International investment income: patterns, drivers, and heterogeneous sensitivities

Giovanni Donato

Graduate Institute of International and Development Studies

Cedric Tille

Graduate Institute of International and Development Studies, and CEPR

International investment income: patterns, drivers, and heterogeneous sensitivities

Giovanni Donato *& Cedric Tille †

July 16, 2024

Abstract

Financial globalization has led to a large increase in international asset holdings. While the rise of associated dividend and interest flows has until now been muted by the decreasing trend in interest rates, this pattern could change, leading to a larger role of investment income flows in the balance of payments. We use a broad sample of countries to document the heterogeneous evolution of the various components of investment income flows, with a rising role of FDI and equity income, especially in advanced economies. We then assess the impact of various variables on yields with a panel analysis. Various drivers have highly heterogeneous effects across investment categories and country groups, often impacting the yields on both assets and liabilities. This translates into substantial heterogeneity in the response of countries' income balance, due to different compositions of asset and liabilities. This heterogeneity is amplified if we consider country-specific estimates in complement to the panel ones. Focusing on the impact of changes in interest rates, we find that higher rates only had a limited impact in the 2013 taper tantrum, investment income balances are likely to benefit from higher US rates in the current phase of higher rates, with offsetting effects of higher domestic rates.

Keywords: Financial integration, primary investment income flows, interest rates, exchange rates
JEL classification: F32, F36, F40

*Graduate Institute of International and Development Studies, Chemin Eugene-Rigot 2A,CH-1211 Geneva, Switzerland, email: *giovanni.donato@graduateinstitute.ch*

†Corresponding author, Graduate Institute of International and Development Studies, and CEPR, Chemin Eugene-Rigot 2A,CH-1211 Geneva, Switzerland, email: *cedric.tille@graduateinstitute.ch* On behalf of all authors, the corresponding author states that there is no conflict of interest.

Contents

List of Tables

List of Figures

1. Introduction

 Financial globalization has been a major development since the mid-1990s, leading to large increases in countries' external assets and liabilities (Lane and Milesi-Ferretti, 2018, Milesi-Ferretti, 2022a). One would then expect a similar rise in the associated dividend and interest streams - the primary investment income. However, this is not the case, at least not to the extent one may expect. Figure 1 contrasts the rise in trade flows over the last twenty years (until 2023) against investment income flows. In the median advanced economy (left panel), the sum of exports and imports has steadily increased relative to GDP (red line). By contrast, while the sum of investment income receipts and payments also increased until 2008, it has then dropped back and remained steady up until a surge in 2023 when interest rates increased worldwide (blue line). A similar pattern is seen in the median emerging economy (right panel), with the recent rise in investment income taking place earlier than in advanced economies.

 The link between asset income flows and the international investment position is not as tight as one may expect. Figure 2 shows the net investment income position (horizontal axis) and the net investment (vertical axis), each point corresponding to a country average value over the first decade of the 21$^{\text{st}}$ century (red dot) and subsequent years. Among advanced economies (top panel), we observe a clear correlation, but with some dispersion, as well as a flatter relation post-crisis with the net income being less sensitive to the NIIP. The pattern is even more striking among emerging economies (bottom panel) where the connection between the two measures is quite loose.

 In this paper, we analyze the drivers of the yields on assets and liabilities (income flows in percentage of association investment positions). In the context of rising interest rates, investment income flows may start accounting for a larger share of the current account. In fact, the decrease in the magnitude of investment income flows since 2008 seen in figure 1 substantially reflects the downward trend in nominal interest rates over these years, and the subsequent sharp reversal of policy rates in response to the recent inflation episode. Furthermore, the composition of countries' external assets and liabilities has substantially changed through time, with for instance a sizable increase in foreign direct investment positions in emerging economies, as detailed by Milesi-Ferretti (2022b). These various changes imply that

one cannot simply rely on the net international investment, scaled by a yield factor, to inform us reliably on the investment income flows. Instead, understanding what drives investment income at the level of individual categories of assets and liabilities, and distinguishing between advanced and emerging economies is warranted. Such is the focus of this paper.

We undertake a panel analysis of yields on various categories of assets and liabilities over a large sample of advanced and emerging economies to assess the role of a range of drivers (exchange rates, interest rates, and macroeconomic variables).

We find a substantial heterogeneity of the sensitivity of yields on the various driving forces, across investment categories and country groups. Higher interest rates in the US raise the yield on other (banking investment), reserves, and portfolio debt (for US long-term yields), but have little effect beyond. This is consistent with the dominant presence of the dollar in banking and international debt markets. Inflation also leads to higher yields in these categories. An increase in risk perception, proxied by a higher VIX index, reduces yields across the board. By contrast, the impact of a broad appreciation of the dollar is concentrated in foreign direct investment and portfolio equity (in advanced economies), and leads to a reduction in yields. This could indicate that companies connected to international investors are also more linked to international trade flows, which are reduced by a dollar appreciation. This could be because the currency dominates the invoicing of international trade, or is associated with changing risk appetites that also affect investment and profits, or that multinational companies alter the pattern of profit transfers among their affiliates when the exchange rate moves. We complete our panel estimates with country-specific estimates, that display substantial heterogeneity.

The impact of the various drivers on a country's net investment income is heterogeneous, as it reflects the balance of offsetting forces. Our estimates show that several drivers impact the yields on both assets and liabilities, which implies that the effect on the net investment income can be positive or negative depending on the specific structure of the country's international financial exposure. This is a major difference from trade flows, as the latter are less subjected to such offsetting influences.

Focusing on the impact of the VIX, interest rates, and dollar exchange rate, we show that a higher VIX raises net investment income in emerging economies. While higher US

short-term rate raise the net income in emerging countries, the effect is the opposite for US long-term rates. A broad dollar appreciation has a detrimental effect for advanced economies, and a small positive one for emerging economies. All these effects tend to be larger and more heterogeneous when using country-specific estimates. We finally illustrate the impact of interest rates by looking at two specific episodes of rising rates. We estimate that the 2013 taper tantrum had only a moderate impact on net investment income, and the current phase of rising US rates and inflation could lead to improvement in the income balances.

While there is a rich literature looking at the determinants of the current account and the trade balance, the analysis of primary investment income flows is more recent. Our paper contributes to this growing literature. Joyce (2021) documents the growing income deficit, driven by FDI, in 26 emerging economies. Behar and Hassan (2022) present the comovements of trade and investment income balance, and look at the impact of exchange rates, which are also the focus of Colacelli et al. (2021). We expand on these contributions by considering a broader range of drivers of the yields on assets and liabilities. Eugster and Donato (2022) present the impact of the exchange rate on the trade and investment income balances in Switzerland. Auer (2019) shows how monetary policy shocks impact the investment receipt and payment flows, both overall and across categories, in the United States and Canada. In contrast to these papers, we take a broad perspective with a large sample of advanced and emerging economies.

The rest of the paper is structured as follows. Section 2. reviews the related literature. Section 3. presents the analytical framework, data, and stylized facts. The results from the econometric analysis are presented in section 4., and section 5. discusses the heterogeneous impact of selected variables on countries' net trade and investment income flows. Section 6. considers the impact of specific episodes of rising interest rates, and section 7. concludes.

2. Literature review

Our analysis relates to several branches of the literature on the drivers of external accounts. The first is the analysis of determinants of "global imbalances". Before the global financial crisis, a large literature assessed the imbalances where the United States ran a large a persistent current account deficits mirrored by surpluses in emerging economies. Panel

analyses of current account balances found a role for public deficits, financial development, and the experience of financial crises (Chinn and Prasad, 2003; Gruber and Kamin, 2007). Asymmetries in the development of financial markets have been pointed as a source of the persistent US deficit (Caballero et al., 2008). Subsequent contributions to the literature have taken a more granular look. Alfaro et al. (2014) show that capital flows driven by sovereign investors behave differently than flows driven by private investors. Ito and McCauley (2019) point to the need to take account of the world's main currency zones, as imbalances within and across zone show different patterns. While the researchers' interest in global imbalances decreased in the eve of the 2008 crisis, as capital flows retrenched (IMF, 2014), recent contributions have provided additional angles on the topic. Chinn and Ito (2022) show that the pattern has evolved, with the role of China and oil exporters becoming less important, fiscal variables taking a relevant role, and financial development having a heterogeneous effect. Other contributions point to the role of determinants of portfolio choice by global investors (Devereux et al., 2020; Jiang et al., 2022). Finally, several contributions have taken a broader view in terms of both flows and stocks. While flow imbalances (in terms of current accounts) have stayed broadly steady, stock imbalances (in terms of international investment positions) remain on the rise (Alberola et al., 2020; Lane and Milesi-Ferretti, 2014; Milesi-Ferretti, 2022b).

The second line of literature that we connect to covers the impact of major economic shocks on the current account. The exchange rate is a variable that has received a lot of attention, as models indicate that narrowing imbalances relies on exchange rate movements, with a focus on the impact on the trade balance. Obstfeld and Rogoff (2007) find that the US imbalances calls for a weakening of the dollar. The empirical evidence on the impact of exchange rate is however contrasted. Devereux and Genberg (2007) point that exchange rate movements are unlikely to play a sizable role for emerging Asian economics. Taking a medium run perspective, Chinn and Prasad (2003) find that exchange rates only play a role for industrial countries, and a small one. Gruber and Kamin (2007), Chinn and Ito (2007) and Chinn and Lee (2009) also find mixed results, and Beckmann and Czudaj (2017) shows that the link between exchange rates and current accounts is ambiguous, especially at a shorter horizons. Cubeddu et al. (2019) estimate the REER-elasticity of the Current

Account as part of the IMF's ESR using the so-called *CGER-inspired approach*, and find a moderate average elasticity of -0.26 with substantial heterogeneity. The limited impact of the exchange rate can be explained by a moderate transmission to import prices when these are set in currencies that are not the one of the importing country, as in the "dominant currency pricing" (Boz et al., 2022; Georgiadis et al., 2021; Gopinath et al., 2020).

Movements in interest rates are another important source of fluctuations. Antràs (2023) develops a framework where lower interest rates provides an incentive to invest in longer but more productive production processes, leading to larger trade flows. Schuler and Sun (2022) consider the co-movements of the current account and interest rates in Euro area countries. They show that these are specific to the shocks driving fluctuations. Shocks to consumption and investment financial frictions (which are shocks to domestic demand) move interest rates and the current account into the same direction, while shocks to foreign demand and TFP have the opposite effect.

Finally, our works contributes to the literature on the determinants of the primary income, and especially the income from assets (investment income flows). While there has been an extensive literature on the drivers of trade flows, the analysis of primary income flows remains at a relatively early stage. Joyce (2021) focuses on the pattern in 26 emerging economies, and shows a growing deficit in net investment income, especially for direct investment. Countries with higher trade and financial openness are characterized by larger FDI income payments. Behar and Hassan (2022) present a multi-country assessment of the dynamics of the primary income balance. They show that it is an important element of the current account, exceeding the trade balance in 20 percent of countries in the sample. Fluctuations in the primary income balance tend to be negatively correlated with the ones in the trade balance, thereby stabilizing the overall current account. In times of crises however, the income balance does not improve, in contrast to the trade balance. The authors finally assess the sensitivity of the income flows to the exchange rate. While the exchange rate impacts both gross components of the income (receipts and payments), these effect offset each other with a limited impact on the primary income balance. The impact of the exchange rate on the current account thus operates primarily through the trade channel. Colacelli et al. (2021) consider the drivers of the primary income using annual data for 1999-2018 over 40 countries. They also find

that exchange rate movements have a sizable impact on receipts and payments flows, with a moderate impact in net terms.

An important element in the impact of exchange rates in Behar and Hassan (2022) and Colacelli et al. (2021) is a "mechanical" effect. As a country's assets and liabilities are often denominated in foreign currency, exchange rate movement affects the domestic currency value of the associated flow of earnings, even when the yield in terms of the currency of denomination is not changed. This effect is similar to the well-know valuation effect of exchange rate movements on the international investment position, with the difference that these valuation effects are capital gains that do not enter the current account (Bénétrix et al., 2015; Bénétrix et al., 2020; Gourinchas and Rey, 2007; Lane and Milesi-Ferretti, 2004; Tille, 2008). Behar and Hassan (2022) and Colacelli et al. (2021) show that the mechanical effect is a major aspect of the impact of exchange rates, and the residual "economic" effect is small and heterogeneous.

Eugster and Donato (2022) document the impact of exchange rate movements on the Swiss current account, focusing on movements that reflect the Swiss safe haven property. They confirm the offsetting movements of trade and trade and primary income balances of Behar and Hassan (2022), with a stronger Swiss franc reducing the trade surplus and improving the primary income balance. The later is driven by an improvement in the net FDI income, as expenses fall more that receipts.

While the previous studies focus on the impact of the exchange rate, Auer (2019) assesses the impact of monetary policy shocks in the United States and Canada. A tightening of monetary policy appreciates the currency, and has a J-curve effect on the trade balance. It leads to a reduction of both investment income receipts and payments, as well as the net receipts. The effect on income flows gradually builds up and reaches a peak after 1-2 years. A finer assessment shows that the higher interest rates temporarily raise the income flows for the "other" investment category (which are mostly banking holdings), leading to a positive net effect, but lower the income flows on FDI holdings, leading to a negative net effect.

3. Empirical framework

3.1 Primary income dynamics

3.1.1 General setting

Consider the primary income flows on a country's external asset holdings (the flows on the liability sides are computed similarly). As described below, we rely on the IMF data for the balance of payments, as well as the international assets and positions data from Milesi-Ferretti (2022c) which are measured in US dollar. The asset position on which the income flows apply is denominated in a currency basket D which is in general different from the country's own currency and the dollar.

We denote the exchange rate between the dollar and the currency of denomination of the asset by $S^{\$,D}$ with an increase representing a depreciation of the dollar. The primary investment income flows in the denomination currency reflects the effective return in that currency $r^{eff,D}$, so we write $P_t^D = r_t^{eff,D} A_{t-1}^D$ where A^D is the asset position expressed in the currency of denomination. The dollar flows are written as $P_t^{\$} = r_t^{eff,D} \left(S_t^{\$/D} / S_{t-1}^{\$/D} \right) A_{t-1}^{\$} = r_t^{eff,\$} A_{t-1}^{\$}$.

The portfolio of a country consist of fixed income assets, indexed by F, and assets with variable yield, indexed by V. A share α^F of fixed income assets mature in each period. The gross capital flows in period t consist of a purchase of assets replacing the maturing ones, and net capital flows $K_t^{net,\$}$ (measured in dollar).

3.1.2 Income flows and yields

At the beginning of period t, a share $1 - \alpha^F$ of fixed income assets has not matured and delivers the same yield (on the face value in the currency of denomination) in period t than in period $t - 1$. The investment income flows on these assets in period t is the same as in the previous period. The newly purchased assets deliver a new yield $r_t^{new,F,D}$ in period t. The primary income in the currency of denomination is thus (see the appendix for details):

$$P_t^{F,D} = \left(1 - \alpha^F \right) P_{t-1}^{F,D} + r_t^{new,F,D} \left(\left(1 - \alpha^F \right) K_{t-1}^{net,F,D} + \alpha^F A_{t-1}^{F,D} \right)$$

where denotes the net capital flows. The expression for variables yield asset is similar, setting $\alpha^F = 1$. The overall investment income $(P_t^D = P_t^{F,D} + P_t^{V,D})$ is then, in currencies of denomination and in dollar:

$$
\begin{aligned}
P_t^D &= \left(1 - \alpha^F\right) P_{t-1}^{F,D} + r_t^{new,F,D}\left(1 - \alpha^F\right) K_{t-1}^{net,F,D} + r_t^{new,F,D}\alpha^F A_{t-1}^{F,D} + r_t^{new,V,D} A_{t-1}^{V,D} \\
P_t^\$ &= \frac{S_t^{\$/D}}{S_{t-1}^{\$/D}}\left[\left(1 - \alpha^F\right) P_{t-1}^{F,\$} + r_t^{new,F,D}\left(1 - \alpha^F\right) K_{t-1}^{net,F,\$} + r_t^{new,F,D}\alpha^F A_{t-1}^{F,\$} + r_t^{new,V,D} A_{t-1}^{V,\$}\right]
\end{aligned}
$$

The yield on the overall asset position, $r_t^\$ = P_t^\$/A_{t-1}^\$$, is written as:

$$
\begin{aligned}
r_t^\$ &= \frac{S_t^{\$/D}}{S_{t-1}^{\$/D}}\frac{A_{t-1}^{F,\$}}{A_{t-1}^\$}\left[\left(1 - \alpha^F\right)\frac{A_{t-2}^{F,\$}}{A_{t-1}^{F,\$}}r_{t-1}^{F,\$} + \left(\alpha^F + \left(1 - \alpha^F\right)\frac{K_{t-1}^{net,F,\$}}{A_{t-1}^{F,\$}}\right)r_t^{new,F,D}\right] \\
&\quad + \frac{S_t^{\$/D}}{S_{t-1}^{\$/D}}\frac{A_{t-1}^{V,\$}}{A_{t-1}^\$}r_t^{new,V,D}
\end{aligned}
\tag{1}
$$

3.1.3 Approximation

We express the yield (1) in terms of a linear approximation around a steady growth path, where asset prices and exchange rates are constant, all variables grow at a rate ρ_{ss}, and the fixed income assets represent a share δ_{ss}^F of the overall assets. Hatted variables denote log deviations from the growth path, while hatted yields are deviations in absolute value. [1] The linear approximation of (1) gives:

$$
\begin{aligned}
\frac{\hat{r}_t^\$}{r_{ss}} &= \left(\widehat{S}_t^{\$/D} - \widehat{S}_{t-1}^{\$/D}\right) + \frac{\left(1 - \alpha^F\right)\delta_{ss}^F}{1 + \rho_{ss}}\frac{\hat{r}_{t-1}^{F,\$}}{r_{ss}} \\
&\quad + \left(1 - \frac{1 - \alpha^F}{1 + \rho_{ss}}\right)\delta_{ss}^F\frac{\hat{r}_t^{new,F,D}}{r_{ss}} + \left(1 - \delta_{ss}^F\right)\frac{\hat{r}_t^{new,V,D}}{r_{ss}} \\
&\quad - \frac{\left(1 - \alpha^F\right)\delta_{ss}^F}{1 + \rho_{ss}}\left(\widehat{S}_{t-1}^{\$/D} - \widehat{S}_{t-2}^{\$/D} + \widehat{Q}_{t-1}^{F,D} - \widehat{Q}_{t-2}^{F,D}\right)
\end{aligned}
\tag{2}
$$

where $\widehat{Q}_t^{F,D}$ is asset price of fixed income assets in the currency of denomination, which enters

---

[1] Specifically, $\hat{A}_t^\$ = \left(A_t^\$ - A_{ss,t}^\$\right)/A_{ss,t}^\$$, $\widehat{S}_t^{\$/D} = \left(S_t^{\$/D} - S_{ss}^{\$/D}\right)/S_{ss}^{\$/D}$, $\left(\hat{K}_{t-1}^{net,F,\$} = K_{t-1}^{net,F,\$} - \frac{\rho_{ss}}{1+\rho_{ss}}A_{ss,t-1}^{F,\$}\right)/\left(\frac{\rho_{ss}}{1+\rho_{ss}}A_{ss,t-1}^{F,\$}\right)$, $\widehat{r}_t^D = r_t^D - r_{ss}$, $\hat{Q}_t^{F,D} = \left(Q_t^{F,D} - Q_{ss}^{F,D}\right)/Q_{ss}^{F,D}$, where the ss subscript denotes the value of variables along the steady growth path.

because the fixed yield is in term of face value and not market value. $\hat{r}_t^\$/r_{ss}$ indicates the effect on the yield in percent, instead of percentage points. [2] (2) shows that the yield in the currency of measurement is affected by several factors. First, there is a valuation effect reflecting movement of the exchange rate between the currency of measurement (the dollar) and the currency in which the assets are denominated, with a dollar depreciation raising the primary income. This is the effect identified in Colacelli et al. (2021). Second, as shown by the last block in the first row, the yield is affected by the lagged yield to the extent that there are long maturity fixed income assets. The second row present the impact of changing yields on specific assets market value in the currency of denomination. This applies to variable yield assets, as well as fixed income assets to the extent that their maturity is short (α^F is high). Finally, the lagged dynamics of the exchange rate between the currency of denomination and the dollar enter, as do the the lagged dynamics of the fixed income asset price, in the currency of denomination. These two terms indicate the lag of capital gains on fixed income assets in the currency of denomination, and their presence is linked to fixed assets that do not yet mature, and for which the market value changes relative to the face value, the later being the one on which the fixed yield applies. By contrast, movements in assets prices in the currency of denomination for assets with variables yields do not enter, as these are already reflected in the value of the positions included in the computation of yields.

3.1.4 Empirical specification

We implement an estimation of (2) for total assets, as well as at for specific investment categories: FDI, portfolio equity, portfolio debt, other investment excluding reserves (mostly banking), and foreign exchange reserves. For each category, the estimates are done separately for yields on external assets and on external liabilities. The specification is as follows:

$$
\begin{aligned}
ln\left(r_t^\$\right) \;=\; & \alpha + \beta_{lag}ln\left(r_{t-1}^\$\right) + \beta_{valS}\Delta ln\left(S_t^{\$,D}\right) \\
& + \beta_{valSL}\Delta ln\left(S_{t-1}^{\$,D}\right) + \beta_{vaQL}\Delta ln\left(Q_{t-1}^D\right) \\
& + \delta_{glob}\mathrm{X}_t^{global} + \delta_{local}\mathrm{Z}_t^{local}
\end{aligned}
\tag{3}
$$

---

[2]If for instance the steady state yield is 4% and a variable moves the yield to 4.5%, we have $\hat{r}_t^\$ = 0.005$ (0.5 percentage points) and $\hat{r}_t^\$/r_{ss} = 0.005/0.04 = 0.125$ (12.5 percent of steady state value).

where $r_t^\$$ is the yield, measured in dollar (we take the log to correspond to $\hat{r}_t^\$/r_{ss}$ in (2)), $\Delta ln\left(S_t^{\$,D}\right)$ is the first difference of the log of the exchange rate between the dollar and the currency of denomination of assets (with an increase representing a depreciation of the dollar), $\Delta ln\left(Q_{t-1}^D\right)$ is the first difference between the log of the asset price in the currency of denomination ($\Delta ln\left(S_{t-1}^{\$,D}\right) + \Delta ln\left(Q_{t-1}^D\right)$ drive the valuation effect on the asset position, expressed in dollar), X_t^{global} is a vector of global controls and Z_t^{local} is a vector of controls specific to the country. These two vectors include variables that can affect the yields on the currency of denomination.

The global controls X_t^{global} include:[3]

- First difference of the log of the broad trade-weighted exchange rate index of the US dollar, to capture its movements against all other currencies. A positive value denotes an appreciation of the US dollar.

- US short-term interest rate (3 months money market) to capture monetary policy in the major economy.

- US long-term interest rate (10 year Treasury yield) to capture changing long rates in the major economy.

- VIX index (normalized), to capture changing risk perceptions and appetite.

- World inflation (first difference of the log CPI), for regressions of income receipts.

- World real GDP growth, for regressions of income receipts.

We include the broad dollar exchange rate for three reasons. First, the literature points to it as a global factor due to the dominant role of the dollar in international financial markets (Avdjiev et al., 2019), with a strong dollar leading to tighter funding conditions. This is a distinct channel than the revaluation of income flows on dollar-denominated financial holdings, which are captured by $\Delta ln\left(S_t^{\$,D}\right)$. Second, given the dominant use of the dollar in the invoicing of international trade (the Dominant Currency Paradigm, Boz et al., 2022, Gopinath et al., 2020), an appreciation of the US currency reduces all international trade activity, and the associated profits of exporting firms. The dividends paid by these firms can in turn be reduced. Third, movements in the dollar exchange rate can reflect fluctuations of risk appetite (switch from "risk on" and "risk off" periods) that also impact real investment activity.

---

[3]In earlier specifications, we included the first difference of the log of the SP500 index, and the dividend yield on that index, but they proved not statistically significant.

The US interest rates proxy for interest rates in advanced economies, which we expect to directly impact earning on countries' assets, and possibly on their liabilities to the extent that they are dollar denominated, or that US interest rate affect yields in other currencies. The VIX index is included as a recognized measure of global risk attitude, which can have real economy effects as pointed above. World real growth and inflation differ are expected to impact the yield on assets abroad especially for investment categories that are state contingent.

The local controls Z_t^{local} include (for regressions of income payments):

- Inflation (first difference of the log CPI).

- Real GDP growth.

- Domestic short-term interest rate (for advanced economies).

- Domestic long-term interest rate (for advanced economies).

Domestic inflation and real growth are expected to affect the yield of the country's liability to foreign investors, especially for contingent investments. Short and long-term interest rate impact the yield on the liabilities, to the extent that they are denominated in domestic currency.

In terms of the estimation method for (3), we compute panel OLS estimates for all countries, as well as for advanced and emerging economies separately. Errors are clustered at the country level, and we include country fixed effects. The estimations are conducted both for the overall asset, as well as at the level of individual asset categories. In addition to our panel estimates, we undertake the estimation countr-by-country to assess the heterogeneity of the coefficients.

Our estimates of the coefficients in (3) indicate the impact of each right-hand side variable on the log yield for the specific asset category. We can convert this impact to express the effect in terms of the ratio of investment income flows to GDP (in percentage points), as explained in section 5.

3.2 Data sources and stylized fact

3.2.1 Data sources

We take our data from the standard sources, as indicated in table 1. Specifically, current

account figures on investment income (in US dollar), exchange rates, interest rates, GDP and inflation are from the IMF International Financial Statistics and World Economic Outlook. The values of countries' external assets and liabilities (in US dollar) are from the External Wealth of Nations database (Milesi-Ferretti, 2022c).[4] The balance of payments and position data allow to conduct the analysis at the level of the usual categories of assets, namely foreign direct investment, portfolio investment (total, equity, debt), other investment (excluding foreign reserves), and reserves. The currency of denomination of the assets and liabilities is from Bénétrix et al. (2020), with the 2017 values kept in subsequent years. The US broad dollar exchange rate is from the Board of Governors. When data are missing, other sources are used as described in table 1.

The computation of the exchange rate between the currency of denomination and the dollar, $\Delta ln\left(S_t^{\$,D}\right)$, follows the steps of Colacelli et al. (2021), based on the currency composition data of Bénétrix et al. (2020). As detailed in the appendix, the data provide us with the weights of the US dollar, Euro, Pound, Yen, Renminbi and domestic currency for assets and liabilities. They include the currency weights for the overall assets (liabilities), as well as for "debt" positions (portfolio debt and other investment). Based on these weights and the investment position data, we consider four sets of currency weights: one for the total (from the data), one for portfolio debt and other (also from the data), one for FDI, portfolio equity and reserves (computed based on the previous two), and one for overall portfolio (also computed).[5]

We compute the price valuation effect ($\Delta ln\left(Q_{t-1}^D\right)$ in 3) by taking the first difference in the dollar value of positions from Milesi-Ferretti, 2022c, removing the associated capital flows to get a residual valuation adjustment, and express in in percentage of the corresponding position to get a rate of capital gain. Two observations are warranted on this point. First, our measure of residual valuation includes the "other" valuations that are due to other factors than exchange rate and asset prices. This limits the precision of our measure, but more precise decomposition are not available for a broad range of countries. Second, the dollar

---

[4]While the positions in banking and portfolio investment can be measured using asset prices, it is well known that FDI investment are harder to gauge as they entail holdings that are not publicly traded. We rely on the IFS data, with different approaches of measuring FDI, as they are the most widely available ones.

[5]While our approach of computing the non-debt yields as a residual likely overlooks heterogeneous currency composition of FDI and equity, for instance, the Bénétrix et al. (2020) are the standard references on the issue, and computing an additional detailed currency composition would go beyond the scope of this paper.

valuation change we compute includes the impact of both exchange rate and asset prices movements, and thus corresponds to $(\Delta ln \left(S_{t-1}^{\$,D} \right) + \Delta ln \left(Q_{t-1}^{D} \right))$. As we however directly control for $\Delta ln \left(S_{t-1}^{\$,D} \right)$ in our regressions, the coefficient on our residual valuation captures movement in asset prices that are orthogonal to the exchange rate.

We compile the data for a broad range of 45 countries, listed in table 2, which does not include financial centers, very small countries, and countries for which the data on the currency composition of assets and liabilities are missing. We split countries between and advanced groupe (23 countries) and an emerging economies group (22 countries), using the WEO classification (with narrower coverage for some categories of assets in emerging economies).

3.2.2   Stylized facts on investment income flows

Before turning to our econometric estimates, we present some stylized facts on the primary investment income to GDP ratio since 1999. Figures 3-7 present the pattern for the median country in each group, and appendix figures 20-25 take a more detailed view.

We illustrate the patterns by presenting the gross investment income flows (sum or receipts and payments) and the net flows (difference), scaled by GDP. The first measure shows the extent of bidirectional integration in income flows, while the second indicates whether a country is a net earning or not. Figures 3 presents the pattern for the total investment income flows, for advanced economies (left panel) and emerging countries (right panel). In terms of gross flows, we see again the pattern presented in figure 1 (blue lines, which are the same as in figure 1), with an increase prior to 2008, followed by a decrease, which has reversed since 2023 in advanced economies, and since 2017in emerging countries. In net terms (red lines), the median advanced economy moved from being a net payer to a net earner, while the median emerging market remains a net payer.

Turning to specific asset categories, figures 4 and 5 show the pattern for FDI and portfolio equity, respectively. For both categories, the gross investment income flows (blue lines in the left panels) show a clear positive trend, indicating that investment income flows have indeed moved in the same direction as the rising investment positions. The pattern in net terms is more contrasted, Advanced economies moved from balance or deficit towards surpluses, while emerging economies remain in deficit territory, with a downward trend for FDI.

The pattern is different when looking at portfolio debt and other investment (figures 6 and 7). The blue lines show that growth flows have a clear cyclical pattern, with increases prior to the global financial crisis of 2008, followed by decreases that lasted until the interest rate increases of recent years (with the exception of portfolio debt for emerging economies). This shows that initially the investment flows were moving in a direction consistent with financial globalization, before being dominated by movements in interest rates, both during the sustained period of lower rates following the global crisis and during the recent rise in interest rates related to the inflation surge.

Figures 20-25 in the appendix present the two gross income flows (payment and receipts) separately, as well as net flows, and for each show the bottom and top quartile in the distribution in addition to the median. These figures show that the situation is quite heterogeneous across countries of the same group. For instance, the top quartile of FDI and portfolio equity receipts in emerging economies show sizable increases. As pointed above the gross payments associated with portfolio debt have increased in emerging economies in recent years. Figure 23 shows that payments flows dominate have have been on a steady increase since the 2010's. Figure 25 shows that the income flows on foreign exchange reserves shows a decreasing trend, especially since the global financial crisis for emerging economies.

Overall we observe a contrasted pattern, both across country groups and types of assets. Income flows linked to FDI and equity has broadly increased relative to GDP for both advanced and emerging economies. By contrast, income flows on debt and banking asset have shown a decrease since the global financial crisis especially in advanced economies, but less so in emerging markets where payments have instead increased in recent years.

4.   Econometric analysis of the drivers of investment income

This section presents our estimates of the drivers of the (log) yield on assets and liabilities following (3). We first present panel estimates for the entire sample, and then focus on advanced and emerging economies. We then compute country-specific estimates and present their distribution to give a sense of heterogeneity.

4.1 Overall sample

The results of the panel estimations of (3) for the entire sample of advanced and emerging economies are given in table 3. Columns (1) and (2) shows the estimates for the (log) yield for receipts (credits) and payments (debits) respectively for the overall asset and liability holdings. The subsequent columns show the results for specific categories of assets, namely FDI, portfolio investment (total, then split into equity and debt), other investment, and reserves.

The yields are characterized by clear inertia with the coefficient on the lag being significant in all specifications.

The exchange rate between the dollar and the currency of denomination of the asset is expected to have a coefficient of +1 according to (2).[6] While it is not the case for FDI income yields, it is confirmed for portfolio and other income, both for receipts and payments. A finer assessment of the portfolio shows that the effect is most significant for debt payments, and marginally significant for equity payments. This could reflect the fact that our currency composition for FDI and equity relies on our computed residual which could mask additional heterogeneity in the currency composition between FDI, equity and reserves. Our results are thus partially in line with the finding of Colacelli et al. (2021) who find a strong mechanical effect.

The broad exchange rate of the dollar has a strong effect concentrated in the FDI payments. An appreciation of the US currency reduces yields both for receipts and payments, which leaves the net impact uncertain. This adverse effect of a dollar appreciation on FDI income could reflect several factors. First, large firms, including multinational, are more active in international trade than others. If the strengthening of the dollar leads to a reduction of trade flows (and associated profits), the return on multinational firms would be particularly affected. The effect of the dollar on trade flows can reflect the dominant currency paradigm, as shown in Boz et al. (2022). It can also be the sign of a "risk off" period where economic activity, and especially investment, is reduced. Firms which are more internationally oriented could be affected more than firms with a domestic focus.

---

[6]As exchange rates are measured as the first difference in logs, a 10% movements of the exchange rate is read as a change of 0.1 of the explanatory variable.

Turning to US interest rates, an increase raises the yields on both assets and liabilities (especially for short rates), with substantial heterogeneity across categories.[7] An increase in the short-term rate raises overall yields, with the effect concentrated among other investment and foreign reserves. This is expected, as other investment consists mostly of banking positions of short maturity while reserves are often placed in short-maturity liquid assets, and the dollar plays a dominant role as a funding and investment currency. By contrast, there is little effect in the portfolio investment. Higher US long-term rates have a similar, but broader effect. In addition to raising yields on other investment and reserves, the affect the yields on portfolio debt, as well as portfolio equity payments.

Movements in the VIX index have a broad impact, with an increase in risk reducing yields. This is seen across all types of flows, both on the receipts and payments sides, with the exception of equity and FDI receipts. This broad effect is consistent with the "risk off" view indicated above, as a more prudent attitude of investors can lead to a broad economic slowdown that adversely affect the returns of all assets. One may be concerned that the VIX, US interest rates, and the broad exchange rate of the dollar proxy for the same underlying factor of risk appetite. The correlation between them is however limited.[8] In addition, computing our estimates without the VIX, as in table 4, shows that the results are broadly unchanged for all variables.

Turning to the impact of inflation and real GDP growth, we consider the values for the world in the regressions for receipts, and the domestic values for the regressions for payments. Higher inflation raises the yields on other investment receipts, as well as foreign reserves. A similar effect is seen for the portfolio equity payments.[9] This could reflect the fact that inflation leads to higher interest rates on private investments, that go beyond the interest rates on money markets and Treasury yields that we control for. As the effect are sizable on both sides, the impact of a global inflation increase on net income flows are uncertain. Higher real growth worldwide raises FDI yields, especially for payments. They also reduce yields on other and reserves receipts.

---

[7]Interest rates enters in levels, so an increase by 1 percentage point translate in a value of +1 for the explanatory variable.

[8]In the appendix, table 8 shows that correlations are limited, with the exception of the two US interest rates.

[9]Inflation enters as the first difference of the log CPI. An increase of inflation by 2 percentage points then implies an increase of 0.02 of the explanatory variable

The presence of non-maturing fixed income assets implies that lagged movements in exchange rates and asset prices should have a negative coefficient. While the effect of the exchange rate is limited, there is evidence that the price valuation effect has the predicted effect, primarily for portfolio investment and other payments. The presence of the effect for portfolio equity yields is somewhat puzzling given the absence of fixed income in this category.

Overall our results show effects that are quite heterogeneous across drivers and categories of investments. Given this heterogeneity, it is questionable whether much can be inferred from a sample that combine advanced and emerging economies. We therefore turn to results for each of these two set of countries.

4.2 Advanced economies

Table 5 presents the results for the sample of advanced economies. For brevity, we focus on the salient dimensions of the results. As for the overall sample, we observe a clear effect of the lagged yield.

The exchange rate between the dollar and the currency of denomination has the expected sign (+1) on a broader basis, namely for overall yields, as well as for portfolio debt and other investment. The adverse impact of a broad dollar appreciation now extends beyond FDI to portfolio equity.

Higher US short-term and long-term interest rates raise yields on both sides in other investment and reserves. Long-term interest rates also impact the yields on portfolio debt, which reflects the longer maturity of these investments. These findings are consistent with the relevance of dollar funding in international banking, as well as the dominant role played by dollar bonds in debt security markets. As the effects occur for both receipts and payments, the impact on the net income balance remains uncertain. The adverse impact of the VIX on yields is confirmed, and observed on a broader range with yield on FDI now being both impacted.

Higher inflation raises the yields on other investment and reserves, due to the strong presence of short-maturity assets in these categories with a rapid adjustment of the interest rates on newly issued instruments. Higher global growth again boost the yield on FDI,

especially regarding payments. The lagged movements in capital gains again have a negative impact on portfolio and other investments, while the lagged exchange rate has no effect.

Given the availability of domestic interest rates for advanced economies, we also include the countries' short- and long-term interest rates. Only short-term rate have an effect, concentrated on portfolio debt and other investments payments.

4.3 Emerging economies

We now turn to the evidence for emerging economies, presented in table 6. Overall, several drivers have impact that are less significant than for the overall samples and advanced economies. The impact of lagged yields is similar to the overall sample.

The exchange rate between the dollar and the currency of denomination has a much less significant effect, and matters only for portfolio debt payments. This puzzling result could reflect a higher dominance of the dollar for these countries (with the associated exchange rate set at unity) implying that the movements of the exchange rate are driven by currencies that play a marginal role in the composition of the investment basket.

A broad appreciation of the dollar lowers the yield on FDI payments, but has no impact beyond, including on FDI receipts. This could reflect companies in these countries being more affected by lower trade flows and associated profits, while the companies in which emerging economies invest are less affected (as would be the case if they operate in the United States).

Turning to US interest rates, the pattern is similar to the advanced countries. The impact is concentrated on other investment and reserves, as well as portfolio debt for the long-term rate. While an increase in the VIX index also reduces yields, the effect is somewhat narrower than for advanced economies and more concentrated on yields on other investment, reserve, and portfolio debt.

Turning to macroeconomic variables, higher inflation again raises the yields on reserve and other investments, while growth impact primarily FDI yields, especially on the payment side. The lagged movement in asset prices have the expected negative effect across all categories, while the lagged exchange rate movement has barely any significant effect.

4.4 Country specific estimates

We build on our panel results by estimating (3) country by country. Figures 8-11 show the distribution of the coefficients using box and whiskers diagrams, focusing on the VIX, US interest rates, and the US broad dollar exchange rate. Overall, the exercise shows a substantial heterogeneity of the coefficients, especially among emerging markets.

The distribution of the VIX coefficients are in figure 8 for the advanced economies (left panel) and the emerging economies (right panel), with rows corresponding to the yield on receipts and payments for the various asset categories. The country specific coefficients are dispersed, especially among emerging economies. The advanced economies panel shows that the negative effect of the VIX is broadly seen, with the boxes being relatively similar across different yields (with the exception of reserves). The situation is more contrasted in emerging economies. While a higher VIX lowers the yield on other investment and reserves for most countries, the impact is more heterogeneous for portfolio debt, and especially receipts of portfolio equity with several countries showing positive coefficients.

Figure 9 shows the impact of an increase in the short-term US rate. The heterogeneity of the effect is similar in the two groups of countries. Coefficients are mostly positive for other investment and reserves, and are otherwise distributed around zero. We observe a high heterogeneity for portfolio equity and debt receipts in emerging economies, as well as FDI yield in advanced economies with a majority of coefficients showing positive values. Turning to the impact of long-term rates (figure 10, we again see positive coefficients for other investment and reserves, as well as (but more marginally so) for portfolio debt. Yields on receipts for portfolio equity and debt are again highly heterogeneous in emerging economies.

The impact of the broad exchange rate of the dollar is displayed in figure 11. The distribution of coefficients falls around zero, but the ones for FDI are more in negative territory, but with a lot of heterogeneity, especially among advanced economies. Again we observe a high dispersion of coefficients on portfolio equity and debt receipts in emerging countries.

4.5 Taking stock

Several elements can be taken from our econometric results. First, there is a high degree

of heterogeneity of the impact of various drives across different categories of investment, and across countries. Second, we observe a valuation effect of the exchange rate with the currency of denomination of assets, but primarily in advanced economies for other investment and portfolio debt. The limited significance beyond could reflect a lack of precision of the estimates of currency composition.

Third, a broad appreciation of the dollar has an adverse effect that is concentrated in FDI holdings, as well as equity holdings for advanced economies. This pattern could reflect several mechanisms. First, the dominant currency paradigm implies that international trade, invoiced in dollar, contracts when the currency appreciates. As large firms, including multinationals, are the ones most active in international trade, the strong dollar would impat their sales and profits. This is in line with our results, but we could expect trade of multinational firms to be primarily intra firm, and thus less impacted by exchange rate movemenets than arms-length trade.

A second possible mechanism is that a strong dollar indicates a "risk off" time where investors are more cautiouns in funding real investment, leading to a contraction of economic activity. As investment goods account for a large share of trade, multinationals involved in international exchanges see a contraction of their sales and profits. While the pattern is similar to the dominant currency pricing, the mechanism differs as the strong dollar is more a consequence of a higher risk aversion that also reduces economic activity than a direct cause of weaker trade.

Another mechanism is that multinational firms may affect their internal allocation of profits following exchange rate movements. If a strong dollar puts pressure on business, parent companies may opt to keep more profits in their subsidiaries to strengthen the financial resources of their foreign operations. This would translate into lower investment income payments and yields. An interesting pattern of the results is that among emerging economies the reduction in FDI yield occur only on the payments side. This is consistent with parents in advanced economies being less demanding on their subsidiaries in emerging countries in terms of profit payments when economic conditions become more challenging.

The fourth salient element is that US interest rates have a clear impact on yields, which is concentrated on fixed-income categories, as can be expected. Specifically, higher short-term

interest rates raise the yield on other investment and reserve, and higher long-term rates also do so and further impact portfolio debt yields. US monetary conditions have a robust impact on international investment income, reflecting the large presence of the dollar in loans and security debt markets. The effect is seen in both advanced and emerging economies.

A fifth point is that risk conditions matter, with a higher vIX reducing yields. The effect is if anything stronger in advanced economies, where all yields are affected while in emerging economies the effect is concentrated on portfolio debt, reserves, and other investment.

Macroeconomic conditions are also relevant, with higher growth raising the yield on FDI, especially on payments. Higher inflation robustly raises the yields on portfolio debt, other investment and reserves, which is consistent with interest rates raising beyond the US government rates.

The seventh salient pattern is that country-specific estimates show a low of heterogeneity. This tends to be more pronounced in emerging economies, especially for the impact of US interest rates, the VIX and the US dollar exchange rate on the receipts of portfolio equity and debt. This suggests that the composition of external equity investment, in terms of sectoral or regional exposure, could be very differentiated across countries, leading to very different sensitivity to global variables.

Finally, when variables have a statistically significant effects, they tend to do so for both receipts and earnings, leaving the net impact ambiguous. Assessing it requires combining the yields and position, as we do now.

5.   Impact on net investment income flows

This section computes the impact of the various variables considered in the econometric exercise on the investment income flows, relative to GDP. Doing so requires combining the estimated impact on yields or the various assets and liabilities (from the panel or country-specific regression) with the corresponding asset and liabilities positions of each country. We first present the method, and then illustrate the impact of selected variables (VIX, US interest rates, and US dollar exchange rate).

5.1 Linking yields and income flows

We take the estimates of yields from section \ref{Econometric results} convert them in terms of trade and primary income flows relative to GDP, which vary by countries. Our estimates provide us with fitted values of the (ln) yield in dollar, $\hat{r}_t^\$/r_{ss}$. We convert them into effects in terms of income flows relative to GDP by taking the approximation of the relation between flows, GDP, yields and positions:

$$\hat{p}_t^\$ \;=\; -p_{ss}^\$ \left(\widehat{Y}_t^\$ - \widehat{Y}_{t-1}^\$ \right) + p_{ss}^\$ \frac{\hat{r}_t^\$}{r_{ss}} + \frac{r_{ss}}{1 + \rho_{ss}} \hat{a}_{t-1}^\$$$

where lower-case letter denote ratios to GDP. [10] Starting from a period $t-1$, we compute the impact of a shock at time t through the yield $\hat{r}_t^\$/r_{ss}$ on the income flows $\hat{p}_t^\$$, in terms of percentage point to GDP. We proxy $p_{ss}^\$$ by the value of primary income to GDP, taking the average over five years. The effect on income flows (in percentage points of GDP) is then $\hat{p}_t^\$ = p_{ss}^\$ \left(\hat{r}_t^\$/r_{ss} \right)$. Throughout the section, we measure $p_{ss}^\$$ using the 2017-2021 average of the ratio of investment income to GDP for the specific asset categories.

The impact of movements in the exchange rate between the dollar and the currency of denomination, $\widehat{S}_t^{\$/D}$, have an impact also through the value of assets. A change starting at period t impacts $\hat{p}_t^\$$ through the yield $\hat{r}_t^\$/r_{ss}$. If the exchange rate movement is persistent, it has an additional impact in subsequent period through the revaluation of asset positions $\hat{a}_{t+h}^\$$. For instance, a permanent change of the exchange rate ($\widehat{S}_t^{\$/D} - \widehat{S}_{t-1}^{\$/D} \neq 0$, $\widehat{S}_{t+1}^{\$/D} = \widehat{S}_t^{\$/D}$) impacts yields only in the first period ($\hat{r}_t^\$/r_{ss} = \widehat{S}_t^{\$/D} - \widehat{S}_{t-1}^{\$/D}$, $\hat{r}_{t+1}^\$/r_{ss} = \hat{r}_{t+2}^\$/r_{ss} = 0$). It however affects the value of assets starting at time t ($\hat{a}_{t-1}^\$ = 0$ and $\hat{a}_t^\$ = \hat{a}_{t+1}^\$ = a_{ss}^\$ \left(\widehat{S}_t^{\$/D} - \widehat{S}_{t-1}^{\$/D} \right)$). These two effects lead to a permanent change in the ratio of income to GDP, as we can show that $\hat{p}_{t+h}^\$ = p_{ss}^\$ \left(\widehat{S}_t^{\$/D} - \widehat{S}_{t-1}^{\$/D} \right)$ for $h \geq 0$. The appendix presents more details on the computations for specific variables.

5.2 Results

Figure 12 shows the impact of an increase of the VIX by 1 standard deviation. The effect on the net investment income to GDP is shown for advanced economies (left panel) and

---

[10]Specifically, $\widehat{Y}_t^\$ = \left(Y_t^\$ - Y_{ss,t}^\$ \right) / Y_{ss,t}^\$$, $\hat{p}_t^\$ = p_t^\$ - p_{ss}^\$$ and $\hat{a}_t^\$ = a_t^\$ - a_{ss}^\$$.

emerging countries (right panel).[11] For each we show the effect based on our panel estimates for the impact on yields (red bars) and the effect using the country-specific estimates blue bars). We compute the effects taking all related coefficients from our regressions, without focusing on the ones that are statistically significant. A common pattern across the figures is that using country-specific estimates leads to much more heterogeneity, as can be expected.

Among advanced economies, higher uncertainty tends to push the net investment income towards a deficit or a small surplus. The pattern is sensitive, as several countries show the opposite pattern when using country-specific estimates. Emerging economies by contrast see their investment income balance improve following an increase on the VIX, as the yield reductions weights more on their liabilities than on their assets. Considering country-specific estimates raises the magnitude of the effect, but switches its sign for a few countries.

Turning to US interest rates, figure 13 shows that the movements on the short-term rate have little effect in advanced economies when we use panel estimates. While the coefficients are significant, the highly leverage position in other investment for instance leads to effects on payments and receipts to largely offset each other. The situation is more contrasted when using country-specific coefficients, as several countries, such as Switzerland and he Netherlands, see a deterioration of their income balance. Emerging economies tend to benefit, in terms of the net investment income, from an increase in the short-term US interest rate. Allowing for different coefficient across countries amplifies the magnitude of the effect for several of them, but flips its sign for others.

Figure 14 shows the impact of an increase in the US long-term interest rate. Among advanced economies, the effect remains moderate, unless we consider country-specific estimates in which case several see a sizable improvement in their net investment income. The situation is reversed for emerging economies with deterioration of the investment balance. Using country-specific estimates raises the magnitude of this adverse effect substantially, even though it changes direction for a few countries. Overall, we see that while US interest rate movements have significant effects on yields, these occur for both payments and receipts and a results the impact on the net investment income is moderate for advanced economies (except for a few of them when we consider country specific estimates). The situation is more

---

[11]A value of 0.2 indicates 0.2% of GDP

contrasted among emerging markets. Temporary increases of US interest rates improve their income balance, but this effect is overturn if the increases are expected to be lasting and also show up in long-term rates. Considering country-specific estimates amplify the magnitude of the effect for most countries, but overturns it for others.

Turning to the impact of exchange rates, figure 15 considers the effect of a 10% appreciation of the dollar.[12] This affects several of the drivers in our econometric specification, namely the broad dollar exchange rate, and the exchange rate between the dollar and the currency of denomination. A strengthening of the dollar has a very contrasted impact. It reduces the net investment balance for advanced economies, reflecting the large presence of FDI for this group. Considering country-specific estimates amplifies the effect for most, but overturns it for a few countries. Emerging economies by contrast are not much affected (when using panel estimates), and several of them see an improvement in their net investment when we consider country-specific coefficients. This reflects the sizable negative effect of the dollar appreciation that is concentrated on the payment side for FDI.

Overall, combining the estimated impacts on yields with the specific asset positions shows that the effect on the net investment income is heterogeneous across country groups. Allowing for coefficients to differ across countries brings substantial additional heterogeneity, and for most countries tends to amplify the impact on net investment income, especially in emerging economies.

6. Case studies of the impact of interest rates

The world economy is recently experienced a rapid increase in interest rates and inflation. In addition, sharp movements in interest rates have long been a cause of concern for policy makers. We use our estimates to shed light on the possible impact on investment income through two case studies, namely the 2013 taper tantrum and the current increase in interest rates.

---

[12]In the figure we do not display the impact for Guatemala using country-specific estimates, as they lead to very large values.

6.1 The 2013 taper tantrum

Announcements by the Federal Reserve in May 2013 that it was considering gradually halting the expansion of its balance sheet led to a rapid increase in US interest rates (mostly long-term) at the end of the second quarter, and episode referred to as the "taper tantrum".

Using our estimates, we assess the impact of the interest rate movements on the net investment income. Specifically, we take the observed changes in US short and long-term interest rates between 2012 and 2013, combine them with our estimates for the impact on the (log) yield, as well as with the 2012 ratio of investment income to GDP by asset categories.

Figure 16 shows our estimates of how the movements in US interest rates would have impacted the net investment income relative to GDP (blue bars). We also present the actual change of the net income to GDP between 2012 and 2013 (red bars). We do the exercise relying on country-specific estimates for the coefficients (top panel) or on panel estimates (bottom panel).

Using our panel estimates shows that the direct impact of higher US rates had only a limited impact, with some deterioration of the net investment income in emerging economies. These effects proved to be much smaller that the changes in the income balance that actually took place.

If we rely on country-specific estimates (top panel), the estimated effects of the higher interest rate are larger for advanced economies, and mostly beneficial. The actual movements in the net income proved however smaller. In emerging economies, the higher rates had a negative effect, which is larger than when using panel estimates but still of moderate magnitude with the impact remaining below 0.5% of GDP for most.

Overall, the rise in US rates did not have a detrimental impact, according to our estimates. It actually raised the net investment income in advanced economies, and only moderately reduced it in emerging markets. Our estimates of the direct effect are mostly smaller, and less positive, than the the actual changes This pattern likely reflects the fact that the sharp movements in the US interest rates in 2013, albeit noteworthy and much discussed, were limited to long-term rates.

6.2 The current interest rate and inflation surge

Our second case study covers the sharp increase in interest rates and inflation observed since early 2022. We first consider the impact of US rates, before adding the one of interest rates in other countries (for advanced economies), and looking at the direct impact of inflation.

Specifically, we take 2021 as our starting point, and compute the path of the various drivers until 2025, as described below. We combine these with our panel estimates for the impact on yields, and the 2021 ratio of investment income to GDP by asset categories.[13]

6.2.1 Impact of US interest rates

We start with the impact of higher US interest rates. We take actual rates until May from Fred, and subsequent forecasts from Statista, for the US Fed Fund, the 3 months Treasury yield, and the 10 years Treasury yield.[14]. Combining these, we compute the paths of the 3 months and 10 years rates from 2021 to 2025.

Figure 17 shows the impact on the investment income balance for advanced economies (left panel) and emerging markets (right panel). For each country, it displays the estimates of the effect in 2023 (blue bars) and 2025 (red bars). We again undertake the analysis using country-specific estimates of the coefficients (top panel) or panel estimates (bottom panel).

Among advanced economies, we estimate that the increase in US interest rates should lead to an improvement of the net investment income for several of them, with the effect building up over time. This pattern is however somewhat sensitive to the specifications. Considering panel estimates shows a more balanced pattern between positive and negative impacts. Turning to emerging economies, we estimate a positive impact on the net investment balance, as the increase in yields has a stronger effect on the receipt side. The effect build up over time. Considering country-specific estimates shows that while most countries still see a beneficial effect, several of them face a deterioration of their net investment income.

---

[13]We consider impact of the interest rates for all categories, even if the estimate is not statistically significant.

[14]These are found at https://econforecasting.com/forecast/ffr, https://econforecasting.com/forecast/t03m, and https://econforecasting.com/forecast/t10y, respectively

6.2.2 Impact of domestic interest rates

The increase in interest rates is a global phenomenon that goes well beyond the United States. We therefore expand our analysis to take account of the changes in interest rates in the other economies, focusing on advanced countries as the availability of domestic rates is limited for emerging markets.

Specifically, we rely on 3 months and 10 years interest rates for the United Kingdom and the Euro area. The central bank rates are taken from Statista.[15]. The interest rates on 3 months and 10 year bonds are taken from Fred until May 2024, with forecasts for later values the World Government Bonds site.[16] These rates are used to compute paths of domestic rates for the United Kingdom and the euro area. For other advanced economies we consider a 50-50 weighting of the path of US and Euro area rates starting from their 2021 values.

Figure 18 shows the impact on advanced economies investment income balance. The left panel shows the impact of domestic rates alone, while the right panel shows the overall effect of higher rates in the US and the country itself. We again compute the effects in 2023 and 2025, and contrast the findings depending on whether we use estimates specific to countries (top panel) or from the panel regression (bottom panel).

Higher domestic interest rates lower the net income for advanced economies, the more so as time passes. The effect are even larger when we consider country-specific estimates. When we consider the impact of both US and domestic rates, the estimates point to a deterioration of the net investment income, but with substantial heterogeneity. While the pattern based on the panel estimates mostly points towards lower net income, using the country specific estimates shows a more constrasted situation, with quite a few countries seeing an improved situation.

6.2.3 Impact of inflation

The current increase in interest rates is happening in the context of a broad surge of

---

[15]https://econforecasting.com/forecast/ukbankrate, and https://econforecasting.com/forecast/estr

[16]http://www.worldgovernmentbonds.com/bond-forecast/germany/10-years/ and http://www.worldgovernmentbonds.com/bond-forecast/united-kingdom/10-years/, respectively. The site gives forecasts for every third month until June 2025, and values for intermediate months are interpolated. As these forecasts end in June 2025, we assume that 10 year rates remain unchanged until end 2025 and 3 months rates parallel the evolution of the policy rates over the second half of 2025.

inflation, which itself impacts the net investment income. We assess the direct impact of inflation by combining our econometric estimates for the sensitivity of yields with the inflation forecasts from the IMF World Economic Outlook.

Figure 19 shows a highly contrasted impact of global and domestic inflation. As before, we show the results for advanced and emerging economies (left and right panels), and based on country-specific or panel estimates (top and bottom panels). Higher inflation lead to higher yields on other investment, reserves, and portfolio debt. In advanced economies the impact on the payment side is stronger, leading to an improvement of the net investment income. The situation is more contrasted when using country-specific estimates, with several seeing a deterioration. We observe more heterogeneity among emerging economies. While most see an improvement, a sizable minority faces a deterioration. Using country-specific estimates reduces the positive effect for most countries, with Tunisia being an outlier.

6.3   Taking stock of the case studies

Several elements emerge from our analysis. First, using country-specific estimates leads to larger and highly contrasted patterns. As these estimates rely on a narrower sample, the coefficients are likely to be less precisely estimated than in the panel. We thus focus the rest of our discussion on the panel estimates.

The taper tantrum, while spectacular, had only a moderate impact as the effect of the higher US short-term rates on yields largely offset each other on the receipt and payments sides. Even in emerging economies, the magnitudes barely reach a third of a percent of GDP, and was small also in comparison to the changes in net income that actually occurred, driven by several factors.

The current increase in US interest rates is expected to improve the net investment income for most advanced and emerging economies, with several seeing an effect between 0.5% and 1% of GDP. This effect is however offset by the parallel increase in domestic interest rates (in advanced economies) which leads to deteriorating balances. Combining US and domestic interest rates, we estimate that several countries will see a deterioration, exceeding 1% of GDP for a few. On the other hand, higher inflation should lead to an improvement in the net asset income among advanced economies, but a more heterogeneous pattern in emerging

ones.

7. Conclusion

 Financial globalisation has opened the door for a growing role of dividend and interest flows as channels of international transmission, in addition to trade flows. While the downwards trend of interest rate until 2021 has acted has an offsetting force, the current rapid increase in interest rates in the fact of higher inflation could change the picture.

In this paper, we document the evolving pattern of investment income flows and their drivers, for the various asset categories in advanced and emerging economies. Our analysis points to substantial heterogeneity. Flows linked to FDI and equity have shown a rising trend, in contrast to decreasing flows linked to debt and international banking, albeit with different path across country groups. Our econometric analysis of the drivers of yields shows that their effect is highly contrasted across types of investment, receipts and payment flows, and country groups. Specifically, in our panel analysis we find that a broad appreciation of the dollar reduce yields for FDI and equity investment, while higher US interest rates and global inflation raise yields on other investment, reserves and portfolio debt, and an increase in the VIX broadly reduce yields. Allowing the coefficients to differ across countries shows that their effect can be quite heterogeneous, in particular for the impact of interest rates and the exchange rate on portfolio investment receipts in emerging economies.

Assessing the impact of drivers on the net investment income leads to heterogeneous results across countries. This reflects the fact that several drivers impact yields on both receipts and payments, which affect the net income in offsetting ways. Depending on the specific composition of a country's assets and liabilities, the net effect can be positive or negative. Using our estimates, we assess the net investment income in two specific episodes. While US interest rates increased during the 2013 taper tantrum, this only had a moderate effect on income balances. The ongoing increase in US interest rates should actually lead to an improvement in the net income, albeit with offsetting effects of domestic rates..

Our analysis provides a first look at how income flows associated with financial asset behave in response to policy and macroeconomic shocks. It can be expanded in several directions. In terms of data, our knowledge of the currency composition of countries' assets

and liabilities can be refined at the level of specific categories, allowing for a more precise estimation of the impact of exchange rate movements. Our analysis shows that using panel or country-specific estimates affects the results, and additional research is needed to strike a balance between allowing for effects that reflects countries specific situations and relying on a large enough sample to compute robust estimates.

Another avenue of work is to model the joints movements in interest rate, exchange rate, stock prices, and the other drivers to compute a broader view of the impact of specific underlying shocks. Future research can also take account of the global adding-up constraints of surpluses and deficits to conduct a joint estimation across countries. We have also considered a linear setting, but movements in interest rates and exchange rate can have non-linear effects by triggering borrowing constraints and risk premia.

References

Alberola, Enrique, Ángel Estrada, and Francesca Viani (2020). "Global imbalances from a stock perspective: The asymmetry between creditors and debtors". In: *Journal of International Money and Finance* 107.C.

Alfaro, Laura, Sebnem Kalemli-Ozcan, and Vadym Volosovych (2014). "Sovereigns, Upstream Capital Flows, And Global Imbalances". In: *Journal of the European Economic Association* 12.5, pp. 1240–1284.

Antràs, Pol (Jan. 2023). *Interest Rates and World Trade: An 'Austrian' Perspective*. NBER Working Papers 30844. National Bureau of Economic Research, Inc.

Auer, Simone (2019). "Monetary policy shocks and foreign investment income: Evidence from a large Bayesian VAR". In: *Journal of International Money and Finance* 93.C, pp. 142–166.

Avdjiev, Stefan, Valentina Bruno, Catherine Koch, and Hyun Song Shin (2019). "The Dollar Exchange Rate as a Global Risk Factor: Evidence from Investment". In: *IMF Economic Review* 67.1, pp. 151–173.

Beckmann, Joscha and Robert Czudaj (2017). "Effective exchange rates, current accounts and global imbalances". In: *Review of International Economics* 25.3, pp. 500–533.

Behar, Alberto and Ramin Hassan (2022). "The Current Account Income Balance: External Adjustment Channel or Vulnerability Amplifier?" In.

Bénétrix, Agustín S, Philip R Lane, and Jay C Shambaugh (2015). "International currency exposures, valuation effects and the global financial crisis". In: *Journal of International Economics* 96, S98–S109.

Boz, Emine et al. (2022). "Patterns of invoicing currency in global trade: New evidence". In: *Journal of International Economics* 136.C.

Bénétrix, Agustín S, Luciana Juvenal, Martin Schmitz, and Deepali Gautam (May 2020). *Cross-border currency exposures: new evidence based on an enhanced and updated dataset*. Working Paper Series 2417. European Central Bank.

Caballero, Ricardo J., Emmanuel Farhi, and Pierre-Olivier Gourinchas (2008). "An Equilibrium Model of Global Imbalances" and Low Interest Rates". In: *American Economic Review* 98.1, pp. 358–393.

Chinn, Menzie D and Hiro Ito (2007). "Current account balances, financial development and institutions: Assaying the world "saving glut"". In: *Journal of international money and Finance* 26.4, pp. 546–569.

Chinn, Menzie D. and Hiro Ito (2022). "A Requiem for "Blame It on Beijing" interpreting rotating global current account surpluses". In: *Journal of International Money and Finance* 121.C.

Chinn, Menzie D and Jaewoo Lee (2009). "Three current account balances: A "semi-structuralist" interpretation". In: *Japan and the World Economy* 21.2, pp. 202–212.

Chinn, Menzie D and Eswar S Prasad (2003). "Medium-term determinants of current accounts in industrial and developing countries: an empirical exploration". In: *Journal of international economics* 59.1, pp. 47–76.

Colacelli, Mariana, Deepali Gautam, and Cyril Rebillard (2021). *Japan's Foreign Assets and Liabilities: Implications for the External Accounts*. International Monetary Fund.

Cubeddu, Mr Luis M et al. (2019). *The External Balance Assessment Methodology: 2018 Update.* International Monetary Fund.

Devereux, Michael B and Hans Genberg (2007). "Currency appreciation and current account adjustment". In: *Journal of International Money and Finance* 26.4, pp. 570–586.

Devereux, Michael B., Makoto Saito, and Changhua Yu (2020). "International capital flows, portfolio composition, and the stability of external imbalances". In: *Journal of International Economics* 127.C.

Eugster, Johannes and Giovanni Donato (2022). *The exchange rate elasticity of the Swiss current account.* Working Papers 2022-14. Swiss National Bank.

Georgiadis, Georgios, Arnaud Mehl, Helena Le Mezo, and Cédric Tille (2021). "Fundamentals vs. policies: can the US dollar's dominance in global trade be dented?" In.

Gopinath, Gita et al. (2020). "Dominant Currency Paradigm". In: *American Economic Review* 110.3, pp. 677–719.

Gourinchas, Pierre-Olivier and Helene Rey (2007). "International financial adjustment". In: *Journal of political economy* 115.4, pp. 665–703.

Gruber, Joseph W and Steven B Kamin (2007). "Explaining the global pattern of current account imbalances". In: *Journal of international money and Finance* 26.4, pp. 500–522.

IMF (2014). "Are Global Imbalances at a Turning Point?" In: *World Economic Outlook.*

Ito, Hiro and Robert N. McCauley (2019). "A key currency view of global imbalances". In: *Journal of International Money and Finance* 94.C, pp. 97–115.

Jiang, Zhengyang, Robert J. Richmond, and Tony Zhang (July 2022). *A Portfolio Approach to Global Imbalances.* NBER Working Papers 30253. National Bureau of Economic Research, Inc.

Joyce, Joseph P. (2021). "The sources of international investment income in emerging market economies". In: *Review of International Economics* 29.3, pp. 606–625.

Lane, Philip and Gian Maria Milesi-Ferretti (Aug. 2014). *Global Imbalances and External Adjustment after the Crisis.* IMF Working Papers 2014/151. International Monetary Fund.

Lane, Philip R and Gian Maria Milesi-Ferretti (2004). "Financial globalization and exchange rates". In: *Available at SSRN 654529.*

Lane, Philip R. and Gian Maria Milesi-Ferretti (2018). "The External Wealth of Nations Revisited: International Financial Integration in the Aftermath of the Global Financial Crisis". In: *IMF Economic Review* 66.1, pp. 189–222.

Milesi-Ferretti, Gian Maria (2022a). "2021 was a year of strong global capital flows: Updating External Wealth of Nations database with year-end 2021 data". In: *Brookings Institution.*

Milesi-Ferretti, Gian Maria (2022b). "Many Creditors, One Large Debtor: Understanding the Buildup of Global Stock Imbalances after the Global Financial Crisis". In: *IMF 23 Jacques Pollack research conference.*

Milesi-Ferretti, Gian Maria (2022c). "The external wealth of nations database". In: *Brookings Institution.*

Obstfeld, Maurice and Kenneth Rogoff (2007). "The unsustainable US current account position revisited". In: *G7 current account imbalances: Sustainability and adjustment.* University of Chicago Press, pp. 339–376.

Schuler, Tobias and Yiqiao Sun (Aug. 2022). *The current account and monetary policy in the euro area.* Working Paper Series 2696. European Central Bank.

Tille, Cédric (2008). "Financial integration and the wealth effect of exchange rate fluctuations". In: *Journal of International Economics* 75.2, pp. 283–294.

Table 1: Data and Sources

Variable	Source	Time period / Frequency
Current Account Data in USD	IMF BOPS	1990-2022 / annual, quarterly
Exchange Rates	IMF IFS	1990-2022 / annual, quarterly
Nominal and Real GDP	IMF IFS IMF WEO UNCTAD	1990-2021 / annual, quarterly 2022 / annual 1990-2022 / annual
Trade Weights	BIS ITC	1993-2018/ multi-annual 2001- / annual
Currency of Invoicing of Assets and Liabilities	Benetrix et al. 2020	1990-2017 / annual
Assets and Liabilities, decomposition	External Wealth of Nation Database	1990-2021 / annual
Short-term interest rates (3-month Money Market & CB Policy rate)	IMF IFS OECD	1990-2022 / annual, quarterly 1990-2022 / annual, quarterly
Long-term interest rates (10-year Government Bond Yield)	IMF IFS OECD	1990-2022 / annual, quarterly 1990-2022 / annual, quarterly
VIX	FRED	1990-2022 / daily
Broad US Index	FED Board Author's calculation	2006-2022 / monthly 1990-2006 / monthly
CPI	IMF IFS UNCTAD OECD	1990-2022 / annual, quarterly 1990-2022 / annual, quarterly 1990-2022 / annual, quarterly
S&P 500 Index	Macrotrends: https://www.macrotrends.net/2324/sp-500-historical-chart-data	1990-2022/ annual
S&P 500 Dividend Yield	https://www.multpl.com/s-p-500-dividend-yield/table/by-year	1990-2022 / annual

Table 2: List of Countries

	Advanced Economies		**Emerging Economies**	
Australia	Japan	Argentina	Pakistan
Austria	Korea	Brazil	Peru
Belgium	Netherlands	Chile	Philippines
Canada	New Zealand	Colombia	Poland
Czech Rep.	Norway	Egypt	Russia
Denmark	Portugal	Guatemala	South Africa
Finland	Spain	Hungary	Thailand
France	Sweden	India	Tunisia
Germany	Switzerland	Indonesia	Turkey
Greece	United Kingdom	Malaysia	Uruguay
Israel	United States	Mexico	
Italy		Morocco	

Table 3: Drivers of (ln) Yields - All Countries

	Investment Income		FDI		Portfolio (total)		Portfolio Equity		Portfolio Debt		Other Investment		Reserves
	Receipts (1)	Payments (2)	Receipts (3)	Payments (4)	Receipts (5)	Payments (6)	Receipts (7)	Payments (8)	Receipts (9)	Payments (10)	Receipts (11)	Payments (12)	Receipts (13)
L.ln Yield	0.638*** (0.0436)	0.685*** (0.0492)	0.494*** (0.0449)	0.605*** (0.0531)	0.624*** (0.0552)	0.708*** (0.0781)	0.589*** (0.0794)	0.571*** (0.0594)	0.659*** (0.0837)	0.736*** (0.0475)	0.832*** (0.0514)	0.621*** (0.0283)	0.613*** (0.0410)
Δln $-Denomination XR (increase = $ depreciation)	0.672*** (0.232)	0.236 (0.196)	0.0520 (0.594)	-0.638*** (0.232)	1.209** (0.485)	1.778*** (0.506)	0.980 (0.741)	0.992** (0.399)	0.333 (0.337)	1.391*** (0.358)	0.837** (0.358)	1.188*** (0.332)	0.185 (0.568)
L.Δln $-Denomination XR (increase = $ depreciation)	-0.131 (0.108)	-0.0382 (0.0772)	-0.101 (0.152)	0.165 (0.136)	-0.278 (0.307)	-0.0859 (0.250)	-0.210 (0.140)	0.0713 (0.174)	-0.227 (0.217)	-0.0292 (0.139)	-0.219 (0.144)	-0.355** (0.152)	-0.130 (0.0802)
Δln USD Broad Index (increase = $ appreciation)	-0.456 (0.298)	-1.272*** (0.265)	-0.929 (0.651)	-2.158*** (0.289)	-0.577 (0.554)	0.135 (0.454)	-0.826 (0.729)	0.152 (0.755)	-0.410 (0.489)	0.338 (0.237)	0.297 (0.386)	0.193 (0.343)	0.241 (0.678)
US 3-month interest rate	0.0479*** (0.00788)	0.0485*** (0.00789)	0.00586 (0.0151)	-0.0253*** (0.00803)	0.0205 (0.0153)	-0.0139* (0.00796)	-0.00873 (0.0223)	-0.0438** (0.0170)	0.0115 (0.0134)	-0.00852 (0.00895)	0.0366*** (0.00906)	0.0877*** (0.00689)	0.109*** (0.0228)
US 10-year treasury yield	0.0138 (0.0100)	0.00389 (0.00942)	0.00653 (0.0195)	0.0371*** (0.0136)	0.0650*** (0.0213)	0.0601*** (0.0172)	0.0537* (0.0291)	0.0839*** (0.0261)	0.102*** (0.0200)	0.0818*** (0.0159)	0.0839*** (0.0188)	0.0969*** (0.0231)	0.147*** (0.0287)
VIX (normalized)	-0.0280** (0.0109)	-0.0570*** (0.0106)	-0.0154 (0.0227)	-0.0508*** (0.00879)	-0.0229 (0.0245)	-0.0321*** (0.0110)	-0.0270 (0.0428)	-0.0481*** (0.0132)	-0.0559** (0.0219)	-0.0223*** (0.00799)	-0.155*** (0.0176)	-0.0380*** (0.0100)	-0.0848*** (0.0223)
Inflation(Δln CPI)	0.288 (0.577)	0.382** (0.162)	0.662 (1.095)	1.082*** (0.330)	-0.833 (1.042)	0.249 (0.288)	0.637 (2.264)	1.260*** (0.300)	0.881 (1.200)	-0.0236 (0.214)	12.63*** (1.519)	0.293 (0.211)	4.813** (2.008)
RGDP growth	0.0296*** (0.00583)	0.359** (0.150)	0.0553*** (0.0158)	1.577*** (0.349)	-0.00137 (0.0113)	0.424* (0.240)	-0.0133 (0.0231)	1.158** (0.562)	-0.0136 (0.0108)	0.0971 (0.206)	-0.0373*** (0.00971)	0.0745 (0.253)	-0.0406*** (0.0101)
L. Capital Gains	-0.00286*** (0.000795)	-0.00468*** (0.00106)	-0.000106 (0.0000995)	-0.00269*** (0.000945)	-0.00301 (0.00235)	-0.00634*** (0.000917)	-0.00104** (0.000384)	-0.00411*** (0.000659)	-0.000290*** (0.0000261)	-0.00398*** (0.00110)	-0.00223 (0.00201)	-0.00668*** (0.00140)	-0.000402 (0.00369)
Constant	-1.536*** (0.156)	-1.353*** (0.193)	-1.789*** (0.155)	-1.255*** (0.167)	-1.505*** (0.196)	-1.153*** (0.293)	-1.797*** (0.355)	-1.815*** (0.265)	-1.401*** (0.265)	-1.091*** (0.174)	-1.344*** (0.222)	-1.976*** (0.165)	-2.382*** (0.197)
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1056	1059	1011	1044	1014	1044	863	891	922	981	1025	1024	560
Countries	45	45	45	45	45	45	42	41	43	44	44	44	31
Adj. (R{2})	0.721	0.693	0.362	0.546	0.527	0.616	0.376	0.378	0.584	0.746	0.824	0.790	0.764

Notes: OLS panel estimates, errors clustered at the country level. *, **, *** indicates significance at the 10, 5 and 1% level respectively. Inflation and real GDP growth are values for the rest of the world in the Receipt regressions, and values for the country in the Payment regressions.

Table 4: Drivers of (ln) Yields - All Countries, no VIX index

	Investment Income		FDI		Portfolio (total)		Portfolio Equity		Portfolio Debt		Other Investment		Reserves
	Receipts (1)	Payments (2)	Receipts (3)	Payments (4)	Receipts (5)	Payments (6)	Receipts (7)	Payments (8)	Receipts (9)	Payments (10)	Receipts (11)	Payments (12)	Receipts (13)
L.ln Yield	0.622*** (0.0434)	0.646*** (0.0439)	0.495*** (0.0424)	0.603*** (0.0550)	0.598*** (0.0576)	0.727*** (0.0779)	0.574*** (0.0826)	0.586*** (0.0612)	0.602*** (0.0896)	0.739*** (0.0473)	0.780*** (0.0690)	0.568*** (0.0595)	0.574*** (0.0519)
Δln $-Denomination XR (increase = $ depreciation)	0.810*** (0.245)	0.233 (0.192)	0.112 (0.532)	-0.476* (0.244)	1.289*** (0.438)	1.667*** (0.492)	0.933 (0.823)	0.890** (0.402)	0.356 (0.384)	1.232*** (0.352)	1.540*** (0.372)	1.029*** (0.339)	0.598 (0.615)
L.Δln $-Denomination XR (increase = $ depreciation)	-0.223* (0.127)	-0.0757 (0.0853)	-0.0885 (0.152)	0.163 (0.148)	-0.420 (0.328)	-0.1000 (0.297)	-0.0963 (0.144)	0.0543 (0.206)	-0.269 (0.258)	0.0431 (0.128)	-0.233 (0.159)	-0.0731 (0.168)	-0.195* (0.109)
Δln USD Broad Index (increase = $ appreciation)	-0.246 (0.325)	-1.265*** (0.255)	-0.970* (0.554)	-2.065*** (0.258)	-0.371 (0.496)	0.0199 (0.424)	-0.811 (0.814)	-0.173 (0.649)	-0.367 (0.643)	0.182 (0.222)	1.231** (0.477)	0.196 (0.343)	0.997 (0.712)
US 3-month interest rate	0.0533*** (0.00768)	0.0547*** (0.00809)	0.00595 (0.0121)	-0.0138* (0.00809)	0.0288** (0.0138)	-0.0134 (0.00860)	-0.0136 (0.0168)	-0.0449** (0.0177)	0.0241* (0.0125)	-0.00559 (0.00998)	0.0723*** (0.00935)	0.0613*** (0.00910)	0.122*** (0.0247)
US 10-year treasury yield	0.00527 (0.0111)	-0.00693 (0.00957)	0.00286 (0.0201)	0.0195 (0.0143)	0.0579*** (0.0206)	0.0568*** (0.0210)	0.0417 (0.0303)	0.0838*** (0.0269)	0.0942*** (0.0226)	0.0738*** (0.0172)	0.0302 (0.0255)	0.128*** (0.0432)	0.136*** (0.0333)
Inflation(Δln CPI)	0.756 (0.590)	0.200 (0.189)	0.0598 (0.996)	0.365 (0.235)	0.0889 (1.256)	0.107 (0.334)	-1.535 (2.392)	1.289** (0.518)	0.284 (1.056)	0.169 (0.203)	7.041*** (1.456)	1.167** (0.521)	5.493*** (1.854)
RGDP growth	0.0401*** (0.00644)	0.995*** (0.217)	0.0610*** (0.00909)	2.684*** (0.473)	0.00137 (0.0123)	0.527 (0.343)	-0.00338 (0.0136)	0.103 (0.768)	0.00583 (0.00810)	-0.0666 (0.259)	0.0320*** (0.0117)	-0.0706 (0.409)	-0.00976 (0.0109)
L. Capital Gains	-0.00287*** (0.000847)	-0.00482*** (0.00119)	-0.000117 (0.0000986)	-0.00293*** (0.00106)	-0.00287 (0.00231)	-0.00630*** (0.000938)	-0.00102*** (0.000372)	-0.00383*** (0.000706)	-0.000273*** (0.0000278)	-0.00381*** (0.00105)	-0.000992 (0.00175)	-0.00583*** (0.00143)	-0.00389 (0.00350)
Constant	-1.617*** (0.170)	-1.498*** (0.176)	-1.769*** (0.160)	-1.234*** (0.171)	-1.617*** (0.224)	-1.085*** (0.297)	-1.775*** (0.409)	-1.747*** (0.247)	-1.616*** (0.308)	-1.068*** (0.172)	-1.459*** (0.321)	-2.265*** (0.344)	-2.641*** (0.289)
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1009	1019	966	1004	966	1002	819	853	881	941	983	985	528
Countries	45	45	45	45	45	45	42	41	43	44	44	44	31
Adj. R^2	0.727	0.675	0.362	0.550	0.502	0.638	0.348	0.384	0.537	0.742	0.805	0.731	0.760

Notes: OLS panel estimates, errors clustered at the country level. *, **, *** indicates significance at the 10, 5 and 1% level respectively. Inflation and real GDP growth are values for the rest of the world in the Receipt regressions, and values for the country in the Payment regressions.

Table 5: Drivers of (ln) Yields - Advanced Economies

|	Investment Income		FDI		Portfolio		Portfolio Equity		Portfolio Debt		Other Investment		Reserves
	Receipts (1)	Payments (2)	Receipts (3)	Payments (4)	Receipts (5)	Payments (6)	Receipts (7)	Payments (8)	Receipts (9)	Payments (10)	Receipts (11)	Payments (12)	Receipts (13)
L.ln Yield	0.593*** (0.0520)	0.635*** (0.0491)	0.396*** (0.0417)	0.393*** (0.0569)	0.706*** (0.0502)	0.763*** (0.0188)	0.660*** (0.0698)	0.628*** (0.0754)	0.751*** (0.0448)	0.782*** (0.0239)	0.747*** (0.0254)	0.590*** (0.0346)	0.643*** (0.0537)
Δln $-Denomination XR (increase = $ depreciation)	0.568*** (0.193)	0.595*** (0.166)	-0.601 (0.462)	-0.509 (0.366)	0.780*** (0.230)	1.117*** (0.349)	0.441 (0.357)	0.350 (0.298)	0.680*** (0.230)	1.468*** (0.509)	1.257*** (0.371)	1.339*** (0.269)	-0.763 (0.666)
L.Δln $-Denomination XR (increase = $ depreciation)	0.0491 (0.114)	0.0686 (0.106)	-0.129 (0.130)	-0.00188 (0.143)	-0.235 (0.260)	-0.138 (0.108)	-0.0156 (0.0832)	0.0529 (0.228)	-0.248 (0.219)	-0.300*** (0.103)	-0.123 (0.130)	-0.325** (0.129)	-0.118 (0.0847)
Δln USD Broad Index (increase = $ appreciation)	-0.708*** (0.188)	-0.976*** (0.168)	-2.139*** (0.586)	-1.981*** (0.410)	-0.610*** (0.205)	-0.394* (0.224)	-1.561*** (0.273)	-0.781*** (0.298)	-0.235 (0.274)	0.288 (0.279)	0.134 (0.435)	0.495 (0.404)	-1.220 (0.901)
US 3-month interest rate	0.0182*** (0.00627)	0.0145** (0.00614)	0.00730 (0.0160)	0.0180 (0.0146)	-0.0109 (0.00980)	-0.00855 (0.00948)	-0.00201 (0.00945)	-0.0277** (0.0106)	-0.0136 (0.00998)	0.00216 (0.0116)	0.0378*** (0.00989)	0.0688*** (0.0112)	0.0762*** (0.0235)
US 10-year treasury yield	0.0386*** (0.0101)	0.0204 (0.0141)	-0.00117 (0.0235)	-0.000789 (0.0253)	0.0650*** (0.0203)	0.0325** (0.0149)	0.00744 (0.0160)	-0.00291 (0.0216)	0.0938*** (0.0164)	0.0636*** (0.0190)	0.109*** (0.0223)	0.115** (0.0409)	0.159*** (0.0297)
VIX (normalized)	-0.0287*** (0.00977)	-0.0504*** (0.00785)	-0.0600** (0.0253)	-0.0379** (0.0147)	-0.0393*** (0.00820)	-0.0360*** (0.00965)	-0.0642*** (0.0144)	-0.0664*** (0.0125)	-0.0460*** (0.0115)	-0.0372*** (0.00922)	-0.113*** (0.0126)	-0.0729*** (0.0135)	-0.0929*** (0.0271)
Inflation(Δln CPI)	0.189 (0.616)	1.506*** (0.341)	1.306 (1.199)	1.120 (0.754)	-0.482 (0.628)	1.250* (0.605)	-0.146 (0.865)	0.398 (0.695)	1.614* (0.840)	1.524 (0.898)	12.12*** (1.618)	5.927*** (1.122)	5.088* (2.892)
RGDP growth	0.0226*** (0.00549)	1.128*** (0.311)	0.0339** (0.0147)	2.872*** (0.451)	-0.00801 (0.00522)	1.148*** (0.375)	-0.00679 (0.00654)	1.419*** (0.477)	-0.0171*** (0.00442)	0.0609 (0.594)	-0.0283*** (0.00774)	-0.737 (0.763)	-0.0521*** (0.0163)
L. Capital Gains	-0.00302** (0.00133)	-0.00450*** (0.00138)	-0.00147 (0.00100)	-0.00165 (0.00112)	-0.00465*** (0.00161)	-0.00663*** (0.000417)	-0.00626*** (0.000561)	-0.00535*** (0.00100)	-0.00294* (0.00144)	-0.00552*** (0.00121)	-0.00537*** (0.00122)	-0.00539*** (0.00163)	-0.00353 (0.00314)
Domestic Long-term IR		-0.000109 (0.00431)		0.0334** (0.0130)		0.0143** (0.00589)		0.000892 (0.00510)		0.0186** (0.00884)		0.0139** (0.00649)	
Domestic Short-term IR		0.00403 (0.00884)		-0.0254 (0.0184)		0.00745 (0.0134)		0.0340** (0.0160)		-0.00275 (0.0114)		0.0361** (0.0163)	
Constant	-1.644*** (0.180)	-1.440*** (0.182)	-1.921*** (0.146)	-1.940*** (0.184)	-1.201*** (0.201)	-1.031*** (0.0740)	-1.259*** (0.254)	-1.338*** (0.238)	-1.148*** (0.170)	-1.078*** (0.0962)	-1.769*** (0.160)	-2.424*** (0.252)	-2.212*** (0.214)
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	542	541	527	531	542	541	526	520	529	529	542	541	324
Countries	23	23	23	23	23	23	23	23	23	23	23	23	17
Adj. R²	0.790	0.753	0.344	0.400	0.722	0.798	0.532	0.549	0.799	0.862	0.881	0.864	0.773

Notes: OLS panel estimates, errors clustered at the country level. *, **, *** indicates significance at the 10, 5 and 1% level respectively. Inflation and real GDP growth are values for the rest of the world in the Receipt regressions, and values for the country in the Payment regressions.

Table 6: Drivers of (ln) Yields - Emerging Economies

	Investment Income		FDI		Portfolio (total)		Portfolio Equity		Portfolio Debt		Other Investment		Reserves
	Receipts (1)	Payments (2)	Receipts (3)	Payments (4)	Receipts (5)	Payments (6)	Receipts (7)	Payments (8)	Receipts (9)	Payments (10)	Receipts (11)	Payments (12)	Receipts (13)
L.ln Yield	0.636*** (0.0571)	0.694*** (0.0598)	0.525*** (0.0525)	0.688*** (0.0586)	0.603*** (0.0569)	0.695*** (0.0966)	0.583*** (0.100)	0.533*** (0.0755)	0.625*** (0.104)	0.667*** (0.104)	0.856*** (0.0613)	0.644*** (0.0499)	0.567*** (0.0407)
Δln \$-Denomination XR (increase = \$ depreciation)	0.813 (0.583)	0.0358 (0.368)	0.885 (1.380)	-0.670* (0.383)	4.626** (2.162)	2.848** (1.257)	4.698* (2.565)	2.535* (1.245)	0.986 (1.673)	1.516*** (0.487)	0.579 (1.292)	0.894* (0.454)	1.452 (1.500)
L.Δln \$-Denomination XR (increase = \$ depreciation)	-0.489* (0.242)	-0.0675 (0.132)	0.833 (0.564)	0.399** (0.171)	0.00347 (1.006)	-0.152 (0.733)	0.277 (1.008)	0.416 (0.411)	0.551 (1.200)	0.749** (0.337)	-0.0103 (0.405)	-0.122 (0.294)	-0.298 (1.505)
Δln USD Broad Index (increase = \$ appreciation)	-0.328 (0.466)	-1.443*** (0.485)	-0.120 (1.074)	-2.189*** (0.406)	0.282 (1.108)	0.758 (0.826)	0.407 (1.476)	1.480 (1.643)	-0.579 (0.858)	0.498 (0.376)	0.303 (0.698)	0.255 (0.465)	1.520 (0.877)
US 3-month interest rate	0.0809*** (0.0113)	0.0800*** (0.0114)	0.00440 (0.0276)	-0.0386*** (0.0125)	0.0670** (0.0320)	-0.0132 (0.0168)	0.0109 (0.0566)	-0.0707* (0.0386)	0.0494 (0.0287)	-0.0169 (0.0136)	0.0344** (0.0132)	0.0770*** (0.0104)	0.157*** (0.0411)
US 10-year treasury yield	-0.00641 (0.0166)	-0.0167 (0.0156)	0.0128 (0.0324)	0.0516** (0.0205)	0.0441 (0.0425)	0.0493* (0.0282)	0.0741 (0.0741)	0.169*** (0.0578)	0.0896** (0.0375)	0.0642*** (0.0222)	0.0765** (0.0298)	0.0402** (0.0159)	0.138** (0.0565)
VIX (normalized)	-0.0252 (0.0203)	-0.0621*** (0.0188)	0.0222 (0.0361)	-0.0402*** (0.0117)	0.00239 (0.0520)	-0.0312 (0.0204)	0.0504 (0.111)	-0.0259 (0.0285)	-0.0720 (0.0449)	-0.0174 (0.0126)	-0.182*** (0.0317)	-0.0471*** (0.0159)	-0.0735* (0.0384)
Inflation(Δln CPI)	0.215 (1.008)	0.191 (0.137)	0.360 (1.984)	0.835*** (0.277)	-0.499 (2.078)	0.173 (0.298)	1.153 (5.385)	1.227** (0.497)	1.045 (2.178)	-0.0327 (0.234)	11.75*** (2.463)	0.175 (0.179)	3.996 (2.440)
RGDP growth	0.0353*** (0.00996)	0.152 (0.164)	0.0703** (0.0288)	1.208*** (0.322)	0.0139 (0.0225)	0.375 (0.296)	0.00623 (0.0584)	1.167 (0.879)	-0.00638 (0.0233)	0.146 (0.269)	-0.0447** (0.0191)	0.0977 (0.194)	-0.0297* (0.0149)
L. Capital Gains	-0.00327*** (0.000905)	-0.00565*** (0.00169)	-0.000103 (0.0000973)	-0.00356*** (0.00100)	-0.00270 (0.00272)	-0.00602*** (0.00122)	-0.000818* (0.000441)	-0.00352*** (0.000794)	-0.000288*** (0.0000324)	-0.00360*** (0.000965)	-0.00185 (0.00209)	-0.00665*** (0.00176)	0.00870 (0.0121)
Constant	-1.603*** (0.213)	-1.416*** (0.249)	-1.836*** (0.216)	-1.002*** (0.186)	-1.590*** (0.228)	-1.091*** (0.341)	-2.157*** (0.580)	-2.277*** (0.445)	-1.381*** (0.287)	-1.097*** (0.319)	-1.172*** (0.261)	-1.592*** (0.203)	-2.613*** (0.285)
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	514	517	484	512	472	502	337	370	393	451	483	482	236
Countries	22	22	22	22	22	22	19	18	20	21	21	21	14
Adj. (R^2)	0.710	0.692	0.377	0.642	0.510	0.562	0.363	0.349	0.532	0.570	0.797	0.699	0.758

Notes: OLS panel estimates, errors clustered at the country level. *, **, *** indicates significance at the 10, 5 and 1% level respectively. Inflation and real GDP growth are values for the rest of the world in the Receipt regressions, and values for the country in the Payments regressions. We do not include domestic interest rates for the Payments regressions due to data availability issues in EMEs.

Figure 1: International integration (receipts + payments, % GDP)
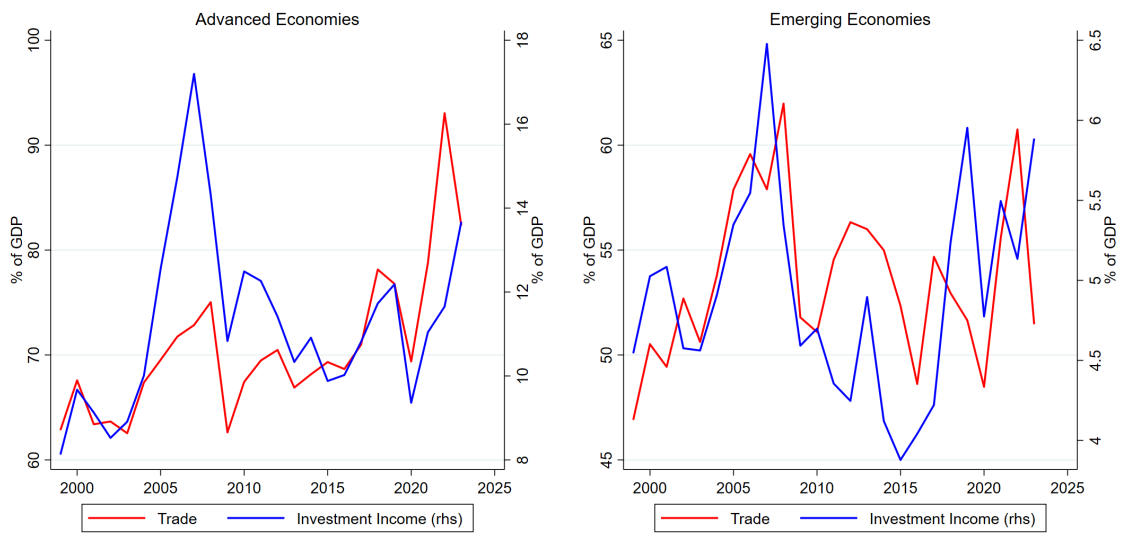
Note: Sum of receipts and payments flows in the balance of payments, trade (red line, left scale) and investment income (blue line, right scale).

Figure 2: Net Investment Income and Net International Investment Position (averages % GDP)
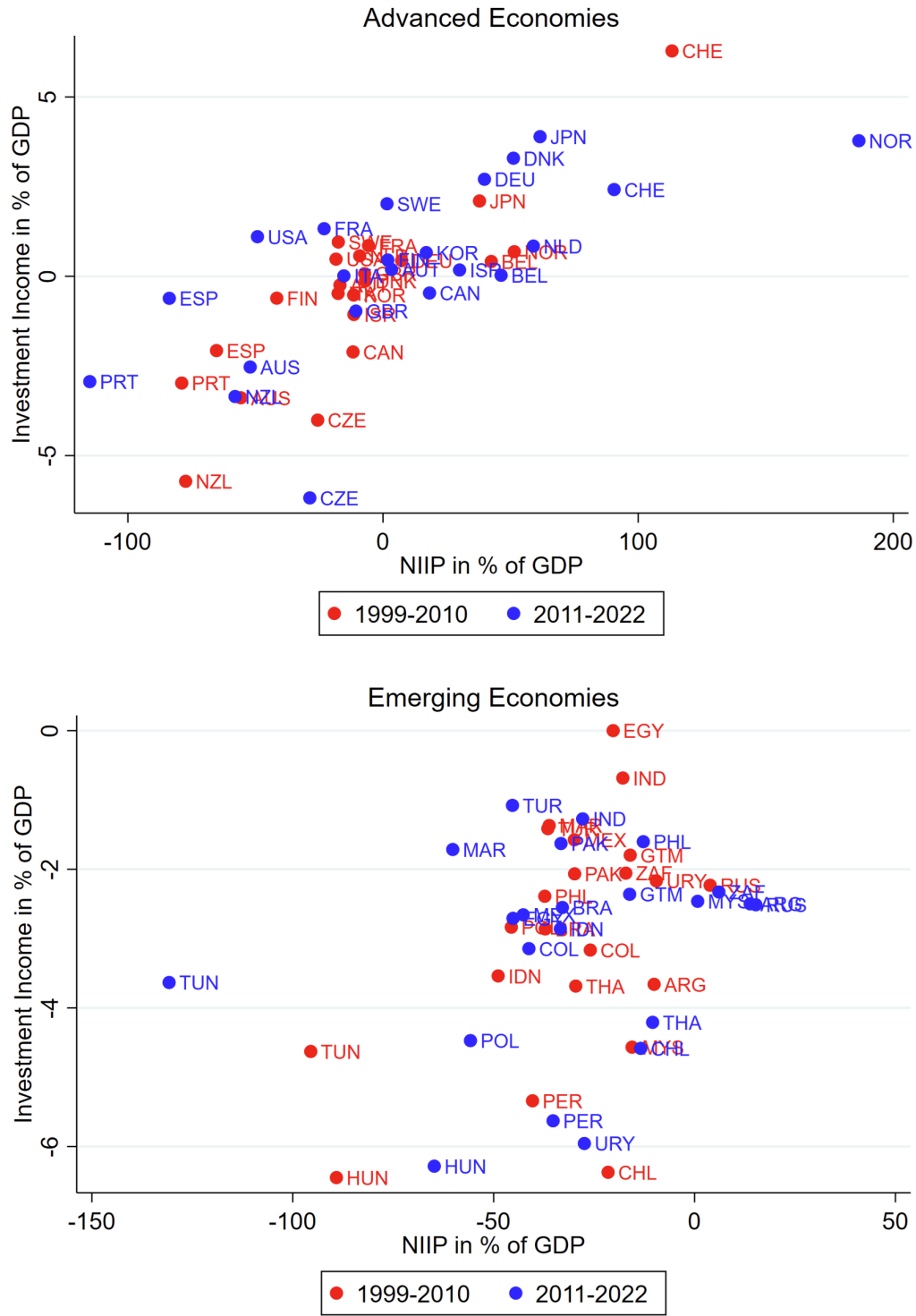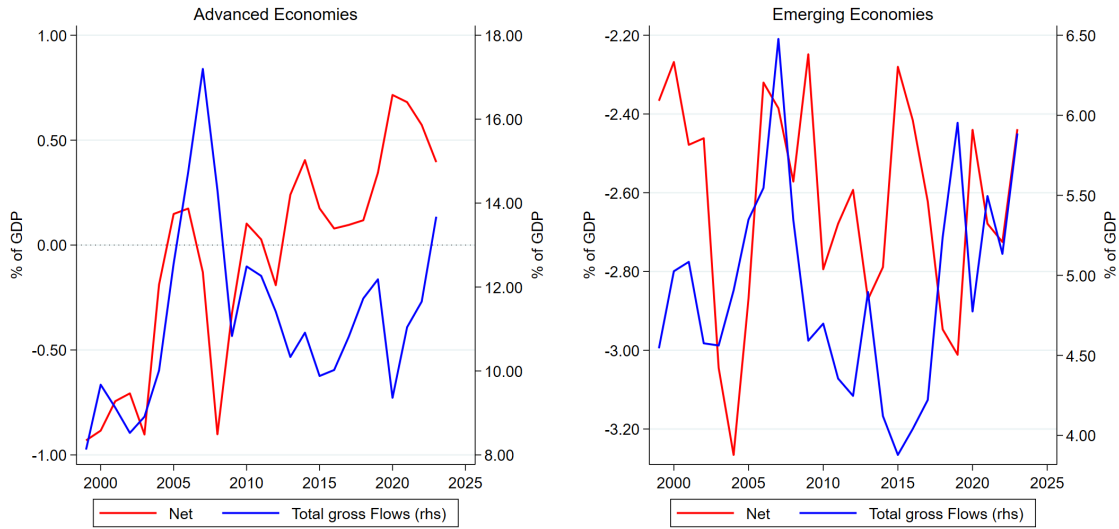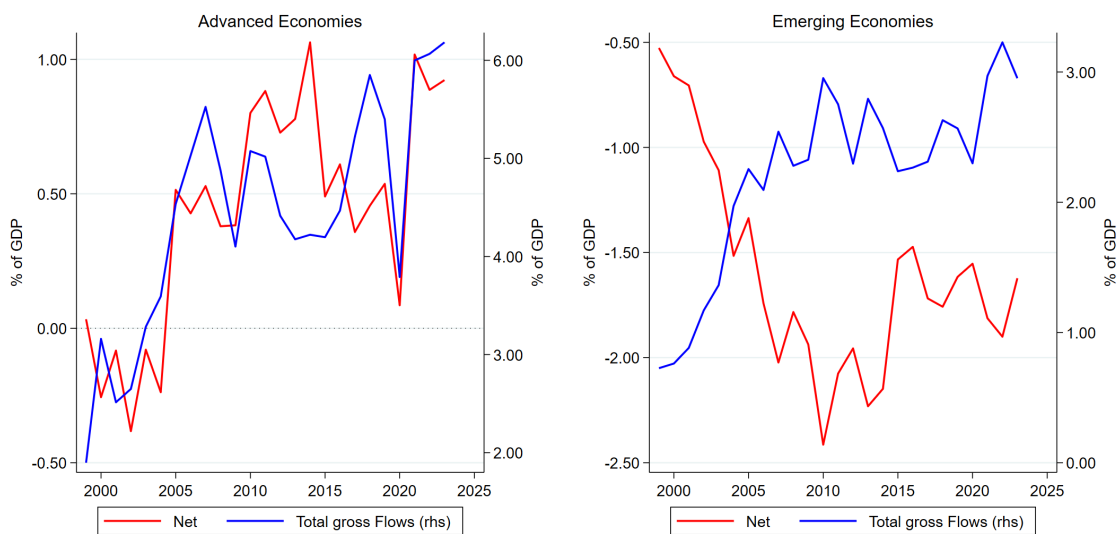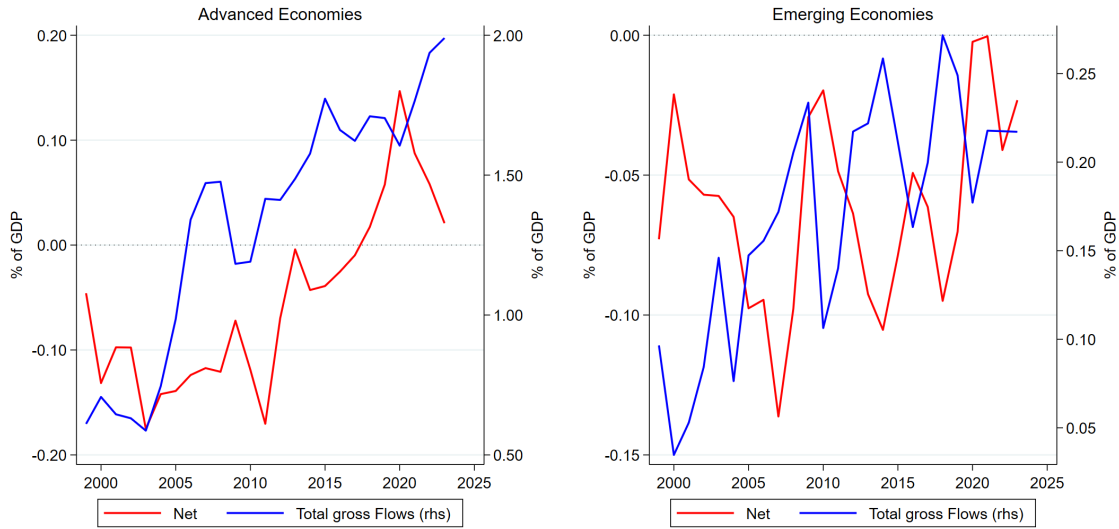
Figure 3: Gross and net income flows, total (% GDP)

Note: Difference between receipts and payments income flows (red line, left scale) and sum of receipts and payments income flows (blue line, right scale).

Figure 4: Gross and net income flows, FDI (% GDP)

Note: Difference between receipts and payments income flows (red line, left scale) and sum of receipts and payments income flows (blue line, right scale).

Figure 5: Gross and net income flows, Portfolio equity (% GDP)

Note: Difference between receipts and payments income flows (red line, left scale) and sum of receipts and payments income flows (blue line, right scale).

Figure 6: Gross and net income flows, Portfolio debt (% GDP)
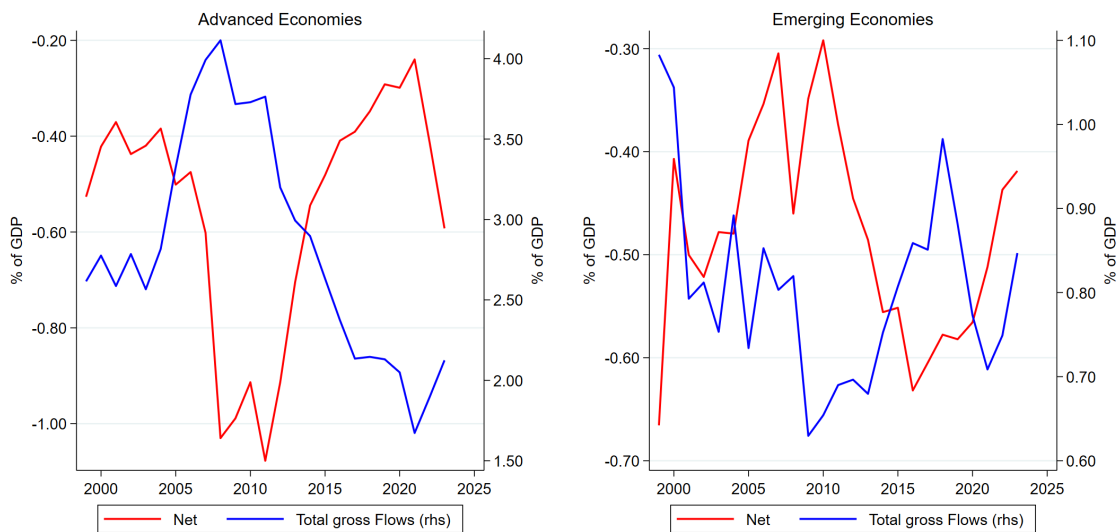
Note: Difference between receipts and payments income flows (red line, left scale) and sum of receipts and payments income flows (blue line, right scale).

Figure 7: Gross and net income flows, other investment (% GDP)
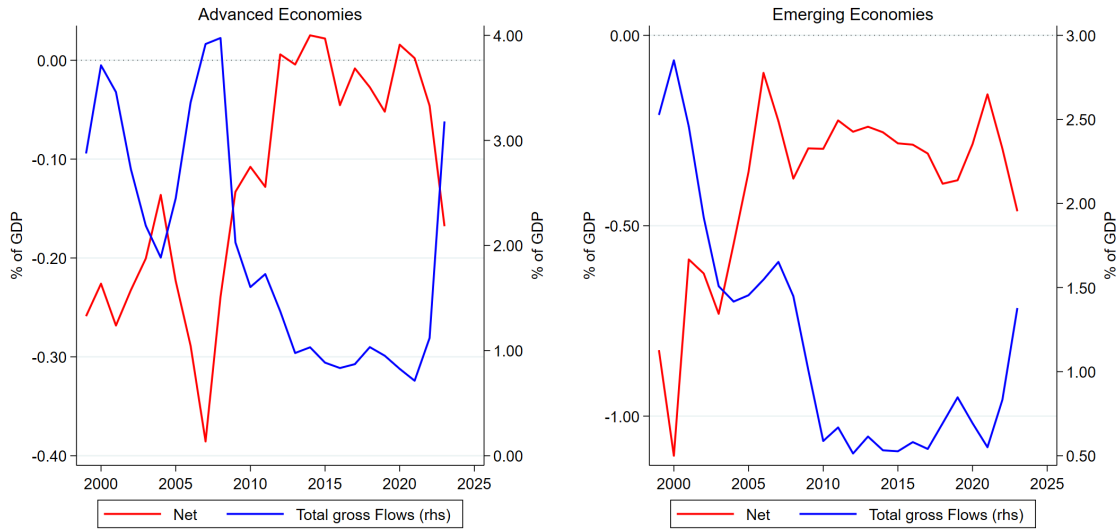
Note: Difference between receipts and payments income flows (red line, left scale) and sum of receipts and payments income flows (blue line, right scale).

Figure 8: Distribution of coefficient, VIX
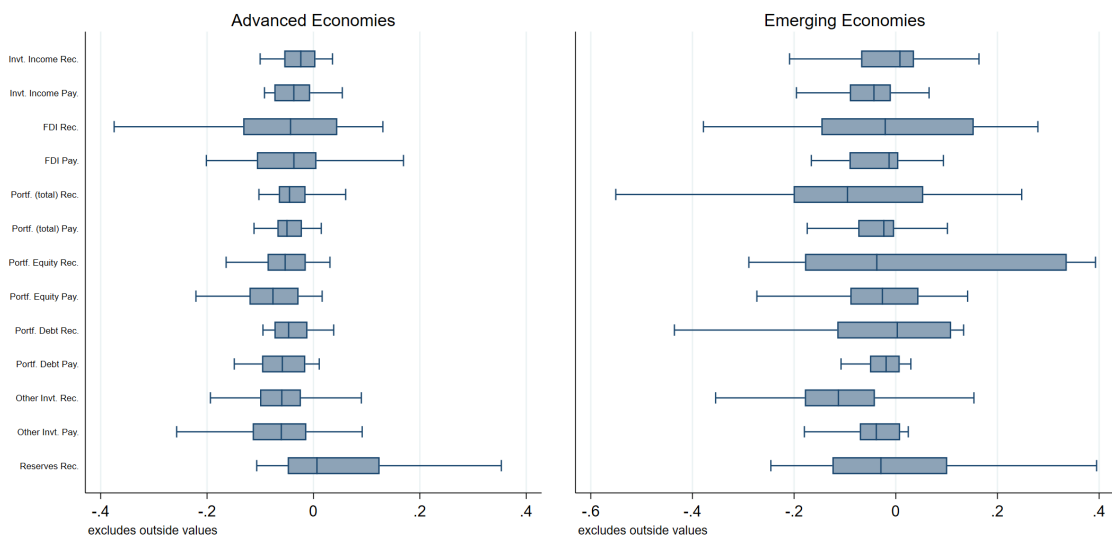
*Note:*Distribution of the coefficients estimated country-by-country for receipts and for payments for the specific type of asset income.

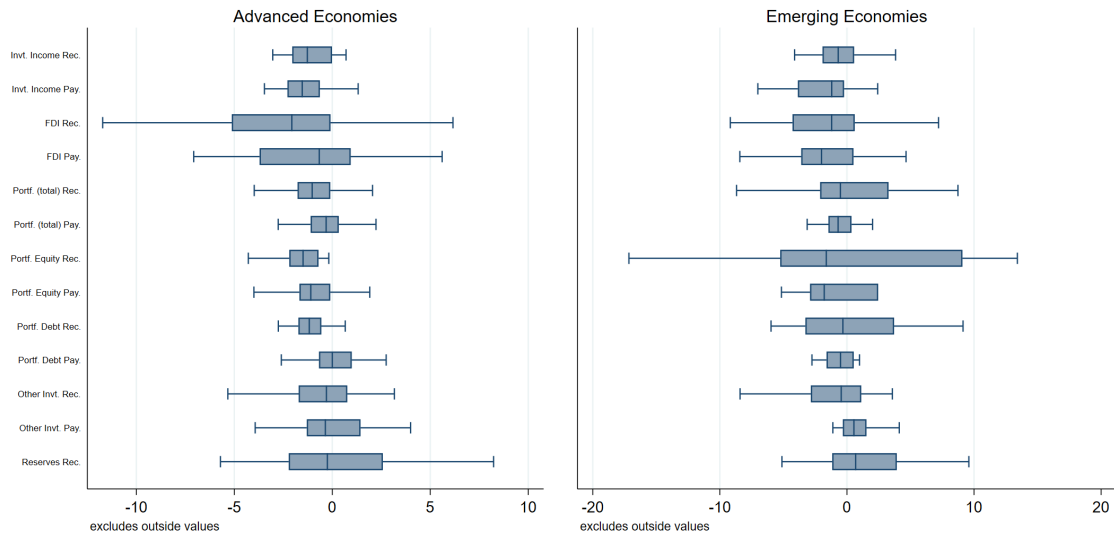Figure 9: Distribution of coefficient, short-term US interest rate
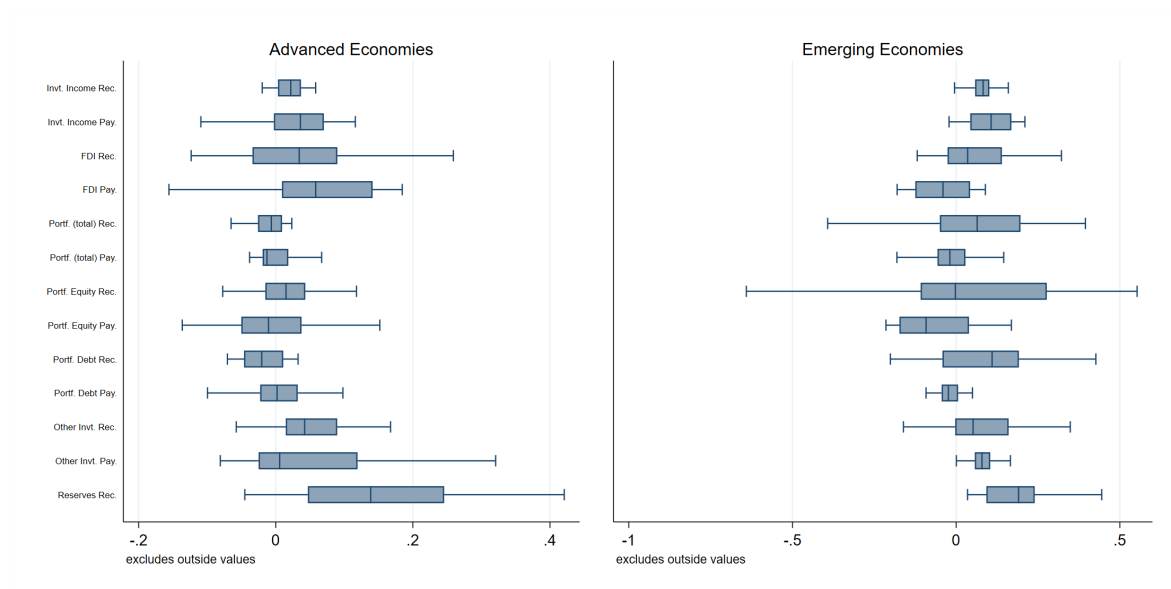
*Note:*Distribution of the coefficients estimated country-by-country for receipts and for payments for the specific type of asset income.

Figure 10: Distribution of coefficient, long-term US interest rate
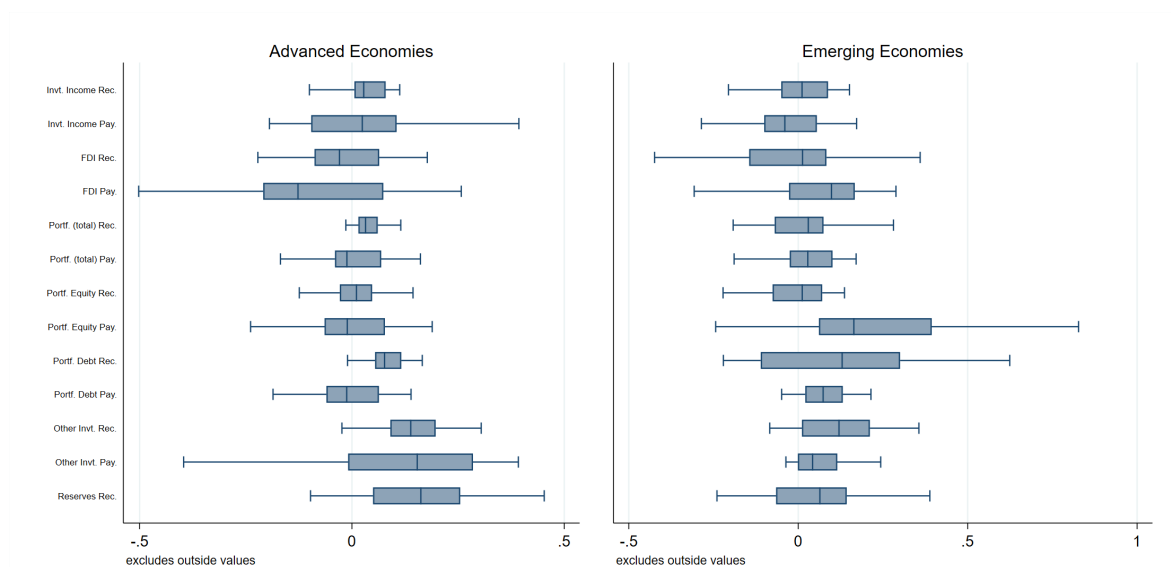
*Note:*Distribution of the coefficients estimated country-by-country for receipts and for payments for the specific type of asset income.

Figure 11: Distribution of coefficient, US dollar broad exchange rate

*Note:*Distribution of the coefficients estimated country-by-country for receipts and for payments for the specific type of asset income.
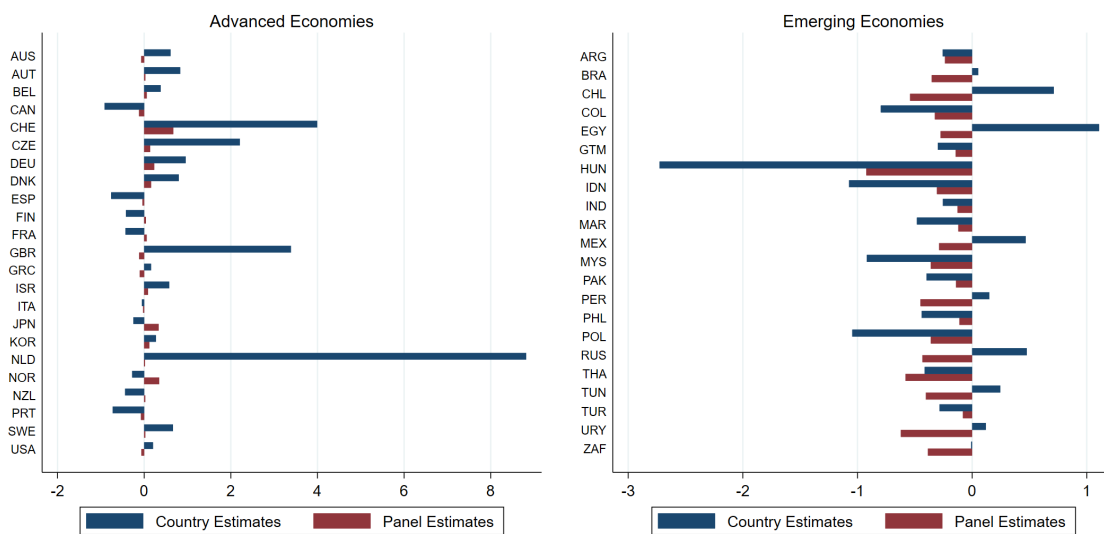
Figure 12: Impact of a VIX increase
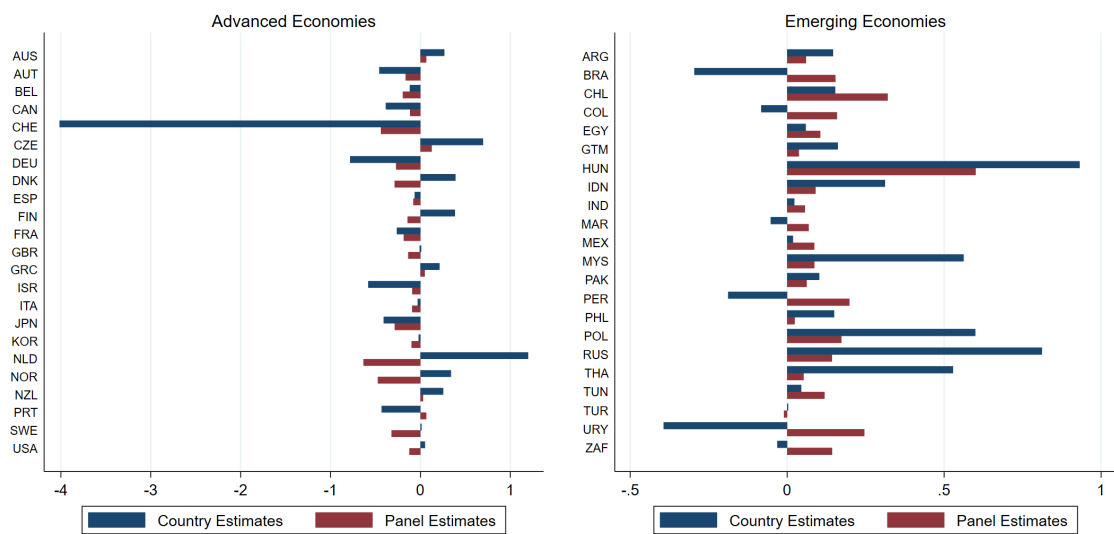
*Note:*Impact of a 1 standard error increase in the VIX index on the net primary asset income (% of GDP), based on country-specific coefficients (blue bars) or panel coefficients (red bars).

Figure 13: Impact of a US short-term interest rate increase
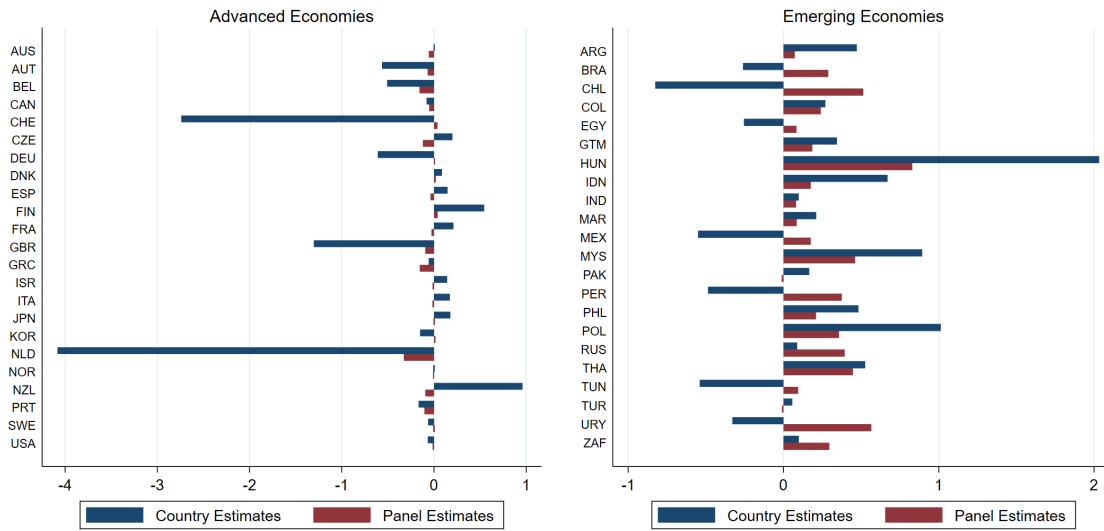
Note: Impact of a 1 percentage point increase in the US 3 months interest rate on the net primary asset income (% of GDP), based on country-specific coefficients (blue bars) or panel coefficients (red bars).

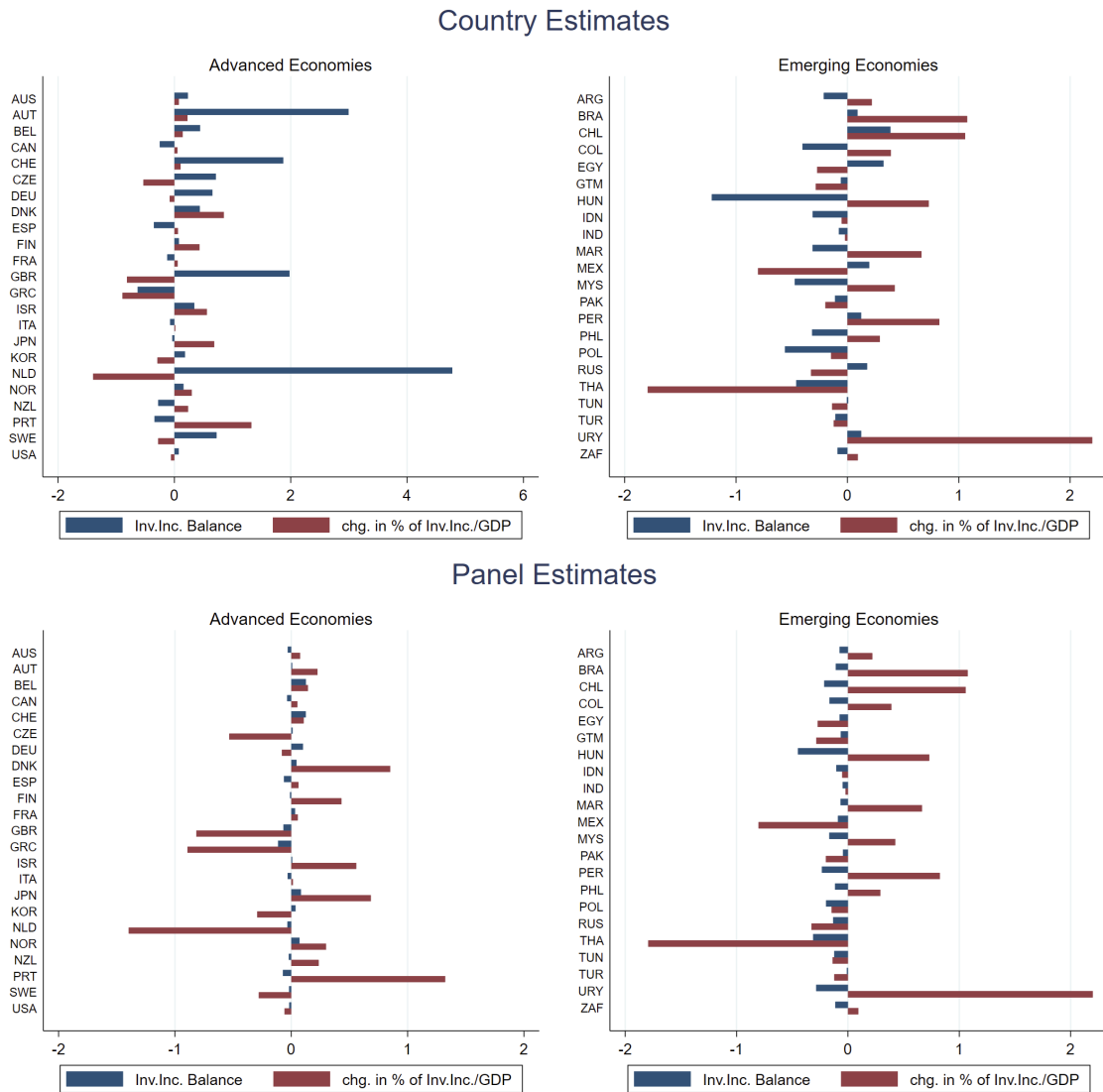Figure 14: Impact of a US long-term interest rate increase

Note: Impact of a 1 percentage point increase in the US 10 year interest rate on the net primary asset income (% of GDP), based on country-specific coefficients (blue bars) or panel coefficients (red bars).

Figure 15: Impact of a dollar appreciation
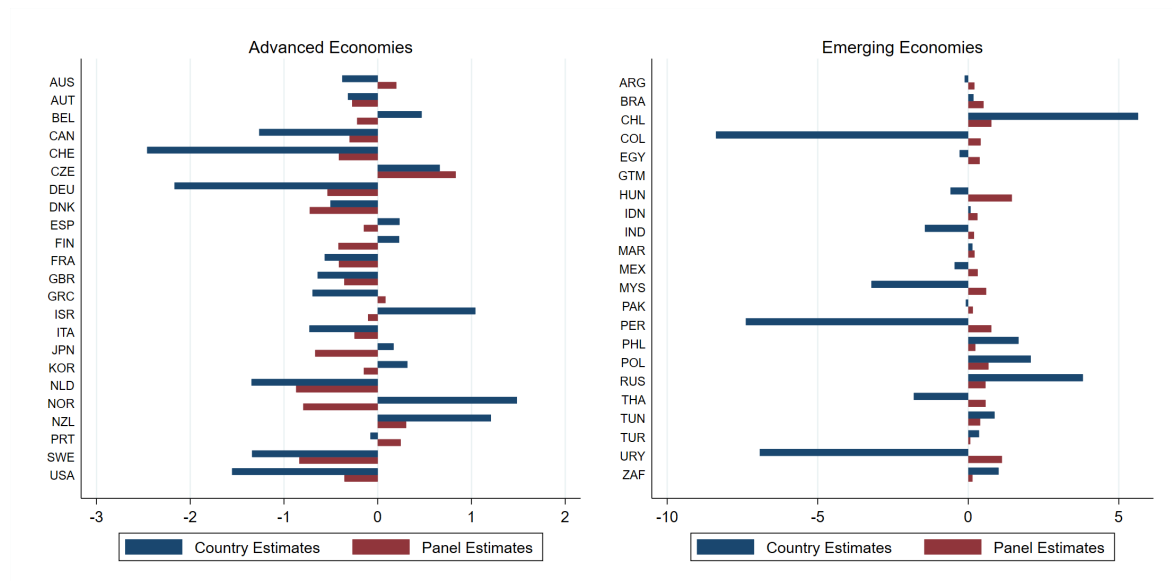
*Note:*Impact of a 10 percentage point appreciation of the US dollar against all currencies on the net primary asset income (% of GDP), based on country-specific coefficients (blue bars) or panel coefficients (red bars).

Figure 16: Taper Tantrum

Country Estimates

Advanced Economies

Emerging Economies

Panel Estimates

Advanced Economies

Emerging Economies

*Note:*Impact of the 2012-2013 increase of US short and long-term interest rates on the net primary asset income (% of GDP), estimated effect (blue bar, based on country-specific coefficients (top panel) or panel coefficients (bottom panel), and observed 2012-2013 change in the net primary asset income (red bar, % of GDP).

49

## Figure 17: Impact of rising US interest rates since 2021
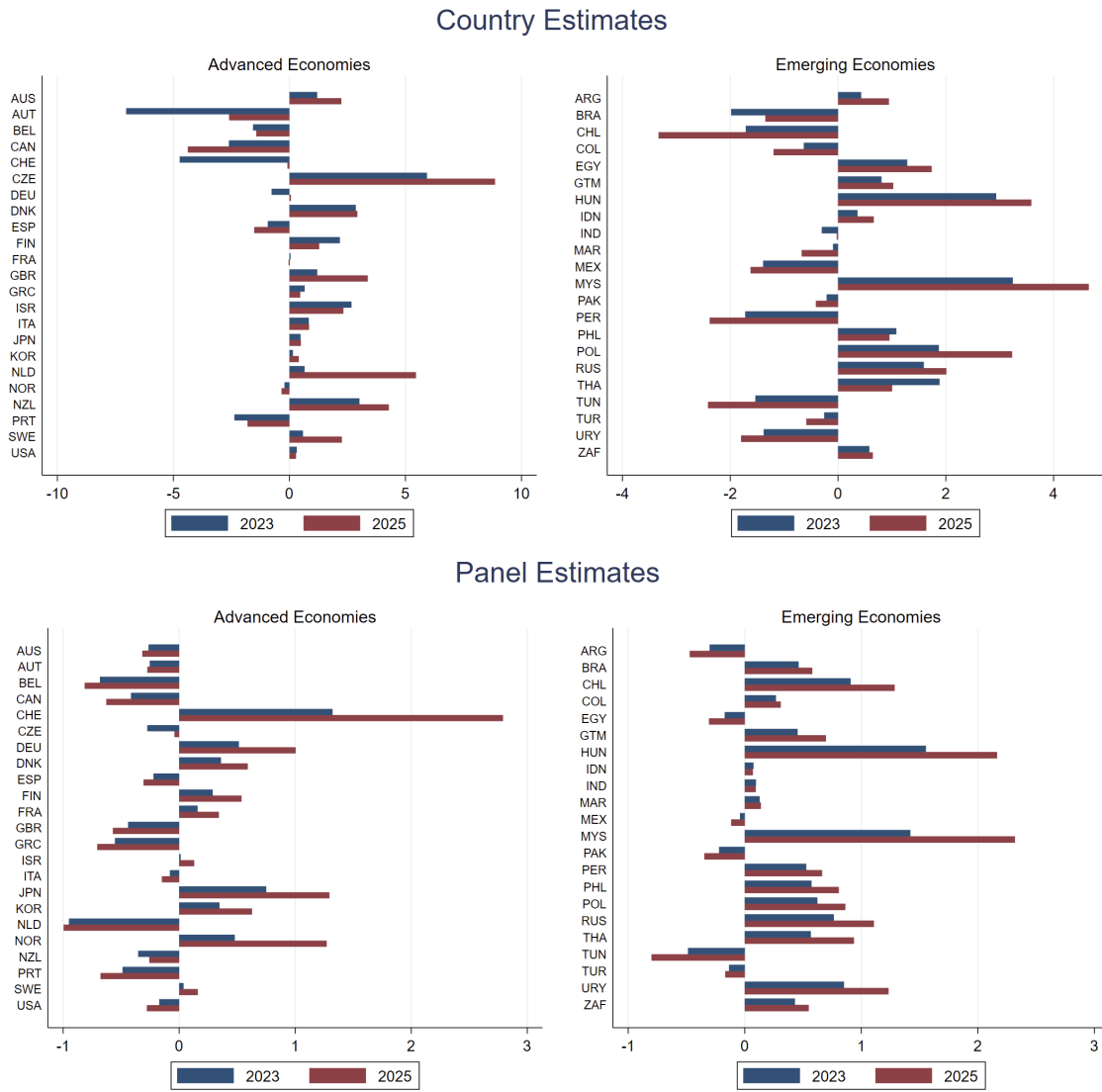
Note: Impact of the actual and expected increase of US short and long-term interest rates since 2021 on the net primary asset income (% of GDP), in 2023 (red bars) and 2025 (blue bars). Estimates based on country-specific coefficients (top panel) or panel coefficients (bottom panel).

Figure 18: Impact of rising US and domestic interest rates since 2021
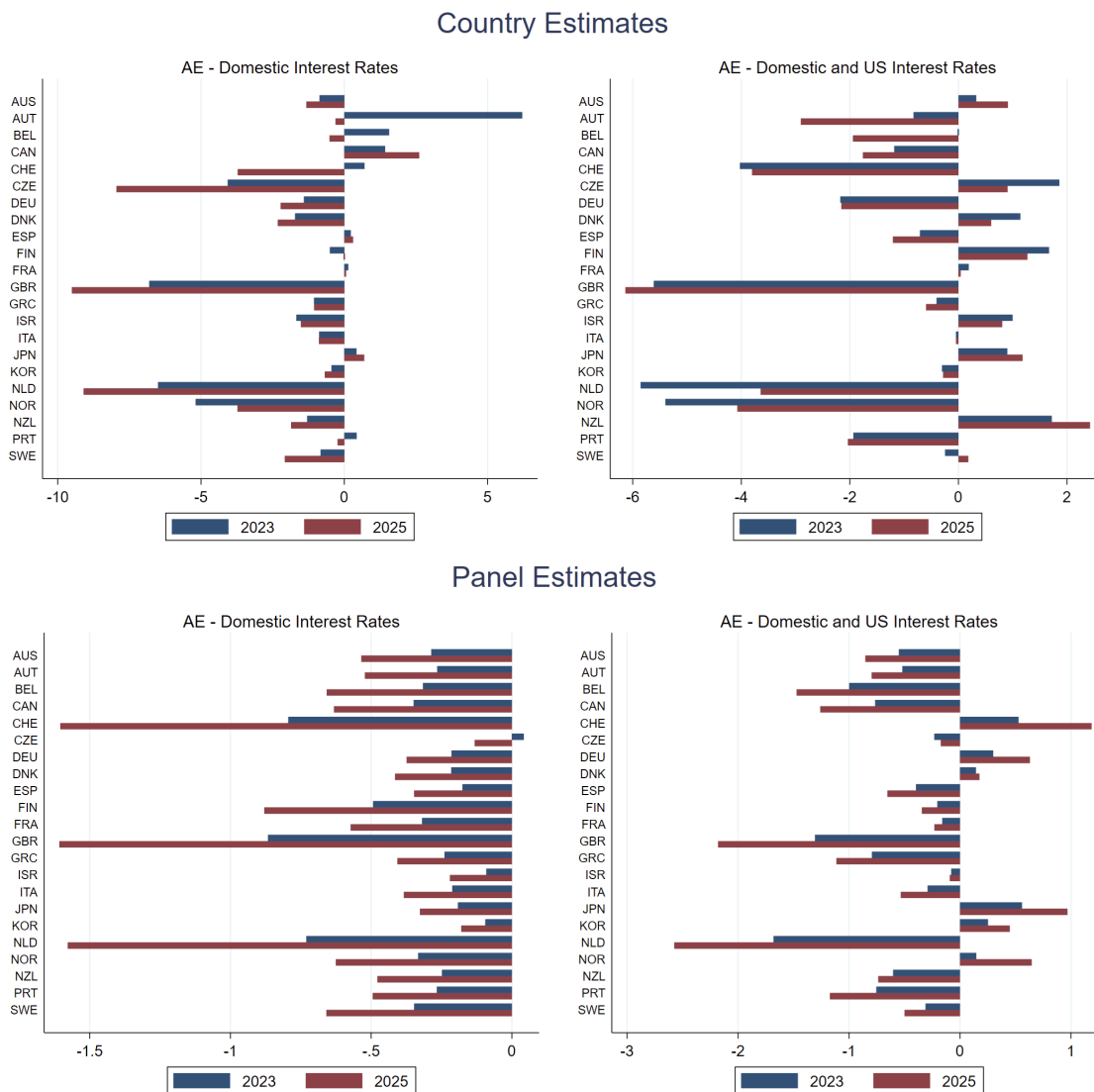
*Note:*Impact of the actual and expected increase of US and domestic short and long-term interest rates since 2021 on the net primary asset income (% of GDP), in 2023 (red bars) and 2025 (blue bars). Effect of domestic interest rates (left panel) and total effect of US and domestic interest rates (right panel). Estimates based on country-specific coefficients (top panel) or panel coefficients (bottom panel).

Figure 19: Impact of world and domestic inflation since 2021
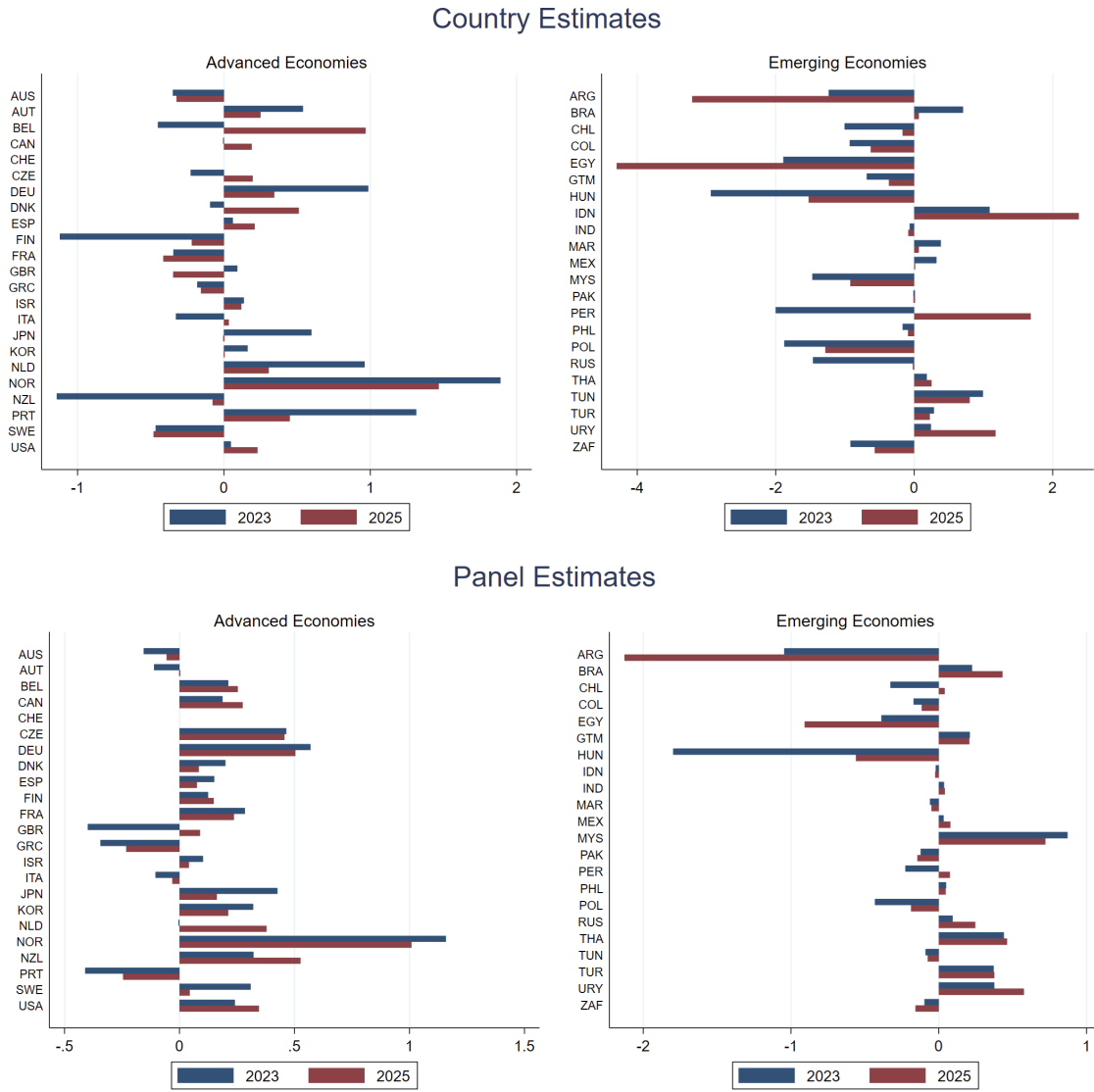
Note: Impact of the actual and expected increase of of world and domestic inflation since 2021 on the net primary asset income (% of GDP), in 2023 (red bars) and 2025 (blue bars). Estimates based on country-specific coefficients (top panel) or panel coefficients (bottom panel).

A Appendix: Dynamics of yields

1.1 Income flows and dynamics of assets

The income flow associated to the variable-yield asset in period t is simply the yield $r_t^{new,V,D}$ on the market value at the end of the previous period, $A_{t-1}^{V,D}$. The change in the asset position in the currency of denomination reflects net capital flows and capital gains from changes in asset prices in the currency of denomination, $Q_t^{V,D}$:

$$A_t^{V,D} = \frac{Q_t^{V,D}}{Q_{t-1}^{V,D}} A_{t-1}^{V,D} + K_t^{net,V,D} \qquad ; \qquad P_t^{V,D} = r_t^{new,V,D} A_{t-1}^{V,D}$$

Turning to fixed-income assets, we distinguish between the face value, $\tilde{A}_t^{F,D}$, on which the fixed yield applies, and the market value $A_t^{F,D} = Q_t^{F,D} \tilde{A}_t^{F,D}$ of the holding, in the currency of denomination. A share α^F of assets mature. The value of the asset position at the end of period t is the part of the previous position that has not matured, valuated at the new asset price, and the gross capital flows equal to the sum of net flows and replacement of the matured asset, $K_t^{gross,F,D} = K_t^{net,F,D} + \alpha^F Q_t^{F,D} \tilde{A}_{t-1}^{F,D}$:

$$A_t^{F,D} = \left(1 - \alpha^F\right) Q_t^{F,D} \tilde{A}_{t-1}^{F,D} + K_t^{gross,F,D}$$

$$A_t^{F,D} = \frac{Q_t^{F,D}}{Q_{t-1}^{F,D}} A_{t-1}^{F,D} + K_t^{net,F,D}$$

In period t, the assets purchased in the previous period, $K_{t-1}^{gross,F,D}$, earn a new yield $\tilde{r}_t^{new,F,D}$ on the face value. The asset that have not matured in period $t-1$ earn the old yield $\tilde{r}_{t-1}^{eff,F,D}$ on the face value $\left(1 - \alpha^F\right) \tilde{A}_{t-2}^{F,D}$. Using the fact that $P_{t-1}^{F,D} = \tilde{r}_{t-1}^{eff,F,D} \tilde{A}_{t-2}^{F,D}$, the income flow

is:

$$P_t^{F,D} = \left(1 - \alpha^F\right) \widetilde{r}_{t-1}^{eff,F,D} \widetilde{A}_{t-2}^{F,D} + \widetilde{r}_t^{new,F,D} \left(\frac{K_{t-1}^{net,F,D}}{Q_{t-1}^{F,D}} + \alpha^F \widetilde{A}_{t-2}^{F,D} \right)$$

$$P_t^{F,D} = \left(1 - \alpha^F\right) P_{t-1}^{F,D} + \frac{\widetilde{r}_t^{new,F,D}}{Q_{t-1}^{F,D}} \left(K_{t-1}^{net,F,D} + \alpha^F \frac{Q_{t-1}^{F,D}}{Q_{t-2}^{F,D}} A_{t-2}^{F,D} \right)$$

$$P_t^{F,D} = \left(1 - \alpha^F\right) P_{t-1}^{F,D} + \frac{\widetilde{r}_t^{new,F,D}}{Q_{t-1}^{F,D}} \left(K_{t-1}^{net,F,D} + \alpha^F \left(A_{t-1}^{F,D} - K_{t-1}^{net,F,D} \right) \right)$$

$$P_t^{F,D} = \left(1 - \alpha^F\right) P_{t-1}^{F,D} + r_t^{new,F,D} \left(\left(1 - \alpha^F\right) K_{t-1}^{net,F,D} + \alpha^F A_{t-1}^{F,D} \right)$$

1.2   Approximation

Along the steady growth path, exchange rates and asset prices are constant and all variables grow at the same rate ρ_{ss}. Yields are equalized across all assets at r_{ss}. Asset holdings grow through net capital flows:

$$K_{ss,t}^{net,F,D} = \rho_{ss} A_{ss,t-1}^{F,D} \qquad ; \qquad K_{ss,t}^{net,V,D} = \rho_{ss} A_{ss,t-1}^{V,D}$$

$$K_{ss,t}^{net,F,\$} = \rho_{ss} A_{ss,t-1}^{F,\$} \qquad ; \qquad K_{ss,t}^{net,V,\$} = \rho_{ss} A_{ss,t-1}^{V,\$}$$

The linear approximation of income flows, measured in dollar, on variable yield assets, fixed yield assets and overall assets gives:

$$\widehat{P}_t^{V,\$} = \left(\widehat{S}_t^{\$/D} - \widehat{S}_{t-1}^{\$/D} \right) + \frac{\hat{r}_t^{new,V,D}}{r_{ss}} + \widehat{A}_{t-1}^{V,\$}$$

$$\widehat{P}_t^{F,\$} = \left(\widehat{S}_t^{\$/D} - \widehat{S}_{t-1}^{\$/D} \right) + \frac{1 - \alpha^F}{1 + \rho_{ss}} \widehat{P}_{t-1}^{F,\$} + \frac{\left(1 - \alpha^F\right) \rho_{ss}}{1 + \rho_{ss}} \widehat{K}_{t-1}^{net,F,\$}$$
$$+ \left(1 - \frac{1 - \alpha^F}{1 + \rho_{ss}} \right) \frac{\hat{r}_t^{new,F,\$}}{\rho_{ss}} + \alpha^F \widehat{A}_{t-1}^{F,\$}$$

$$\widehat{P}_t^{\$} = \left(\widehat{S}_t^{\$/D} - \widehat{S}_{t-1}^{\$/D} \right) + \frac{\left(1 - \alpha^F\right) \delta_{ss}^F}{1 + \rho_{ss}} \widehat{P}_{t-1}^{F,\$} + \frac{\left(1 - \alpha^F\right) \delta_{ss}^F \rho_{ss}}{1 + \rho_{ss}} \widehat{K}_{t-1}^{net,F,\$}$$
$$+ \left(1 - \frac{1 - \alpha^F}{1 + \rho_{ss}} \right) \delta_{ss}^F \frac{\hat{r}_t^{new,F,D}}{r_{ss}} + \left(1 - \delta_{ss}^F\right) \frac{\hat{r}_t^{new,NF,D}}{r_{ss}}$$
$$+ \alpha^F \delta_{ss}^F \widehat{A}_{t-1}^{F,\$} + \left(1 - \delta_{ss}^F\right) \widehat{A}_{t-1}^{V,\$}$$

The yield s given by $\hat{r}_t^{eff,\$} = r_{ss}\left(\hat{P}_t^{\$} - \hat{A}_{t-1}^{\$}\right)$. The linear approximation of (1) is then:

$$
\begin{aligned}
\frac{\hat{r}_t^{\$}}{r_{ss}} &= \left(\widehat{S}_t^{\$/D} - \widehat{S}_{t-1}^{\$/D}\right) + \frac{\left(1-\alpha^F\right)\delta_{ss}^F}{1+\rho_{ss}}\left(\frac{\hat{r}_{t-1}^{F,\$}}{r_{ss}} + \hat{A}_{t-2}^{F,\$}\right) - \left(1-\alpha^F\right)\delta_{ss}^F \widehat{A}_{t-1}^{F,\$} \\
&+ \frac{\left(1-\alpha^F\right)\delta_{ss}^F \rho_{ss}}{1+\rho_{ss}}\widehat{K}_{t-1}^{net,F,\$} + \left(1 - \frac{1-\alpha^F}{1+\rho_{ss}}\right)\delta_{ss}^F \frac{\hat{r}_t^{new,F,D}}{r_{ss}} + \left(1-\delta_{ss}^F\right)\frac{\hat{r}_t^{new,NF,D}}{r_{ss}} \\
&+ \delta_{ss}^F\left(\widehat{A}_{t-1}^{F,\$} - \hat{A}_{t-1}^{\$}\right) + \left(1-\delta_{ss}^F\right)\left(\widehat{A}_{t-1}^{V,\$} - \hat{A}_{t-1}^{\$}\right)
\end{aligned}
$$

By definition $\hat{A}_{t-1}^{\$} = \delta_{ss}^F \widehat{A}_{t-1}^{F,\$} + \left(1-\delta_{ss}^F\right)\widehat{A}_{t-1}^{V,\$}$. The dynamics of the asset position in fixed income assets is approximated as $\left(1+\rho_{ss}\right)\hat{A}_{t-1}^{F,\$} = \left(\widehat{S}_{t-1}^{\$/D} - \widehat{S}_{t-2}^{\$/D}\right) + \left(\widehat{Q}_{t-1}^{FD} - \widehat{Q}_{t-2}^{FD}\right) + \hat{A}_{t-2}^{F,\$} + \rho_{ss}\hat{K}_{t-1}^{net,F,\$}$. Using that relation, we obtain (2). For a category without fixed income assets $(\delta_{ss}^F = 0)$ the yield simplifies to $\hat{r}_t^{\$}/r_{ss} = \left(\widehat{S}_t^{\$/D} - \widehat{S}_{t-1}^{\$/D}\right) + \hat{r}_t^{new,V,D}/r_{ss}$.

B   Appendix: Impact on income flows

2.1   Effect of the Vix index

The impact of a 1 standard deviation in the Vix (+1 increase in the Vix) on the dollar yield in an asset category k (FDI, portfolio equity, portfolio debt, other, reserves) is obtained from the panel regression. For the yield on asset, leading to income receipts, we write:

$$
\left[\frac{\hat{r}_t^{\$}}{r_{ss}}\right]_{FIT-Vix,k}^{receipt} = \delta_{VIX,k}^{receipt} * 1
$$

This fitted value is the same for all countries. We compute a country-specific fit for the income to GDP for category k in country c following the general steps presented above:

$$
\left[\hat{p}_t^{\$}\right]_{FIT-Vix,k,c}^{receipt} = \overline{p}_{k,c}^{\$,asset}\left[\frac{\hat{r}_t^{\$}}{r_{ss}}\right]_{FIT-Vix,k}^{receipt} = \overline{p}_{k,c}^{\$,asset}\delta_{VIX,k}^{receipt}
$$

where $\overline{p}_{k,c}^{\$,asset}$ is the reference value of income flows to GDP for category k in country c (we take the average over the 5 years until period t). These values are then summed across

receipts and payments to compute the impact on the primary income balance to GDP:

$$[NPI_t/Y_t]_{FIT-Vix,c} = \sum_k \left[\bar{p}_{k,c}^{\$,asset} \delta_{VIX,k}^{receipt} - \bar{p}_{k,c}^{\$,liability} \delta_{VIX,k}^{payment} \right]$$

2.2 Effect of US interest rates

Turning to the effect of US interest rates, we consider a 1 percentage point increase (+1 increase in the US interest rate). We consider a persistent increase, and compute both the immediate impact, as well as the impact one period ahead that takes account of the persistence in the income to GDP ratio.

Start with the immediate impact of an increase in the US long-term interest rate. The effect on yield on assets in an category k is:

$$\left[\frac{\hat{r}_t^{\$}}{r_{ss}} \right]_{FIT-Vix,k}^{receipt} = \delta_{USlong,k}^{receipt} * 1$$

The impact on the primary income balance to GDP is computed as for the Vix:

$$[NPI_t/Y_t]_{FIT-USlong,c} = \sum_k \left[\bar{p}_{k,c}^{\$,asset} \delta_{USlong,k}^{receipt} - \bar{p}_{k,c}^{\$,liability} \delta_{USlong,k}^{payment} \right]$$

We now turn to the impact at period $t+1$, taking account of a) that US interest rate remains higher and b) the persistence through the lagged yield. Specifically:

$$\left[\frac{\hat{r}_{t+1}^{\$}}{r_{ss}} \right]_{FIT-USlong,k}^{receipt} = \delta_{USlong,k}^{receipt} * 1 + \beta_{lag} \left[\frac{\hat{r}_t^{\$}}{r_{ss}} \right]_{FIT-USlong,k}^{receipt}$$

$$= \left[(1 + \beta_{lag}) \delta_{USlong,k}^{receipt} + \beta_{lag} \delta_{USlong,k}^{receipt} \right] * 1$$

These effects are then combined to compute the primary income balance to GDP:

$$[NPI_{t+1}/Y_{t+1}]_{FIT-USlong,c} = \sum_k \left[\bar{p}_{k,c}^{\$,asset} \left[(1 + \beta_{lag}) \delta_{USlong,k}^{receipt} + \beta_{lag} \delta_{USlong,k}^{receipt} \right] \right]$$

$$- \sum_k \left[\bar{p}_{k,c}^{\$,liability} \left[(1 + \beta_{lag}) \delta_{USlong,k}^{payment} + \beta_{lag} \delta_{USlong,k}^{payment} \right] \right]$$

2.3 Effect of dollar exchange rate

We finally compute the effect of a permanent change in the dollar exchange rate, considering its transmission through the Broad dollar index as well as through the dollar exchange rate against the currency of denomination. For illustration, consider a 10% appreciation of the dollar, which implies a $+0.1$ value for the broad index and a $-0.1\left(1 - w_{t,k,c}\right)$ value for the exchange rate between the dollar and the currency of denomination, where $w_{t,k,c}$ is the weight of the dollar in the denomination basket.

The effect on the dollar yield in an category k in country c is (the presence $w_{t,k,c}$ of makes the effect country specific):

$$\left[\frac{\hat{r}_t^{\$}}{r_{ss}}\right]_{FIT-USD,k,c}^{receipt} = \delta_{USDbroad,k}^{receipt} * (0.1) + \beta_{val,k}^{receipt} * \left(1 - w_{t,k,c}^{asset}\right) * (-0.1)$$

The impact on the primary income balance to GDP is then computed as:

$$
\begin{aligned}
[NPI_t/Y_t]_{FIT-USD,c} = & \sum_k \left[\bar{p}_{k,c}^{\$,asset} \left[\delta_{USDbroad,k}^{receipt} - \beta_{val,k}^{receipt} * \left(1 - w_{t,k,c}^{asset}\right)\right]\right] * (0.1) \\
& - \sum_k \left[\bar{p}_{k,c}^{\$,asset} \left[\delta_{USDbroad,k}^{payment} - \beta_{val,k}^{payment} * \left(1 - w_{t,k,c}^{liability}\right)\right]\right] * (0.1)
\end{aligned}
$$

We now turn to the impact at period $t + 1$, considering a permanent exchange rate movement. This combine a) the persistence through the lagged yield and b) the impact through the value of assets, which enters separately. Specifically:

$$
\begin{aligned}
\left[\frac{\hat{r}_{t+1}^{\$}}{r_{ss}}\right]_{FIT-USD,k,c}^{receipt} = & \; \beta_{lag} \left[\frac{\hat{r}_t^{\$}}{r_{ss}}\right]_{FIT-USD,k,c}^{receipt} \\
= & \; \beta_{lag} \left(\delta_{USDbroad,k}^{receipt} - \beta_{val,k}^{receipt} * \left(1 - w_{t,k,c}^{asset}\right)\right) * (0.1)
\end{aligned}
$$

The impact on the primary income balance to GDP is then computed as:

$$
\begin{aligned}
[NPI_{t+1}/Y_{t+1}]_{FIT-USD,c} &= \sum_k \left[\overline{p}_{k,c}^{\$,asset} \beta_{lag} \left[\delta_{USDbroad,k}^{receipt} - \beta_{val,k}^{receipt} * \left(1 - w_{t,k,c}^{asset}\right) \right] \right] * (0.1) \\
&\quad + \sum_k \left[\frac{\overline{r}_{k,c}^{\$,receipts}}{1 + \overline{g}_c} \left(1 - w_{t,k,c}^{asset}\right) \right] * (-0.1) \\
&\quad - \sum_k \left[\overline{p}_{k,c}^{\$,liabilities} \beta_{lag} \left[\delta_{USDbroad,k}^{payment} - \beta_{val,k}^{payment} * \left(1 - w_{t,k,c}^{liability}\right) \right] \right] * (0.1) \\
&\quad - \sum_k \left[\frac{\overline{r}_{k,c}^{\$,paiments}}{1 + \overline{g}_c} \left(1 - w_{t,k,c}^{liabilities}\right) \right] * (-0.1) \\
&= \beta_{lag} [NPI_t/Y_t]_{FIT-USD,c} \\
&\quad - \sum_k \left[\frac{\overline{r}_{k,c}^{\$,receipts}}{1 + \overline{g}_c} \left(1 - w_{t,k,c}^{asset}\right) - \frac{\overline{r}_{k,c}^{\$,paiments}}{1 + \overline{g}_c} \left(1 - w_{t,k,c}^{liabilities}\right) \right] * (0.1)
\end{aligned}
$$

C Appendix: Construction of Currency-of-Investment (CIW) Weighted Exchange rate indices

This appendix presents the steps in constructing the exchange rate between the dollar and the currency of denomination of financial assets and liabilities. We rely on the Bénétrix et al. (2020) data on the currency of invoicing of Assets and Liabilities for 50 countries between 1990 and 2017. As the Bénétrix et al., 2020 data are available only until 2017, we keep the currency composition of that year unchanged until 2022. Our approach follows the steps of Colacelli et al., 2021, focusing on the period since 1999 to better handle the role of the euro.

As in Colacelli et al., 2021 indices are geometric averages of the ratios of bilateral exchange rates with respect to the US dollar around the base year 2010. Specifically, for country i, $R_{i,t}/R_{i,2010}$ is the exchange rate of currency i relative to the US dollar, set to 1 in 2010, with a value above units denoting a depreciation of the country's currency against the dollar. The ratio $(R_{i,t}/R_{i,2010})/(R_{j,t}/R_{j,2010})$ is exchange rate currency of i against the currency of j, with a value above unity denoting a depreciation of i. We weight this ratio by the share of the external assets (liabilities) of country i that are denominated in currency j, $W_{i,j,t}^{A,L}$. We have information of the weights of the USD, EUR, GBP, CNY and JPY, as well as domestic currency, with the balance consisting of other currencies (OTH). We assume that the OTH

currency has the same composition across the currencies (other than the domestic one), and adjust the weights of USD, EUR, GBP, CNY and JPY accordingly,[17] leaving the share of domestic currency $S_{i,DC,t}^{A,L}$ unchanged.

These exchange rates are then weighted using the share of assets (and liabilities) invoiced in USD, EUR, GBP, CNY and JPY, as well as domestic currency, with the assumption that foreign assets (and domestic liabilities) invoiced in other (OTH) currencies are actually invoiced in the known currencies by re-weighting the other shares in a proportional way (leaving the share of domestic currency unchanged).

The weighted exchange rate between the dollar and the basket in which the assets of country i are denominated, $R_{i,t}^{\$,D,A,L}$ is as follows, with a value $R_t^{\$,Di} > 1$ indicating that since 2010 the dollar has depreciated against depreciated against the currencies in which country i's assets (liabilities) are denominated

The currency of investment weighted exchange rate for assets (and liabilities) is then of the following form, with a value of $\mathrm{ER}_{i,t}^{A,L} > 1$ indicating that since 2010 the currency of country i has depreciated against the currencies in which its assets (liabilities) are denominated:

$$\mathrm{R}_{i,t}^{\$,D,A,L} = \Pi_j \left(\frac{1}{R_{j,t}/R_{j,2010}} \right)^{W_{i,j,t}^{A,L}}$$

where $R_{\$,t} = 1$ and:

$$W_{i,j,t}^{A,L} = S_{i,j,t}^{A,L} \times \frac{\sum_{k \in (\mathrm{USD,EUR,GBP,CNY,JPY})} S_{i,k,t}^{A,L} + S_{i,OTH,t}^{A,L}}{\sum_{k \in (\mathrm{USD,EUR,GBP,CNY,JPY})} S_{i,k,t}^{A,L}}$$
$$W_{i,j,t}^{A,L} + S_{i,DC,t}^{A,L} = 1$$

We consider a serie of weights across different categories of assets and liabilities, with each set of weight giving an different measure of $\mathrm{ER}_{i,t}^{A,L}$. Specifically, we rely on Bénétrix et al. (2020) for weights for all assets, as well as weights for "debt" assets, which include portfolio debt and other investment. Combining these two sets of weights with the holdings from Milesi-Ferretti (2022c), we can compute the values of the "non-debt" assets (FDI, Portfolio equity, reserves) across the various currencies, as well as the corresponding weights.

---

[17]$W_{i,j,t}^{A,L}$ are the weight after the adjustment, and $S_{i,j,t}^{A,L}$ are the weights before

This gives us an exchange rate $\text{ER}_{i,t}^{A,L}$ for these specific categories. Finally, combining the weighted exchange rates of debt and non-debt assets, and the holdings of portfolio equity and portfolio debt, we constructs weights and the corresponding exchange rate for the overall protfolio category. Similar steps are done on the liability side.

D   Appendix: Tables and figures

Table 7: Overview of the Primary Income Account

|	Receipts/ Credits	Expenses/ Debits
Compensation of employees		
Investment Income		
Direct Investment		
Income on equity and investment fund shares		
Dividends and withdrawals from income of quasi-corporations		
Reinvested earnings		
Interests		
Portfolio Investment		
Income on equity and investment fund shares		
Dividends on equity other than investment fund shares		
Investment income attributable to investment fund shareholders		
Dividends on investment fund shares		
Reinvested earnings on investment fund shares		
Interest		
Other Investment		
Income on equity and investment fund shares		
Interest		
Investment income attributable to policyholders in insurance, standardized guarantees, and pension funds		
Reserve assets		
Other primary income		
Rent		
Taxes on production and imports		
Subsidies		

Source: International Monetary Fund, BPM6, 2009.

Table 8: Correlation of VIX and US variables

	VIX	USD broad	US long-term rate	US short-term rate
VIX	1			
USD broad	-0.0012	1		
	(0.709)			
US long-term rate	0.171***	-0.039	1	
	(0.000)	(0.236)		
US short-term rate	0.036	0.086***	0.824***	1
	(0.277)	(0.009)	(0.000)	

Notes: p-values in parentheses. *, **, *** indicates significance at the 10, 5 and 1% level respectively.

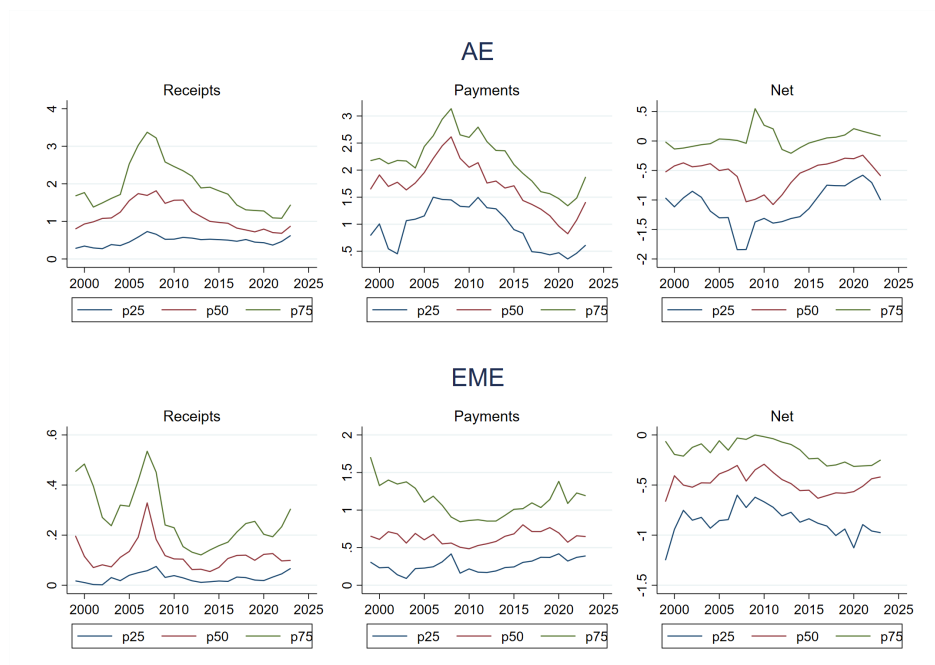Figure 20: Gross and net income flows, total (% GDP)
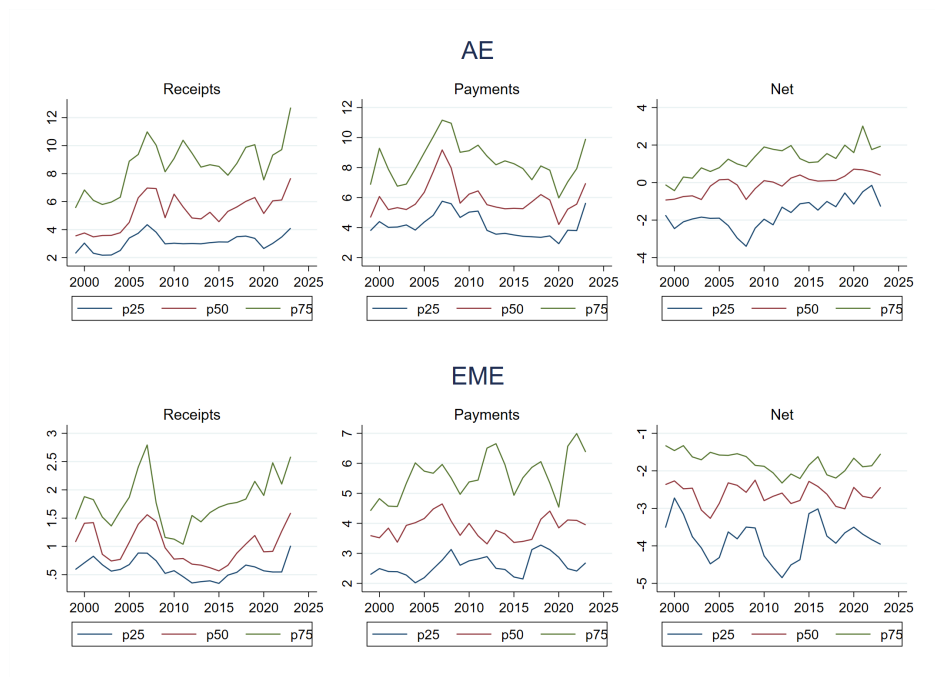
*Note:*Bottom quartile (blue line), median (red line) and top quartile (green line) of country group. AE and EME and denote advanced and emerging economies

Figure 21: Gross and net income flows, FDI (% GDP)
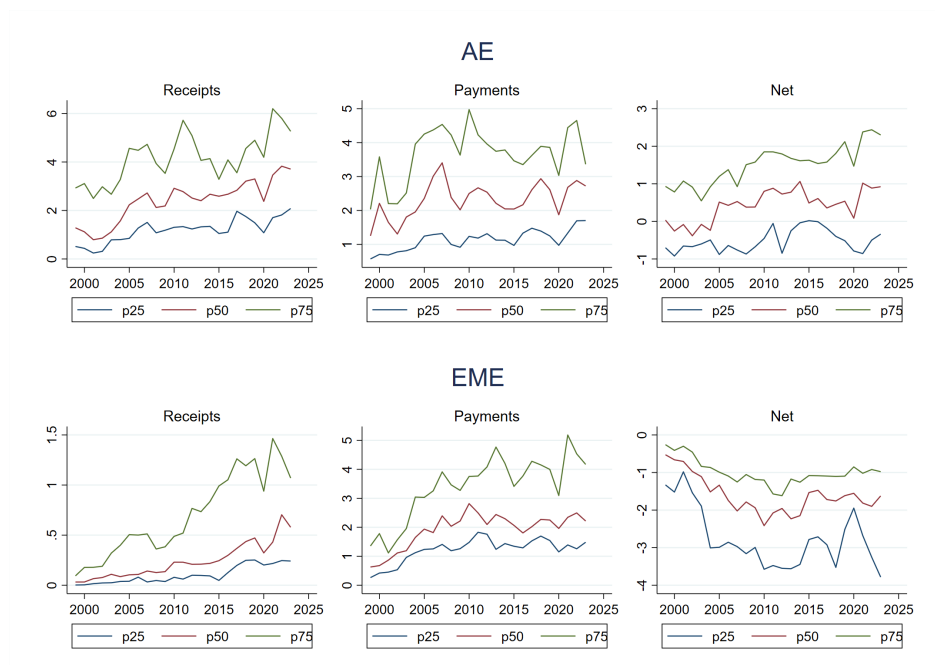
Note: Bottom quartile (blue line), median (red line) and top quartile (green line) of country group. AE and EME and denote advanced and emerging economies

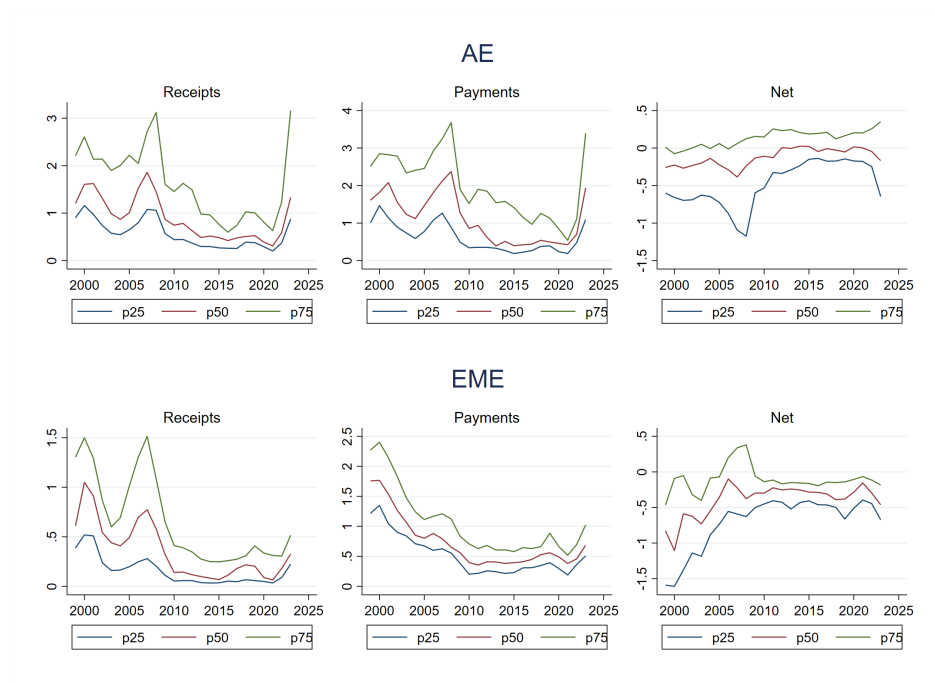Figure 22: Gross and net income flows, Portfolio equity (% GDP)
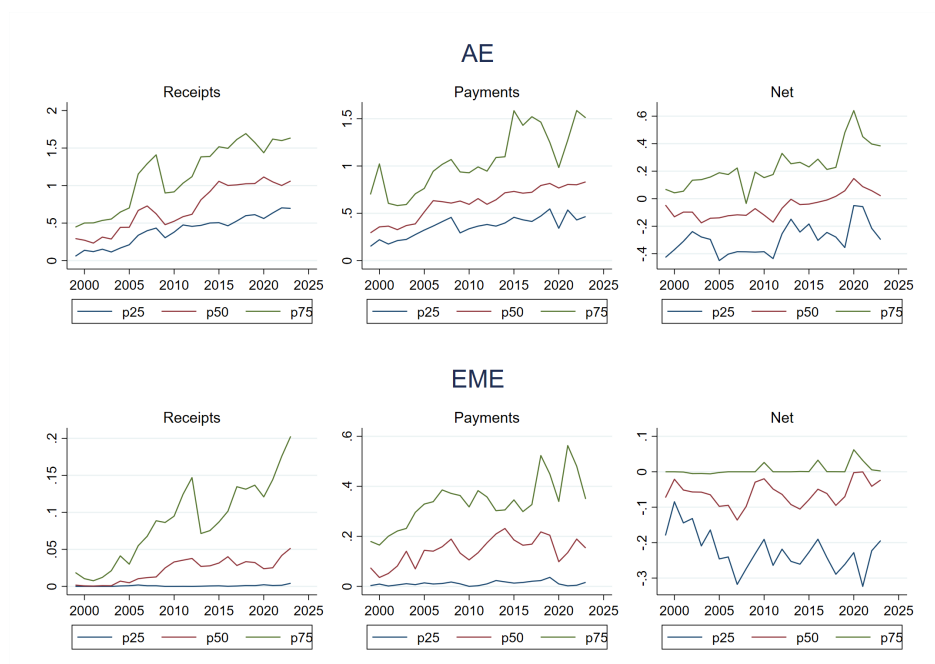
Note: Bottom quartile (blue line), median (red line) and top quartile (green line) of country group. AE and EME and denote advanced and emerging economies

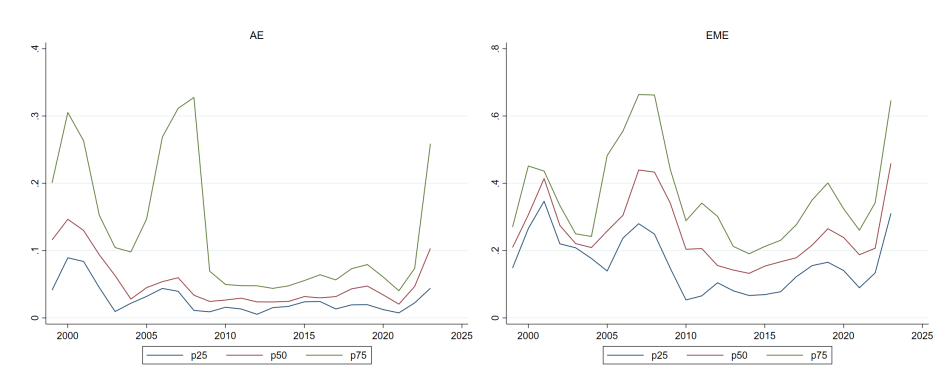Figure 23: Gross and net income flows, Portfolio debt (% GDP)

*Note:*Bottom quartile (blue line), median (red line) and top quartile (green line) of country group. AE and EME and denote advanced and emerging economies

Figure 24: Gross and net income flows, Other investment (% GDP)

*Note:*Bottom quartile (blue line), median (red line) and top quartile (green line) of country group. AE and EME and denote advanced and emerging economies

Figure 25: Gross (also net) income flows, Reserves (% GDP)

*Note:*Bottom quartile (blue line), median (red line) and top quartile (green line) of country group. AE and EME and denote advanced and emerging economies