International investment income: patterns, drivers, and heterogeneous sensitivities

Cedric Tille *& Giovanni Donato †

October 20, 2023

PRELIMINARY DRAFT

Abstract

Financial globalisation 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 component of investment income flows, with a rising role of FDI and equity earnings, 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. We show that while net investment income flows tend to partially offset the movements in trade flows in response to shocks in advanced economies, the offsetting pattern is sensitive to the specific shock in emerging countries. Focusing on the impact of changes in interest rates, we find that while higher long-term rates only had a limited impact in the 2013 taper tantrum, investment income balances are likely to be more materially reduced in the current phase of higher rates, as short-term rates are also on the rise.

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

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

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

Contents

List of Tables

List of Figures

1. Introduction

Financial globalization has been a major development since the mid-1990's, leading to large increases in countries' external assets and liabilities (Lane and Milesi-Ferretti, 2018, Milesi-Ferretti, 2022b). One would then expect a similar rise of the associated dividend and interest streams.

This is the case, but with a contrasted pattern. Figure 1 shows the role of investment income flows (earnings of dividends and interest) in terms of gross receipts and payments by expressing income flows as a share of total flows (investment income plus trade), contrasting advanced economies (top panel), emerging economies (middle panel), and financial centers (bottom panel). For the median advanced economy, investment income went from 10% of overall receipts in 2000 to more than 15% before the crisis, before stabilizing around 12%. Several countries have substantially larger figures, with the 75th percentile stable at 20%. The post-crisis reversal is more pronounced for the share of payments that are accounted by investment income flows. The role of investment income has been more steady among emerging economies, which is to be expected as financial integration has been concentrated among advanced countries. Taking a perspective in net terms, figure 2 presents net trade and investment income flows, relative to GDP. The median advanced economy (left panel) has seen its trade balance move towards a surplus along with the reduction of its investment income deficit. The median emerging economy (right panel) has seen a steady trade deficit, but a rising deficit in its investment income. In other words, investment income has gained prominence for that group in net terms, even though it has remained steady relative to trade flows in gross terms.

The contrasted rising role of investment income flows can reflect the long-standing downward trend in nominal interest rates since the 1990's, especially for the payments on advanced economies' liabilities. If so, the picture may change with the rapid increase in interest rates since early-2022 in response to inflationary pressures, raising the need to better understand what drives investment income. In this paper, we undertake an empirical assessment of its drivers, and explore the heterogeneity of their impact across different types of assets and different countries.

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, dividend yield, macroeconomic variables). We find a substantial heterogeneity of the sensitivity of yields on the various driving forces, across investment categories and country groups. Specifically, a broad appreciation of the dollar reduces yields, especially for FDI and equity. This could indicate that companies connected to international investors are also more linked to international trade flows, which are reduced by a dollar appreciation as this currency dominates the invoicing of international trade. Higher US interest rates raise the yield on portfolio debt, other (banking) investment, and reserves, reflecting the large presence of the dollar in these categories. An increase in the VIX broadly reduces yields. Higher inflation raises the yield on debt and other investment, possibly through interest rate increase that go beyond the ones on US Treasury bonds. Finally, higher growth raises yields on FDI.

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' international financial exposure. This is a major difference between analyzing investment income and trade flows, are 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 net investment income partially offsets the trade balance in advanced economies. The pattern is more contrasted in emerging economies, with a strong offset for some drivers (such as the dollar exchange rate) and an amplification effect for others (such as short-term US rates). We finally illustrate the impact of interest rates by looking at two specific episodes of rising rates. While we estimate that the 2013 taper tantrum had only a moderate impact on net investment income, the current phase of rising rates is expected to adversely affect the investment income balance, especially in emerging economies. The contrast between the two episodes reflects the fact that short-term rates, which have a lager impact, are currently on the rise, while they remained unchanged in 2013.

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. Behar and Hassan (2022) presents 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. By 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. Section2. 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 episode 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 reserchers' 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, 2022a)

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. 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; 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 investment 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 income flows in the denomination currency reflects the effective net 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 held by the 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 (in currency of denomination) in period t than in period $t-1$, denominated as $r_{t-1}^{eff,F,D}$. The 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:

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

where $K_{t-1}^{net,F,D}$ denotes the net capital flows. [1] The expression for variables yield assets is similar, setting $\alpha^F = 1$.

The overall primary 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 is the ratio between the investment income flow during the period and the value of the asset position at the end of the previous period, $r_t^{\$} = P_t^{\$}/A_{t-1}^{\$}$. This is written as:

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

where $r_{t-1}^{F,\$}$ is the lagged yield, expressed in dollar, on fixed income assets. We can also express

[1] The dynamics of the asset position is $A_t^{F,D} = A_{t-1}^{F,D} + K_t^{net,F,D}$.

the income as a ratio to GDP is, where $Y_t^{\$}$ is nominal GDP measured in dollar:

$$p_t = \frac{S_t^{\$/D} Y_{t-1}^{\$}}{S_{t-1}^{\$/D} Y_t^{\$}} \left[\begin{array}{c} \left(1-\alpha^F\right) p_{t-1}^F + \left(1-\alpha^F\right) r_t^{new,F,D} k_{t-1}^{net,F} \\ + r_t^{new,F,D} \alpha^F a_{t-1}^F + r_t^{new,V,D} a_{t-1}^V \end{array} \right] \tag{2}$$

3.1.3 Approximation

We express the yield (1) in terms of linear approximations around a steady growth path, where all variables grow at a rate g_{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. [2] (1) is approximated as follows:

$$\begin{aligned} \frac{\hat{r}_t^{\$}}{r_{ss}} = & \left(\widehat{S}_t^{\$/D} - \widehat{S}_{t-1}^{\$/D}\right) + \frac{\left(1-\alpha^F\right)\delta_{ss}^F}{1+g_{ss}} \frac{\hat{r}_{t-1}^{F,\$}}{r_{ss}} \\ & + \left(1 - \frac{1-\alpha^F}{1+g_{ss}}\right) \delta_{ss}^F \frac{\hat{r}_t^{new,F,D}}{r_{ss}} + \left(1-\delta_{ss}^F\right) \frac{\hat{r}_t^{new,V,D}}{r_{ss}} \\ & - \frac{\left(1-\alpha^F\right)\delta_{ss}^F}{1+g_{ss}} \left(\widehat{S}_{t-1}^{\$/D} - \widehat{S}_{t-2}^{\$/D}\right) \end{aligned} \tag{3}$$

where $\hat{r}_t^{\$}/r_{ss}$ indicates the effect on the yield in percent (and not percentage points). [3] (3) shows that the yield in the currency of measurement is affected by several factors. First 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 investment 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 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, lagged of the exchange rate between the currency of denomination and the dollar enters, to the extent that there are long maturity fixed income assets.

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

[3] 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).

3.2 Econometric specification

We implement an estimation of (3) 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. The estimates are done separately for yields on external assets and on external liabilities. The specification is as follows:

$$\begin{aligned} ln\left(r_t^{\$}\right) &= \alpha + \beta_{lag} ln\left(r_{t-1}^{\$}\right) + \beta_{val}\Delta ln\left(S_t^{\$,D}\right) + \beta_{valL}\Delta ln\left(S_{t-1}^{\$,D}\right) \\ &\quad + \delta_{glob}\mathrm{X}_t^{global} + \delta_{local}\mathrm{Z}_t^{local} \end{aligned} \tag{4}$$

where $r_t^{\$}$ is the yield, measured in dollar (we take the log to correspond to $\hat{r}_t^{\$}/r_{ss}$ in (3)). Throughout the paper, the yield in a year t is computed as the ratio between the dividend and interest flows of year t and the value of the investment position at the end of year $t-1$. $\Delta ln\left(S_t^{\$,D}\right)$ is the first difference of the log of the exchange rate between the dollar and the currency of denomination of assets (with a positive value representing a depreciation of the dollar), X_t^{global} is a vector of global controls and Z_t^{local} is a vector of controls specific to the country. These last two controls include variables that we expect to impact the yield of the assets, $\widehat{r}_t^{new,F,D}$ and $\widehat{r}_t^{new,V,D}$ in (3).

The global controls X_t^{global} include:

- 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.
- First difference of the log of the SP500 index, to capture movement in stock prices in major markets.
- Dividend yield on the SP500 index, to capture dividend payouts in major markets.
- 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 two 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). 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.

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. We include measures of performance in the US stock market to reflect dividend yields in advanced economies, which should affect the yield on countries' assets, especially in stocks and FDI. The VIX index is included as a recognized measure of global risk attitude. 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 (4), we compute 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.

Our estimates of the coefficients in (4) 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.

The specification (4) focuses on the log yields on assets and liabilities. For comparison, we estimate a similar specification for exports and imports (log of the ratio to GDP), with some modifications. First, we replace $\Delta ln\left(S_t^{\$,D}\right)$ by the exchange rate of the dollar vis-à-vis the country's own currency, $\Delta ln\left(S_t^{Ctry,\$}\right)$, with an increase representing a dollar appreciation. Second, we include the country's effective real exchange rate to reflect the standard competitiveness effect of exchange rate movements on trade flows. We also include the broad effective exchange rate of the dollar to capture its dominant use as an invoicing currency, as explained above.[4]

3.3 Data sources and stylized fact

3.3.1 Data sources

We take our data from the standard sources, as indicated in table 1. Specifically, current account figures (trade and 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 taken from the External Wealth of Nations database (Milesi-Ferretti, 2022c). The currency of denomination of the assets and liabilities is from Bénétrix et al. (2020), with the 2017 values kept in subsequent years. 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 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

[4]Strictly speaking, the bilateral exchange rate against the dollar should absorb this effect. We nonetheless include the broad dollar rate to ease comparison between our estimates for trade flows and investment yields.

data of Bénétrix et al. (2020).[5] A limitation of the approach is that we cannot compute the indices for all categories, but instead compute one for overall assets (and liabilities), which we apply to the various categoried except for debt for which a specific decomposition is available.

We compile the data for a broad range of 123 countries, listed in table 2. While we present stylized facts for the primary investment income across all, the set of countries that we can include in the econometrics exercise is more limited primarily due to the availability of data on the currency composition of assets and liabilities. We also exclude 28 countries that are financial centers as they are most often outliers in international financial statistics. We allocate countries across advanced and emerging groups based on the WEO classification, leaving us with 23 advanced economies and 23 emerging markets (with narrower coverage for some categories of assets).

3.3.2 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. For reference, figure 3 shows the pattern for trade. It is split between advanced economies (AE, top panel), emerging economies (EME, middle panel) and financial centers (FC, bottom panel). For each country group we present the exports (receipts), imports (expenses) and trade balance in percentage of GDP, with each figure showing the median and bottom and top quartiles. Broadly speaking, the median values of exports and imports have increased relative to GDP before the global financial crisis, but then stabilized. Some countries have however seen rising trade integration, especially in advanced economies where the top quartile has increased.

Figure 4 shows the evolution of the total primary income income flows relative to GDP. Among advanced economies, median receipts and payments have initially increased, but then retrenched, especially for payments, leading to a reduction in the deficit. Some countries have experienced large movements at high values, with a move of the top quartile of the primary balance into a surplus. Emerging markets have seen a small positive trend in median receipts and payments, especially for the latter leading to a widening of the median deficit. Here also some countries display large income gross flows, with a positive trend in the top quartile

[5] The detailed steps are presented in the appendix

of payments. While the median values have remained steady for financial centers, some countries have seen a rapid increase in the income flows at high values.

We now contrast the pattern across the various categories of investments. Figure 5 shows the evolution of income from FDI. In both advanced and emerging economies, the receipts and payment have increased as a share of GDP for the median country, with the trend for the top quartile being similar or even more pronounced (for emerging countries' receipts). These changes have led to a slight narrowing of the median deficit in advanced countries but a widening one in emerging economies. Among financial centers, the median value have been more steady, while the top quartile increased markedly.

Turning to portfolio equity income (figure 6), we observe clear positive trends of the median receipts and payments among advanced economies, leading to a move of the median net income from deficit to surplus. This shifts occurred across the distribution of countries, with the bottom and top quartiles showing similar trends. By contrast equity income flows have remained small and steady for the median emerging economies, with some of them displaying a large increase in receipts at high values. The pattern is similar for financial centers, with some clear outliers as shown by the top quartiles.

The income streams on portfolio debt holdings show a contrasted pattern (figure 7). In advanced economies, a positive trend in both receipts and payments before the global crisis has since turned around, across quartiles of the distribution, likely reflecting the downward trend in interest rates. In net terms, this has led to a narrowing of the deficit. The situation is different in emerging economies: while receipts have shown some downtrend (especially at the top quartile), payments have increase across the distribution since 2010, a pattern likely driven by the rise in indebtedness. As a result, the primary income deficit have been widening for all quartiles. Financial centers show little trend overall, with a pronounced up-down cycle around the time of the crisis, especially for the top quartile.

Other investment flows, primarily consisting of banking, are presented in figure 8. In advanced economies, receipts and payments show a slight positive trend before the crisis, followed by a clear contraction in later years, which is seen across the distribution and especially for the top quartile. This reflects both the reduction in interest rates and the retrenchment of global international banking activity. As a results, the income deficit has narrowed. The

situation is similar in emerging economies, where if anything the downwards trend started earlier, especially for payments, leading to a small narrowing of the deficit. A downwards trend is also observed for the median financial center (especially on the payments side), but not at the top of the distribution with the highest quartile remaining steady.

Finally, primary income on foreign exchange reserves (figure 9) show a contrasted pattern. They have decreased for the median advanced economies (although reserves play a small role for most of these) and financial centers, but have increased among emerging economies before the global financial crisis, with a moderate downtrend in subsequent years. This likely reflects the offsetting forces of accumulation of additional reserve and decreasing returns on the safe and liquid assets that constitute the bulk of them.

Overall the stylized facts show a contrasted pattern, both across country groups and types of assets. Income linked to FDI has increased relative to GDP for both advanced and emerging economies, while dividends on portfolio equity have also increased albeit only for advanced economies. By contrast, income flows linked to debt asset have shown a decrease since the global financial crisis in advanced economies, but less so in emerging markets where payments have instead increased. Income linked to international banking activity have clearly decreased for all countries, especially for advanced economies.

4. Econometric analysis of the drivers of trade and investment income

This section presents our estimates of the drivers of the (log) ratio of trade to GDP, and of specification (4) for the (log) yield on assets and liabilities.

4.1 Trade flows

Table 3 shows the regression results for trade export receipts and import payments for the entire sample, as well as advanced and emerging economies. The ratio of trade flows to GDP shows sizable persistence, especially in advanced economies. Exchange rates play a sizable role, but in a contrasted way. For advanced economies, an appreciation of the dollar against their own currency raises both receipts and payments, but this is largely offset if

the dollar appreciates broadly across all currencies in the world (negative coefficient on the broad dollar index). A real effective appreciation of a country's currency against its partner (controlling for the bilateral dollar exchange rate) raises both flows (relative to GDP) for advanced countries. By contrast emerging economies see a contraction in trade following an appreciation of their currency. There is also a contraction of their export receipts following a broad appreciation of the dollar, in line with that currency's dominant role in the invoicing of trade.

For comparability with the subsequent analysis of primary income flows, we also consider the impact of interest rates, stock prices, and the VIX index. The short term US interest rate tend to reduce export receipts in advanced economies, and raise import payments in emerging ones. US long terms rates have a contrasted pattern, with the initial effect on imports being largely offset by the lag. Higher stock prices in the US, indicating a booming economy, are associated with increased trade flows in all directions and for all countries, with a higher dividend yield having the same effect. By contrast, trade flows show very limited sensitivity to the VIX.

Macroeconomic variables have the expected sign, with higher inflation raising the value of nominal trade flows, as does higher real GDP growth.

4.2 Investment yields

4.2.1 Overall sample

The results of the estimations of (4) for the entire sample of advanced and emerging economies are given in table 4. Columns (1) and (2) shows the estimates for the (log) yield for receipts (credits) and payments (debits) respectively. We then presents 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. While the effect is larger for the portfolio debt categories, which is the one with a higher role of long maturity fixed income investments, the difference relative to the other categories is not very large.

The exchange rate between the dollar and the currency of denomination of the asset is

expected to have a coefficient of +1 according to (3).[6] This is however the case only for payments on equity debt and receipts of other investment. The absence of an effect for receipts on portfolio debt or payments of other investment is not surprising if dollar bonds represent the bulk of countries external debt assets, and its banking liabilities are in dollar. For the other categories, the coefficient is either insignificant, or with the wrong sign. The limited significance overall stands in contrast to the finding of Colacelli et al. (2021) who find a strong mechanical effect. It could reflect our imprecise data of the currency composition of assets outside of debt.

The broad exchange rate of the dollar has a strong effect, with an appreciation of the US currency reducing yields both for receipts and payments. The effect is contrasted across categories, being stronger for FDI, and present in equity payments and debt receipts. By contrast, it is not present for earnings on other investment and reserves. The adverse effect of a dollar appreciation on FDI income could reflect the fact that multinational firms are more active in international trade than others, combined with the broad reduction in trade flows (and associated profits) from a dollar strengthening under the dominant currency paradigm.

Turning to US interest rates, and increase raises the yields on both assets and liabilities, with substantial heterogeneity across categories.[7] An increase in the short-term rate raises overall yields, with the effect driven by other investment and foreign reserves. This is expected, as other investment consists mostly of banking flows of short maturity, and the dollar plays a dominant role as a funding currency. By contrast, there is no effect in the portfolio investment. Higher US long-term rates raise yields on other investment, reserves, as well as portfolio liabilities. There is also a lagged negative effect on FDI receipts.

The fluctuations in the SP500 impact yields, with higher US stock prices broadly reducing them in FDI and portfolio investments. This puzzling effect could reflect the combination of steady dividend and rising stock prices, which lowers the yield on the market value of assets. The dividend yield also has a negative impact on FDI receipts. 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.

[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.

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

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 global inflation raises the yields on other investment, foreign reserves, and portfolio debt, while higher domestic inflation raises the yield on other investments.[8] 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 the yield for FDI receipts, while higher domestic growth has the same effect on FDI payments.

Looking at domestic interest rate (available for fewer countries) shows that short rates do not have any effect, while higher long-term rates raising the yield on debt payments, as expected. There is no effect for other investments, possibly reflecting the limited presence of domestic currency 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.

4.2.2 Advanced economies

Table 5 presents the results focusing on the 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) only for portfolio debt and other investment. The broad exchange rate of the dollar has a significant impact. This is concentrated on yields on FDI and equity, both for receipts and payment, which are reduced by a broad strengthening of the dollar. While one may view this as one more manifestation of the dominant role of the US currency in global financial markets, this interpretation is questionable: the dominance is especially relevant for global debt and banking activities, but we observe no effect of the broad dollar index for

[8] 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

yields on portfolio debt and other investments. Instead, it is more likely that the exchange rate impact reflects the contractionnary effect of a strong dollar on trade and profits under dominant invoicing, and the dominance of large firms on international trade and stock market capitalisation.

Higher US short-term interest rates raise overall yields on both sides, but the effect is concentrated on reserves and other investment payments. The later can reflect the relevance of dollar funding in international banking. Higher long-term US interest rate broadly raise yields on portfolio debt, other investment, and reserves. This reflects 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.

As for the overall results, an increase in SP500 prices lowers yield for FDI and portfolio equity investments, both in terms of receipts and payments. The dividend yield impact is by contrast quite narrow. An increase in the VIX has a broad adverse effect on all yields across categories. As the impact is seen broadly, the consequences for the income balance are uncertain.

Global inflation raises the yield on debt, other investments, and reserves, while higher global growth boosts the yield on FDI and equity. Changes in domestic long-term rates are broadly transmitted to payments yields.

4.2.3 Emerging economies

We now turn to the evidence for emerging economies, presented in table 6. As domestic interest rates are only available for a few of those, we omit them in the regression. For brevity, we focus on the dimensions in which the results differ from the ones for the entire sample.

The impact of lagged yields are similar to the ones in table 4. The role of the exchange rate between the dollar and the currency of denomination only significant for a few categories, and often with the wrong sign. 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.

An appreciation of the dollar in terms of the broad exchange rate again lowers yields, but

the effect is concentrated in the FDI category, especially on the payments side. 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).

US interest rates have a more limited impact than in advanced economies. Higher short-term rates raise yields, but this is concentrated among payments on other investment and receipts on reserves, possibly reflecting a concentration of short-duration dollar investments in these asset categories. Movements in US long-term yields have no significant impact.

Higher US stock prices lower yields, mostly for the FDI category, with some heterogeneous effects in portfolio investment. A higher dividend yield is also associated with reduced FDI yields, on both sides of the income balance. An increase in the VIX index again reduces yields, but the effect is somewhat less broad than for advanced economies and more concentrated on receipt from debt, other investment, and reserves, with also an effect on payments on equity and FDI.

Turning to macroeconomic variables, higher global inflation raises he yields on other investment and reserves (with the latter effect being quite strong), but with no effect on portfolio debt (unlike in advanced economies). The impact of global real growth is concentrated on FDI yields, which are boosted in response.

Overall our results point to an heterogeneous situation across countries and asset categories. In addition, several variables impact yields for both receipts and payments. The net impact is therefore ambiguous, and can only be assessed with further steps to which we now turn.

5. Impact on net trade and 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 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 rate, and US dollar exchange rate).

5.1 Linking yields and income flows

Our approach combines the estimates of yields from section 4. convert them in terms of trade and primary income flows relative to GDP, which vary by countries. Our panel estimates provide us with fitted values of the (ln) yield in dollar, $\hat{r}_t^{\$}/r_{ss}$, which are the same for all countries. We convert them into country-specific effects in terms of investment income flows relative to GDP by taking the approximation of the relation between flows, GDP, yields and positions:

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

where lower-case letter denote ratios to GDP. [9] Starting from a period $t-1$, we compute the impact of a shift in drivers 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 $\hat{p}_{t+h}^{\$} = p_{ss}^{\$}\left(\hat{r}_{t+h}^{\$}/r_{ss}\right)$ for $h \geq 0$.

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 10 shows the impact of a 1 standard deviation of the VIX. Throughout this section, we measure $p_{ss}^{\$}$ using the 2017-2021 average of the ratio of investment income to GDP for

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

the specific asset categories. We also compute the effects taking all related coefficients from our panel regression, without focusing on the ones that are statistically significant. To give a sense of whether trade and investment income flows amplify or offset each other, we present the immpact on the nominal trade balance (red bars) and the investment income balance (blue bars). Both are expressed in percent of GDP. [10]. The left and right panels show the impact on advanced and emerging economies, respectively.

Overall, higher uncertainty tends to reduce trade balances. The effect on investment income balances tends to go in the opposite direction. Among advanced economies, the increase in net investment income often presents a large offset from the impact on trade. This is however not a uniform pattern, and several countries see their net investment income amplify the trade effect. The pattern is more uniform in emerging economies, where higher uncertainty is associated with a higher income balance, albeit to a magnitude smaller than the effect on trade. The fact that our computations lead to broadly positive effects on net investment income, even through a VIX increase broadly reduced yields, illustrate the need to take account of the countries' specific asset and liability positions, as well as their composition, as the decrease in yields on receipts and payments pull in different directions, with the net effect driven by the composition of international investment positions.

Figures 11 and 12 show the impact of increases of the US short and long-term interest rates, respectively. Given the lags in the effect of the long-term rate, both figures show the impact after two periods, assuming a 1 percentage point increase in the interest rate that remain for both periods. An increase in the US short-term rate broadly pushes countries towards trade deficits for both country groups (through lower exports for advanced countries and higher imports for emerging economies), as shown in figure 11. The impact of net investment income is quite contrasted among advanced economies, with a broadly even split between negative and positive effects, all of limited magnitude however. The pattern is clearer among emerging economies which higher US rates adversely impact the net investment income, with the magnitude being broadly similar to the one for trade. A tightening of US monetary policy therefore has a large impact on emerging economies external accounts.

The situation is quite different in the case of an increase in the US long-term interest rate

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

(figure 12). While it also leads to trade deficits, mostly by raising imports, its effect on the net investment income goes in the offsetting direction. The magnitude is however limited, especially among emerging economies.

Turning to the impact of exchange rates, figure 13 considers the effect of a 10% appreciation of the dollar. This affects several of the drivers in our econometric specification, namely the broad dollar exchange rate, the exchange rate between the dollar and the currency of denomination (for yields regressions) and the bilateral exchange rate of the country vis-à-vis the dollar (for trade regressions). A strengthening of the dollar has a very contrasted impact. In terms of trade, it leads to higher surpluses in advanced economies and higher deficits in emerging markets. The changes in net investment income however deliver an offsetting effect. For most advanced economies, the strong dollar lowers net income flows, offering a partial compensation for the trade effect. In emerging economies by contrast, the strong dollar leads to sizable improvements in net investment income, which broadly offsets the impact from trade. This apparently puzzling effect reflects the fact that while a stronger dollar tends to reduce yields, in particular for FDI, the impact is larger for payments, leading to a positive net effect.

Overall, our assessment of the impact of the VIX, US interest rate, and the dollar exchange rate shows that the panel estimates translate into quite heterogeneous effects at the level of each country's trade and investment income balances relative to GDP. In advanced economies, the impact on net investment income tends to offset the one on trade, albeit only partially. For emerging markets, net investment income acts as an offsetting force for some variables (VIX, and especially exchange rate), but as an amplifying one for other (US short-term interest rates).

6. Case studies of the impact of interest rates

The world economy is experiencing 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.

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 14 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). Overall, the rise in US rates did not have a detrimental impact, according to our estimates. Among advanced economies, it led to an increase in the net income. The situation is more contrasted in emerging economies, with some increases of investment income, some decreases, and many moderate effects. The magnitudes of the estimated changes remain however moderate, with gains of at most 0.2 to 0.3 % of GDP in advanced economies, and losses of at most 0.05% in emerging countries. The actual changes in the net investment income proved to be even smaller.

Our estimates thus show that the sharp movements in the US interest rates in 2013, albeit noteworthy and much discussed, did not lead to a sizable reshaping of the net investment income flows in the world economy.

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, 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.[11]

[11] We consider impact of the interest rates for all categories, even if the estimate is not statistically signifi-

6.2.1 Impact of US interest rates

We start with the impact of higher US interest rates. We take forecasts for their future path from Statista, for the US Fed Fund, the 3 months Treasury yield, and the 10 year Treasury yield.[12]. Combining these forecasts and the actual values until mid-2023, we compute the paths of the 3 months and 10 year rates from 2021 to 2025.

Figure 15 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). The initial impact for advanced economies is an increase of income balance, with many countries experiencing a shift of 1 percent to GDP and higher. As time passes however, the positive effects weakens, or even switches sign with countries experiencing a moderate deficit.

The situation is more detrimental in emerging economies. The higher US rates push most of them towards deficits already in 2023, with values around 1 percent of GDP, event though a few countries experience an improvement. As tie passes, the negative effect grows. This stands in sharp contrast with the taper tantrum episode. The main difference is that short-term rates did not raise in 2013, while they did rapidly in the current episodes. As our estimates show a larger impact of US short-term rates than long-term rates, the current situation is of more concerns to policy makers than the tantrum was.

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.[13]. The interest rates on 3 months and 10 year bonds are taken from Fred until May 2023, with forecasts for later values

cant.

[12]These are foung at https://econforecasting.com/forecast-ffr, https://econforecasting.com/forecast-t03m, and https://econforecasting.com/forecast-t10y, respectively

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

the World Government Bonds site.[14] These rates are used to compute path 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 16 shows the impact on advanced economies net 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. An increase in domestic interest rates leads to a deterioration of the net investment income balance for most advanced economies, with the effect building up as time passes.

This deterioration from higher domestic rates is an offsetting force for the impact of higher US rates shown in figure 15. When taking both into account, the global raise of interest rates has only moderate effects in 2023, with some countries such as Switzerland actually experiencing an improvement. The situation however subsequently deteriorates, with a negative effect for most economies by 2025. While it remains below 1% of GDP for most, some experience larger values.

6.2.3 Impact of inflation

The current increase in interest rates is happening in the context of a broad surge of 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 (17) shows a highly contrasted impact of global and domestic inflation. Among advanced economies, the rise in inflation leads to a reduction of net investment income in 2023, of between -0.5 to -1% in most countries. As inflation is expected to moderate after that, the 2025 impact is evenly split between positive and negative values. Emerging economies also display a highly heterogeneous sensitivity to inflation at both horizons.

[14] http://www.worldgovernmentbonds.com/bond-forecast/germany/10-years/ and http://www.worldgovernmentbonds.com/bond-forecast/united-kingdom/10-years/, respectively. As these forecast end in December 2024, we assume that 10 year rates remain unchanged in 2025 and 3 months rates parallel the evolution of the policy rates in 2025.

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. We then undertake an panel analysis of the drivers of yields, and show that their effect is highly contrasted across types of investment, receipts and payment flows, and country groups. Specifically, we find that a broad appreciation of the dollar reduce yields for FDI and equity investment, higher US interest rates raise yields on other investment and reserves, an increase in the VIX broadly reduce yields, while inflation increases them and higher growth raises the FDI yield.

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. Focusing on the main drivers, we show that their impact on net investment income tends to somewhat offset the effect on the trade balance in advanced economies, but that the offsetting pattern in emerging markets depends on the specific drivers.

Using our estimates, we assess the net investment income in two specific episodes. While US interest rates increased during the 2013 taper tantrum, this was limited to long-rates which have a limited impact on yields. As a results, net income flows were not much affected. By contrast, the global increase in interest rates and inflation since 2021 has a large effect, that we expect to build up in coming years. Higher rates should reduce net investment income, especially for emerging economies.

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 di-

rections. 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. 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.

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). "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 (2022b). "T2021 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 (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. 2019	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**		**Financial Centers**
Australia	Albania	Kazakhstan	Anguilla
Austria	Algeria	Kosovo	Antigua and Barbuda
Belgium	Angola	Kuwait	Aruba
Canada	***Argentina***	Libya	Bahamas
Croatia	Armenia	***Malaysia***	Bahrain
Czech Rep.	Azerbaijan	Maldives	Belize
Denmark	Barbados	***Mexico***	Bermuda
Estonia	Belarus	Mongolia	Hong Kong
Finland	Bolivia	Montenegro	Macao
France	Bosnia and Herzegovina	***Morocco***	Costa Rica
Germany	Botswana	Namibia	Cyprus
Greece	***Brazil***	North Macedonia	Dominica
Iceland	Bulgaria	Oman	Grenada
Israel	Cabo Verde	***Pakistan***	Ireland
Italy	***Chile***	Paraguay	Lebanon
Japan	China	***Peru***	Luxembourg
Korea	***Colombia***	***Philippines***	Malta
Latvia	Dominican Rep.	***Poland***	Mauritius
Lithuania	Ecuador	Romania	Montserrat
Netherlands	***Egypt***	***Russian Federation***	Palau
New Zealand	El Salvador	Saudi Arabia	Panama
Norway	Eswatini	Serbia	Samoa
Portugal	Fiji	***South Africa***	Seychelles
Slovakia	Gabon	***Sri Lanka***	St.Kitts & Nevis
Slovenia	Georgia	Suriname	St.Lucia
Spain	***Guatemala***	***Thailand***	St.Vincent
Sweden	Guyana	Tonga	Trinidad & Tobago
Switzerland	***Hungary***	***Tunisia***	Vanuatu
United Kingdom	***India***	***Turkey***	
United States	***Indonesia***	Ukraine	
	Iraq	***Uruguay***	
	Jamaica	Venezuela	
	Jordan		

Notes: Countries marked in bold and italic are the ones included in our econometric analysis. The entire sample is used for the stylised facts.

Table 3: Drivers of (ln) Trade - GDP ratio

	All Countries		**Advanced Economies**		**Emerging Economies**	
	Receipts (1)	Payments (2)	Receipts (3)	Payments (4)	Receipts (5)	Payments (6)
L.ln Trade/GDP	0.978***	0.956***	1.002***	0.990***	0.910***	0.794***
	(0.0300)	(0.0493)	(0.0183)	(0.0269)	(0.0249)	(0.0584)
Δln Nom.GDP ($-denominated)	-0.0636	0.222	0.249	0.160	-0.00619	0.203
	(0.168)	(0.166)	(0.271)	(0.294)	(0.200)	(0.191)
Δln XDC/USD (increase = $ appreciation)	0.904***	1.164***	1.250***	1.149***	0.223	-0.187
	(0.159)	(0.174)	(0.263)	(0.300)	(0.174)	(0.281)
Δln REER (increase = XDC appreciation)	0.368***	0.383***	0.457***	0.386***	-0.402***	-0.934***
	(0.0437)	(0.0687)	(0.0630)	(0.0862)	(0.0850)	(0.150)
Δln USD Broad Index (increase = $ appreciation)	-1.197***	-1.294***	-1.211***	-1.320***	-0.458***	0.127
	(0.0843)	(0.128)	(0.0769)	(0.119)	(0.141)	(0.163)
US 3-month interest rate	-0.00483***	0.00202	-0.00859***	-0.00376	0.000392	0.0106***
	(0.00169)	(0.00203)	(0.00244)	(0.00228)	(0.00215)	(0.00309)
US 10-year treasury yield	0.00550	0.0420***	0.00979***	0.0335***	0.00287	0.0359***
	(0.00409)	(0.00542)	(0.00279)	(0.00508)	(0.00927)	(0.00830)
L.US 10-year treasury yield	0.00282	-0.0383***	0.00487	-0.0225***	-0.000397	-0.0406***
	(0.00407)	(0.00473)	(0.00369)	(0.00626)	(0.00785)	(0.00830)
Δln SNP500 Index	0.0956***	0.161***	0.139***	0.165***	0.0809*	0.256***
	(0.0287)	(0.0314)	(0.0288)	(0.0344)	(0.0405)	(0.0428)
SNP500 dividend yield	0.00960	0.0361***	0.0226***	0.0278***	-0.00478	0.0437**
	(0.00597)	(0.00627)	(0.00507)	(0.00559)	(0.00914)	(0.0167)
VIX (normalized)	-0.00647**	0.00848**	-0.00764*	-0.000813	0.00238	0.0170**
	(0.00314)	(0.00416)	(0.00380)	(0.00554)	(0.00476)	(0.00618)
Inflation	2.430***	-0.152	2.127***	1.007**	2.545***	0.796**
	(0.208)	(0.272)	(0.240)	(0.426)	(0.453)	(0.295)
Real GDP growth	0.0108***		0.00656*		0.0127**	
	(0.00340)		(0.00353)		(0.00570)	
Constant	-0.163***	-0.131**	-0.154***	-0.0963**	-0.226***	-0.366***
	(0.0331)	(0.0604)	(0.0204)	(0.0427)	(0.0446)	(0.0932)
Country FE	Y	Y	Y	Y	Y	Y
Observations	815	815	494	494	321	321
Countries	36	36	22	22	14	14
Adj. R^2	0.954	0.919	0.976	0.964	0.884	0.763

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

	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	0.605***	0.632***	0.501***	0.490***	0.592***	0.813***	0.528***	0.531***	0.537***	0.769***	0.793***	0.539***	0.601***
	(0.0465)	(0.0462)	(0.0369)	(0.0504)	(0.0521)	(0.0487)	(0.0790)	(0.0582)	(0.0682)	(0.0394)	(0.0665)	(0.0811)	(0.0480)
Δln $-Denomination XR	0.170	-0.130	-0.287	-0.872***	0.528	0.557*	0.298	-0.389	-0.386	0.778**	1.117***	0.488	-0.540
(increase = $ depreciation)	(0.255)	(0.233)	(0.527)	(0.293)	(0.564)	(0.325)	(0.669)	(0.347)	(0.442)	(0.375)	(0.372)	(0.402)	(0.554)
L.Δln $-Denomination XR	-0.401**	-0.252	1.071***	-0.253	-0.473	0.284	0.635*	0.596*	-0.307	-0.178	-1.302***	-0.321	-0.677**
(increase = $ depreciation)	(0.166)	(0.164)	(0.364)	(0.261)	(0.320)	(0.415)	(0.338)	(0.346)	(0.287)	(0.159)	(0.246)	(0.222)	(0.293)
Δln USD Broad Index	-1.136***	-1.718***	-2.364***	-2.847***	-1.603***	-0.801***	-0.903	-2.659***	-2.024**	0.216	0.282	-0.154	-0.386
(increase = $ appreciation)	(0.409)	(0.439)	(0.666)	(0.471)	(0.533)	(0.232)	(1.232)	(0.550)	(0.869)	(0.348)	(0.399)	(0.490)	(0.706)
US 3-month interest rate	0.0462***	0.0347***	0.0166	-0.00804	0.0151	-0.0142	0.0177	-0.0363**	0.00447	-0.00120	0.0203*	0.0708***	0.0898***
	(0.00827)	(0.0108)	(0.0135)	(0.00984)	(0.0189)	(0.0101)	(0.0375)	(0.0143)	(0.0243)	(0.0109)	(0.0106)	(0.0136)	(0.0205)
US 10-year treasury yield	-0.00886	0.0281	-0.0195	0.00552	-0.0322	-0.00412	0.106	-0.0152	0.0526	0.0483**	0.0654*	0.110**	0.130***
	(0.0200)	(0.0260)	(0.0390)	(0.0234)	(0.0317)	(0.0269)	(0.0831)	(0.0470)	(0.0368)	(0.0214)	(0.0360)	(0.0445)	(0.0437)
L.US 10-year treasury yield	0.00300	-0.0400**	-0.0720**	-0.0116	0.0661*	-0.0288	-0.0857	-0.0405	0.0385	0.00451	0.0579**	0.00969	0.0318
	(0.0162)	(0.0187)	(0.0341)	(0.0205)	(0.0375)	(0.0185)	(0.0610)	(0.0318)	(0.0353)	(0.0210)	(0.0252)	(0.0357)	(0.0307)
Δln SNP500 Index	-0.489***	-0.416**	-1.048***	-0.658***	-0.966***	-0.860***	-0.122	-1.608***	-0.831**	-0.118	-0.0966	-0.519**	-0.343
	(0.152)	(0.188)	(0.290)	(0.175)	(0.266)	(0.200)	(0.794)	(0.191)	(0.374)	(0.209)	(0.291)	(0.243)	(0.257)
SNP500 dividend yield	-0.0533**	-0.0594**	-0.169***	-0.0401	-0.0321	-0.0622**	0.0885	-0.0893	-0.0395	0.0267	0.0913***	0.0317	0.0765
	(0.0245)	(0.0246)	(0.0502)	(0.0269)	(0.0617)	(0.0252)	(0.0862)	(0.0566)	(0.0685)	(0.0272)	(0.0267)	(0.0459)	(0.0526)
VIX	-0.0636***	-0.0583***	-0.0255	-0.0899***	-0.108***	-0.0874***	0.0319	-0.154***	-0.121***	-0.0435**	-0.202***	-0.0907***	-0.140***
(normalized)	(0.0133)	(0.0104)	(0.0245)	(0.0160)	(0.0252)	(0.0182)	(0.104)	(0.0218)	(0.0360)	(0.0192)	(0.0361)	(0.0230)	(0.0287)
Inflation(Δln CPI)	1.748**	0.761	-2.742**	0.451	2.008	0.0478	-4.039	-1.334	2.966**	0.441	15.43***	4.021**	10.18***
	(0.855)	(0.472)	(1.332)	(0.740)	(2.012)	(0.743)	(4.025)	(1.184)	(1.440)	(0.739)	(2.167)	(1.689)	(2.577)
RGDP growth	0.0285***	0.458	0.0741***	1.941***	0.00211	0.100	0.000664	-0.222	-0.0136	-0.317	-0.0414***	-0.392	-0.0499***
	(0.00735)	(0.299)	(0.0169)	(0.617)	(0.0160)	(0.440)	(0.0243)	(1.142)	(0.0152)	(0.467)	(0.0109)	(0.479)	(0.0116)
Domestic Short-term IR		-0.00451		-0.0103		0.00318		0.0183		-0.00667		-0.000466	
		(0.00654)		(0.0124)		(0.0128)		(0.0207)		(0.00976)		(0.0161)	
Domestic Long-term IR		-0.000276		0.0106		0.0185**		0.00301		0.0201**		0.0188	
		(0.00982)		(0.0116)		(0.00836)		(0.0157)		(0.00900)		(0.0126)	
Constant	-1.509***	-1.304***	-1.042***	-1.364***	-1.505***	-0.465*	-2.029***	-1.224***	-1.643***	-1.065***	-1.837***	-2.574***	-2.709***
	(0.201)	(0.151)	(0.210)	(0.180)	(0.360)	(0.254)	(0.603)	(0.229)	(0.367)	(0.211)	(0.364)	(0.519)	(0.269)
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	999	800	953	789	940	785	801	730	893	760	965	778	527
Countries	46	39	46	39	45	39	42	38	44	39	45	38	32
Adj. R^2	0.698	0.606	0.374	0.454	0.505	0.693	0.308	0.406	0.453	0.765	0.805	0.727	0.761

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 (total)**		**Portfolio Equity**		**Portfolio Debt**		**Other Investment**		**Reserves**
	Receipts	Payments	Receipts	Payments	Receipts	Payments	Receipts	Payments	Receipts	Payments	Receipts	Payments	Receipts
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
L.ln Yield	0.593***	0.623***	0.416***	0.398***	0.678***	0.703***	0.669***	0.489***	0.705***	0.767***	0.743***	0.469***	0.655***
	(0.0609)	(0.0570)	(0.0424)	(0.0650)	(0.0432)	(0.0307)	(0.0471)	(0.101)	(0.0532)	(0.0301)	(0.0426)	(0.0943)	(0.0552)
Δln $-Denomination XR	0.187	0.318*	-0.722	-0.953**	0.202	0.570	-0.142	-0.512	0.349	0.946**	1.029**	1.081***	-1.174
(increase = $ depreciation)	(0.194)	(0.179)	(0.447)	(0.425)	(0.222)	(0.337)	(0.284)	(0.434)	(0.243)	(0.418)	(0.487)	(0.299)	(0.803)
L.Δln $-Denomination XR	-0.168	-0.144	0.940**	-0.265	-0.239*	-0.143	0.504*	0.569**	-0.698***	-0.376**	-0.973***	-0.211	-0.366
(increase = $ depreciation)	(0.183)	(0.178)	(0.421)	(0.320)	(0.134)	(0.115)	(0.258)	(0.248)	(0.157)	(0.164)	(0.193)	(0.150)	(0.286)
Δln USD Broad Index	-1.098***	-0.981***	-2.814***	-3.191***	-1.029***	-0.742**	-2.120***	-2.776***	-0.113	0.635	0.711	0.777*	-0.944
(increase = $ appreciation)	(0.253)	(0.236)	(0.651)	(0.704)	(0.337)	(0.356)	(0.454)	(0.665)	(0.352)	(0.386)	(0.543)	(0.433)	(1.345)
US 3-month interest rate	0.0156***	0.0158**	0.0198	0.0160	-0.00917	-0.00554	0.000882	-0.0256**	-0.0203*	0.00805	0.0194	0.0544***	0.0738***
	(0.00553)	(0.00662)	(0.0140)	(0.0144)	(0.0114)	(0.0141)	(0.00870)	(0.0110)	(0.0115)	(0.0168)	(0.0118)	(0.0145)	(0.0205)
US 10-year treasury yield	0.00663	0.00467	-0.00741	-0.0266	-0.00374	-0.00246	-0.0655	-0.0892***	0.0763***	0.0401*	0.108***	0.0982*	0.141**
	(0.0182)	(0.0222)	(0.0341)	(0.0432)	(0.0167)	(0.0176)	(0.0428)	(0.0242)	(0.0210)	(0.0194)	(0.0359)	(0.0501)	(0.0517)
L.US 10-year treasury yield	0.0131	-0.00458	-0.0704*	-0.0230	0.0373	-0.00113	0.000838	-0.0281	0.0433	0.0156	0.0572***	0.0731	0.00887
	(0.0201)	(0.0188)	(0.0361)	(0.0234)	(0.0230)	(0.0157)	(0.0311)	(0.0271)	(0.0304)	(0.0266)	(0.0192)	(0.0560)	(0.0439)
Δln SNP500 Index	-0.364***	-0.275**	-0.666***	-0.707***	-0.667***	-0.704***	-1.256***	-1.661***	0.0201	-0.0309	0.304*	-0.332	-0.0993
	(0.106)	(0.0995)	(0.178)	(0.230)	(0.124)	(0.117)	(0.232)	(0.165)	(0.105)	(0.171)	(0.162)	(0.243)	(0.419)
SNP500 dividend yield	-0.0328	-0.0333*	-0.122**	-0.0212	-0.00809	0.00180	-0.0878**	-0.00178	0.0728***	0.0289	0.116***	0.0463	0.0890
	(0.0204)	(0.0193)	(0.0502)	(0.0397)	(0.0212)	(0.0191)	(0.0346)	(0.0532)	(0.0256)	(0.0270)	(0.0290)	(0.0589)	(0.0724)
VIX	-0.0542***	-0.0622***	-0.0530**	-0.0867***	-0.0767***	-0.0736***	-0.0931***	-0.168***	-0.0657***	-0.0318	-0.151***	-0.113***	-0.0960**
(normalized)	(0.00939)	(0.00991)	(0.0212)	(0.0219)	(0.0140)	(0.0164)	(0.0225)	(0.0176)	(0.0130)	(0.0191)	(0.0215)	(0.0324)	(0.0381)
Inflation(Δln CPI)	0.269	1.112*	-2.736	0.0972	-1.412*	0.490	-3.878**	-1.646	2.213***	1.739**	15.79***	8.790***	6.170*
	(0.716)	(0.578)	(1.682)	(1.056)	(0.731)	(0.475)	(1.475)	(1.160)	(0.702)	(0.703)	(2.312)	(1.719)	(3.159)
RGDP growth	0.0264***	1.212***	0.0482***	2.801***	0.00537	1.183***	0.0191**	1.200**	-0.0186***	0.799	-0.0451***	-0.883	-0.0422**
	(0.00561)	(0.315)	(0.0158)	(0.568)	(0.00497)	(0.405)	(0.00753)	(0.453)	(0.00438)	(0.770)	(0.0118)	(1.015)	(0.0165)
Domestic Short-term IR		-0.000822		-0.0254		-0.00332		0.00996		-0.00899		0.0341	
		(0.00850)		(0.0151)		(0.0176)		(0.0176)		(0.0170)		(0.0241)	
Domestic Long-term IR		0.00897*		0.0378**		0.0311***		0.0277***		0.0298**		0.0211**	
		(0.00446)		(0.0153)		(0.00917)		(0.00827)		(0.0117)		(0.00981)	
Constant	-1.524***	-1.369***	-1.286***	-1.689***	-1.180***	-1.144***	-0.754***	-1.436***	-1.540***	-1.221***	-2.247***	-3.230***	-2.358***
	(0.259)	(0.238)	(0.217)	(0.229)	(0.196)	(0.108)	(0.173)	(0.403)	(0.224)	(0.111)	(0.306)	(0.718)	(0.252)
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	497	497	483	487	497	497	482	477	486	486	497	497	298
Countries	23	23	23	23	23	23	23	23	23	23	23	23	17
Adj. R^2	0.785	0.728	0.355	0.395	0.727	0.760	0.508	0.450	0.795	0.847	0.878	0.773	0.781

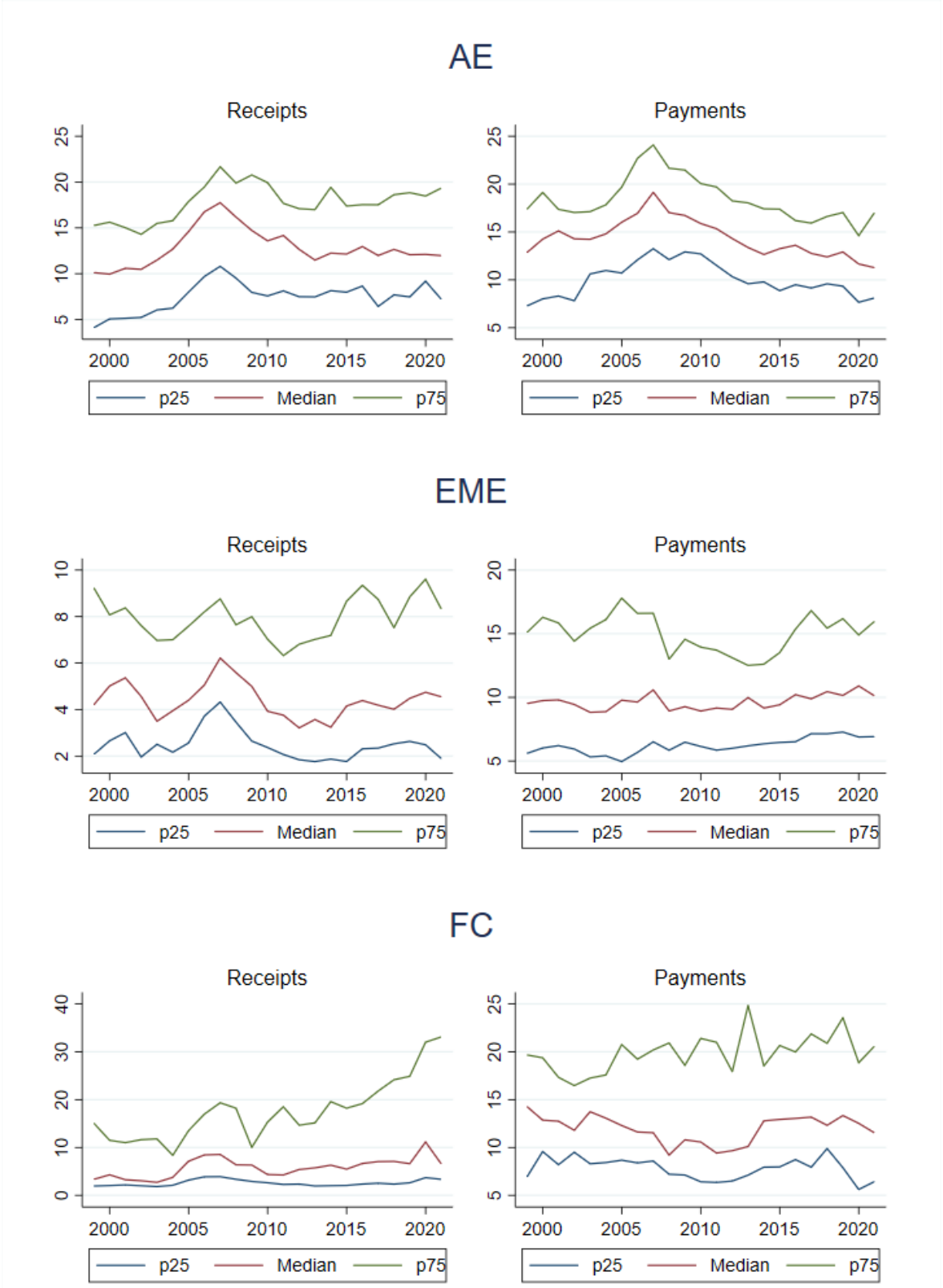
Notes: OLS panel estimates, errors clustered at the country level. *, **, *** indicates significance at the 10, 5 and 1% level respectively. Inflation and real GDP growth are values for the rest of the world in the Receipt regressions, and values for the country in the Payment regressions.

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	0.594***	0.663***	0.515***	0.713***	0.573***	0.718***	0.506***	0.514***	0.507***	0.621***	0.805***	0.622***	0.543***
	(0.0581)	(0.0574)	(0.0418)	(0.0425)	(0.0513)	(0.0943)	(0.0922)	(0.0817)	(0.0710)	(0.127)	(0.0815)	(0.0564)	(0.0434)
Δln $-Denomination XR	0.636	-0.00129	-0.150	-1.476**	4.452	1.903	4.179	1.862	-0.408	1.480*	2.345*	0.214	0.288
	(0.675)	(0.449)	(1.274)	(0.527)	(2.595)	(1.351)	(2.869)	(1.088)	(2.044)	(0.852)	(1.355)	(0.382)	(1.505)
L.Δln $-Denomination XR	-0.949**	-0.285	1.789**	0.477	-1.075	0.962	1.279	0.786	2.489	0.743*	-2.324***	-0.673**	-2.593**
(increase = $ depreciation)	(0.437)	(0.278)	(0.683)	(0.407)	(1.440)	(1.232)	(1.213)	(1.003)	(1.863)	(0.433)	(0.709)	(0.300)	(1.111)
Δln USD Broad Index	-0.949	-1.474**	-2.072*	-3.096***	-0.653	0.641	2.153	-1.232	-3.237*	0.789	0.235	-0.509	0.0343
(increase = $ appreciation)	(0.664)	(0.674)	(1.159)	(0.591)	(1.210)	(0.857)	(2.774)	(1.457)	(1.724)	(0.682)	(0.638)	(0.326)	(0.640)
US 3-month interest rate	0.0781***	0.0878***	0.0201	-0.0279*	0.0546	-0.0164	0.0577	-0.103	0.0547	-0.0184	0.0221	0.0613***	0.120***
	(0.0135)	(0.0128)	(0.0247)	(0.0138)	(0.0374)	(0.0214)	(0.0972)	(0.0599)	(0.0505)	(0.0205)	(0.0175)	(0.0107)	(0.0385)
US 10-year treasury yield	-0.0205	0.0421	-0.0215	-0.00132	-0.0720	0.00726	0.326*	0.0732	0.00984	0.0292	0.0269	0.0336	0.115
	(0.0345)	(0.0374)	(0.0700)	(0.0192)	(0.0599)	(0.0367)	(0.179)	(0.0911)	(0.0702)	(0.0252)	(0.0626)	(0.0353)	(0.0705)
L.US 10-year treasury yield	-0.00591	-0.0895***	-0.0795	-0.0229	0.0927	0.0106	-0.222	0.0156	-0.00511	0.0424	0.0712	-0.00921	0.0696*
	(0.0269)	(0.0298)	(0.0576)	(0.0303)	(0.0792)	(0.0296)	(0.150)	(0.0987)	(0.0777)	(0.0332)	(0.0458)	(0.0317)	(0.0395)
Δln SNP500 Index	-0.574*	-0.498	-1.360**	-1.013***	-1.187**	-0.595	1.307	-2.186***	-1.749**	0.0844	-0.463	-0.545*	-0.615*
	(0.279)	(0.336)	(0.554)	(0.283)	(0.559)	(0.364)	(1.834)	(0.729)	(0.786)	(0.311)	(0.608)	(0.281)	(0.298)
SNP500 dividend yield	-0.0660	-0.0726	-0.191**	-0.129***	-0.0673	-0.134**	0.294	-0.222*	-0.212	0.0348	0.0724	0.0154	0.0443
	(0.0455)	(0.0454)	(0.0833)	(0.0344)	(0.118)	(0.0478)	(0.186)	(0.126)	(0.136)	(0.0454)	(0.0470)	(0.0436)	(0.0733)
VIX	-0.0691**	-0.0582**	0.00322	-0.0936***	-0.121**	-0.0703**	0.243	-0.202**	-0.161*	-0.0381	-0.248***	-0.0755**	-0.193***
(normalized)	(0.0260)	(0.0219)	(0.0434)	(0.0222)	(0.0520)	(0.0331)	(0.256)	(0.0793)	(0.0813)	(0.0308)	(0.0693)	(0.0269)	(0.0466)
Inflation(Δln CPI)	3.348**	0.207	-2.584	0.488***	6.421	0.0137	-5.560	1.360*	4.094	0.114	15.01***	0.719**	15.36***
	(1.491)	(0.231)	(2.092)	(0.155)	(4.522)	(0.449)	(9.682)	(0.739)	(3.271)	(0.355)	(3.723)	(0.326)	(3.481)
RGDP growth	0.0307**	0.240	0.0940***	2.044***	0.00868	-0.204	-0.000698	-1.104	-0.00230	-0.453	-0.0357	0.104	-0.0629***
	(0.0138)	(0.248)	(0.0300)	(0.569)	(0.0318)	(0.467)	(0.0561)	(1.099)	(0.0331)	(0.379)	(0.0211)	(0.270)	(0.0195)
Constant	-1.615***	-1.306***	-1.064***	-0.431*	-1.610**	-0.640	-3.038***	-1.463**	-0.993*	-1.319***	-1.648***	-1.616***	-3.101***
	(0.278)	(0.296)	(0.297)	(0.213)	(0.581)	(0.416)	(1.050)	(0.527)	(0.542)	(0.462)	(0.490)	(0.179)	(0.400)
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	502	502	470	498	443	475	319	354	407	445	468	470	229
Countries	23	23	23	23	22	23	19	19	21	23	22	22	15
Adj. R^2	0.682	0.655	0.386	0.644	0.488	0.581	0.291	0.357	0.402	0.470	0.769	0.674	0.751

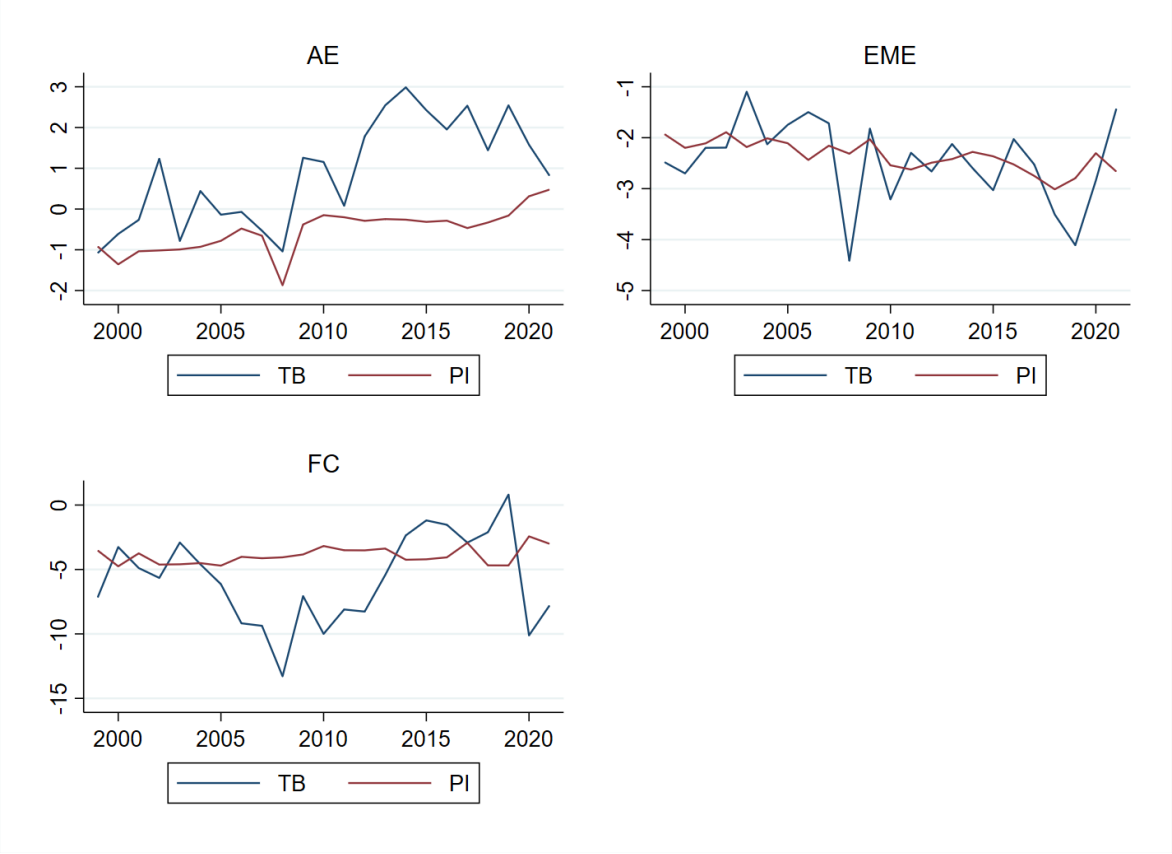
Notes: OLS panel estimates, errors clustered at the country level. *, **, *** indicates significance at the 10, 5 and 1% level respectively. Inflation and real GDP growth are values for the rest of the world in the Receipt regressions, and values for the country in the Payment regressions. We do not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

Figure 1: Primary income flows (percent of primary income + trade flows)



Notes: AE, EME and FC denotes advanced economies, emerging economies (both excluding financial centers) and financial centers.

Figure 2: Net trade and primary income balance (percent of GDP, median country)



Notes: AE, EME and FC denotes advanced economies, emerging economies (both excluding financial centers) and financial centers.

Figure 3: Trade flows (percent of GDP)

Notes: AE, EME and FC denotes advanced economies, emerging economies (both excluding financial centers) and financial centers.

Figure 4: Total primary income flows (percent of GDP)

Notes: AE, EME and FC denotes advanced economies, emerging economies (both excluding financial centers) and financial centers.

Figure 5: FDI primary income flows (percent of GDP)

Notes: AE, EME and FC denotes advanced economies, emerging economies (both excluding financial centers) and financial centers.

Figure 6: Portfolio equity primary income flows (percent of GDP)

Notes: AE, EME and FC denotes advanced economies, emerging economies (both excluding financial centers) and financial centers.

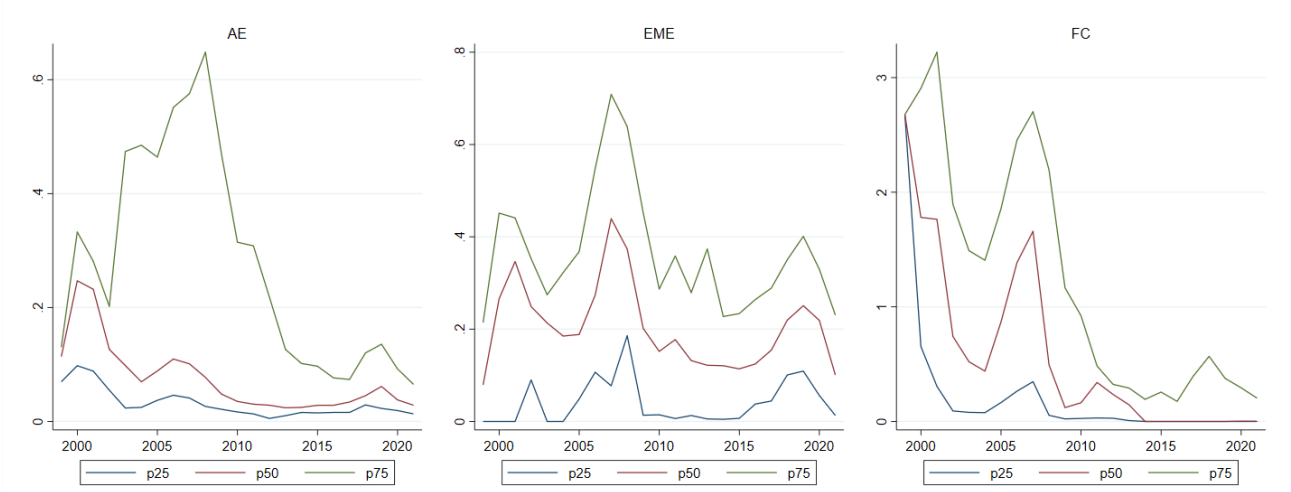
Figure 7: Portfolio debt primary income flows (percent of GDP)

Notes: AE, EME and FC denotes advanced economies, emerging economies (both excluding financial centers) and financial centers.

Figure 8: Other investment primary income flows (percent of GDP)

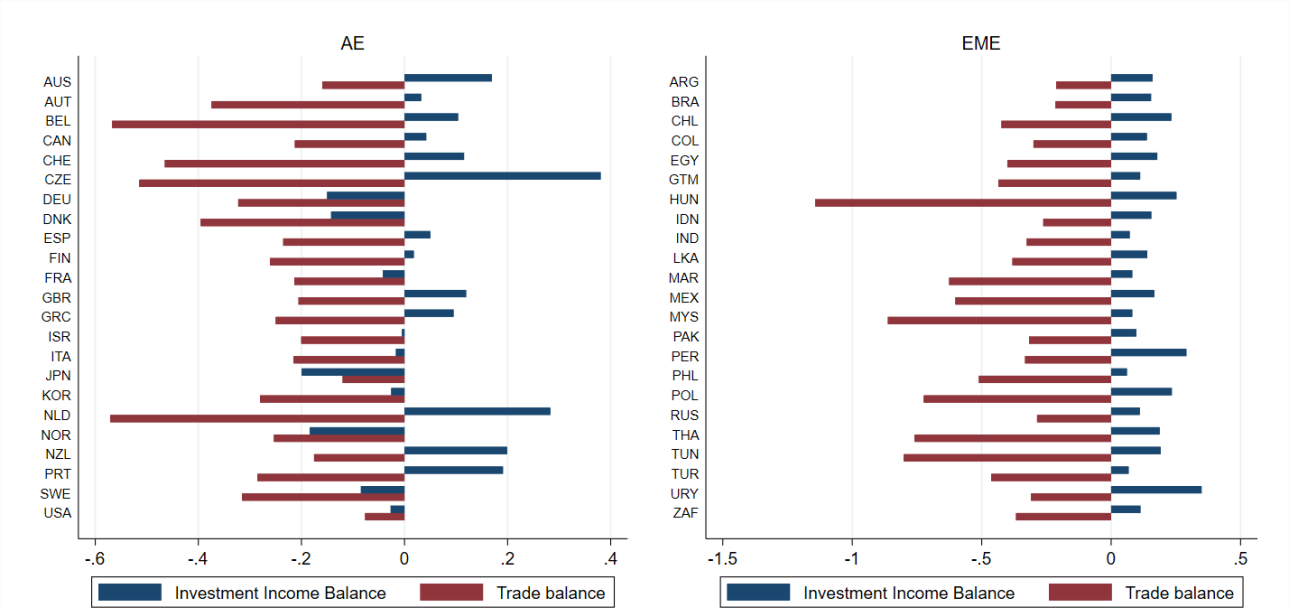
Notes: AE, EME and FC denotes advanced economies, emerging economies (both excluding financial centers) and financial centers.

Figure 9: Foreign reserves primary income receipts (percent of GDP)



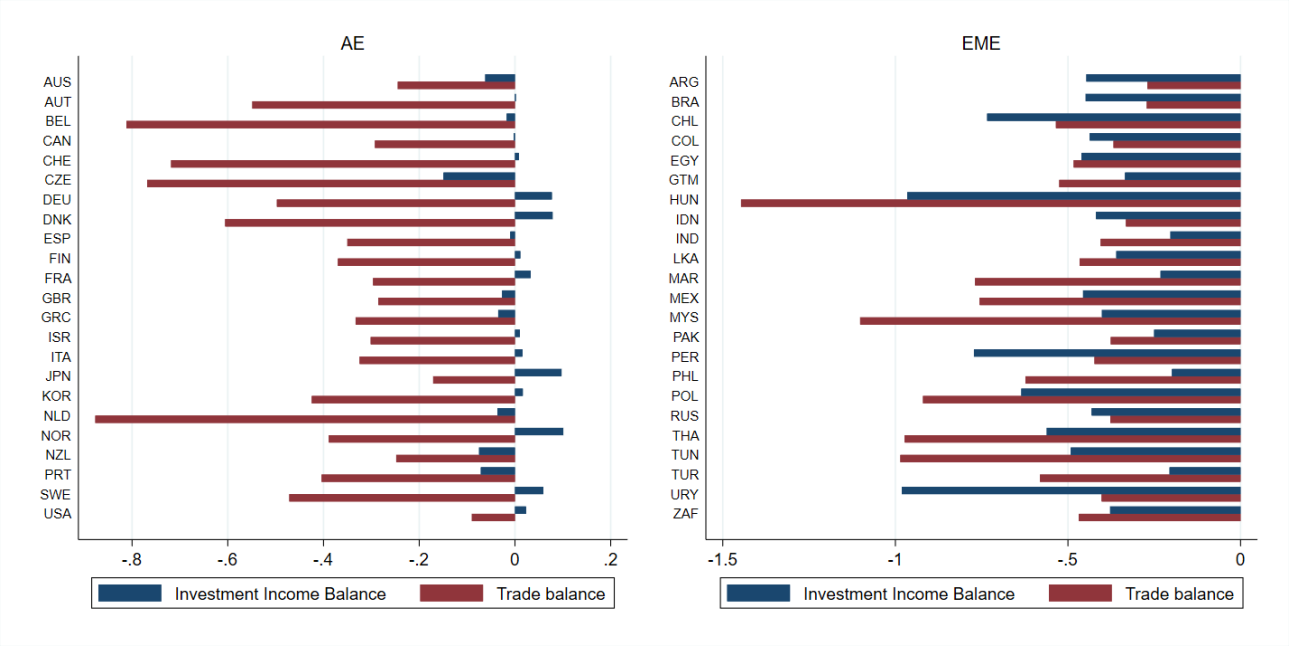
Notes: AE, EME and FC denotes advanced economies, emerging economies (both excluding financial centers) and financial centers.

Figure 10: Impact of a VIX increase



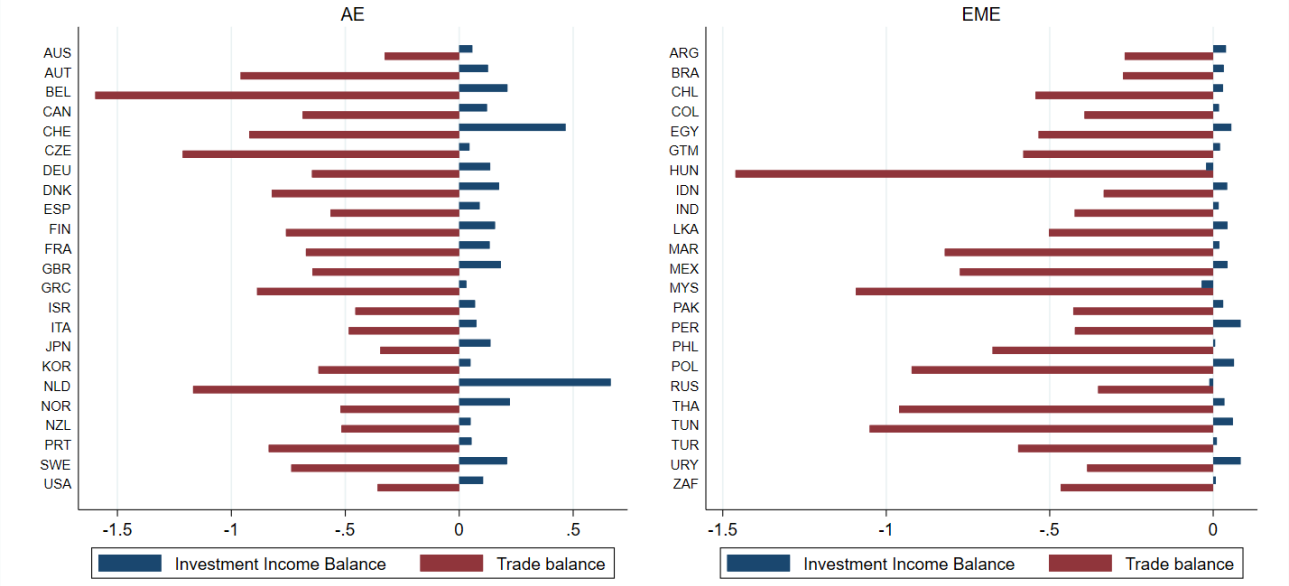
Notes: The figure shows the impact of a 1 standard error increase in the VIX index on the balances of trade and primary income (% of GDP) of the same year.

Figure 11: Impact of a US short-term interest rate increase



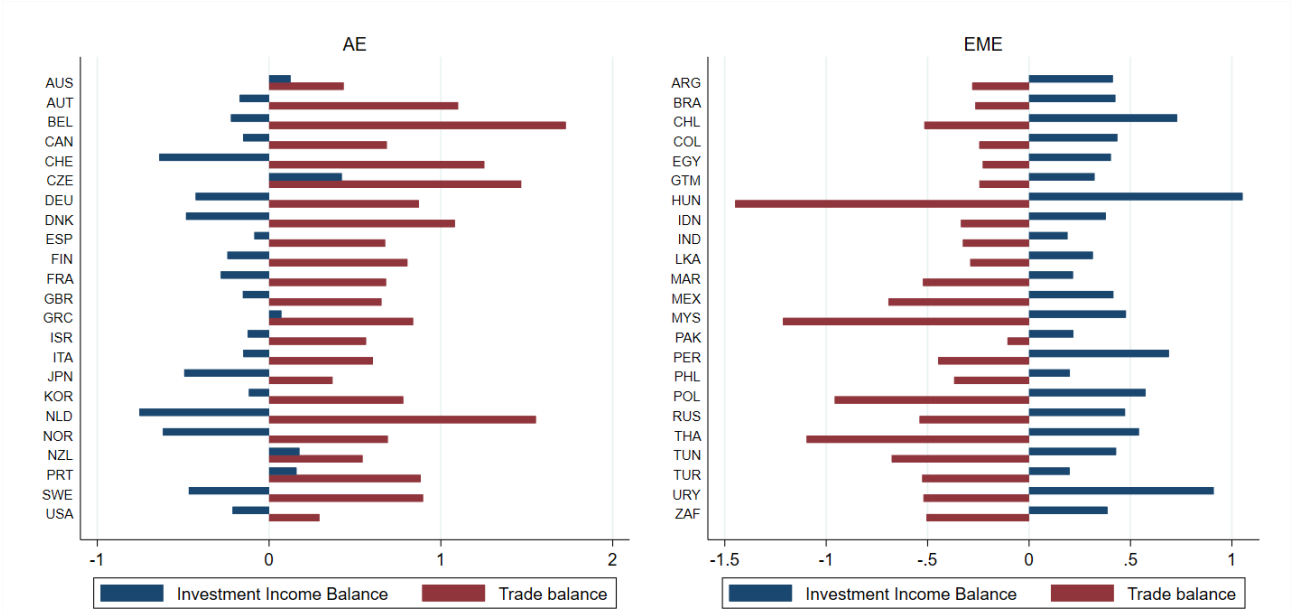
Notes: The figure shows the impact of a 1 percentage point increase in the US 3 months interest rate on the balances of trade and primary income (% of GDP) after two years.

Figure 12: Impact of a US long-term interest rate increase



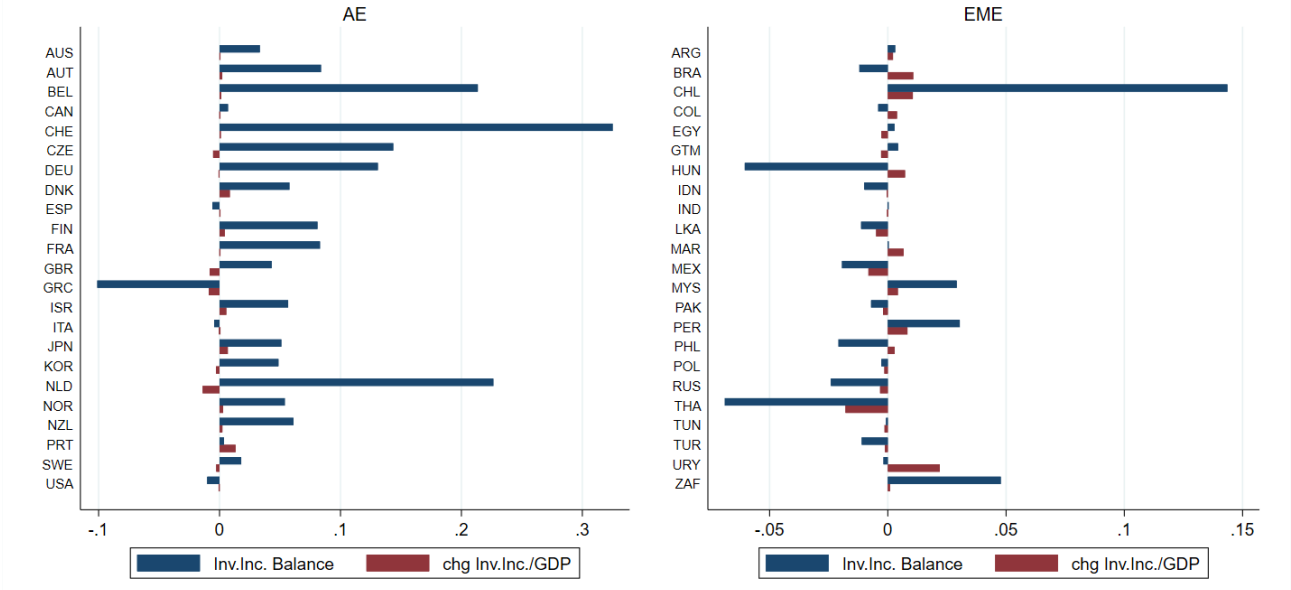
Notes: The figure shows the impact of a 1 percentage point increase in the US 10 year interest rate on the balances of trade and primary income (% of GDP) after two years.

Figure 13: Impact of a dollar appreciation



Notes: The figure shows the impact of a 10 percentage point appreciation of the US dollar against all currencies on the balances of trade and primary income (% of GDP) of the same year.

Figure 14: Taper Tantrum

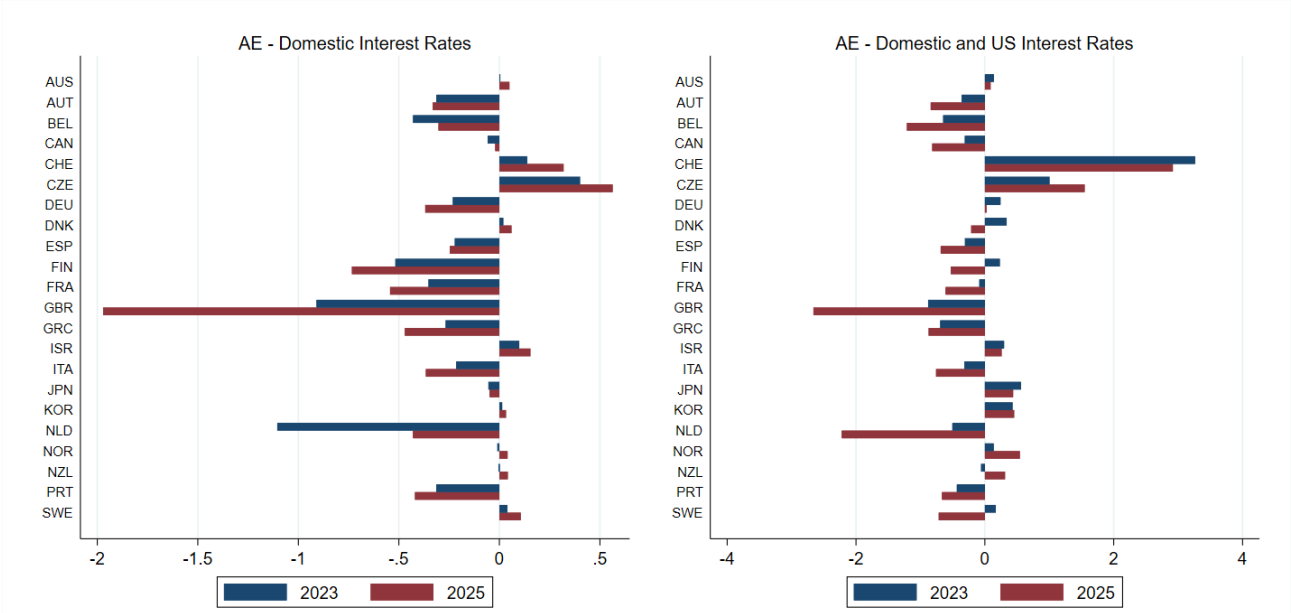


Notes: The figure shows the impact of the expected increase of US short and long-term interest rates in the US and in other economies since 2012 on the sum of components of Investment Income (% of GDP) for 2013 as well as the change in Investment Income Balance-to-GDP-ratio. It includes the net effect on FDI, Portfolio, Other Investment Income and Reserves (only for receipts).

Figure 15: Impact of rising US interest rates since 2021

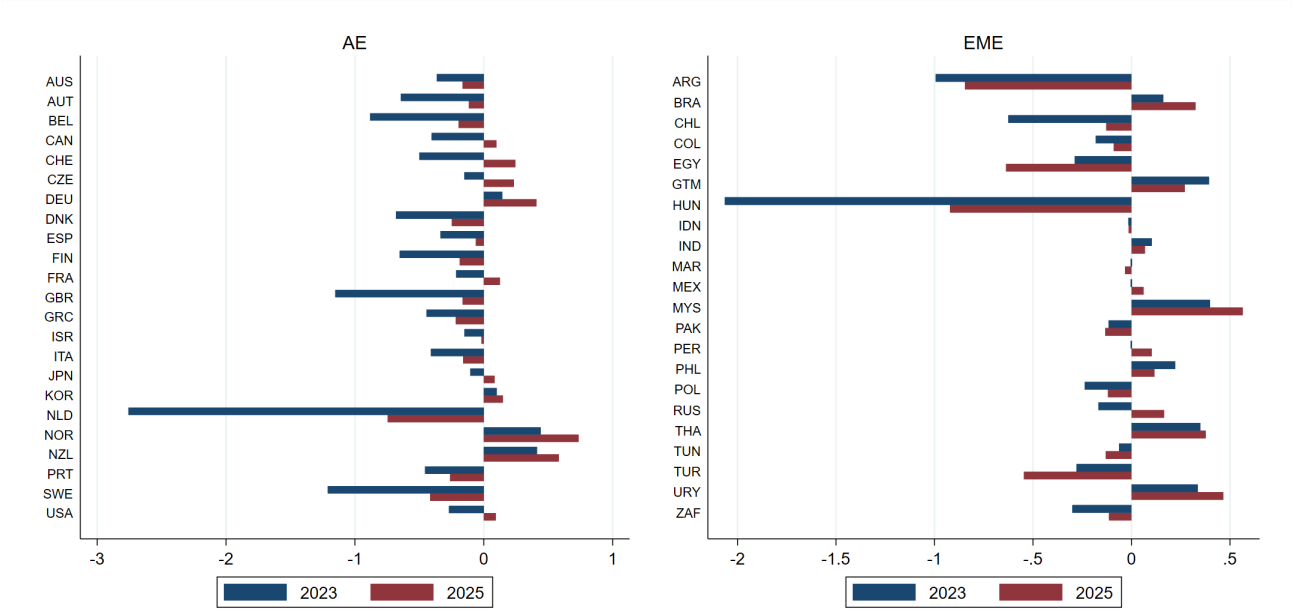
Notes: The figure shows the impact of the actual and expected increase of US short and long-term interest rates since 2021 on the sum of components of Investment Income (% of GDP) for 2023 and 2025. It includes the net effect on FDI, Portfolio, Other Investment Income and Reserves (only for receipts).

Figure 16: Impact of rising US and domestic interest rates since 2021



Notes: The figure shows the impact of the actual and expected increase of short and long-term interest rates in the US and in other economies since 2021 on the sum of components of Investment Income (% of GDP) for 2023 and 2025. It includes the net effect on FDI, Portfolio, Other Investment Income and Reserves (only for receipts).

Figure 17: Impact of world and domestic inflation since 2021



Notes: The figure shows the impact of the actual and expected increase of world and domestic inflation since 2021 on the sum of components of Investment Income (% of GDP) for 2023 and 2025 for Receipts and Payments respectively. It includes the net effect on FDI, Portfolio, Other Investment Income and Reserves (only for receipts).

A Appendix

1.1 Approximation of yields

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

$$\begin{aligned} K^{net,F,D}_{ss,t} &= g_{ss} A^{F,D}_{ss,t-1} \quad ; \quad K^{net,V,D}_{ss,t} = g_{ss} A^{V,D}_{ss,t-1} \\ K^{net,F,\$}_{ss,t} &= g_{ss} A^{F,\$}_{ss,t-1} \quad ; \quad K^{net,V,\$}_{ss,t} = g_{ss} A^{V,\$}_{ss,t-1} \end{aligned}$$

Taking a linear approximation of (1), we obtain:

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

The dynamics of the asset position in fixed income assets is approximated as $\left(1+g_{ss}\right)\hat{A}^{F,\$}_{t-1} = \left(\widehat{S}^{\$/D}_{t-1} - \widehat{S}^{\$/D}_{t-2}\right) + \hat{A}^{F,\$}_{t-2} + g_{ss}\hat{K}^{net,F,\$}_{t-1}$. Using that relation, we obtain (3). For a category without fixed income assets ($\delta^F_{ss} = 0$) the yield simplifies to $\hat{r}^{\$}_t/r_{ss} = \left(\widehat{S}^{\$/D}_t - \widehat{S}^{\$/D}_{t-1}\right) + \hat{r}^{new,V,D}_t/r_{ss}$.

1.2 Impact on income flows

1.2.1 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:

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

1.2.2 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 and the presence of lagged effect for long-term US rates.

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:

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

We now turn to the impact at period $t+1$. This combine a) the immediate impact as the US interest rate remains higher b) the impact of the lag interest rate in the regression and c) the persistence through the lagged yield. Specifically:

$$\begin{aligned}\left[\frac{\hat{r}^{\$}_{t+1}}{r_{ss}}\right]^{receipt}_{FIT-USlong,k} &= \delta^{receipt}_{USlong,k} * 1 + \delta^{receipt}_{USlong-lag,k} * 1 + \beta_{lag}\left[\frac{\hat{r}^{\$}_{t}}{r_{ss}}\right]^{receipt}_{FIT-USlong,k} \\ &= \left[(1+\beta_{lag})\,\delta^{receipt}_{USlong,k} + \delta^{receipt}_{USlong-lag,k} + \beta_{lag}\delta^{receipt}_{USlong,k}\right] * 1\end{aligned}$$

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

$$\begin{aligned}[NPI_{t+1}/Y_{t+1}]_{FIT-USlong,c} &= \sum_k \left[\overline{p}^{\$,asset}_{k,c}\left[(1+\beta_{lag})\,\delta^{receipt}_{USlong,k} + \delta^{receipt}_{USlong-lag,k} + \beta_{lag}\delta^{receipt}_{USlong,k}\right]\right] \\ &\quad - \sum_k \left[\overline{p}^{\$,liabbility}_{k,c}\left[(1+\beta_{lag})\,\delta^{payment}_{USlong,k} + \delta^{payment}_{USlong-lag,k} + \beta_{lag}\delta^{payment}_{USlong,k}\right]\right]\end{aligned}$$

1.2.3 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 $-0.1\,(1-w_{t,k,c})$ 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):

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

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

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

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:

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

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

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

1.3 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, $W^{A,L}_{i,j,t}$. 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,[15] leaving the share of domestic currency $S^{A,L}_{i,DC,t}$ 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 currency of investment weighted exchange rate for assets (and liabilities) is then of the following form, with a value of $\text{ER}^{A,L}_{i,t} > 1$ indicating that since 2010 the currency of country i has depreciated against the currencies in which its assets (liabilities) are denominated:

$$\text{ER}^{A,L}_{i,t} = \Pi_{j \neq i} \left(\frac{R_{i,t}/R_{i,2010}}{R_{j,t}/R_{j,2010}} \right)^{W^{A,L}_{i,j,t}}$$

where:

$$W^{A,L}_{i,j,t} = S^{A,L}_{i,j,t} \times \frac{\sum_{k \in (\text{USD,EUR,GBP,CNY,JPY})} S^{A,L}_{i,k,t} + S^{A,L}_{i,OTH,t}}{\sum_{k \in (\text{USD,EUR,GBP,CNY,JPY})} S^{A,L}_{i,k,t}}$$

$$W^{A,L}_{i,j,t} + S^{A,L}_{i,DC,t} = 1$$

As we conduct seperate regressions for investment income receipts and earnings, we keep separate weighted exchange rates for assets and liabilities instead of calculating an index as in Colacelli et al., 2021. In addition, whenever data are available, these exchange rates are

[15] $W^{A,L}_{i,j,t}$ are the weight after the adjustment, and $S^{A,L}_{i,j,t}$ are the weights before

calculated on the share of debt in different currencies (regressions on Portfolio Interests in our case).

The final step is to express the weighted exchange rates against the US dollar. This is done by dividing the weighted exchange rate (units of currency i per unit of the currency basket of investment) by the bilateral exchange rate against the dollar (units of currency i per dollar), so the resulting index denotes unit of dollar per unit of the currency basket of investment, with an increase representing a depreciation of the dollar.

1.4 Composition of Primary Income

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.