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# Dominant Drivers of Current Account Dynamics

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**Dominant Drivers of Current Account Dynamics**  
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**ABSTRACT:** We estimate shocks that explain most of the variation in the current account at business cycle frequencies and over the long run. We then explore, using a standard open-economy macro model, which macroeconomic shocks are behind the empirical dominant drivers of the current account at business-cycle frequency. Rather than financial shocks or aggregate shocks to supply or demand, shocks to the relative demand between home and foreign goods are found to play a pivotal role in current account dynamics.

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# 1 Introduction

As a key metric of international macroeconomics, current account imbalances often reflect cross-country differences in (desirable) saving and investment, corresponding to the international flows of goods and finance that are consistent with economic fundamentals. But at times they can emanate from economic and financial distortions and mirror rising vulnerabilities to crises (Obstfeld, 2012). The relative importance of these two types of current account imbalances would eventually depend on the nature of the underlying shocks that drive them. Accordingly, numerous papers have examined the effects of various shocks on current account movements.<sup>1</sup>

Adopting a slightly different angle from the existing literature, this paper explores those shocks that explain most of the fluctuations in current account imbalances. Starting with an agnostic examination of US and other-G7 data, we estimate structural vector autoregression (SVAR)-based shocks that account for the largest share of the volatility of current account dynamics over short-run and long-run horizons. The joint responses of the current account, exchange rate, and several additional macroeconomic variables are documented as potential guideposts in discerning underlying economic shocks. Then we turn to a more structural investigation. Relying on a standard open-economy macro model that allows for international financial shocks and relative shifts in demand, we explore which estimated model-based macroeconomic shocks come close to the dominant short-run driver of the current account uncovered by the SVAR analysis.

To uncover the dominant drivers of current account movements (at business cycle frequencies and in the long run), we use the max-share identification following Angeletos et al. (2020) who examine the main determinants of business cycles. Chahrour et al. (2021) and Miyamoto et al. (2023) use the same approach to study the main determinants of exchange rates. We study current account fluctuations in G7 countries with relatively long data (the US, Canada, France, Germany, Italy, Japan, and the UK), while putting

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<sup>1</sup>See the next section for a discussion of the literature.

special emphasis on the US.

We show that dominant current account shocks are distinct from dominant exchange rate shocks as dominant exchange rate shocks display a gradual current account response driven by expenditure switching, i.e., a strong initial depreciation of the exchange rate leading to a gradual increase in the current account balance. In contrast and despite some heterogeneity across countries, dominant shocks to the current account at business cycle frequencies induce an immediate and persistent increase in the current account that is accompanied by a gradual exchange rate *appreciation*. The shocks reduce domestic consumption and investment in the short to medium term while foreign consumption tends to increase on impact. For the current account’s dominant long-run driver, we instead observe a depreciating exchange rate when the current account increases, highlighting expenditure switching as a primary channel for adjusting the current account balance in the long run.

As our identification strategy relies on minimal assumptions, the resulting shocks do not necessarily need to correspond one-to-one to the shocks identified by particular structural open-macro models. Nevertheless, theoretical models can provide informative guideposts for identifying such structural economic shocks that play an important role in explaining the majority of current account variations. From this viewpoint, we try to decode the VAR-estimated dominant current account (also written CA in shorthand) shock using a dynamic open-macro model at business cycle frequency.<sup>2</sup>

Our model augments a representative two-country new Keynesian open-economy macro model (e.g. Galí, 2015 and Itskhoki and Mukhin, 2021) with additional shocks. In particular, we introduce a relative demand shock that alters the degree of home bias, as used in Stockman and Tesar (1995) and Pavlova and Rigobon (2007). The two economies are symmetric, apart from the currency pricing regimes and the relative demand shock. The model demonstrates how current account dynamics are subject to two contrasting mechanisms—expenditure switching and expenditure changing—which follow partly from

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<sup>2</sup>An analysis of long-run adjustments would require a different type of DSGE model from the one used in our analysis.

the same sets of structural shocks. To disentangle the contributions from the different shocks we estimate the model with Bayesian techniques using data for the same variables as in our empirical SVAR analysis.

Analyzing the impulse-response functions, the forecast error variance decomposition, and the historical shock series, we find that the most prominent candidate for explaining the dominant current account shock is a shock that shifts the international relative demand between home and foreign goods. Increased relative demand for home goods appreciates the exchange rate while bolstering the current account surplus (or reducing the current account deficit) of the home economy. The same shock also lowers domestic expenditure in the short run while later increasing domestic investment and consumption. A projection of the dominant current account shock on the estimated model shocks shows that financial shocks—which have been shown to play a major role in explaining exchange rate dynamics—play only a secondary role in explaining current account dynamics. Moreover, applying the same max-share VAR approach to different sets of model-simulated data yields further evidence that the relative demand shock resembles the dominant current account shock most closely.

## 1.1 Related Literature

In exploring the dominant drivers of current account movements, our paper offers one way to compare numerous papers on current account dynamics. With this in mind, we try to provide a brief review of the literature.

Before the emergence of the inter-temporal approach to the current account, the absorption approach (Alexander, 1952; Hahn, 1959) and elasticities approach (Magee, 1973; Goldstein and Khan, 1985) highlighted the roles of overall spending and relative prices in accounting for trade in goods and services, which in turn accounted for the bulk of current account balances. The inter-temporal approach (Buiter, 1981; Sachs et al., 1981) synthesized these two competing approaches by introducing the macroeconomic factors that drive relative prices and spending over time, highlighting the role of temporary shocks

in determining the current account balance as the gap between the economy-wide saving and investment. Subsequent dynamic open-economy macroeconomic models (Mendoza, 1991; Obstfeld and Rogoff, 1995; Ghosh and Ostry, 1995) have built on the intertemporal approach by embedding the current account in a rich dynamic and often stochastic general equilibrium analysis, incorporating key insights of earlier approaches and risk sharing across countries.

Early time-series analyses of current account dynamics have yielded somewhat limited success. Empirical implementations of the inter-temporal approach based on present value tests had difficulty explaining current account dynamics (e.g., Sheffrin and Woo, 1990; Bergin and Sheffrin, 2000). Econometric analyses based on New Keynesian open-economy macroeconomics models have found that current account dynamics were not primarily driven by policy shocks but rather by financial shocks or technology shocks (Bergin, 2006; Kim and Lee, 2015).

The large US deficit has motivated several insightful papers. Engel and Rogers (2006) examined the role of the expected share of the US in the world economy, which is driven by stronger growth in the US than in other advanced economies. Blanchard et al. (2005) examined the implications of the increased demand for US assets. Providing a concrete context to one source of the demand for US assets, Caballero et al. (2008) brought out the global excess demand for safe assets, of which the US is an undisputed major supplier. Mendoza et al. (2009) highlighted the role of different degrees of financial market developments in generating large global imbalances. Although these papers have focused on the US deficit (rather than the surplus and deficit of an average country), they have called attention to the role of financial shocks and external (global) developments in understanding the current account even of the US, the largest economy.

Papers that combined dynamic macro models and trade models put forward the role of trade costs in current account movements. Obstfeld and Rogoff (2001) developed the possible effects of trade costs on the effective interest rates and, ultimately, on the current account. Alessandria and Choi (2021) find trade policy and resulting changes in trade

barriers were an important driver of the US trade balance since the 1980s. Mullen and Woo (2024) develop a model that captures both financial and trade shocks and generates the data-consistent comovement between the US real exchange rates and net exports across different time horizons.

Regarding more traditional or low-frequency drivers of current accounts, the cross-country panel empirical literature, initiated by Chinn and Prasad (2003), has identified several main determinants (or correlates) of current account balances, which include structural fundamentals like demographics, institutional quality, and natural resources, as well as macroeconomic fundamentals like the expected real growth, economic policies, and cross-country differences in business cycles (see Lee et al. (2008), Allen et al. (2023), Chinn and Ito (2022) and Coutinho et al. (2022)). This literature has put more emphasis on medium-term movements in current accounts, using data at an annual frequency or averaged over several years. Resonating with this empirical literature, the role of demographic transitions has been developed in the context of dynamic models by Ferrero (2010), Backus et al. (2014), and Barany et al. (2023).

However, no consensus emerged on the core drivers of current account movements. Studies that focus on demographics, for example, do not necessarily find the demographic factors to play the most important role. For instance, Ferrero (2010) finds productivity to have played a greater role than demographic factors. Similar limitations apply to other studies in that no set of variables has been widely recognized as the primary driver of current account dynamics in quantitative terms.

We take a step back from these factors identified in the literature and place as few ex-ante restrictions on our empirical investigation as possible. Our approach yields an agnostic description of the empirical comovements of macroeconomic aggregates associated with unexpected fluctuations in the current account. Our results point to international relative demand shocks as the major drivers behind the current account, a finding that has received limited attention.

The remainder of the paper is structured as follows. Section 2 briefly describes the

data and lays out the econometric methodology. It estimates the dominant current account shocks for the US and the other G7, and contrasts them with the dominant exchange rate shock. Section 3 discusses the open-economy macro model and its estimation. In Section 4 we discuss the model-estimated shocks and reconcile them with the empirical evidence. Finally, section 5 concludes.

## 2 Empirical Analysis

This section describes the framework for SVAR and presents its findings.

### 2.1 Data and Empirical Framework

To discover the statistical properties of the main empirical driver of current account fluctuations while keeping the structural identification restrictions to a minimum, we rely on the max-share approach as in Angeletos et al. (2020), developed by Faust (1998) and Uhlig (2003). The approach identifies one dominant shock that is the largest contributor to the volatility of a single variable at a particular frequency. It has the advantage that we do not need to resort to potentially problematic (timing or sign) restrictions or to come up with an instrument that is contentious. Moreover, the approach can easily be applied to different countries and allows for flexibility in choosing the set of model variables.

We estimate a reduced-form VAR

$$\mathbf{y}_t = \mathbf{a} + \mathbf{A}_1 \mathbf{y}_{t-1} + \dots + \mathbf{A}_p \mathbf{y}_{t-p} + \mathbf{u}_t, \quad (1)$$

with a lag length of  $p = 4$  quarters, where  $\mathbf{a}$  denotes a constant,  $\mathbf{A}_i$  the reduced-form VAR coefficients and  $\mathbf{u}_t$  the reduced-form forecast errors. These errors have no economic interpretation.

The endogenous variables in  $\mathbf{y}_t$  include quarterly macroeconomic data on our country of interest, i.e., the US or the remaining G7 countries vis-à-vis a trade-weighted aggregate



of G6 economies<sup>3</sup> as in Engel (2016) and Chahrour et al. (2021): (i) the current account to GDP ratio, (ii) the nominal exchange rate expressed in domestic currency per foreign currency (i.e., an increase is a depreciation of the domestic currency), (iii) domestic real consumption and investment, (iv) foreign, i.e., G6, real consumption and investment, (v) the CPI price level differential, (vi) the interest rate differential, (vii) a measure of domestic total factor productivity.<sup>4</sup> The sample runs from 1975:Q1-2022:Q3, and the variables enter the VAR in log levels except for the current account to GDP ratio which is not transformed. For six countries except the US, baseline results are estimated without measures of TFP. The online-appendix holds additional information on data sources and construction. To estimate the VAR, we use a Minnesota-type prior implemented via a Gibbs sampler as in Angeletos et al. (2020) and Miyamoto et al. (2023).<sup>5</sup>

The reduced-form VAR in (1) can be expressed in a structural form given by

$$\mathbf{B}_0 \mathbf{y}_t = \mathbf{b} + \mathbf{B}_1 \mathbf{y}_{t-1} + \dots + \mathbf{B}_p \mathbf{y}_{t-p} + \boldsymbol{\varepsilon}_t. \quad (2)$$

In equation (2),  $\boldsymbol{\varepsilon}_t$  are independent structural shocks with an economic interpretation. These are related to the reduced-form errors via the linear transformation  $\mathbf{u}_t = \mathbf{B}_0^{-1} \boldsymbol{\varepsilon}_t$ . Thus,  $\mathbf{B}_0^{-1}$  contains the impact effects of the structural shocks on the endogenous variables in  $\mathbf{y}_t$ . By assuming a unit variance for the uncorrelated structural shocks, i.e.,  $\mathbb{E}(\boldsymbol{\varepsilon}_t \boldsymbol{\varepsilon}_t') = \mathbf{I}_n$  (an identity matrix), the reduced-form covariance matrix  $\boldsymbol{\Sigma}_u$  is related to the structural impact multiplier matrix as  $\boldsymbol{\Sigma}_u = \mathbb{E}(\mathbf{u}_t \mathbf{u}_t') = \mathbf{B}_0^{-1} \mathbb{E}(\boldsymbol{\varepsilon}_t \boldsymbol{\varepsilon}_t') \mathbf{B}_0^{-1'} = \mathbf{B}_0^{-1} \mathbf{B}_0^{-1'}$ .

There exists a large set of observationally equivalent  $\mathbf{B}_0^{-1}$  matrices and we can write  $\mathbf{B}_0^{-1} = \boldsymbol{\Sigma}_{u,tr} \mathbf{Q}$  where  $\boldsymbol{\Sigma}_{u,tr}$  denotes the unique lower triangular Cholesky matrix of  $\boldsymbol{\Sigma}_u$  with non-negative diagonal coefficients, and  $\mathbf{Q}$  is an orthogonal matrix, i.e.,  $\mathbf{Q} \mathbf{Q}' = \mathbf{I}$  and

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<sup>3</sup>A shorthand for the other G7 economies excluding a country in question, the U.S. in this instance.

<sup>4</sup>We note the potential discrepancy that the current account relates to a country's transactions with all foreign countries while we focus on the G6 as the rest of the world for the remaining variables. As a robustness exercise, we replace the nominal exchange rate vs. G6 with the nominal effective exchange rate vs. 51 countries from Darvas (2021).

<sup>5</sup>For estimation we drop the extreme observation 2020:Q2. Our results are robust to weighing down the observations of 2020:Q2 and the following quarters as proposed in Lenza and Primiceri (2022).

$\mathbf{Q}^{-1} = \mathbf{Q}'$  (see Uhlig, 2005). Concentrating on the relation of reduced-form residuals to structural shocks, we obtain  $\mathbf{u}_t = \boldsymbol{\Sigma}_{u,tr} \mathbf{Q} \boldsymbol{\varepsilon}_t$ .

We denote the reduced-form VAR in equation (1) in its moving average representation  $\mathbf{y}_t = \mathbf{B}(\mathbf{L})\mathbf{u}_t$  where  $\mathbf{B}(\mathbf{L})$  is an infinite matrix polynomial. Inserting for  $\mathbf{u}_t$  we obtain

$$\mathbf{y}_t = \mathbf{B}(\mathbf{L})\boldsymbol{\Sigma}_{u,tr}\mathbf{Q}\boldsymbol{\varepsilon}_t = \boldsymbol{\Gamma}(\mathbf{L})\boldsymbol{\varepsilon}_t \quad (3)$$

where  $\boldsymbol{\Gamma}(\mathbf{L}) = \sum_{T=0}^{\infty} \boldsymbol{\Gamma}_T \mathbf{L}^T$  and  $\{\boldsymbol{\Gamma}_T\}_{T=0}^{\infty}$  represents the IRFs of the variables to the structural shocks.

To identify a single shock by the requirement that it accounts for the maximal share of the contribution to the volatility of a particular variable in a particular frequency band, we leverage the  $\mathbf{Q}$  matrix. We pick that column  $\mathbf{q}$  from  $\mathbf{Q}$  which relates to the structural shock that is the dominant driver of the current account balance at the business cycle frequency between 6 and 32 quarters and separately in the long run, which refers to a range between 80 quarters and  $\infty$  following Angeletos et al. (2020) and Miyamoto et al. (2023).

For that, we use the spectral density, a frequency domain characterization of time series directly related to the autocovariance time domain representation. The spectral density of the variable  $y$  at frequency  $w$  is given by

$$f_X(y) = \frac{1}{2\pi} \mathbf{C}(e^{-iw}) \mathbf{Q} \mathbf{Q}' \mathbf{C}(e^{-iw})', \quad (4)$$

where  $\mathbf{C}(\mathbf{L}) = \mathbf{B}(\mathbf{L})\boldsymbol{\Sigma}_{u,tr}$ . The volatility of the variable  $y$  can be computed via the integral of the spectral density function (4), in terms of contributions of all the Cholesky-transformed residuals, over a frequency band, for instance,  $[\underline{w}, \bar{w}] = [2\pi/32, 2\pi/6]$  for the business cycle frequency.

Each column vector  $q$  can be used to represent the contribution of a corresponding shock to the spectral density of the variable  $y$  as  $q' \boldsymbol{\Theta} q$  where  $\boldsymbol{\Theta}$  is the integral of the matrix obtained as the product of the complex conjugate transpose of  $\mathbf{C}(e^{-iw})$ 's row that

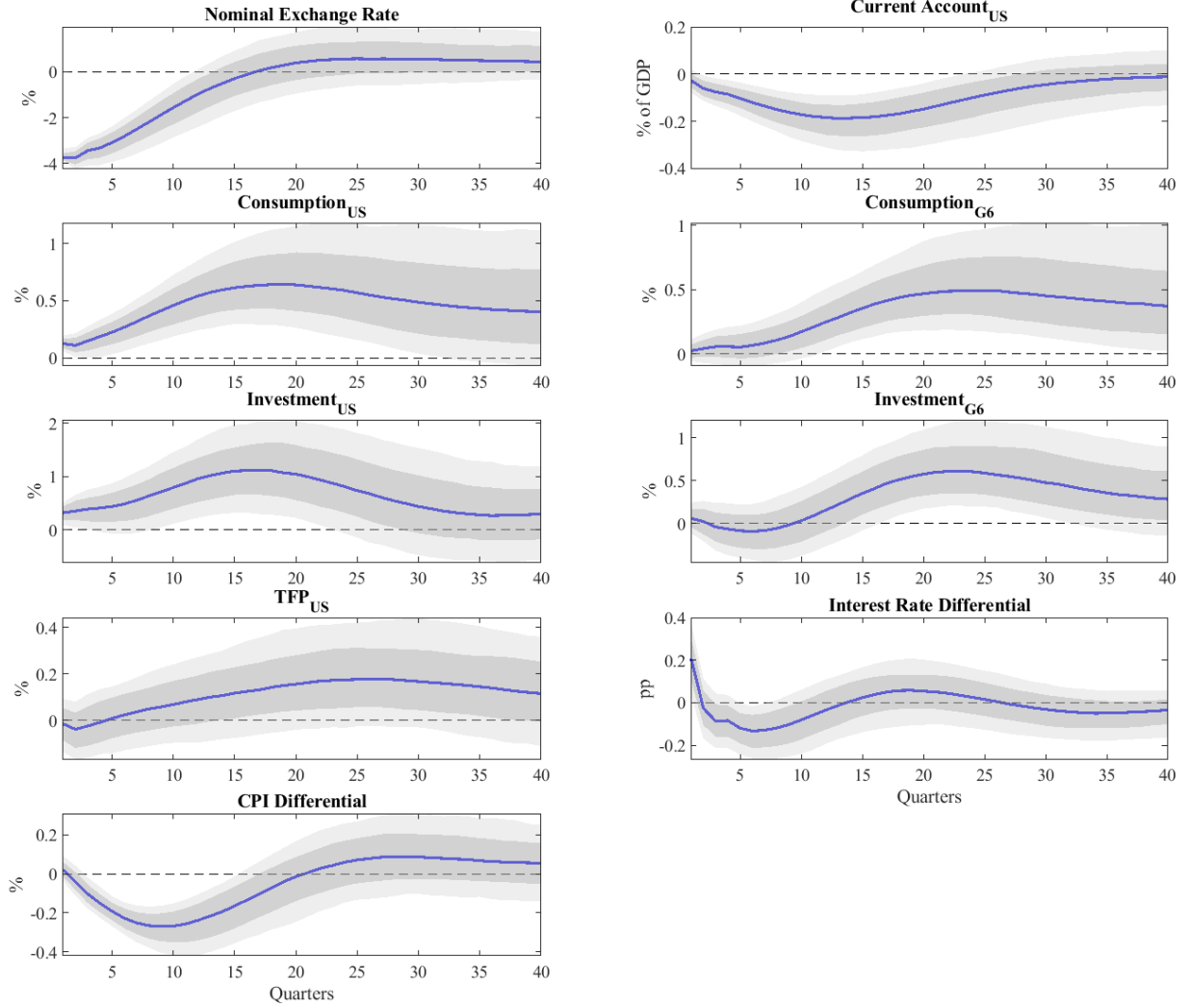
applies to variable  $y$  and the row itself (see Angeletos et al., 2020 for more details). The column vector  $q$  that corresponds to the dominant shock is then the eigenvector associated with the largest eigenvalue of the matrix  $\Theta$  and can thus be identified without making assumptions on the matrix  $Q$ .

## 2.2 Dominant Exchange Rate Shock

Using our VAR system for seven (or six) variables, we first estimate the *dominant (or main) exchange rate shock* at business cycle frequency for the US. This serves as a test run of our choice of the VAR system in studying open macroeconomic questions. The dominant exchange rate shock for the US is characterized by an appreciation of the US dollar vis-à-vis G6 currencies, with a peak response of 4% on impact and reverting to its steady state after around four years (figure 1). The appreciated nominal exchange rate leads to a gradual decline in the current account. After 14 quarters the CA/GDP ratio has decreased by 0.2 percentage points and then slowly reverts back to its steady state. The shock gradually increases domestic consumption, investment and TFP. Chahrour et al. (2021) link this immediate appreciation to positive news about future fundamentals. Miyamoto et al. (2023) emphasize the shock's disconnect from macroeconomic aggregates when they compare it to a major business cycle shock which explains most of the variation in macroeconomic aggregates. The impact on consumption and investment (similarly to the current account) builds up only gradually, and when displayed as US vs. G6 consumption or investment differences, is small compared to the 4% appreciation.

Alternatively or complementary to the interpretation as a news shock, the shock could represent foreign financial inflows (e.g., foreign purchases of US dollars as FX reserves and treasury bonds as safe assets) which induce an exchange rate appreciation and lead to higher investment, consumption and imports in the US, as consumer prices decrease due to a substitution of domestic production with imports. On impact the shock explains less than 5% of the variation in the current account and its share increases to a maximum of close to 30% five years out (see figure B.1).

Figure 1: Impulse Responses to the Dominant Exchange Rate Shock



Notes: Point-wise median impulse responses to the dominant business cycle frequency exchange rate shock with 68% (dark gray) and 90% (light gray) highest posterior density credible sets based on 1000 draws. An increase in the nominal exchange rate is a depreciation. The interest rate and CPI differentials are expressed as US vs. G6. G6 countries include Canada, France, Germany, Italy, the UK and Japan.

### 2.3 Dominant Current Account Shocks

This section presents the structural impulse responses to the dominant drivers of the current account (CA), denoted as *dominant or main CA shocks*, for the US and the remaining G7 countries at business cycle frequency and over the long run. The dominant

business-cycle frequency CA shock for the US displays a distinct pattern compared to the dominant exchange rate shock analyzed in the last section and seems to be driven by a different set of economic forces. This is in line with the dominant exchange rate shock's explanatory share below 30% for the current account, especially over the first quarters.

Figure 2 displays the dominant CA shock at business cycle frequency estimated for US data. The shock induces a peak increase in the CA-to-GDP ratio by 0.25-0.3 percentage points over the first year. The CA slowly reverts to its steady state over a protracted period of four to five years. The nominal US dollar exchange rate vs. G6 economies remains muted on impact but displays a persistent appreciation after one year and peaks at -1% after 15 quarters.<sup>6</sup> The shock is characterized by a short-lived decline in domestic consumption and investment for around 2 years accompanied by a worsening of TFP. After 3-4 years the investment response turns positive with a peak increase of 0.5% after 20 quarters. The G6 agglomerate consumption slightly increases on impact, while G6 investment decreases for several quarters. The CPI differential displays no discernible effect which might result from the rather similar domestic and foreign investment responses. The interest rate differential tends to rise over the medium term.<sup>7</sup> Overall, this short-lived recessionary shock, followed by a boom in investment that coincides with an exchange rate appreciation, speaks against the role of exchange-rate induced expenditure switching in driving CA variations at business cycle frequencies.

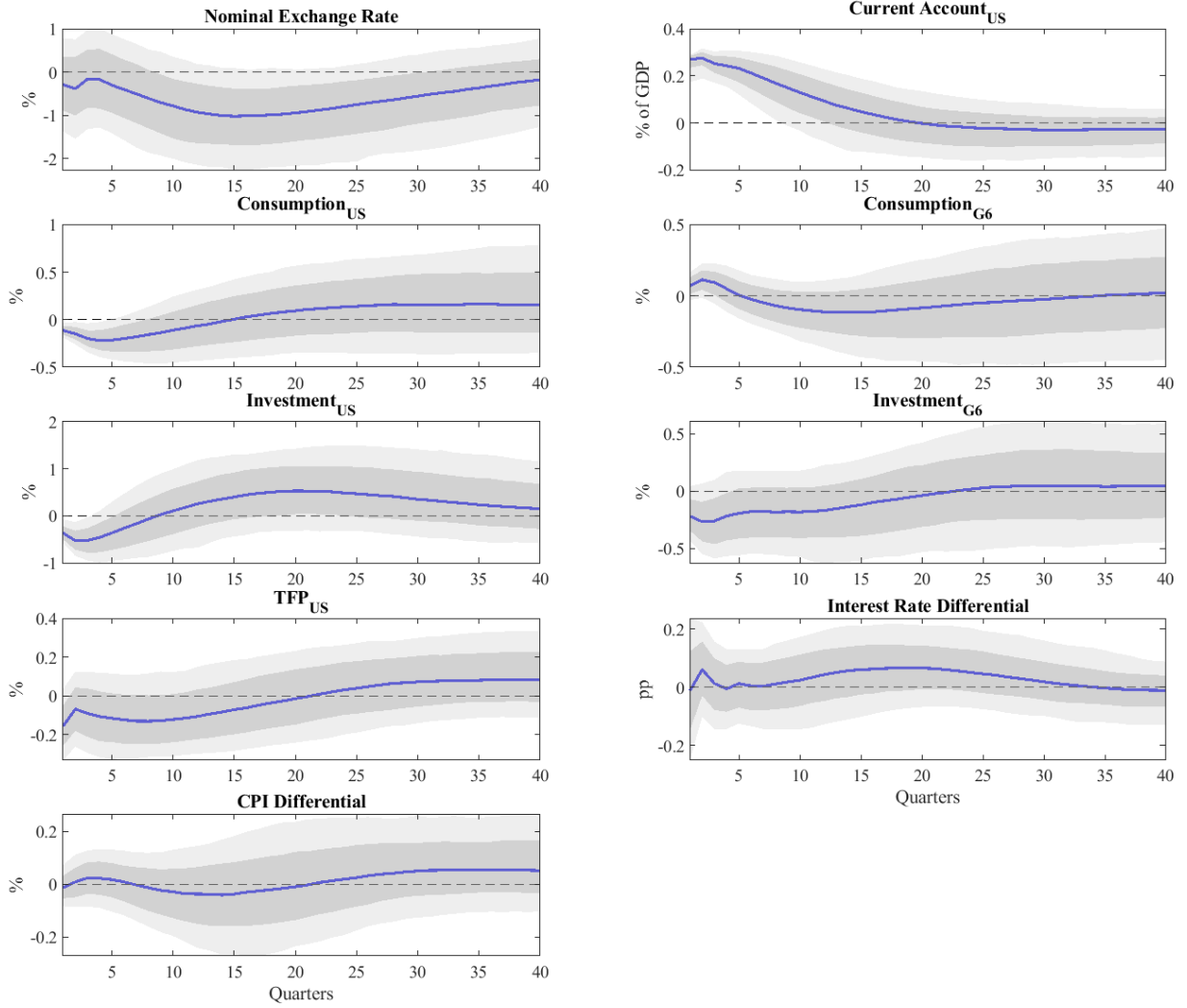
The shock explains around 80% of the volatility in the CA-to-GDP ratio for the first 4 quarters. Then the share drops to around 30% after 20 quarters where it remains (see the forecast error variance decomposition in Figure B.2). The explained share of the nominal exchange rate volatility is close to 0 on impact and rises above 10% several quarters out while the shock explains less than 10% at all horizons of the remaining macroeconomic variables.

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<sup>6</sup>The real exchange rate behaves nearly identically (see figure B.4).

<sup>7</sup>Replacing the interest rate differential with the US interest rate level we observe a slight decrease for 2 to 3 years. The US federal funds rate, instead, displays no change over the first three years.

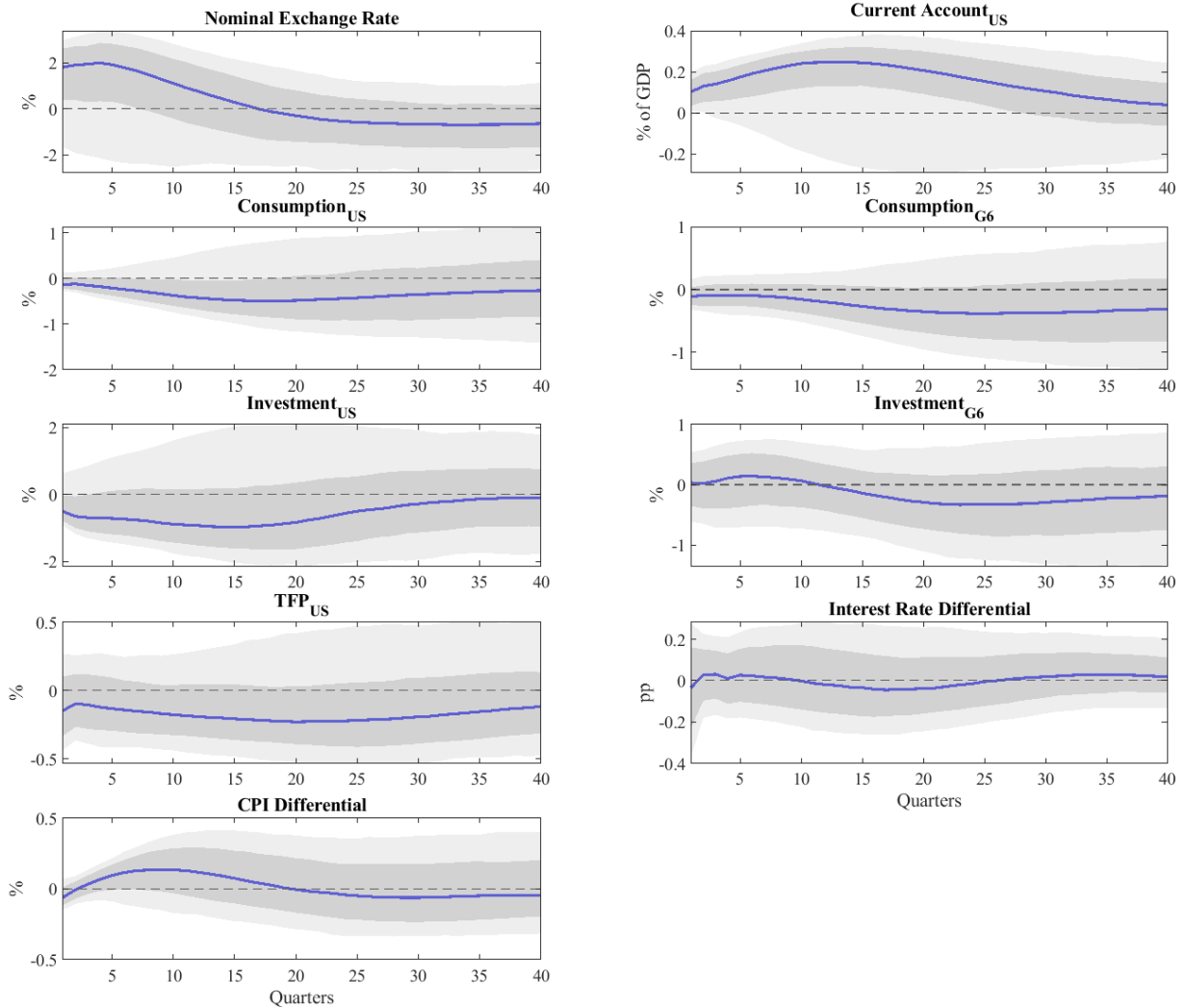
Figure 2: Impulse Responses to the Dominant Current Account Shock



Notes: Point-wise median impulse responses to the dominant business cycle frequency CA (current account) shock with 68% (dark gray) and 90% (light gray) highest posterior density credible sets based on 1000 draws. An increase in the nominal exchange rate is a depreciation. The interest rate and CPI differentials are expressed as US vs. G6. G6 countries include Canada, France, Germany, Italy, Japan and the UK.

Turning to the dominant long-run CA shock's impulse responses in Figure 3, we observe a protracted increase in the CA with a peak response after 10-15 quarters before slowly tapering off. Consumption, investment, and TFP drop on impact and remain persistently depressed for several years, though with low statistical significance. Relative US prices

Figure 3: Impulse Responses to the Dominant Long Run CA Shock



Notes: Point-wise median impulse responses to the dominant long run CA (current account) shock with 68% (dark gray) and 90% (light gray) highest posterior density credible sets based on 1000 draws. An increase in the nominal exchange rate is a depreciation. The interest rate and CPI differentials are expressed as US vs. G6. G6 countries include Canada, France, Germany, Italy, Japan and the UK.

increase somewhat while the interest rate differential shows no discernible response. In a strong contrast to the CA-exchange rate relationship for the short-run dominant CA shock, the nominal exchange rate depreciates strongly by around 2% remaining depreciated for 3-4 years, implying a clear role of expenditure-switching for the long-run fluctuations in the CA. The shock explains around two-thirds of the forecast error variance of the CA-to-GDP ratio several years out (see Figure B.3). In contrast to the dominant driver at business-cycle frequency, the dominant long-run CA shock explains a larger share of the nominal exchange rate volatility: around 20-35% for the 10-year horizon.

### 2.3.1 Other Country Results

We run separate VARs for the remaining G7 countries relying on the same identification strategy. For these countries, we do not have data on TFP for the sample 1975:Q1-2022Q3 and estimate the baseline VAR without TFP. In an extension we include the utilization-adjusted TFP measures from Schmidt et al. (2021a) for France, Germany, Italy and the UK at the cost of a significantly shorter horizon 1991Q1 - 2019Q4 and from Cao (2021) for Canada for the horizon 1976:Q1 - 2018:Q3.

Figure 4 displays the median impulse responses after the dominant CA shocks at business cycle frequency for each G7 economy. The shocks drive up the CA-to-GDP ratio by an average of around 0.5% on impact reverting back to zero over a horizon of 2 years for Italy and more than 5 years for Germany. The shocks induce nominal exchange rate appreciations for each country already on impact and for several years except for France where the exchange rate response remains close to zero and appreciates only slightly after several quarters.

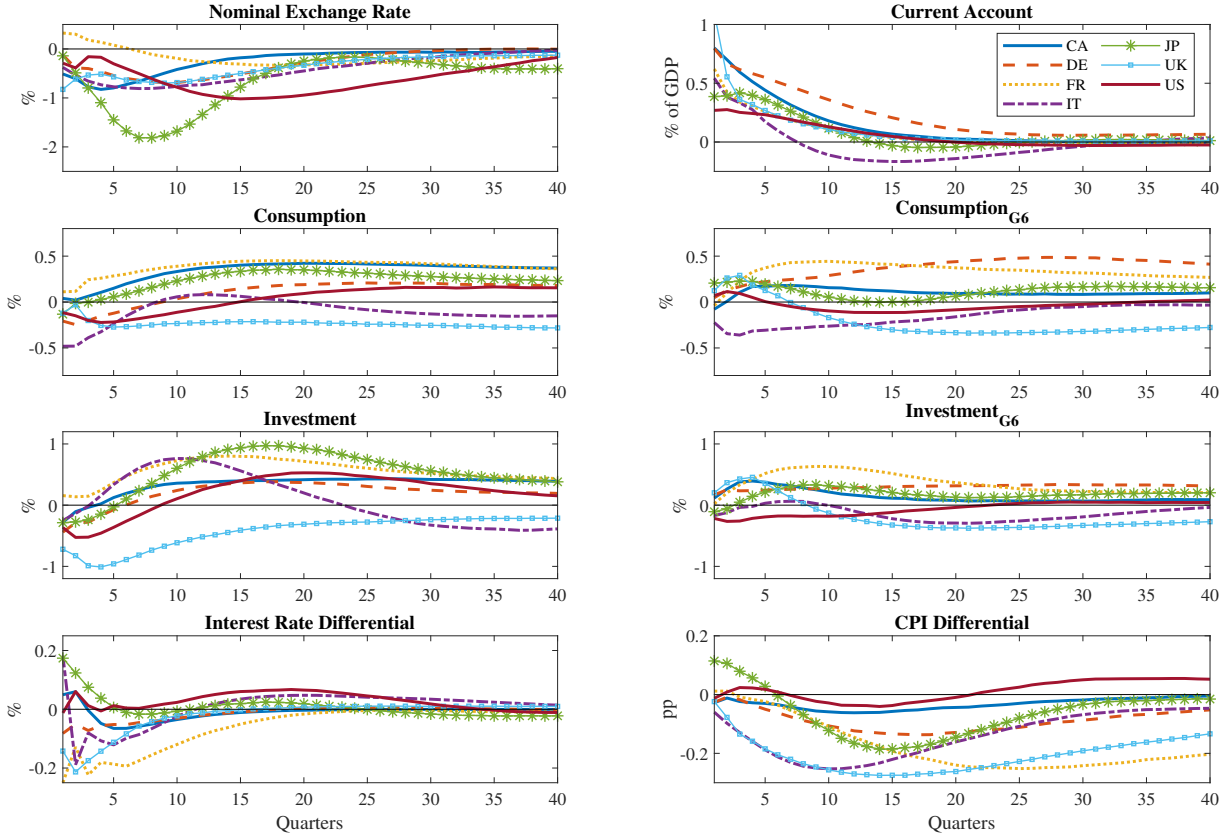
All countries but the UK experience a delayed increase in investment. The CPI differential displays an immediate or delayed decrease for all. Consumption mostly increases after several quarters while the interest rate differential and foreign consumption and investment show less common responses.<sup>8</sup>

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<sup>8</sup>Figure B.32 in the online-appendix displays impulse responses for the dominant long-run CA shocks of all G7 countries which are more inconclusive and display a positive correlation between the CA and



Figure 4: Impulse Responses to the Dominant CA Shocks for G7 Countries



Notes: Point-wise median impulse responses to the dominant business cycle frequency CA (current account) shock for all G7 countries. An increase in the nominal exchange rate is a depreciation. The interest rate and CPI differentials are expressed as individual country vs. G7 excluding the individual country. G7 countries include Canada, France, Germany, Italy, Japan, the UK and the US.

Note that we would not necessarily expect the dominant current account shock to display the exact same types of characteristics across different countries. The seven economies we have analyzed here have quite different historical patterns in their current account balances which can be due to different economic policies (e.g., social systems, trade policies, or tax systems), structural characteristics (e.g., demographics or being part of a currency union) and the exposure to different economic and financial shocks over time.

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the exchange rate, i.e., evidence of expenditure switching, only for the US, Canada, Germany and Japan.

## 2.4 Robustness

Our findings for the dominant business cycle CA shock in the US are robust to exchanging the nominal exchange rate vs. G6 currencies with the real exchange rate vs. G6 countries and with the nominal effective exchange rate (see Figures B.5 and B.4). Results are robust to ending the sample in 2019:Q4 (Figure B.13, weighing down the Covid observations following Lenza and Primiceri (2022) (Figure B.15) or increasing the lag length to 8 quarters (Figure B.16). We also report results ending the sample before the Great Recession in 2007:Q4 for which the error bands become very wide but the negative correlation over the first few quarters between the nominal exchange rate and the current account remains intact (Figure B.13). Moreover, we show additional responses for exports and imports (Figure B.19), the exports-to-imports ratio (Figure B.9, replacing CPI and interest rate differentials with the US variables (Figure B.10), adding the federal funds rate (Figure B.11) and adding the fiscal balance (Figure B.12). We also show that the dominant CA business cycle shock is a mixture of the two dominant shocks to its components: a dominant net exports shock (Figure B.17) and a dominant income balance shock (Figure B.18) which are both rather similar to the dominant CA shock. In contrast, a dominant shock to the exports-to-imports ratio induces a positive correlation between the exchange rate and the exports-to-imports ratio (figure B.19). A more conventional main business cycle shock—which explains most of the variation in domestic consumption—shares the recessionary similarities on impact with the dominant CA shock (Figure B.20), but displays more protracted downswings in consumption and investment. The exchange rate response is muted and the shock explains merely a maximum of 10% of the current account after two years.

Results for the long-run dominant CA shock are qualitatively robust to using the real exchange rate and the nominal effective exchange rate (see Figures B.6 and B.7).

### 3 Model and Estimation

This section tries to interpret the empirical dominant CA shock at business-cycle frequency through the lens of a structural open-economy macro model. We resort to a Dynamic Stochastic General Equilibrium (DSGE) model with standard New Keynesian features and investigate which structural shocks resemble the dominant CA shock. The model encompasses eight shocks related to domestic fundamentals, international fundamentals, and the international financial landscape. Estimating the model on US data, international shocks to relative demand for domestic goods and assets stand out as the primary drivers of the current account, explaining over 80 and 10 percent of its variation, respectively.

#### 3.1 Key Model Elements

We adapt the open economy model with international financial market frictions of Itskhoki and Mukhin (2021). While the model has addressed a series of exchange rate puzzles through a capital flow shock (i.e., an external financial shock), the correlation between the exchange rate and current account balance is close to one, far exceeding the data.<sup>9</sup> We thus enhance the model by incorporating three additional shocks considered in the open-macro literature.

In addition to shocks related to TFP, monetary policy, and capital flows, we include domestic and foreign aggregate demand shocks and a shock to relative demand between home and foreign goods. The aggregate demand shocks are textbook-style subjective discount factor shocks (Galí, 2015) and the relative demand shock alters the weight of home goods in foreign households' consumption basket, similar to the preference shocks advocated in Stockman and Tesar (1995) and Pavlova and Rigobon (2007).<sup>10</sup> These shocks help decrease the current account-exchange rate correlation in the model and are found to

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<sup>9</sup>Using quarterly data on the nominal exchange rate vs. G6 countries and the current account to GDP ratio as used in section 2, the contemporaneous correlation is around 60% for the US, 3% for Germany and -68% for the UK.

<sup>10</sup>In a closed-economy context, Fornaro and Romei (2023) studies a similarly specified demand reallocation shock.

be highly correlated with the dominant CA shock estimated in the previous section.

Since we are resorting to a standard model by choice, most of the subsections that follow are well-known and included for a self-contained reference. They can be skipped by informed readers, with the exception of 3.1.1 and 3.1.6 that contains less standard information.

### 3.1.1 Households

The economy is populated by a unit continuum of identical households. The representative household seeks to maximize the objective function:

$$E_0 \sum_{t=0}^{\infty} \beta^t \left( \frac{C_t^{1-\sigma} - 1}{1-\sigma} - \frac{N_t^{1+\varphi}}{1+\varphi} \right) e^{\Omega_t} \quad \text{for } \sigma > 0 \quad (5)$$

where  $C_t$  is final goods consumption,  $N_t$  denotes hours worked, and  $\Omega_t$  is an exogenous preference shifter. Consumption  $C_t$  is a CES aggregator of home and foreign goods,

$$C_t = \left( \int_0^1 [(1-\gamma)^{1/\theta} C_{Ht}(i)^{(\theta-1)/\theta} + \gamma^{1/\theta} C_{Ft}(i)^{(\theta-1)/\theta}] di \right)^{\theta/(\theta-1)},$$

where  $C_{Ht}$  and  $C_{Ft}$  denote the home and foreign goods, respectively, with the elasticity of substitution among goods  $\theta$ . The parameter  $\gamma$  reflects the weight of foreign goods in the home basket, which is less than 0.5. Hence, households' preferences display a home bias for domestically produced goods.

The preference shifter  $\Omega_t$  in equation (5) evolves as an AR(1) process,

$$\Omega_t = \rho_{\Omega} \Omega_{t-1} + \epsilon_{\Omega,t}, \quad \epsilon_{\Omega,t} \sim iid(0, \sigma_{\Omega}^2), \quad (6)$$

where  $\epsilon_{\Omega,t}$  denotes a domestic aggregate demand shock.

Foreign households have a utility structure analogous to domestic households with the same discount factor  $\beta$  and relative risk-aversion  $\sigma$ . They are subject to an aggregate demand shifter  $\Omega_t^*$ , which also follows an AR(1) process similar to  $\Omega_t$ , though their

auto-correlation and shock variance can differ. We assume shocks to aggregate demand shifters are positively correlated between the two countries. Like home households, foreign households' final consumption is defined as

$$C_t^* = \left( \int_0^1 \left[ \gamma_t^{*1/\theta} C_{Ht}^*(i)^{(\theta-1)/\theta} + (1 - \gamma_t^*)^{1/\theta} C_{Ft}^*(i)^{(\theta-1)/\theta} \right] di \right)^{\theta/(\theta-1)}$$

They exhibit a time-varying consumption home bias,  $\gamma_t^* < 0.5$ , towards their domestically produced goods,  $C_{Ft}^*$ . The home bias of foreign households,  $\gamma_t^*$ , evolves stochastically as

$$\gamma_t^* - \gamma = \rho_{\gamma^*}(\gamma_{t-1}^* - \gamma) + \epsilon_{\gamma^*,t}$$

where  $\gamma$  is its ergodic mean, the same as the home bias of home households. The parameter  $\rho_{\gamma^*}$  is the auto-correlation of  $\gamma^*$ . The innovation term  $\epsilon_{\gamma^*,t}$  is called a relative demand shock.<sup>11</sup>

### 3.1.2 International Funds Intermediation

International capital markets are segmented as in Itskhoki and Mukhin (2021) and Gabaix and Maggiori (2015). Home and foreign households can only trade bonds denominated in their own currencies with international financiers and noise traders. The modified uncovered interest rate parity (UIP) condition, derived from the market clearing condition of local currency bonds, is

$$i_t - i_t^* - E_t \Delta e_{t+1} = \psi_t - \chi b_t \tag{7}$$

where  $i_t$  and  $i_t^*$  represent the domestic and foreign nominal interest rates, respectively, and  $E_t \Delta e_{t+1} = E_t[\log(\mathcal{E}_{t+1}) - \log(\mathcal{E}_t)]$  denotes the expected depreciation of the nominal exchange rate. The nominal exchange rate  $\mathcal{E}_t$  represents the amount of local currency required to purchase one unit of foreign currency (an increased  $\mathcal{E}_t$  indicates a home currency

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<sup>11</sup>Being a shock to relative demand, this can be introduced either of  $\gamma$  or  $\gamma^*$ .

depreciation). On the right-hand side,  $\psi_t$  represents the effect of noise traders' demand for foreign currency bonds (financed by issuing home currency bonds) on the UIP premium, which follows an exogenous AR(1) process:

$$\psi_t = \rho_\psi \psi_{t-1} + \epsilon_{\psi,t}, \quad \epsilon_{\psi,t} \sim iid(0, \sigma_\psi^2)$$

We call the innovation term  $\epsilon_{\psi,t}$  a capital flow shock. Another driver of the UIP premium is the risk premium ( $-\chi b_t$ ) that domestic residents need to pay risk-averse international financiers to hold their net external liability  $-b_t$ .

### 3.1.3 Production

Firms' production of domestic output is based on a Cobb-Douglas technology that involves labor  $L_t$ , capital  $K_t$ , and intermediate inputs  $X_t$ :

$$Y_t = (e^{a_t} K_t^\vartheta L_t^{1-\vartheta})^{1-\phi} X_t^\phi \tag{8}$$

where  $\vartheta$  is the elasticity of substitution between capital and labor, and  $\phi$  is the elasticity of substitution between "value added" and intermediates.

Productivity ( $e^{a_t}$ ) follows an AR(1) process in logs,

$$a_t = \rho_a a_{t-1} + \epsilon_{a,t}, \quad \epsilon_{a,t} \sim iid(0, \sigma_a^2), \tag{9}$$

where  $\epsilon_{a,t}$  is the TFP shock.

Foreign firms have a production function of the same form with equal shares of capital, labor, and intermediate goods. Their TFP process follows an AR(1) process similar to equation (9), with home and foreign TFP shocks positively correlated.

### 3.1.4 Price Setting

Both domestic and foreign goods markets are characterized by monopolistic competition. Each domestic firm  $i$  maximizes its expected discounted sum of profits,

$$\mathbb{E}_0 \sum_{t=0}^{\infty} \Theta_t \Pi_t(i), \quad \text{with} \quad \Pi_t(i) = (P_{Ht}(i) - MC_t) Y_{Ht}(i) + (P_{Ht}^*(i) \mathcal{E}_t - MC_t) Y_{Ht}^*(i),$$

where  $\Theta_t \equiv \beta^t \frac{C_t^{-\sigma}}{P_t}$  represents the nominal stochastic discount factor in which  $P_t$  is the final consumption goods price in home currency,  $P_{Ht}(i)$  and  $P_{Ht}^*(i)$  are the home-made goods prices in home and foreign currencies (of variety  $i$ ), respectively, and  $MC_t$  is the nominal marginal cost of production, common to all domestic firms. Following Calvo pricing, a firm has a probability  $(1 - \lambda_p)$  of being able to adjust its prices. The log-linearized New Keynesian Phillips Curve (NKPC) for domestically sold goods is derived as:

$$\pi_{Ht} = \kappa_p (mc_t - p_{Ht}) + \beta E_t \pi_{Ht+1}, \quad (10)$$

where  $mc_t$  is the real marginal cost of one unit of home goods, and  $p_{Ht}$  is the relative price of home goods to home final goods, both expressed in log deviations from their steady-state values. The slope parameter  $\kappa_p \equiv \frac{(1-\beta\lambda_p)(1-\lambda_p)}{\lambda_p}$  captures the sensitivity of the aggregate price to the marginal cost.

The NKPC for home exports depends also on the price-setting regime. For the US, whose currency is the invoicing currency for its exports, we assume a producer-currency-pricing regime (PCP). The NKPC is given by

$$\pi_{Ht}^* + \Delta e_t = \kappa_p (mc_t - q_t - p_{Ht}^*) + \beta E_t (\pi_{Ht+1}^* + \Delta e_{t+1}), \quad (11)$$

where  $q_t$  is the domestic real exchange rate in log deviations, with a higher  $q_t$  denoting a depreciation, and  $p_{Ht}^*$  is the relative price of home goods to the foreign consumption basket.

Under local currency pricing (LCP) which is assumed for non-US firms the NKPC is given by

$$\pi_{Ht}^* = \kappa_p (mc_t - q_t - p_{Ht}^*) + \beta E_t(\pi_{Ht+1}^*). \quad (12)$$

### 3.1.5 Monetary Policy

We assume that central banks in both home and foreign countries adopt an inflation-targeting monetary policy regime. The home monetary authority adjusts the nominal interest rate  $i_t$  according to the following Taylor-type rule:

$$i_t = \rho_m i_{t-1} + (1 - \rho_m)(\phi_\pi \pi_t + \phi_y y_t) + v_t. \quad (13)$$

Here,  $\rho_m$  is the interest rate smoothing parameter,  $\phi_\pi$  is the coefficient for the CPI inflation rate  $\pi_t$ , and  $\phi_y$  is the coefficient for detrended output  $y_t$ . An exogenous monetary policy shock  $v_t$  evolves according to the AR(1) process:

$$v_t = \rho_v v_{t-1} + \epsilon_{v,t}, \quad \epsilon_{v,t} \sim iid(0, \sigma_v^2). \quad (14)$$

A positive realization of  $\epsilon_{v,t}$  represents a contractionary monetary policy shock.

The foreign country has a similar monetary policy regime, with parameters regarding the policy rule and monetary policy shocks that are not necessarily the same as the home country's. Again, we allow for a positive correlation between home and foreign monetary policy shocks.

### 3.1.6 Current Account Decomposition

Consider net exports at period  $t$ , which are defined by

$$NX_t \equiv \mathcal{E}_t P_{Ht}^* Y_{Ht}^* - P_{Ft} Y_{Ft}.$$



If we linearize the model around a steady state with a zero net foreign asset position for the home country, the current account balance equals the net export value.<sup>12</sup>

Denote normalized net exports by  $nx_t = \frac{NX_t}{GDP_t}$ <sup>13</sup>, the foreign demand for home goods by  $y_{Ht}^*$ , the domestic demand for foreign goods by  $y_{Ft}$ , and the terms of trade by  $s_t = p_{Ft} - q_t - p_{Ht}^*$ .<sup>14</sup> With these notations, net exports can be expressed as

$$nx_t = \frac{\gamma}{1 - \phi} (y_{Ht}^* - y_{Ft} - s_t). \quad (15)$$

Denote the domestic aggregate expenditure by  $AE_t \equiv C_t + X_t + Z_t$  and the foreign aggregate expenditure by  $AE_t^* \equiv C_t^* + X_t^* + Z_t^*$  (where  $Z$  and  $Z^*$  denote domestic and foreign investment). When the home bias difference is  $\hat{\gamma}_t^* = \frac{\gamma_t^* - \gamma}{\gamma}$ , equation (15) can be expressed as

$$nx_t = \frac{\gamma}{1 - \phi} \left( \underbrace{(\epsilon - 1)s_t + \epsilon q_t}_{\text{expenditure switching}} + \underbrace{\log\left(\frac{AE_t^*}{AE_t}\right) + \hat{\gamma}_t^*}_{\text{expenditure changing}} \right) \quad (16)$$

Equation (16) decomposes the current account dynamics into two primary channels: expenditure switching and expenditure changing. The first two terms on the right-hand side encapsulate the expenditure switching effect. Under  $\epsilon > 1$ , a deterioration in the terms of trade (a higher  $s_t$ ) or a depreciated real exchange rate (a higher  $q_t$ ) would, all else equal, increase the current account balance (larger surplus or smaller deficit). The last two terms embody the expenditure-changing effect, suggesting that an increase in foreign aggregate expenditure relative to domestic aggregate expenditure or a larger share of home-produced goods demanded (in the basket of foreign final goods) results in a higher current account for the home economy.

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<sup>12</sup>For many countries, net exports are the main driver of the current account with the income balance being small. For example, the empirical correlation between the current account balance and net exports, based on quarterly data since 1975, is 97%, 96% and 81% for the US, Germany and the UK, respectively.

<sup>13</sup>It is noteworthy that the economy's output  $Y_t$  is not equal to its GDP in our model due to expenditures on intermediate goods.

<sup>14</sup>Excluding net exports and net foreign assets, lowercase variables indicate log deviations from their steady-state values.

Equation (16) is a relationship among endogenous variables that are affected by various shocks, reflecting the complex and intertwined sources of current account dynamics. In terms of the expenditure switching channel,  $q_t$  is sensitive to the capital flow shock, and the terms of trade  $s_t$  can be affected by the TFP shock (via marginal costs), the monetary policy shock (via the nominal exchange rate and marginal costs), the capital flow shock (via the nominal exchange rate), domestic and foreign demand shocks (via marginal costs), and the relative demand shock (via marginal costs). Regarding the expenditure-changing effect, TFP, aggregate demand, monetary policy, and relative demand shocks all affect the demand for home versus foreign goods on the international goods market. In order to identify the contribution of each shock to variations in the current account, we turn to econometric estimation of the model.

## 3.2 Estimation

This section conducts a Bayesian analysis of the model to explore major determinants (i.e., structural shocks) of current account dynamics. We first discuss several parameters that are calibrated and then the rest that are estimated by Bayesian methods.

### 3.2.1 Calibrated Parameters

Table 1 shows the parameters kept fixed during the estimation process. We set the subjective discount factor at 0.99 and the demand elasticity between home and foreign goods at 1.5. The macro Frisch elasticity, denoted as  $\frac{1}{\varphi}$ , is set at 1. The proportion of intermediate goods,  $\phi$ , is 0.5, while the capital's share in the effective labor-capital combination,  $\vartheta$ , is 0.3. The probability that firms cannot adjust their prices, denoted by  $\lambda_p$ , is 0.75. These parameters reflect widely accepted values in the international macroeconomics literature. Furthermore, we set the depreciation rate,  $\delta$ , at 0.05, slightly above its conventional value. While a lower value of  $\delta = 0.02$  would align with the empirical investment-to-GDP ratio, it would overstate the consumption share in GDP and result in overly volatile investment.

Table 1: Calibrated Parameters for Estimation

Parameter	Symbol	Value	Source
Subjective discount factor	$\beta$	0.99	Conventional value
Demand elasticity between home and foreign goods	$\theta$	1.5	Feenstra et al. (2018)
Macro Frisch elasticity	$\varphi^{-1}$	1	Conventional value
Share of intermediate goods	$\phi$	0.5	Conventional value
Capital share in the effective labor-capital combination	$\vartheta$	0.3	Conventional value
Depreciation rate	$\delta$	0.05	Conventional value
Calvo probability for prices	$\lambda_p$	0.75	Conventional value

### 3.2.2 Prior Distributions of the Estimated Parameters

The remaining parameters, mostly concerning the exogenous shock processes, are estimated using Bayesian techniques. We utilize the beta distribution for parameters that are bounded between 0 and 1, including all autoregressive coefficients, the interest rate smoothness  $\rho_m$  and  $\rho_m^*$ , correlations between identical types of shocks across the two countries, and the strength of home bias in consumption,  $1 - \gamma$ . The prior mean is 0.6 for all autoregressive coefficients and 0.3 for the cross-country shock correlations. We apply the inverse gamma distribution with all prior means set at 0.01 for standard deviations of the shocks. Finally, the normal distribution is employed for unbounded parameters, with prior means adhering to conventional values in the literature. Table 2 shows priors and posterior estimates. We use identical priors for all G7 countries.

### 3.2.3 Estimation Results

To estimate our model with eight exogenous shocks, we select eight observables for matching, in line with our VAR specification: the current account  $\Delta nx_t$ , the nominal exchange rate  $\Delta e_t$ , domestic CPI inflation  $\pi_t$ , foreign CPI inflation  $\pi_t^*$ , domestic consumption  $c_t$  (log-deviation), foreign consumption  $c_t^*$  (log-deviation), domestic nominal interest rate  $i_t$ , and foreign nominal interest rate  $i_t^*$ .<sup>15</sup> We report the main estimation results for the US

<sup>15</sup>In Bayesian estimation, a model cannot be estimated with fewer shocks than observables, as this leads to stochastic singularity (Pfeifer, 2014). Many influential studies in the literature employ an equal number of shocks and observables (Rabanal and Rubio-Ramírez, 2005; Smets and Wouters, 2007). However, it is not unusual to have more shocks than observables (Ireland, 2004; Schmitt-Grohé and Uribe, 2012).

in Table 2 and other G7 countries in the online-appendix Table C.5.

Table 2: Parameters Estimation

Parameters	Prior Mean	Post. Mean	Mode	90% HPD Interval	Prior	Prior stdev
$\gamma$	0.07	0.0086	0.0088	[0.0067,0.0109]	Beta	0.02
$\kappa$	8.7	7.5907	7.517	[6.6445,8.4225]	Normal	0.5
$\phi_\pi$	1.5	1.3485	1.3653	[1.2063,1.5281]	Normal	0.1
$\phi_\pi^*$	1.5	1.5402	1.5422	[1.3788,1.6966]	Normal	0.1
$\phi_y$	0.5	0.4545	0.4526	[0.3649,0.5364]	Normal	0.05
$\phi_y^*$	0.5	0.4798	0.4774	[0.3990,0.5556]	Normal	0.05
$\chi_2$	0.001	0.0014	0.0016	[0.0002,0.0028]	Normal	0.001
$\rho_a$	0.6	0.6757	0.6662	[0.5517,0.7830]	Beta	0.1
$\rho_a^*$	0.6	0.6817	0.6804	[0.6047,0.7502]	Beta	0.1
$\rho_\psi$	0.6	0.7146	0.708	[0.6504,0.7743]	Beta	0.1
$\rho_m$	0.6	0.7606	0.75	[0.7007,0.7994]	Beta	0.1
$\rho_m^*$	0.6	0.7912	0.7837	[0.7407,0.8275]	Beta	0.1
$\rho_v$	0.6	0.1576	0.1733	[0.1055,0.2450]	Beta	0.1
$\rho_v^*$	0.6	0.2171	0.232	[0.1513,0.3135]	Beta	0.1
$\rho_\Omega$	0.6	0.7042	0.7032	[0.6311,0.7665]	Beta	0.1
$\rho_\Omega^*$	0.6	0.7084	0.7008	[0.6495,0.7569]	Beta	0.1
$\rho_{\gamma^*}$	0.6	0.8012	0.8045	[0.7431,0.8720]	Beta	0.1
$\sigma_a$	0.01	0.0191	0.0194	[0.0154,0.0228]	Inverse Gamma	Inf
$\sigma_a^*$	0.01	0.0129	0.013	[0.0112,0.0147]	Inverse Gamma	Inf
$\sigma_\psi$	0.01	0.0127	0.013	[0.0101,0.0157]	Inverse Gamma	Inf
$\sigma_v$	0.01	0.0054	0.0056	[0.0047,0.0065]	Inverse Gamma	Inf
$\sigma_v^*$	0.01	0.0033	0.0034	[0.0029,0.0038]	Inverse Gamma	Inf
$\sigma_\Omega$	0.01	0.02	0.0201	[0.0183,0.0220]	Inverse Gamma	Inf
$\sigma_\Omega^*$	0.01	0.0166	0.0167	[0.0151,0.0181]	Inverse Gamma	Inf
$\sigma_{\gamma^*}$	0.01	0.0016	0.0016	[0.0015,0.0017]	Inverse Gamma	Inf
$\rho_{a,a^*}$	0.3	0.3641	0.3619	[0.2700,0.4641]	Beta	0.1
$\rho_{v,v^*}$	0.3	0.2267	0.2333	[0.1341,0.3253]	Beta	0.1
$\rho_{\Omega,\Omega^*}$	0.3	0.3387	0.338	[0.2475,0.4350]	Beta	0.1

Note: The posterior distribution is obtained using the Metropolis-Hastings algorithm.

Among the parameters not directly related to shocks, the posterior mean for trade openness-related parameter,  $\gamma$ , is approximately 0.009, significantly below its prior mean of 0.07<sup>16</sup>. The 90% highest posterior density (HPD) interval for  $\gamma$  is narrow, ranging from 0.0067 to 0.0109. This suggests that the low estimate of  $\gamma$  is data-driven, considering

<sup>16</sup>The prior mean of 0.07 is the calibrated value of  $\gamma$  in Itskhoki and Mukhin (2021), which is an attempt to match U.S. trade openness.

the discrepancy with the prior mean. Regarding the Taylor rule coefficients, the posterior mean of  $\phi_\pi$  and  $\phi_y$  for Home are about 1.35 and 0.45, respectively, lower than their prior mean of 1.5 and 0.5. Their foreign counterparts  $\phi_\pi^*$  and  $\phi_y^*$  are of similar values of 1.54 and 0.48, close to their prior mean. The capital adjustment cost coefficient,  $\kappa$ , is estimated at approximately 7.6, with its prior mean of 8.7 outside its 90% HPD interval. The interest rate smoothing parameters,  $\rho_m$  and  $\rho_m^*$ , are both around 0.8. Lastly, the estimate of  $\xi_2$  aligns well with its prior means, falling within the 90% HPD intervals.

Our estimation shows that shocks are generally less persistent than previously suggested in the literature. Specifically, monetary policy shocks display minimal persistence domestically and abroad, characterized by AR(1) coefficients near 0.2. This observation is consistent with some specifications incorporating an i.i.d. innovation term within the Taylor rule (13) (e.g., Galí and Rabanal, 2004). In contrast, other types of shocks exhibit notably higher persistence. The persistence of TFP shocks is identified at approximately 0.68 for each country. This value is close to the persistence found in non-tradable goods (0.63) and markedly surpasses that of tradable goods (0.15) in Stockman and Tesar (1995). Both capital flow and aggregated demand shocks demonstrate a persistence level of around 0.70. The relative demand shock stands out with the highest persistence of around 0.8. It is important to note that, aside from TFP shocks—which can be estimated using micro-level data—all other shock types are unobservable and necessitate estimation within the model.

The posterior standard deviations of the shock terms are not far from their priors, with narrow 90% HPD intervals. This supports the rationale for employing a first-order linearized model. Suppose we measure a shock’s volatility in terms of its log deviation from the steady state. In that case, the relative demand shock displays the largest volatility, around 19%. The estimated inter-country correlations for identical shock types range from 0.3 to 0.4, aligning with the calibrations for TFP and monetary policy shocks used in Itskhoki and Mukhin (2021) and other papers.

### 3.3 Model Fit

The unconditional moments of the model are quite close to the actual data, as can be seen in Table 3. The model accurately captures the observed volatility of the current account for all countries examined. However, it diverges slightly from actual domestic consumption data, with the degree of deviation varying across countries. Notably, the model demonstrates high accuracy for the US, UK, and Germany and relatively low accuracy for France, Canada, and Japan. Regarding foreign consumption, the US stands out as its model-implied foreign consumption volatility is very close to the empirical moment, while other countries see substantial discrepancies between the two. The model overestimates investment volatility across the G7, probably because investment dynamics are not a matching target in our estimation.<sup>17</sup>

The model closely approximates actual exchange rate volatility for the US but presents noticeable deviations for the UK, France, and Italy. The model matches CPI inflation rates well, with negligible differences for domestic inflation rates and slightly larger discrepancies for foreign inflation rates. It, however, forecasts higher volatility for both domestic and foreign interest rates, with the most pronounced overprediction for Italy.

Regarding the correlation coefficient between current account balances and exchange rate changes, our model significantly reduces the traditionally strong linkage between the two variables by incorporating relative demand shocks, which we will further discuss. Although some differences between the model-implied and actual data correlations exist for individual countries, they are within a tolerable range. This represents a considerable improvement over the high correlation of over 0.95 in the literature (see e.g., Itskhoki and Mukhin (2021) where all shocks induce an expenditure-switching effect). Still, our model tends to underpredict this correlation for the UK, Italy, and Canada, although with smaller margins of difference, while overestimating it for other countries.

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<sup>17</sup>The high investment volatility is not unique to our model; similar contrasts have been reported in other studies, including Stockman and Tesar (1995), which then incorporated a non-tradable goods sector to address this issue.

Table 3: Comparison of Model and Empirical Moments

	US		UK		DE		FR		IT		CA		JP	
	model	data	model	data	model	data	model	data	model	data	model	data	model	data
$std(\Delta nx_t)$	0.0034	0.0031	0.0125	0.0128	0.0083	0.0082	0.0074	0.0072	0.0077	0.0073	0.0091	0.0084	0.0051	0.0047
$std(\Delta e_t)$	0.0483	0.0411	0.0471	0.0353	0.0401	0.034	0.039	0.0285	0.0415	0.0293	0.0428	0.0377	0.0537	0.0516
$std(c_t)$	0.0125	0.011	0.0206	0.0199	0.0134	0.0124	0.0123	0.0101	0.0145	0.016	0.0166	0.0125	0.0127	0.0104
$std(c_t^*)$	0.0097	0.0098	0.0239	0.0306	0.0225	0.0286	0.0228	0.0293	0.0231	0.0297	0.0268	0.0351	0.0149	0.0183
$std(i_t)$	0.0072	0.0037	0.0059	0.0041	0.0036	0.0027	0.0085	0.006	0.0094	0.0065	0.0056	0.0038	0.005	0.0029
$std(i_t^*)$	0.005	0.0029	0.005	0.0027	0.0054	0.0029	0.0044	0.0027	0.0049	0.0026	0.005	0.0027	0.005	0.0029
$std(\pi_t)$	0.0051	0.0048	0.0076	0.0068	0.0048	0.0038	0.0045	0.004	0.0051	0.0042	0.0073	0.0069	0.005	0.0042
$std(\pi_t^*)$	0.0036	0.003	0.0058	0.0036	0.0058	0.0042	0.0058	0.0037	0.0056	0.0035	0.0063	0.0037	0.0044	0.0034
$std(z_t)$	0.0399	0.0353	0.1297	0.0403	0.0763	0.0304	0.0913	0.0243	0.0956	0.0306	0.1175	0.0383	0.081	0.0273
$std(z_t^*)$	0.0302	0.0224	0.1119	0.0368	0.1061	0.035	0.1079	0.0358	0.1059	0.0368	0.121	0.04	0.0806	0.0284
$\rho(\Delta nx_t, \Delta e_t)$	0.1716	0.155	-0.0684	0.1253	0.0561	0.0715	-0.019	-0.0713	-0.0159	0.0361	0.0543	0.1989	0.042	-0.0351

## 4 Which Shocks Matter

This section combines the SVAR and DSGE model results to analyze which structural shocks drive current account dynamics over the business cycle and are most closely associated with the (empirical) dominant CA shock. We begin with a forecast error variance decomposition (FEVD) on the basis of the estimated DSGE model to assess each shock’s contribution to current account variability. We also look into impulse responses of the shocks, primarily for the relative demand shock that comes out as the strongest CA driver in the FEVD. Next, we compare historical shocks obtained from the SVAR and the structural model estimation. Lastly, we apply the max-share identification to the model-simulated data, with simulations implemented for several combinations of underlying shocks.

### 4.1 Examining Structural Model Shocks

The left panel of Figure 5 illustrates the FEVD of current account dynamics  $\Delta nx_t$  for the US. Across all horizons, the relative demand shock (red bars) emerges as the predominant factor accounting for more than 80% of US current account variations. The capital flow shock (blue bars) contributes the second largest share of over 10 percent while all other shocks account for the small remaining part of the variation. This finding differs from the results presented in Itskhoki and Mukhin (2021) and Miyamoto et al. (2023), where the primary influence on exchange rate fluctuations, i.e., capital flow shocks or the main exchange rate shock, contribute more to current account fluctuations.

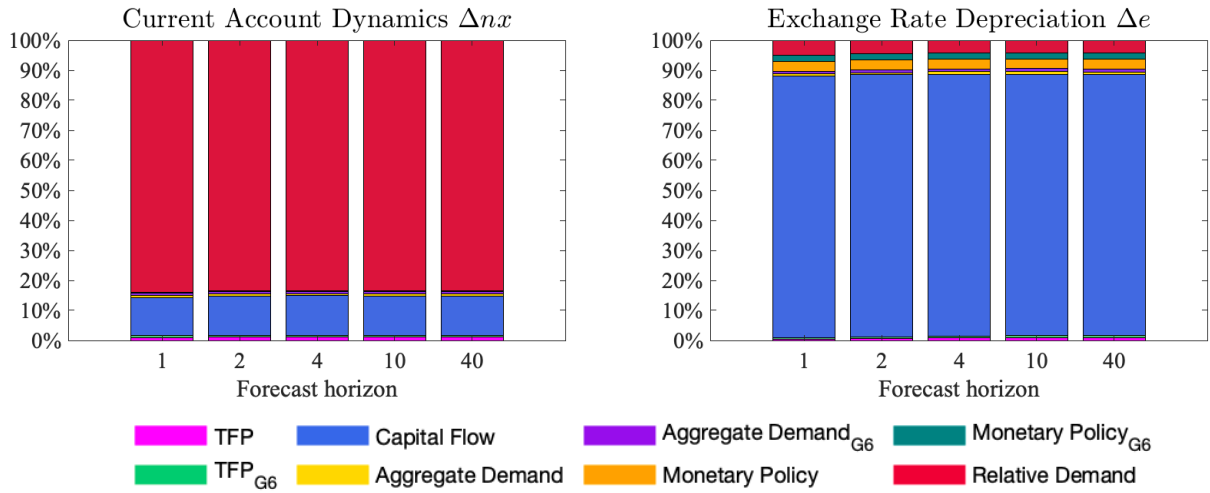
For comparison, the right panel of Figure 5 displays the FEVD of US nominal exchange rate fluctuations  $\Delta e_t$ . In line with Itskhoki and Mukhin (2021), capital flow shocks are identified as the dominant driver of the exchange rate across all horizons, corroborating the popular argument that short-term exchange rate movements often reflect fluctuations in international asset markets to a larger extent rather than macroeconomic factors. Together, relative demand and domestic and foreign monetary policy shocks account for



approximately 10% of the variance in nominal exchange rate fluctuations.

Figures C.1 and C.2 present the FEVD of  $\Delta nx_t$  and  $\Delta e_t$  for the other G7 countries. The relative demand shock accounts for the largest share of current account fluctuations by far, and the capital flow shock explains the bulk of exchange rate fluctuations. These findings suggest a considerable degree of similarity in the importance of relative demand shocks to current account dynamics.

Figure 5: Forecast Error Variance Decomposition: US



Impulse responses to different shocks indicate that the relative demand shock mimics the dominant CA shock over the business cycle closely, especially in the comovement of the current account and the exchange rate. Among the structural shocks analyzed (see the IRFs in the online-appendix section C.3), only relative demand and monetary policy shocks display a negative correlation between the exchange rate and the current account which characterizes the dominant CA shock at business-cycle frequency (see Figure 2). Between the two, monetary policy shocks bring about much shorter-lived effects on the current account than the relative demand shock (or the dominant CA shock).<sup>18</sup>

The relative demand shock, which increases the demand for domestic goods over foreign goods, improves the domestic current account balance and appreciates the real exchange

<sup>18</sup>Figure C.8 shows that monetary policy shocks affect the current account for around four quarters, much shorter than around 20 quarters for the dominant CA shock estimated from the SVAR (Figure 2).

rate (see figure C.10). The relative demand shock is expansionary to the home country as the overall demand for home goods increases. This pushes up domestic inflation as well as the nominal interest rate, leading to higher inflation and interest rate differentials in the short to medium term after the shock. Home consumption and investment decrease as home-made goods, the major component of home final goods, are temporarily shifted to the foreign country's use. The higher demand for home goods, i.e., larger  $\gamma^*$ , implies lower demand for foreign goods, which generates PPI disinflation in the foreign country (i.e.,  $\pi_{Ft}^* < 0$ ). Although import price inflation picks up,  $\pi_{Ht}^* > 0$ , the overall CPI inflation  $\pi_t^*$  decreases due to the larger share of foreign goods in the foreign consumption basket. Lower CPI inflation and lower detrended output ( $y_t^* < 0$ ) in the foreign country induce the foreign central bank to lower interest rates, leading foreign investment and consumption to increase.

## 4.2 Comparing Historical Shocks

We next compare the historical shocks that have been estimated from the SVAR and the DSGE model. To see which structural-model shock series most closely relates to the dominant CA shock series, we estimate the following regression separately for each country:

$$\text{dominant CA shock}_t = \sum_i \beta_i * \text{structural DSGE shock}_{i,t} + u_t.$$

The *dominant CA shock*<sub>t</sub> is the empirical dominant CA shock series uncovered by the max-share SVAR,<sup>19</sup> *structural DSGE shock*<sub>i,t</sub> are the Kalman-filtered smoothed shock series extracted from the estimated DSGE model, where *i* refers to eight structural shocks.

The regression results shown in Table 4 identify two structural shocks as critical contributors to the dominant CA shock: the capital flow shock and the relative demand shock, both displaying statistically significant coefficients across all G7 countries. A larger coefficient in magnitude indicates a larger contribution to the dominant CA shock. The relative

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<sup>19</sup>The historical dominant CA shock series can be retrieved by the method of Stock and Watson (2018).

demand shock exhibits the most sizable coefficient.<sup>20</sup>

In addition to capital flow and relative demand shocks, each G7 country has its particular shock combination as its main contributor to CA dynamics. For instance, the TFP shock is integral to the dominant CA shocks in the UK, France, Italy, and Canada, whereas the foreign TFP shock plays an integral role in the US, UK, Italy, and Canada. Such notable cross-country heterogeneity is also evident in aggregate demand and monetary policy shocks.

Table 4: Regression Results: Short-run Dominant CA Drivers

	US	UK	DE	FR	IT	CA	JP
TFP	0.014 (0.048)	0.041** (0.018)	0.022 (0.031)	0.058** (0.030)	-0.107** (0.052)	-0.075** (0.032)	0.025 (0.021)
TFP <sub>G6</sub>	0.113* (0.063)	-0.038* (0.022)	-0.050 (0.031)	0.008 (0.031)	-0.048 (0.037)	0.122*** (0.035)	-0.035 (0.025)
Capital Flow	0.278*** (0.063)	0.213*** (0.053)	0.191*** (0.071)	0.136* (0.077)	0.296*** (0.095)	0.246*** (0.066)	0.238*** (0.063)
Aggregate Demand	-0.038 (0.042)	-0.012 (0.017)	-0.034 (0.033)	-0.017 (0.032)	-0.064** (0.032)	0.004 (0.037)	-0.062** (0.031)
Aggregate Demand <sub>G6</sub>	0.050 (0.049)	0.032** (0.014)	0.035* (0.018)	0.009 (0.019)	0.030 (0.023)	-0.042 (0.028)	0.030** (0.015)
Monetary Policy	-0.170 (0.187)	-0.242* (0.137)	0.208 (0.418)	-0.081 (0.060)	0.163*** (0.057)	0.488** (0.244)	0.904*** (0.218)
Monetary Policy <sub>G6</sub>	-0.178 (0.227)	0.128 (0.229)	-0.155 (0.235)	-0.312 (0.346)	-0.182 (0.350)	-0.223 (0.231)	-0.744** (0.290)
Relative Demand	4.818*** (0.479)	1.394*** (0.101)	2.021*** (0.182)	2.507*** (0.199)	1.877*** (0.230)	3.277*** (0.289)	2.183*** (0.156)
$R^2$	0.726	0.874	0.783	0.803	0.712	0.791	0.843

Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. The sample is 1976Q1-2022Q3.

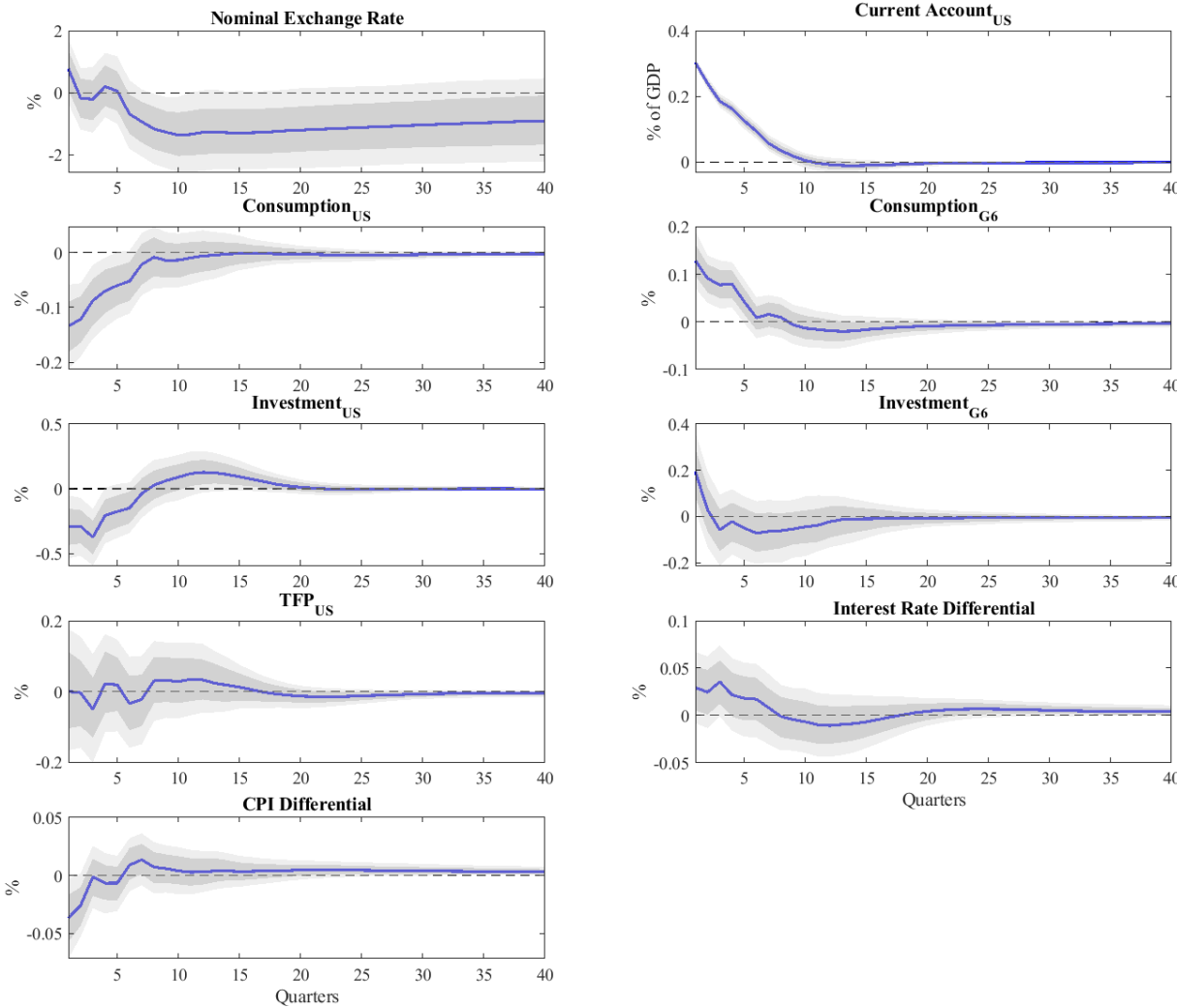
### 4.3 Max-Share SVAR on Model-Simulated Data

This subsection examines the role of the relative demand shock behind the dominant CA shock from yet another angle. We apply the max-share SVAR approach to estimate the dominant CA shocks from model-simulated data, which are generated—over 1,000

<sup>20</sup>The correlation between the dominant CA shock and the relative demand shock is 0.75 for the US. Figure B.39 in the online-appendix plots the SVAR and estimated model shock series.

periods—using different combinations of structural model shocks. We compare such model-based dominant CA shocks (under alternative sets of simulated data) with the empirical counterpart from section 2.3.

Figure 6: Impulse Responses to the Dominant CA Shock from Simulated Data



Notes: Point-wise median impulse responses to the dominant business cycle frequency exchange rate shock with 68% (dark gray) and 90% (light gray) highest posterior density credible sets based on 1000 draws. An increase in the nominal exchange rate is a depreciation.

Figure 6 illustrates the impulse responses of this 'simulated' dominant CA driver under all shocks, which has been estimated on simulated data that were generated allowing all

shocks to kick in. It reveals that the current account increases upon impact while domestic consumption and investment decrease, consistent with the empirical dominant CA driver estimated from the actual data. Foreign consumption also exhibits a short-term increase. The trajectory of TFP, initially declining before rising, albeit insignificantly, also aligns with the empirical counterpart. However, the nominal exchange rate initially depreciates over three quarters,<sup>21</sup> diverging from the empirical findings, while subsequently showing a persistent appreciation in line with the empirical dominant CA shock. These similarities complement the results of the previous section in pointing to the critical role of the relative demand shock behind the dominant CA shock, while some mismatches suggest room for future improvements in modeling.

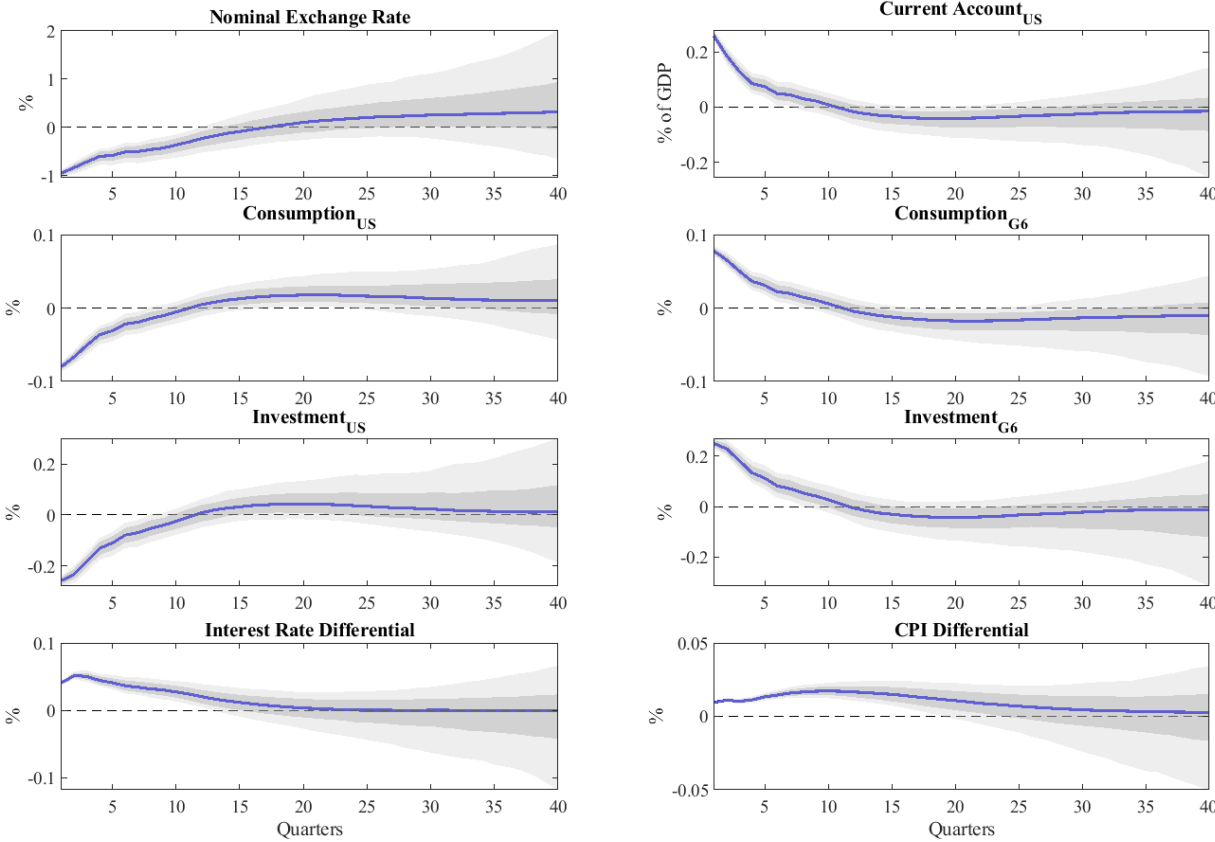
As a further corroboration, we simulate data from the estimated DSGE model when we only allow the relative demand shock, excluding all other shocks. We again apply the max-share SVAR to the simulated data. Figure 7 plots the IRFs of the simulated dominant CA shock. The dynamics of aggregate macroeconomic variables are qualitatively similar to those of the dominant CA shock based on the complete set of shocks and the nominal exchange appreciates immediately after the shock.

For contrast, we simulate the model excluding only the relative demand shock and present the IRFs of the simulated dominant CA shock thus obtained in Figure C.11 in the online-appendix. The simulated shock displays a significant expenditure switching in the short run, which contradicts the data and the full-shock model. In addition, consumption and investment display some irregular dynamics that have not been observed for the empirical dominant CA shock or the simulated shocks that were obtained using all shocks and only the relative demand shock.

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<sup>21</sup>The transitory exchange depreciation is mainly a result of a negative capital flow shock, which has been shown to be highly correlated with the dominant empirical CA shock in table 4.

Figure 7: Impulse Responses to the Dominant CA Shock from Simulated Data with only the Relative Demand Shock



Notes: Point-wise median impulse responses to the dominant business cycle frequency exchange rate shock with 68% (dark gray) and 90% (light gray) highest posterior density credible sets based on 1000 draws. An increase in the nominal exchange rate is a depreciation.

#### 4.4 Discussion

We find that for the US and other G7 countries, relative demand shocks play an important role in accounting for current account fluctuations at business cycle frequency. The dominant CA shock is characterized by an increase in the current account balance and an exchange rate appreciation, which implies a preference shift from foreign to domestic goods that can offset the expenditure switching effect from other underlying structural shocks such as capital flow shocks. Conventional aggregate shocks, be they demand or

supply, will work through the expenditure switching channel and thus do not induce the observed comovement generated by the dominant CA shock. The relative demand shock's importance is reminiscent of the thesis of Stockman and Tesar (1995) that taste shocks are needed to bring about data-consistent comovements between consumption and prices in open-economy real business cycle models.

The role of relative demand shocks seems to diminish in the long term, though with some heterogeneity. In the US case, the long-run dominant CA shock brings about an increase in the current account balance and exchange rate depreciation. This resurgence of the expenditure switching effect in the long run could be due to the low persistence of the relative demand shock, the lagged supply response to the relative demand shock that enables the expenditure switching channel to resurface, or the combination of both. The lagged supply response appears consistent with the recovery of investment over the medium term, even in response to the dominant CA shock at business cycle frequency.

## 5 Conclusion

Although current account imbalances frequently attract economic and political attention, their primary drivers remain elusive. This paper narrows this knowledge gap by empirically documenting the dominant CA shocks and comparing them with the shocks uncovered from an open-economy DSGE model, focusing on G7 economies.

We estimated the dominant CA shocks at business cycle frequency and over the long run using the max-share identification that places minimal restrictions on the data. Our findings contradict the belief that expenditure-switching effects dominate in the short term: associated with higher (smaller) current account surpluses (deficits), we often observe the real exchange rate appreciating or remaining relatively stable rather than depreciating. In addition, these dominant CA shocks are frequently associated with reductions in consumption and investment expenditure in the near to medium term, albeit with some cross-country heterogeneity.

Using a standard DSGE model for open economies, we try to shed light on the structural factors that help to interpret the dominant CA shock. A key result is the pivotal role of relative demand shocks in driving the dominant CA shock. The relative demand shock is closely correlated with the dominant CA shock, as we show by comparisons of the historical series of the dominant CA shock with the historical series of DSGE model-based shocks. When we apply the max-share identification to the DSGE model-simulated data generated only on the basis of the relative demand shock, the hypothetical dominant CA shock uncovered from the simulated data exhibits impulse responses that come close to those of the dominant CA shock uncovered from the actual data.

These results, of course, do not imply that traditional aggregate shocks play no significant roles in current account movements, as they will be key factors behind current account movements orthogonal to the dominant CA shock. Current account movements are bound to reflect all major shocks, when consumption, saving, and investment are determined by the interaction of all shocks. Rather, the results highlight the importance of relative demand, which has received little attention in the recent literature on current account determinants.

Several extensions can be considered for future research. First, the model's data-matching ability and explanatory power can be strengthened by adding additional structures (e.g., consumption habits and non-tradables) or by deconstructing relative demand shocks into more primitive shocks. Second, models better suited for long-run analyses can be developed to interpret the dominant long-run CA shock. Third, in emerging markets that include commodity exporters and countries actively engaged in foreign exchange interventions, different factors might emerge behind the dominant CA shock.



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# PUBLICATIONS

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