varsigma = 0.5$ to match the average share of the service sector in GDP in our sample, which is 50%. Since the imports-to-GDP ratio in this model is $\varsigma\alpha/(1-$

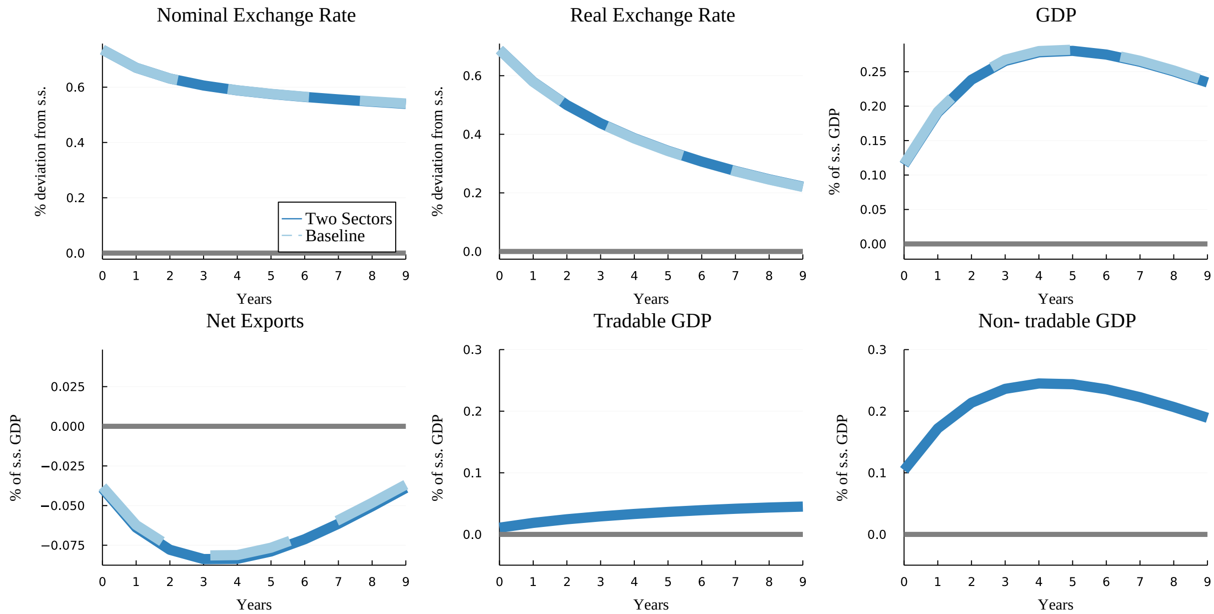


Figure B.3: Tradable and Non-tradable Sectors

*Note:* This figure plots impulse responses of peggers relative to floaters in response to a US UIP shock for the baseline model (dashed line) and the two-sectors model (solid line).

$\omega$), we re-calibrate the value of openness to $\alpha = 0.4$ to match the same imports-to-GDP ratio of 40%. Other parameters are unchanged.

Figure B.3 plots the impulse response of peggers relative to floaters in response to a US UIP shock in this model. We find that extending the model to two sectors barely changes the behavior of aggregate variables. Looking at the response of sectoral output, we find that the increase in GDP is almost entirely driven by the non-tradable sector.

## B.8 Hand-to-Mouth Households

Consider an extension of our baseline model in which some households live hand-to-mouth, i.e., consume their labor income period-by-period. More specifically, assume that a fraction $\varphi^{HtM}$ of households in each country do not have access to financial markets. Their budget constraint is therefore,

$$C_{it}^{HtM} = (1 - \tau_i^n) W_{it} N_{it} / P_{it} + T_{it}. \tag{B.46}$$

The remaining fraction of households – which we refer to as permanent income households – solve the same problem as in the baseline model. We denote their consumption as $C_{it}^r$. Their consumption Euler equation is

$$MU_{it}^{r} = \mathbb{E}_t(1 + r_{it+1}^{p})MU_{it+1}^{r}, \tag{B.47}$$

where the marginal utility from a unit increase in consumption is

$$MU_{it}^{r} = u'(C_{it}^{r} - hC_{it-1}^{r}) - \beta h u'(C_{it+1}^{r} - hC_{it}^{r}).$$

Analogously, the marginal utility of hand-to-mouth households is

$$MU_{it}^{HtM} = u'(C_{it}^{HtM} - hC_{it-1}^{HtM}) - \beta h u'(C_{it+1}^{HtM} - hC_{it}^{HtM}).$$

The labor union now maximizes a weighted average of the two types of households' utility function:

$$\sum_{s=0}^{\infty}(\beta\delta_w)^{s-t}\left[\varphi^{HtM}(u(C_{is}^{HtM} - hC_{is-1}^{HtM}) - \chi(n_{is})) + (1-\varphi^{HtM})(u(C_{is}^{r} - hC_{is-1}^{r}) - \chi(n_{is}))\right],$$

subject to

$$\begin{aligned}
n_{is} &= \int_0^1 N_{is}(\ell)d\ell \\
N_{is}(\ell) &= \left(\frac{W_{it}(\ell)}{W_{is}}\right)^{-\epsilon_w} N_{is} \\
C_{it}^{r} + a_{it} &= a_{it-1}(1 + r_{it}^{h}) + (1 - \tau_i^{n})\int_0^1 W_{it}(\ell)N_{it}(\ell)d\ell/P_{it} + T_{it} \\
C_{it}^{HtM} &= (1 - \tau_i^{n})\int_0^1 W_{it}(\ell)N_{it}(\ell)d\ell/P_{it} + T_{it}.
\end{aligned}$$

Solving the above and taking a first-order approximation around the steady state yields the following New Keynesian wage Phillips Curve:

$$\hat{\pi}_{it}^{w} = \kappa_w\left(\hat{P}_t + \widehat{MU}_{is} + \nu\hat{n}_{it} - \hat{W}_{it}\right) + \beta\hat{\pi}_{i,t+1}^{w}, \tag{B.48}$$

where

$$\widehat{MU}_{is} = \Lambda_i^{HtM}\widehat{MU}_{is}^{HtM} + (1 - \Lambda_i^{HtM})\widehat{MU}_{is}^{r}$$

is the weighted average of the log-changes in marginal utility from a unit increase in consumption

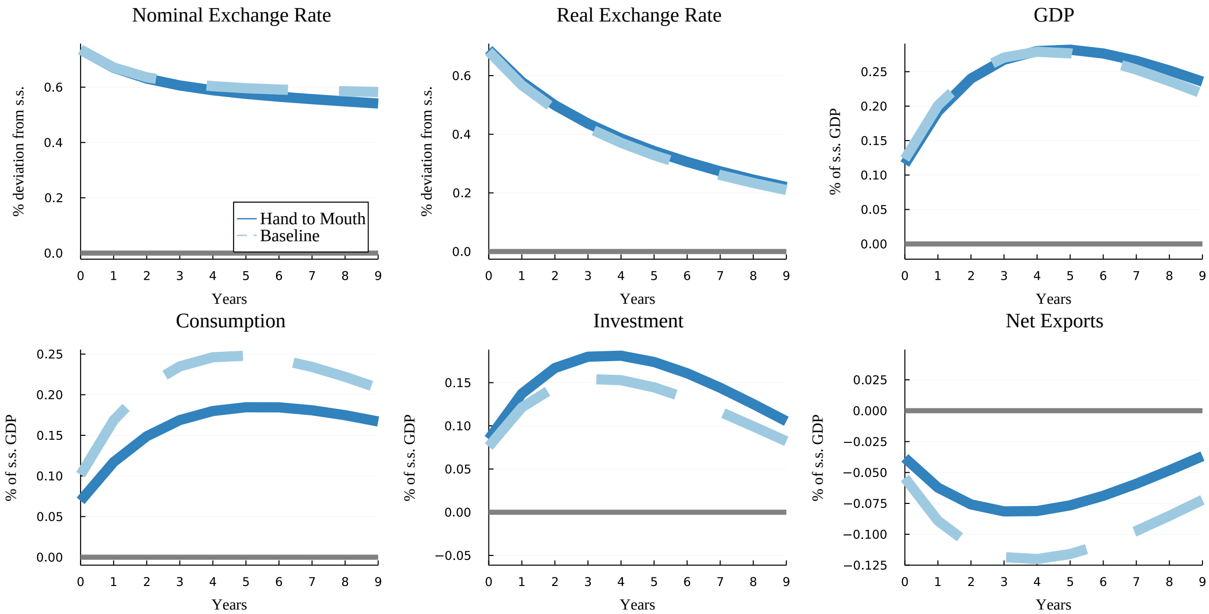


Figure B.4: Hand-to-Mouth Agents

*Note:* This figure plots impulse responses of peggers relative to floaters in response to a US UIP shock for the baseline model (dashed line) and the model with hand-to-mouth agents (solid line).

between the two types of households, and the weight is given by the steady state share of marginal utility: $\Lambda_i^{HtM} = \frac{MU_i^{HtM}}{MU_i^{HtM}+MU_i^r}$.

Aggregate consumption is given by

$$C_{it} = \varphi^{HtM} C_{it}^{HtM} + (1-\varphi^{HtM}) C_{it}^r. \tag{B.49}$$

The equilibrium definition for this economy modifies the definition in Section B.1.3 by replacing equations (B.3) with (B.47), (B.46), and (B.49), and (B.11) with (B.48).

We set the share of hand-to-mouth agents to be 30%, $\varphi^{HtM} = 0.3$. The rest of parameters are unchanged. Figure B.4 shows the response to a US UIP shock for this economy. We find that, if anything, the presence of hand-to-mouth agents amplifies the response of consumption, but dampens the response of investment. The response of GDP is nearly unchanged.

## B.9 Microfoundations of the Capital Flight Shock

As explained in the main text, banks intermediate foreign currency bonds between households and firms and the international financial market. We assume that these banks face a constraint on the amount of intermediation they can engage in: $b_{ijt} \leq \bar{b}_{it}$, where $b_{ijt}$ is the net issuance of foreign bonds of currency $j$ in country $i$, and $\bar{b}_{it}$ is the intermediation constraint of the bank. The bank solves,

$$\max_{b_{ijt}} (1 + r_{ijt+1}) b_{ijt} - (1 + r_{jt}) \frac{Q_{jit+1}}{Q_{jit}} b_{ijt}$$
$$\text{s.t.} \quad b_{ijt} \leq \bar{b}_{it}.$$

A Lagrangian for this problem is

$$\max_{b_{ijt}} (1 + r_{ijt+1}) b_{ijt} - (1 + r_{jt}) \frac{Q_{jit+1}}{Q_{jit}} b_{ijt} + \tilde{\zeta}_{it}(\bar{b}_{it} - b_{ijt}),$$

where $\tilde{\zeta}_{it}$ is the Lagrangian multiplier on the borrowing constraint. The bank's optimality condition is then given by

$$(1 + r_{ijt+1}) = (1 + r_{jt}) \frac{Q_{jit+1}}{Q_{jit}} + \tilde{\zeta}_{it} \tag{B.50}$$

Defining $\zeta_{it} = \frac{1}{\beta}\tilde{\zeta}_{it}$, equation (B.50) is equivalent to equation (16) to a first-order approximation around the symmetric steady state.

## B.10 Regime-Induced Depreciations with Capital Flight Shocks

Table B.4 and Figure B.5 present results that are directly analogous to Table 2 and Figure 10, respectively, for the case where variation in the US exchange rate results from US capital flight shocks rather than US UIP shocks. These responses use the same calibration as we used in Section 5. The results with US capital flight shocks are very similar to the results with US UIP shocks. In other words, we can match our empirical responses to regime-induced exchange rate variation with either US UIP shocks or US capital flight shocks, or any combination of these shocks.

Responses of the world economy to a US capital flight shock do differ from the response to a US UIP shock. But these differences are due to the direct effects of the shock. These direct effects (i.e., effects that do not run through the exchange rate) are "differenced out" in our analysis of regime-induced depreciations, which compare outcomes between pegs and floats. These conditional moments are, in this sense, not sensitive to the choice of shocks driving the exchange rate in our model.

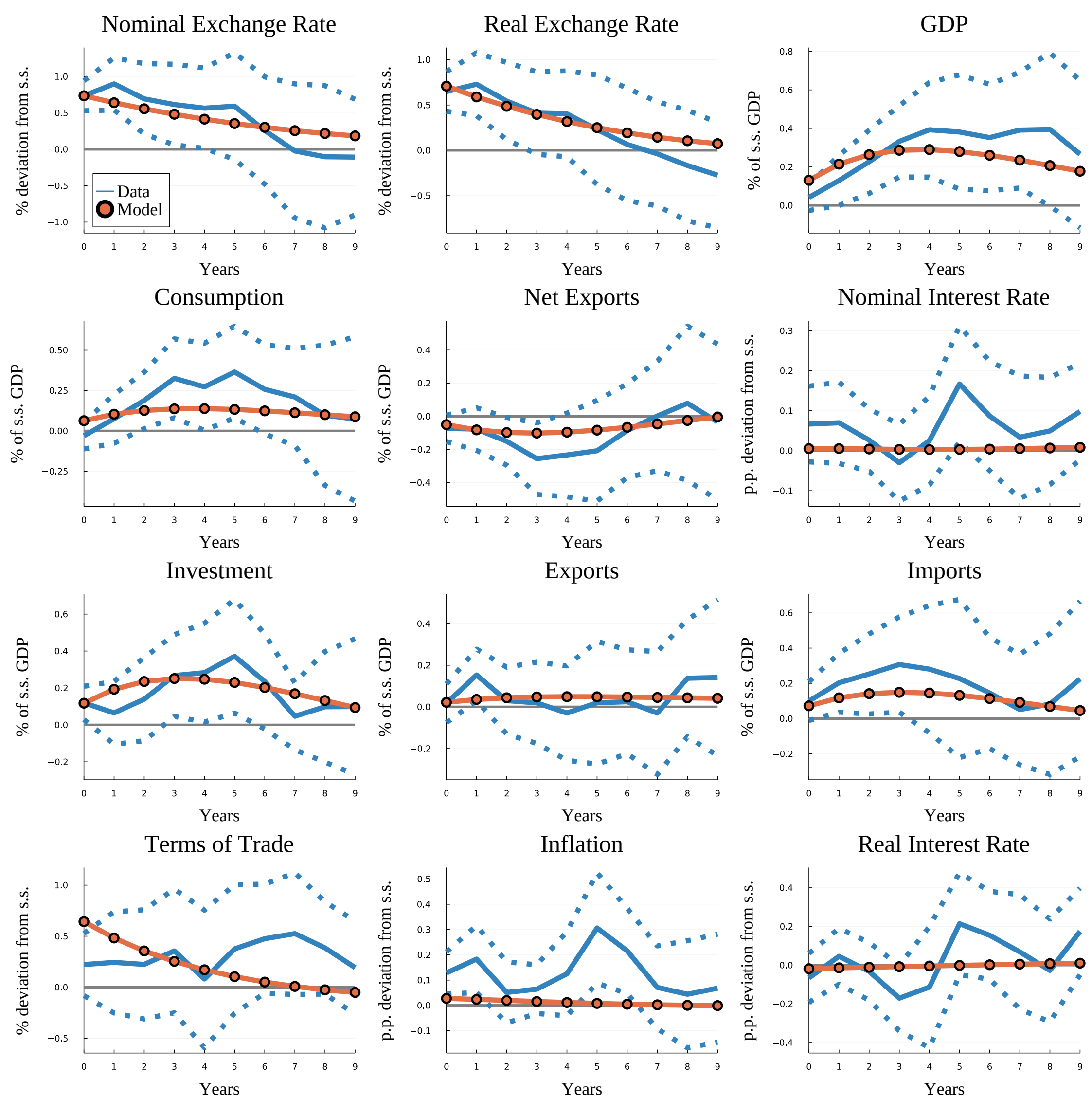


Figure B.5: Model Fit: US Capital Flight Shock

*Note:* This figure plots the response of peggers relative to floaters to a US capital flight shock in the model and in the data. The dashed lines represent the 95% confidence interval in the data.

Table B.4: Regime-Induced Depreciation

| | Impact Response | | 5Y Average Response | |
|---|---|---|---|---|
| | $e$ | $i$ | $e$ | $i$ |
| Data | 0.74 | 0.07 | 0.70 | 0.03 |
| Model | | | | |
| US UIP Shock | 0.74 | 0.04 | 0.65 | 0.05 |
| US Capital Flight Shock | 0.74 | 0.01 | 0.57 | 0.00 |
| US Monetary Policy Shock | 0.74 | -0.41 | 0.27 | -0.14 |
| US Technology Shock | 0.74 | -0.23 | 0.19 | -0.27 |

*Note:* This table reports the impulse response of the log of the nominal effective exchange rate ($e$) and the nominal interest rate ($i$) of peggers relative to floaters. Impact response indicates the response at $h = 0$, while the 5Y average response is the average of the response at horizons $h = 0$ through $h = 4$. The top row of the table shows our empirical estimates for these responses. The remaining rows show the simulated impulse response in our model in response to the shock listed to the left in that row. We choose the size of each shock such that the impact response of the nominal effective exchange rate matches the impact response in the data.

# C Additional Figures and Tables

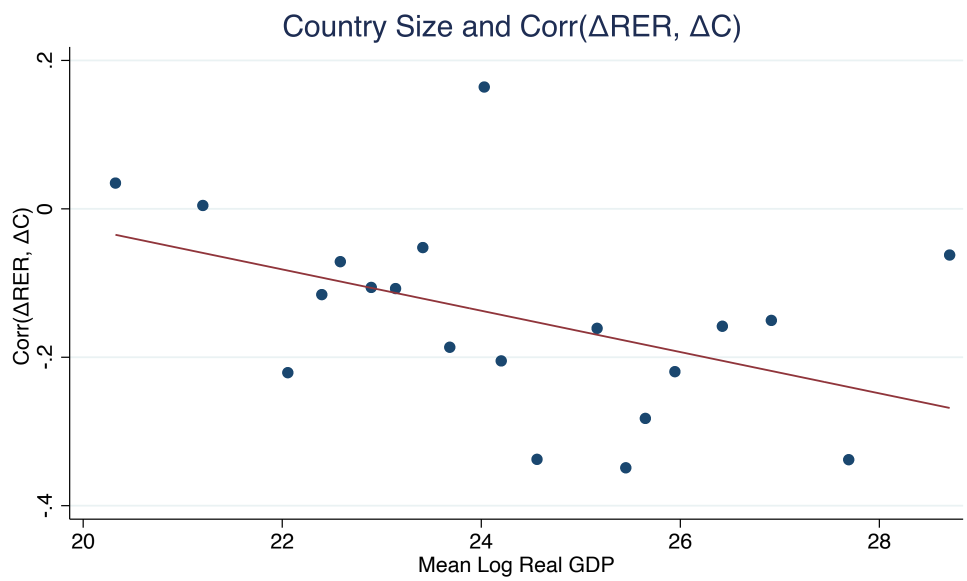


Figure C.1: The Correlation between Real Exchange Rates and Consumption by Country Size

*Note:* The figure plots the country-wise correlation between the log change in consumption and the log change in the real exchange rate as a function of mean log real GDP over the sample period. The figure is a binned-scatter plot with 20 bins. The red line denotes the linear fit. The slope is -0.028 with standard error of 0.010.

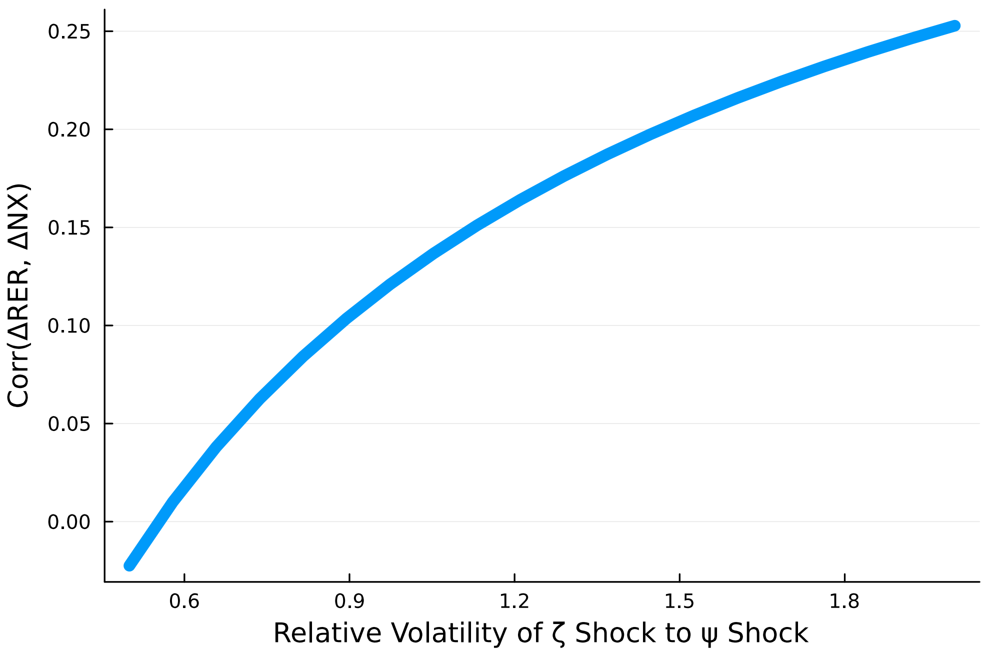


Figure C.2: Corr(ΔRER, ΔNX) versus Relative Volatility of capital flight Shocks

*Note:* This figure plots Corr(ΔRER, ΔNX) – the correlation of log changes in real exchange rates and changes in the ratio of net exports to GDP – as a function of the relative variance of capital flight shocks to UIP shocks in our FDX model. The relative variance of these two shocks is reported relative to its value in our baseline calibration.