What drives non-financial private sector capital outflows in Latin America?

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Abstract

We analyse gross non-financial private sector capital outflows from six large Latin American economies over the past three decades. While considerable attention has recently been devoted to corporate capital inflows into emerging markets, the accumulation of foreign assets by the non-financial private sector in these countries has been overlooked. The omission is surprising, given that residents' outflows contribute considerably to the financial account balance and thus to the external financial vulnerability of the region. Moreover, although there are considerable differences between countries, we find that, in general, these outflows are (i) highly correlated with the global financial cycle; (ii) positively related to capital inflows and the current account balance, implying that they grow with higher foreign exchange availability; and (iii) seemingly unaffected by changes in domestic asset risk.

Keywords

Capital, capital movements, financial resources, financial flows, business cycles, corporations, private sector, macroeconomics, Latin America

JEL classification

F30, F36, F40, F44

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I. Introduction

Macroeconomic stability and economic development in Latin America have been increasingly jeopardized by the volatility of foreign capital. This heightened vulnerability is a direct consequence of the region's increasing integration into global financial markets (ECLAC, 2019) and has been presented as a source of external financial constraints affecting the economies of Latin America and emerging markets more generally (Abeles and Valdecantos, 2016; Pérez Caldentey, 2023).

While external financial vulnerability has been on the rise since the mid-1970s, changes to the global financial architecture in the wake of the global financial crisis of 2008–2009 introduced specific sources of vulnerability. More particularly, non-financial corporations became a key channel of global liquidity (Shin, 2014), especially through bond issuances. This increased the prominence of the non-financial corporate sector as a source of external financial vulnerability for emerging market economies vis-à-vis the banking sector and spurred a more detailed scrutiny of the sector's financial flows in these economies (Abraham, Cortina and Schmukler, 2021).

Although few studies have specifically analysed non-financial corporate indebtedness in Latin America, significant stylized facts emerge. First, the indebtedness of the non-financial corporate sector seems paradoxical in Latin America, where it has been characterized by a continuous financial surplus and weak capital expenditure (Abeles and Pérez Caldentey, 2022; Pérez Artica, Delbianco and Brufman, 2017). Again, Pérez Caldentey, Favreau Negront and Méndez Lobos (2019) show that the cycle of intense bond issuance activity that began in 2009 led to an increase in the fragility of Latin American firms, with potentially negative effects on their capital expenditure. Lastly, De Camino, Pérez Caldentey and Vera (2023) highlight the importance of intracompany loans recorded as part of direct investment flows in the balance-of-payments data and reveal their short-term nature by showing that they are highly correlated with the cyclical component of gross domestic product (GDP). They thus conclude that, despite being recorded as direct investment, these inflows entail serious financial fragility risks.

Simultaneously, academic interest has increasingly turned towards gross rather than net capital flows. This shift has been motivated by several factors. Primarily, the growing size of gross inflows and outflows relative to net flows became apparent, particularly with the sudden and significant changes that followed the crisis. Furthermore, a deeper analysis of the roots of the crisis revealed the need to focus more on gross positions than on current account imbalances (Borio and Disyatat, 2015).

In line with the sixth edition of the International Monetary Fund (IMF) *Balance of Payments and International Investment Position Manual* (BPM6) (IMF, 2009), the literature usually defines gross inflows as the net foreign liabilities incurred, and gross outflows as the net foreign assets accumulated by residents in the economic territory of a given country. An institutional unit is considered a resident of a country when its centre of economic interest lies within the economic territory of that country. This has several implications. First, outflows exclude financial remittances abroad by non-residents (such as firms whose centre of economic interest lies abroad). Second, when a resident firm or individual repatriates assets previously accumulated abroad, this is reflected as a negative gross outflow. Net capital flows are reported as the financial account balance in the BPM6 statistics and obtained as the difference between gross inflows and outflows.

There have been incipient attempts to understand the gross financial flows of different institutional sectors within each country. The first distinction made was between the net flows of the private and public sectors (Alfaro, Kalemli-Ozcan and Volosovych, 2014). Another study dissects gross flows generated by different private agents, such as corporations and banks (Avdjiev and others, 2022). Interestingly, the evidence gathered by these studies shows that the cyclical dynamics of foreign financial flows systematically differ according to whether the domestic sector is acting as borrower or lender in the financial relationship.

In this context, the aim of the present article is to provide an empirical characterization of gross capital outflows originating from the household and non-financial corporate (HNFC) sector over the past three decades in six large Latin American economies, namely Argentina, Brazil, Chile, Colombia, Mexico and Peru.

Several important considerations motivated our engagement with HNFC outflows in Latin America. First, we focus on the HNFC sector because, of all those reported in the BPM6 data, it is the institutional sector that most closely corresponds to the non-financial corporate sector. Although significant efforts have been made to understand the extent and implications of the sector's inflows, a systematic characterization of gross outflows in the region has yet to be accomplished, despite their importance as a source of foreign currency demand and currency crises (Calderón and Kubota, 2013). Moreover, considering the non-financial corporate sector's financial surplus and weak capital expenditures in the region, a study of its gross outflows may prove informative about the alternative uses being made of bond proceeds.

In addition, recent research has highlighted the need to examine the interplay between gross outflows and other key balance-of-payments variables. To illustrate this, we follow ECLAC (2019) and use the following identity:

$$Current\ account\ balance\text{-}financial\ account = \Delta international\ reserves \quad (1)$$

Decomposing the financial account balance as the difference between gross financial outflows (net accumulation of foreign assets) and inflows (net accumulation of foreign liabilities), the identity is as follows:

$$Gross\ outflows = current\ account\ balance + gross\ inflows - \Delta international\ reserves \quad (2)$$

Among other implications, equation 2 shows the role of outflows during a sudden stop in gross inflows. An important discussion in the literature focuses on this point. Some studies have shown that a sudden decline in capital inflows might be offset by a reduction in residents' capital outflows without necessarily evolving into a sudden stop in net capital flows that forces a costly adjustment of the current account balance (Cavallo, Izquierdo and Leon-Diaz, 2017). By contrast, other researchers have found this offsetting to be weak (ECLAC, 2019), strengthening the case for capital controls. Our study contributes to the ongoing discussion in the literature by highlighting this relationship specifically for the HNFC sector in the region.

Local investors may themselves trigger a balance-of-payments crisis by suddenly switching to larger positions in foreign assets (Calderón and Kubota, 2013), a phenomenon that Forbes and Warnock (2021) dub "sudden flight".

We provide novel results with significant implications. First, we build a conceptual framework to explain gross outflows by organizing theoretical arguments from the literature. Regarding our empirical results, the first descriptive analysis shows that HNFC outflows are quantitatively large and clearly eclipse bank outflows. They are also negatively correlated with official outflows (mostly of central bank reserve assets), which reinforces the case for a sectoral breakdown of financial flow analysis. Moreover, while gross national inflows clearly outpace gross national outflows (excluding central bank reserves), HNFC inflows and outflows are quantitatively similar. The sources of these differences are explained below.

Subsequently, we build a parsimonious econometric model that considers four main sets of drivers: (i) the global financial cycle, mainly via global risk; (ii) domestic variables affecting foreign exchange and saving; (iii) foreign capital inflows particularly directed to the non-financial sector; and (iv) variables influencing the relative risk of domestic assets. We also consider the impact of other structural and institutional factors, such as the degree of financial development and different capital control measures.

The main results can be summarized as follows:

(i) Not only total outflows but also HNFC sector outflows are correlated with the global financial cycle, mainly through co-movement with capital market risk and risk aversion;

(ii) HNFC outflows are positively related to the current account balance, which implies that the HNFC sector in the region capitalizes on foreign exchange availability resulting from current account surpluses to finance foreign asset accumulation;

(iii) HNFC outflows are also positively related to gross inflows to the same sector, as well as to foreign direct investment (FDI) (a source of financial inflows to emerging market economies that has gained importance over the past decade) and official sector inflows, and this result is particularly relevant in a phase when gross inflows to the non-financial corporate sector are predominant;

(iv) There is evidence that domestic asset returns have a negative impact on HNFC outflows, but this evidence is insufficient, and domestic asset risk does not seem to affect HNFC outflows; in sum, HNFC outflows do not seem to lend themselves easily to optimal portfolio theory explanations.

The study is organized into five sections after this introduction. Section II presents the conceptual framework used to analyse the determinants of HNFC outflows. Section III introduces the methodology used to construct HNFC outflow series and discusses the behaviour of these outflows. Section IV describes the estimation procedure. Section V presents empirical findings characterizing HNFC outflows. Section VI offers conclusions.

II. A conceptual framework for analysing the determinants of household and non-financial corporate sector outflows in Latin America

There are at least two dimensions in which different sources of outflows in a given sector can be conceptualized.

First, gross outflows or foreign asset accumulation can be seen as resulting from portfolio decisions: residents must decide what share of their portfolio is to be held in foreign assets. Consequently, our conceptual framework allows us to organize the different sources of HNFC outflows as either portfolio growth or portfolio reallocation factors. Portfolio growth factors are those that enlarge total HNFC assets even as portfolio shares are kept constant. This can occur because of an increase in local funding (new domestic savings) or in external sources of finance (financial inflows being a key source). Conversely, portfolio reallocation factors are those that involve changes in domestic returns or risks vis-à-vis foreign assets and thus lead to a shift in portfolio shares. Several previous studies have addressed this (Kraay and Ventura, 2000 and 2003; Tille and Van Wincoop, 2010).

Second, these sources of variation in outflows can be classified following the traditional distinction between push and pull factors (Calvo, Leiderman and Reinhart, 1993; Fernández-Arias, 1996). Push factors are external forces that affect global liquidity, returns, risk, or risk aversion in global financial markets. Conversely, pull factors relate to domestic conditions that allow or prompt the accumulation of assets abroad (e.g. domestic growth, higher foreign currency availability and increasing domestic asset risk).

The sources of HNFC outflows are discussed in detail in the remainder of this section, which organizes factors by whether they belong to the category of pull or international factors or instead result from domestic conditions leading to foreign asset accumulation. We treat gross capital

inflows as a relevant factor on their own, since we cannot classify them as either a pull or a push variable. Within each broad category, we identify the factors that act as sources of portfolio growth or reallocation.

1. Push or global financial cycle factors

(a) Global risk and risk aversion

The bulk of the literature dealing with gross flows, such as Forbes and Warnock (2012), Calderón and Kubota (2013) and Avdjiev and others (2022), finds that capital flow cycles are strongly correlated to the Chicago Board Options Exchange financial market volatility index, a measure used as a proxy for risk and risk aversion in global financial markets. Bearing in mind the growing importance of non-financial corporations as drivers of global liquidity in the aftermath of the global financial crisis of 2008–2009 (Avdjiev, Chui and Shin, 2014; Kim and Shin, 2021), we expect this to be a stronger conditioning factor for HNFC sector flows in that period.

According to our conceptual framework, increasing risk and risk aversion in global financial markets should negatively impact the accumulation of foreign assets by the HNFC sector, owing to the effects of both the portfolio growth and the portfolio reallocation factors. Declining capital inflows from risk-averse foreign investors may deter outflows via a portfolio growth channel. Again, an increase in the risk of foreign vis-à-vis domestic assets might discourage outflows via a portfolio reallocation channel.[1]

The literature provides evidence that outflows are negatively related to global risk. Indeed, using a sample of 99 countries (both developed and emerging market economies), Calderón and Kubota (2013) show that the probability of an "outflow-driven sudden stop" either decreases or shows a non-significant relationship with a rise in the volatility index. Likewise, Forbes and Warnok (2012) study a sample of 59 economies and find that the probability of a "sudden flight" by domestic investors decreases when global risk increases and that global risk leads to a higher probability of domestic investors retrenching their investment positions abroad. Lastly, Adler, Djigbenou and Sosa (2016) analyse a sample of 38 emerging market economies and find that foreign asset accumulation by residents is particularly sensitive to shocks in global financial risk, with asset repatriations offsetting contractions in gross inflows when there is a global financial shock. Thus, we formulate the following hypothesis regarding the impact of a rise in the volatility index on HNFC outflows.

- Hypothesis 1: Global risk is negatively related to HNFC outflows

2. Pull or domestic determinants of capital flows

Our next set of determinants includes country-specific factors. These can be understood as mostly domestically determined, as opposed to being shaped mainly by global forces. They include (i) the current account balance, (ii) domestic growth and (iii) variables characterizing the returns and risk of domestic assets.

(a) The current account balance

We can outline two opposing effects on outflows stemming from the current account balance. First, since the current account balance represents domestic saving in excess of domestic investment, we can interpret it as a source of portfolio growth and thus expect a positive relationship with outflows.

[1] Below we discuss how higher global risk can lead to even higher domestic risk.

Importantly, a positive current account balance also leads to a rise in the availability of foreign exchange to increase the accumulation of foreign assets. Conversely, given that successive negative current account balances will increase the probability of a country being cut off from foreign financing, triggering expectations of an exchange-rate depreciation, we might expect that a negative relationship would prevail in those circumstances.

Thus far, the empirical evidence points to a positive relationship between gross outflows and the current account balance. More specifically, Calderón and Kubota (2013) show that the probability of what they call an outflow-induced sudden stop increases when the current account balance turns positive. Broner and others (2013) also find that the current account balance relates positively to residents' gross capital outflows.

Since the current account balance includes the primary income account, where investment income is recorded, a positive correlation between the current account balance and assets accumulated abroad might seem trivial. In particular, growth in foreign assets leads to a rise in financial income. However, there is evidence that other forces are also at play. First, Broner and others (2013) find a strong positive relationship between outflows and the trade balance by itself. Second, Calderón and Kubota (2013) find that countries with abundant natural resources are more prone to experiencing outflow-driven sudden stops.

Considering both the theoretical and the empirical arguments summarized above, we expect a positive relationship between the current account balance and outflows, which gives us the next hypothesis.

- Hypothesis 2: The current account balance is positively correlated with HNFC outflows

(b) Domestic growth

The empirical literature reviewed by Koepke (2019) shows that domestic growth is also an important driver of capital inflows. This evidence is consistent with domestic growth attracting foreign investors, along the lines of the pull forces proposed by Calvo, Leiderman and Reinhart (1993).

However, the theoretical relationship between growth and gross outflows turns out to be less straightforward, pointing towards two opposite effects. An increase in HNFC saving associated with domestic growth may lead to the accumulation of foreign assets through a portfolio growth effect. Kraay and Ventura (2000) stress this channel.

The empirical evidence thus far seems to support the prevalence of a positive relationship between domestic growth and outflows. Broner and others (2013) find that domestic product is positively related to both inflows and outflows. Second, domestic growth does not seem to lead to any significant reduction in the probability of outflows turning into "sudden flight" or in outflow-driven sudden stop episodes (Calderón and Kubota, 2013; Forbes and Warnock, 2012). In other words, according to the empirical literature focused on country-level gross flows, we should, if anything, expect domestic growth to have a positive impact on outflows.

We thus formulate the following hypothesis regarding the relationship between domestic growth and HNFC outflows:

- Hypothesis 3: The relationship between domestic growth and HNFC outflows is ambiguous, potentially being either positive or negative

(c) Domestic asset returns and risk

As previously discussed, research emphasizing the portfolio decision nature of capital flows shows that changes in returns and risks should prompt changes in foreign asset accumulation. This is also observed in the literature on sudden stops, which frames these episodes as abrupt shifts in portfolio

composition. When discussing the relative importance of domestic (pull) versus external (push) factors, Calvo, Leiderman and Reinhart (1993) consider indicators of domestic returns such as stock market returns and interest rate spreads. Again, many variables used in the gross capital flow literature reflect domestic asset risks, examples being the current account balance, expansionary monetary and fiscal policy, and dollarization of private and public sector liabilities (Calderón and Kubota, 2013).

Empirically, although Meng and Van Wincoop (2020) find evidence that portfolio reallocation dominates short-term variations in outflows from the United States to individual countries, they are less important and persistent than portfolio growth factors.

Thus, we formulate the following hypothesis:

- Hypothesis 4: Domestic asset risk has a positive relationship with HNFC outflows

3. Gross capital inflows to the household and non-financial corporate sector

The study of inflows to the non-financial corporate sector, rather than aggregate inflows, has acquired greater prominence since the global financial crisis of 2008–2009. The surge of dollar-denominated bond issuances by corporations from emerging market economies in this period has led scholars to see corporations as a new driver of global liquidity (Avdjiev, McCauley and Shin, 2016; Shin, 2014), contributing to mounting credit risk and external sector vulnerabilities in these countries (IMF, 2019).

Other research has pointed to the proliferation of domestic financial asset accumulation as a major application of the funds raised by firms in emerging market economies (Bruno and Shin, 2017; Hardy and Saffie, 2019). However, the links between these inflows and the accumulation of foreign assets by firms in emerging market economies are yet to be systematically analysed.

Gross capital inflows may lead to an increase in corporate outflows in several ways.[2] First, there is a simple portfolio growth factor. Inflows represent an increase on the liabilities side of the balance sheet for the HNFC sector that should be matched by an increase on the assets side, leading to a proportional increase in foreign and domestic assets if portfolio shares remain unchanged. Moreover, this positive relationship might be merely the result of larger firms obtaining bank credit abroad and initially leaving the proceeds as deposits in the lending bank.[3]

In addition, portfolio reallocation processes may connect higher inflows to higher outflows. First, new inflows may lead to higher outflows if risk has an asymmetric impact on domestic and foreign investors. To make sense of the positive correlation between gross inflows and outflows, the literature has identified factors that produce asymmetry between domestic and foreign investors' perceptions of risk, such as exchange-rate and sovereign risk, and different hedging strategies (Broner and others, 2013; Milesi-Ferretti and Tille, 2011). These may also be portfolio reallocation forces underlying the positive association between inflows and outflows.

Lastly, the need to hedge currency mismatches arising from dollar-denominated debt might also be a channel leading from foreign inflows to the accumulation of foreign financial assets.

For Latin America, De Camino, Pérez Caldentey and Vera (2023) highlight the importance of intracompany loans registered as part of direct investment flows in the balance-of-payments data and reveal their short-term nature by showing that they are highly correlated with the cyclical component

[2] A number of these have already been touched upon above, given that inflows may act as a channel through which push factors influence outflows.

[3] We are grateful to an anonymous referee for pointing out this possibility.

of GDP. They conclude that, despite being recorded as direct investment, these inflows entail serious financial fragility risks. We therefore carry out robustness exercises for our main results, where we include direct investment inflows as part of HNFC inflows.

Consequently, we propose the following hypothesis for the relationship between HNFC inflows and outflows:

- Hypothesis 5: HNFC inflows should have a positive relationship with HNFC outflows

III. Introducing household and non-financial corporate sector outflows

In this section, we discuss our methodology for constructing the HNFC outflow series using the IMF balance-of-payments database. Subsequently, we highlight several important aspects of the behaviour of HNFC outflows. First, we discuss the importance of this sector as a source of countries' foreign asset accumulation. Second, we analyse how these flows interact with the global financial cycle. Lastly, we assess whether there is a positive correlation between HNFC capital outflows and inflows, given that the literature documents a relationship between country-level capital outflows and inflows.

1. Methodology for constructing the household and non-financial corporate sector outflows series

Since our main purpose is to analyse the evolution of gross capital outflows originating from the HNFC sector in Latin America, we draw on the financial account items of the IMF balance-of-payments database. Our estimate of HNFC gross capital outflows comprises, in principle, three different types of flows originating in this institutional sector: other investment debt, portfolio equity and portfolio debt. When available, we add together all three items to obtain our measure of HNFC outflows:

$$HNFC\ outflows = OID + PE + PD \tag{3}$$

where OID is outflows of other investment debt, PE of portfolio equity and PD of portfolio debt originating in the HNFC sector. Other investment debt represents a large share of total HNFC outflows and includes mostly currency and deposits (as well as loans, trade credit and accounts receivable). Following other studies (Avdjiev and others, 2022), we ignore other flow types, such as financial derivatives[4] and other investment equity.[5] These flows are often negligible and are sparsely reported in the balance-of-payments database (see annex 1[6] and Avdjiev and others, 2022).

In addition, we exclude direct investment flows from our main analysis because these flows are not broken down by institutional sector; thus, we are unable to distinguish between banking and non-banking FDI flows. Lastly, we adopt an admittedly naïve approach and exclude other sources of residents' outflows that may be registered as errors and omissions. The absence of a sectoral breakdown of errors and omissions would prevent their contribution to HNFC outflows from being adequately quantified even if we were to attempt this.

[4] These include derivatives and employee stock options and exclude financial derivatives linked to reserve asset management.

[5] This covers equity investment other than direct investment, reserve assets and securities (this last item is included in the portfolio equity flows category).

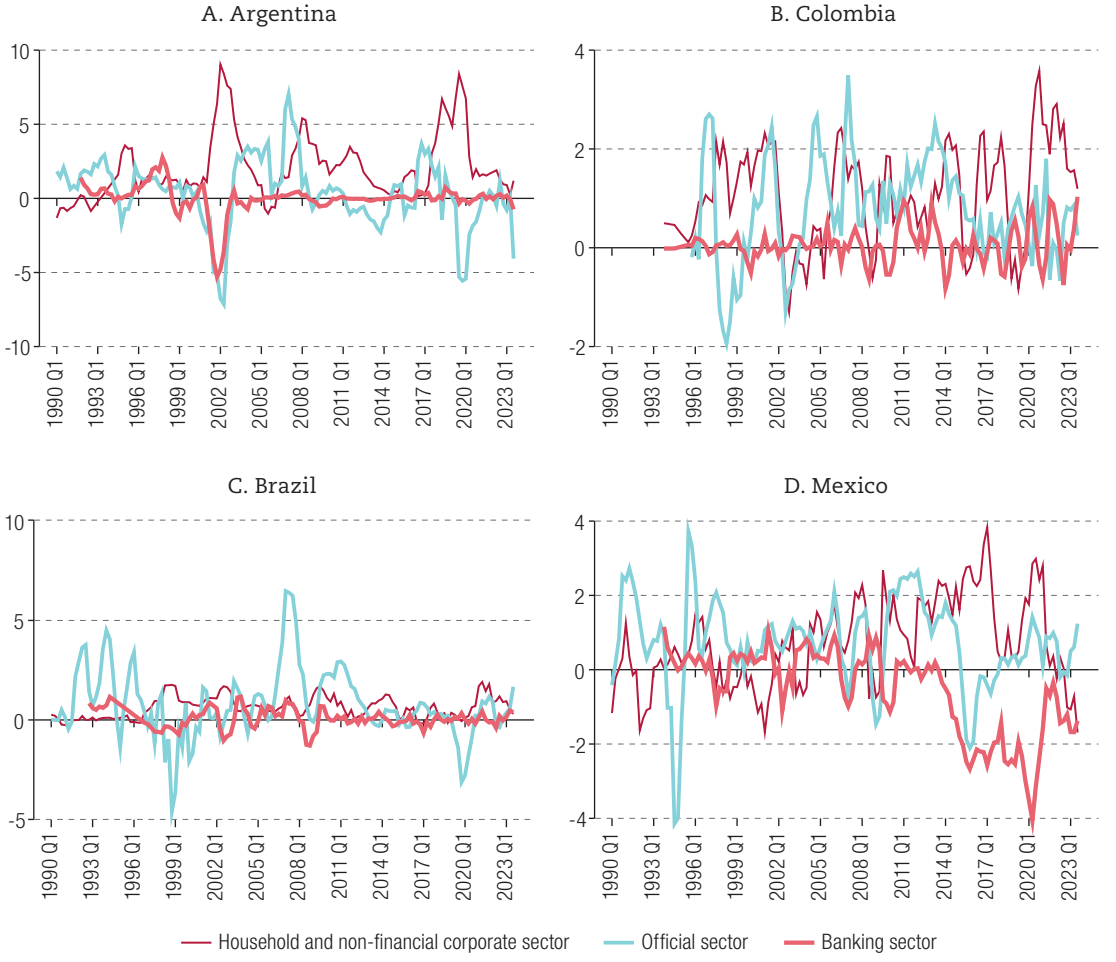
[6] The annexes are available in English at [online] https://www.dropbox.com/scl/fi/1lrufco84l7xicwf64xzb/03_PerezArticaRabinovich_Cepal_Appendix.pdf?rlkey=r977k79r4yfsghlt2ugim2hh8&st=gke17ju7&dl=0.

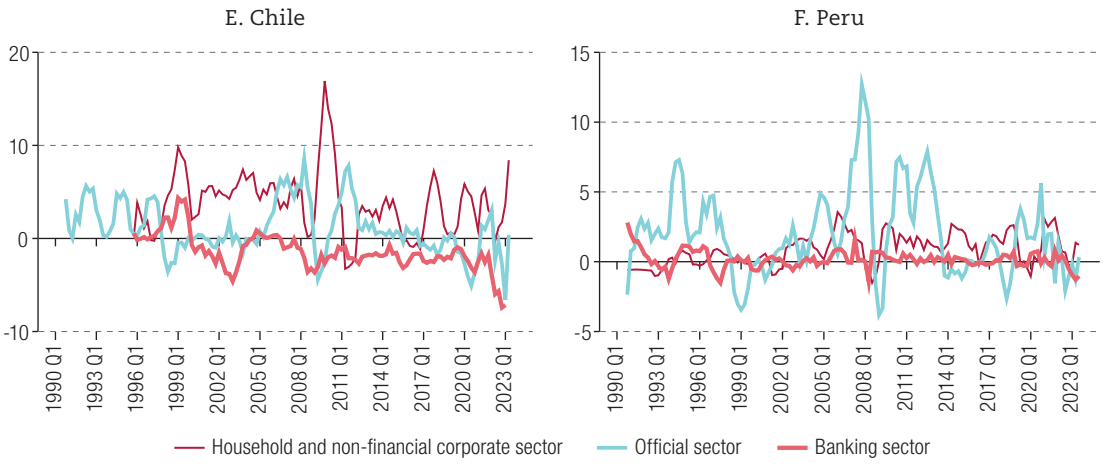
Annex 2 shows the availability of data for the three items composing our estimate of HNFC outflows by country and describes the filling procedure used to replace missing observations. We end up with 757 quarterly observations for the HNFC outflows series, spanning the six countries in our sample for the period from the first quarter of 1990 to the third quarter of 2023.

(a) Capital outflows by institutional sector

Each panel in figure 1 shows the evolution of capital outflows for different institutional sectors in each of the six Latin American countries covered by this study. Following Avdjiev and others (2022), we distinguish three institutional sectors: (i) the HNFC sector, which includes mostly non-financial corporations and households; (ii) the banking sector; and (iii) the official sector, which comprises the central government and the central bank, the bulk of whose foreign assets are composed of central bank reserve assets (see annex 1). We normalize these flows by GDP in current dollars.

Figure 1
Latin America (6 countries): financial outflows originating from the household and non-financial corporate sector, the banking sector and the official sector, four-quarter moving averages, first quarter of 1990 to first quarter of 2023
(Percentages of GDP)





Source: Prepared by the authors.

Figure 1 highlights three significant findings. First, it shows that HNFC outflows are, on average, very large in relation to other sectors and total country-level outflows. This is very striking in Argentina, Chile, Colombia and Mexico, for example, where HNFC outflows eclipse other sectors' outflows, including those of official reserve assets, over considerable periods of time. Second, it reveals the insignificance of banking flows relative to HNFC flows. Third, it suggests that HNFC outflows are predominantly positive for most countries in our sample, despite their fluctuations.

It also suggests that for most countries there is a negative correlation between HNFC and official outflows, reinforcing the case for an analysis that breaks down national flows into sectoral components. Table 1 confirms this negative correlation between HNFC and official outflows and shows that it is statistically substantial for three of the six countries.

Table 1
Latin America (6 countries): correlation of household and non-financial corporate outflows with official outflows

	Argentina	Brazil	Chile	Colombia	Mexico	Peru
Pearson correlation coefficient	-0.3650***	-0.1654	-0.2446**	-0.1393	-0.1935**	-0.0310
P-value	0.0000	0.0620	0.0128	0.1565	0.0286	0.7324

Source: Prepared by the authors.
Note: *** Significant at 1%; ** significant at 5%.

(b) Household and non-financial corporate sector outflows and inflows

We can also gain insight into the scale of HNFC outflows by comparing them with HNFC inflows. We compute HNFC inflows by the same procedure as we used to obtain the HNFC outflows series, considering other investment debt, portfolio equity and portfolio debt inflows to the HNFC sector. Figure 2 shows the time series for gross HNFC inflows and outflows in the six countries considered. Outflows are quantitatively substantial relative to inflows to the sector. It can also be seen that the sector's outflows (excluding central bank reserves) outpace inflows in some periods. This is the opposite of the relationship between total economy-wide inflows and outflows, as shown by ECLAC (2019). In that study, the authors find that total outflows are relatively insignificant compared to total inflows.

Figure 2
Latin America (6 countries): financial inflows and outflows of the household and non-financial corporate sector, four-quarter moving averages, first quarter of 1990 to first quarter of 2023
(Percentages of GDP)

Source: Prepared by the authors.

The divergence between the total inflows to outflows ratio and the HNFC inflows to outflows ratio can be attributed to two main factors. First, direct investment inflows are excluded from HNFC inflows because HNFC and banking flows cannot be disaggregated. Second, although official inflows constitute a substantial portion of gross national inflows, the largest component of official outflows (central bank international reserves) is not included in the national outflows series.

In sum, the recent increase in the salience of non-financial corporate inflows, together with the large size of HNFC outflows in relation to inflows to the sector, make the study of these even more relevant to the assessment of external vulnerability in Latin American countries.

(c) Some differences between countries

Differences between countries emerge when we analyse the time series of HNFC outflows. First, there are substantial differences in the average level of outflows, with Chile leading over the entire period considered, followed by Argentina. Table 2 shows that average HNFC outflows relative to dollar-denominated GDP were between four and five times as large in Chile as in Brazil, Colombia, Mexico or Peru, and almost twice as large as in Argentina. The table also shows that this difference diminished over the decades.

Table 2
Latin America (6 countries): average financial outflows of the household and non-financial corporate sector, by country and decade
(Percentages of GDP)

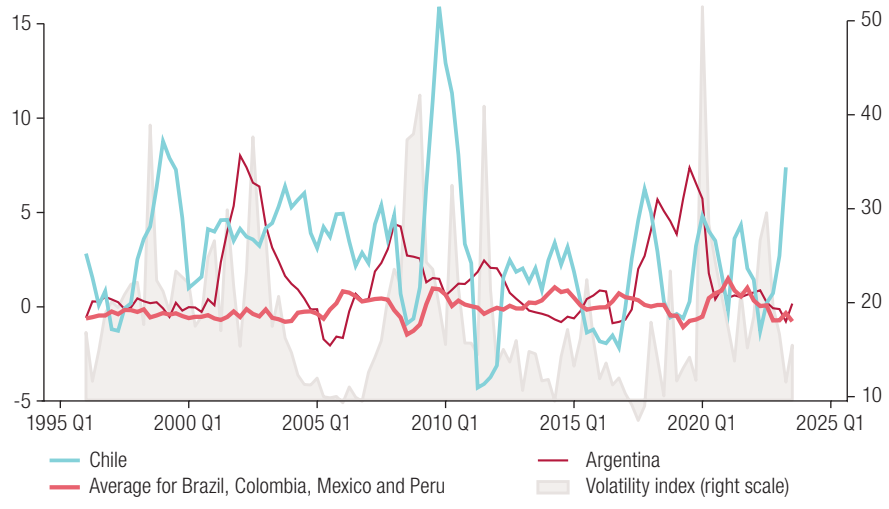
	Argentina	Brazil	Chile	Colombia	Mexico	Peru
1990s	0.9	0.4	3.8	1.0	0.0	0.0
2000s	2.8	0.7	5.9	1.0	0.7	1.2
2010s and 2020s[a]	2.4	0.6	2.6	1.3	1.4	1.3
Overall average	2.1	0.6	3.8	1.1	0.7	0.9

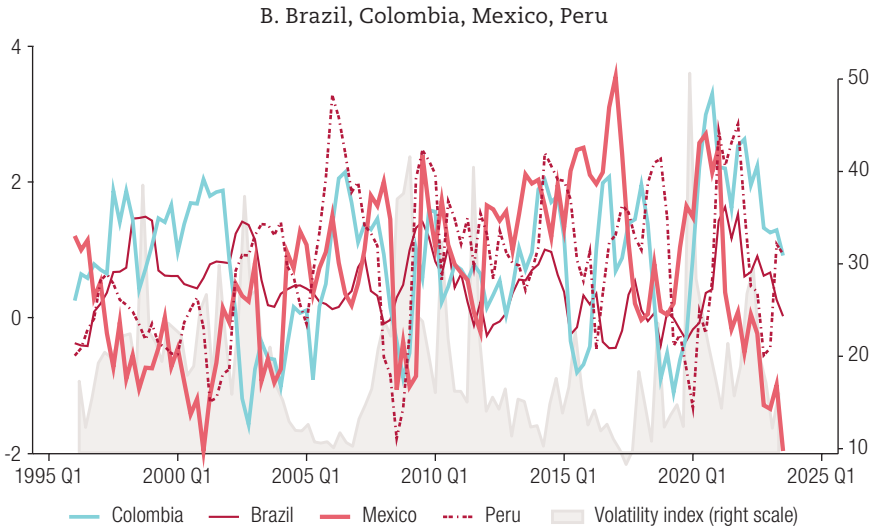
Source: Prepared by the authors.
[a] Up to the third quarter of 2023.

Second, the trend of HNFC outflows seems to have been positive in the four countries with lower average levels. Third, when the time series for outflows is displayed against the volatility index, as in both panels of figure 3, we see that the most extreme movements in HNFC outflows occurred in the vicinity of extreme fluctuations in global risk and risk aversion. On average, HNFC outflows seem to show a negative relationship with the volatility index, something that is confirmed by the econometric results given below.

Figure 3
Latin America (6 countries): financial outflows in the household and non-financial corporate sector and global financial risk as measured by the Chicago Board Options Exchange financial market volatility index, first quarter of 1995 to third quarter of 2024
(Percentages of GDP and index values)

A. Argentina and Chile





Source: Prepared by the authors.
Note: The Chicago Board Options Exchange financial market volatility index measures expected volatility over the next 30 days and is derived from the prices of call and put options on the S&P 500 index.

IV. Estimation procedure

Our data are a panel with a large number of time periods (T) and a small number of cross section individuals (N). When estimating a panel data model, we can usually deal with endogeneity due to unobservable and time-invariant sources of individual heterogeneity by performing a within-transformation of the data. In addition, dynamic panel models are typically used to control for other sources of endogeneity, such as predetermined regressors, which are correlated with the disturbance term.

However, the use of typical dynamic panel models introduces difficulties in a long panel context. As pointed out by Roodman (2009), these estimators are designed for situations with "small T, large N". Consequently, we follow Cameron and Trivedi (2009) and use methods specifically aimed at dealing with long panels.

Whereas in a short panel scenario we could control for serial correlation in the error without specifying a particular model for it, such a model is required when T is large. We use different estimators that were designed for this purpose. Consider the following two-way fixed-effects model:

$$y_{it} = \alpha_i + \gamma_t + X'_{it}\beta + \varepsilon_{it} \tag{4}$$

where α_i represents the individual unobserved effects, γ_t stands for the time effects, X'_{it} is the set of regressors, β are the parameters of interest and ε_{it} is the error term, which we assume to be independent and identically distributed. In our case, given that the panel only has a few individuals, α_i can be included as dummy variables. In addition, the natural ordering of time can be used to include a linear or quadratic time trend, and thus replace γ_t. We therefore obtain the following model:

$$y_{it} = X'_{it}\beta + u_{it} \qquad i = 1, ..., N; t = 1, ..., T \tag{5}$$

where X'_{it} includes indicator variables for each individual and possibly a linear time trend, a quadratic time trend, or both. We allow u_{it} to be heteroskedastic, correlated over i, and use an AR(1) autoregressive process to model the correlation over t. That is, we consider that $u_{it} = \rho_i u_{it-1} + \varepsilon_{it}$, where ε_{it} is serially uncorrelated but is correlated over i.

We can estimate the β parameters by using an ordinary least squares (OLS) or generalized least squares (GLS) procedure. In addition, we can model ρ_i to differ across panels or assume that it is the same for all individuals. We could also allow autocorrelated errors of general form instead of restricting u_{it} to AR(1) (Driscoll and Kraay, 1998).

Alternatively, we could estimate the individual effects model:

$$y_{it} = \alpha_i + X'_{it}\beta + u_{it} \tag{6}$$

Assuming that the error is AR(1), $u_{it} = \rho_i u_{it-1} + \varepsilon_{it}$. Here, the procedure begins by estimating ρ_i and performing a first transformation of the data to remove the effects of the AR(1) process. A second transformation is required to eliminate individual effects.

Our baseline model uses this last approach, although, as we will show, the main results hold when alternative estimators are used. In section V, we discuss further endogeneity issues and the use of instrumental variables in long panels.

We estimate a simple baseline model in which our measure of HNFC outflows relative to dollar-denominated GDP is regressed on variables describing the global financial cycle, pull factors associated with domestic income and foreign exchange availability, and variables describing domestic asset returns and risks. Schematically, we estimate a model described by

$$HNFC\ outflows = f(global\ financial\ cycle,\ domestic\ variables,\ domestic\ risk) \tag{7}$$

We present three subsequent versions, starting from a simple model that considers only push variables: the volatility index, global growth and the global interest rate. The global interest rate is calculated as the average rate of long-term sovereign bonds in the United States, Europe and Japan, following Forbes and Warnock (2012). All variables were obtained from the IMF International Financial Statistics database. Global growth is the yearly global growth rate obtained from the IMF World Economic Outlook database.

In a second step, we include a set of pull factors such as the current account balance as a proportion of GDP, the domestic growth rate, gross foreign capital inflows to domestic HNFC sectors (normalized by dollar-denominated GDP) and the domestic deposit interest rate. Subsequently, we add a set of variables describing domestic asset returns (based on the domestic deposit interest rate) and risk. Following the literature, our baseline model includes domestic inflation, central bank reserve assets as a proportion of GDP (in first difference) and the emerging market bond index for each country. In the robustness checks in section V.2 (c), we consider other sources of risk that are likely to be relevant. Annex 2 summarizes the usual panel unit root tests by showing the p-values corresponding to the statistics of each test. We confirm that the variables included do not follow a unit root process.

V. Empirical characterization of household and non-financial corporate sector outflows

1. Baseline results

Columns 1 to 3 of table 3 present the results of the three steps in our baseline model described above. We observe that the global variables are consistently significant across estimations. In line with our hypothesis 1, the volatility index parameter is always significant and negative. Moreover, its magnitude

is economically substantial, implying that an interquartile increase in the volatility index would lead to a decline in HNFC outflows of approximately 30% relative to the average HNFC outflows for the whole sample.[7]

Table 3
Baseline econometric results

Variable	(1) Push variables only	(2) Push and pull variables	(3) Push, pull and domestic risk variables	(4) Push, pull and domestic risk and financial structure variables	(5) Pull variables only	(6) Pull and domestic risk variables
Volatility index	-0.000314 *	-0.000383 **	-0.000562 ***	-0.000653 ***		
	(0.000168)	(0.000168)	(0.000181)	(0.000192)		
Global interest rates[a]	0.00578	0.00402	0.000927	-0.00214		
	(0.00393)	(0.00420)	(0.00497)	(0.00515)		
Global growth[b]	-0.00229 *	-0.00418 ***	-0.00569 ***	-0.00623 ***		
	(0.00137)	(0.00142)	(0.00161)	(0.00161)		
Domestic growth[b]		-0.0593 *	0.0297	-0.0191	-0.0262	-0.0198
		(0.0357)	(0.0511)	(0.0556)	(0.0244)	(0.0337)
Current account balance[c]		0.321 ***	0.385 ***	0.378 ***	0.292 ***	0.371 ***
		(0.0465)	(0.0550)	(0.0574)	(0.0434)	(0.0545)
Household and non-financial corporate sector inflows[c]		0.300 ***	0.407 ***	0.387 ***	0.331 ***	0.424 ***
		(0.0566)	(0.0658)	(0.0686)	(0.0554)	(0.0653)
Domestic interest rate		-2.92e-06	0.000343	-9.82e-05	-2.06e-06	0.000267
		(1.87e-06)	(0.000274)	(0.000345)	(1.94e-06)	(0.000284)
Reserve assets[a c]			-0.214 ***	-0.217 ***		-0.236 ***
			(0.0373)	(0.0403)		(0.0378)
Emerging market bond index			1.39e-06	1.74e-06		4.00e-07
			(2.10e-06)	(2.10e-06)		(2.16e-06)
Annual inflation			-0.000149	0.000144		-0.000215
			(0.000371)	(0.000380)		(0.000387)
Stock market capitalization[d]				0.000157		
				(0.000133)		
Financial system deposits[d]				-0.000608 *		
				(0.000361)		
Chinn-Ito index				0.0224 **		
				(0.0113)		
Constant	0.0294 ***	0.0445 ***	0.0518 ***	0.0573 ***	0.0200 ***	0.0220 ***
	(0.00475)	(0.00550)	(0.00639)	(0.0136)	(0.00141)	(0.00269)
Observations	655	585	493	457	671	518
Number of countries	6	6	6	6	6	6
R-squared (within)	0.0138	0.122	0.189	0.211	0.0927	0.159
R-squared (between)	0.609	0.342	0.352	0.171	0.420	0.461
R-squared (overall)	0.00748	0.159	0.219	0.208	0.125	0.187

Source: Prepared by the authors.
Note: Standard errors in parentheses. *** Significant at 1%; ** significant at 5%; * significant at 10%.
[a] Expressed in first difference.
[b] Expressed in percentage points.
[c] Normalized by the country's GDP expressed in current dollars.
[d] Normalized by GDP on the basis of Beck, Demirguc-Kunt and Levine (2000).

[7] To compute this, we multiply the point estimates of the parameters reported in column 3 of table 6 by the difference between the twenty-fifth and seventy-fifth percentiles of the distribution for the volatility index (and other regressors subsequently). A summary of the descriptive statistics for HNFC outflows and the regressors is provided in annex 3.

Some interesting results emerge when we consider the relationship with the first set of domestic variables. First, and confirming hypotheses 2 and 5, there is a significant and robust relationship between HNFC outflows, on the one hand, and the current account balance and gross foreign capital inflows received by the HNFC sector, on the other. In effect, these relationships are quantitatively important: interquartile changes in the current account and capital inflows to the HNFC sector are associated with increases of 75% to 80% and 35% to 40% of average HNFC outflows, respectively.[8]

The implications of these findings are significant because they indicate that both sources of foreign currency (the current account balance and capital inflows) were strongly associated with greater accumulation of foreign assets by the HNFC sector in the countries examined. Thus, the portfolio growth factors introduced in our discussion seem to prevail in the relationship between the current account balance and HNFC outflows. Moreover, in annex 3 (table A4, columns 9–11), we perform the same regressions but include the trade balance as a share of GDP instead of the current account balance, and the results are robust to this change.

Regarding the relationship between gross inflows and outflows, these results are consistent with other factors besides portfolio growth leading to a positive relationship, such as risks impacting residents and non-residents asymmetrically and demand for foreign assets for hedging purposes. If the estimated coefficient for HNFC inflows is considered in the light of the debate on offsetting between inflows and outflows, the relationship also seems important, although we still reject the existence of complete offsetting. Nevertheless, further exercises focused on episodes of extreme capital movements are needed.

We do not find any significant relationship between domestic growth and HNFC outflows, which bears out the ambiguous relationship proposed in hypothesis 3. As discussed above, this might imply an offsetting impact of portfolio growth and portfolio reallocation factors, stemming from domestic growth. The robustness exercises presented below show evidence of a positive relationship that might be due to portfolio growth factors.

Among those variables accounting for domestic asset risk, we only find a robust negative relationship with changes in reserve assets. This could be interpreted as the HNFC sector reducing its stock of foreign assets when central banks strengthen their reserve positions, thereby reducing the risk of exchange-rate depreciation. On the other hand, it could merely be the result of the HNFC and official sectors competing for the same supply of foreign exchange, with the former's outflows contributing to a reduction in reserve assets.

Regarding the rest of the variables that account for domestic risk and returns, the relationship between these factors and HNFC outflows is weak at best in the whole sample, as column 3 of table 3 shows. Overall, there is not enough evidence to support hypothesis 4.

Column 4 of table 3 includes a set of controls for the financial development of economies. Besides market capitalization and financial system deposits, both as a share of GDP, these include the Chinn and Ito (2006) financial openness index as a preliminary control for the effect of capital account openness on HNFC outflows.[9] The results show that there is no significant relationship between financial development and aggregate measures of capital account openness, on the one hand, and HNFC outflows, on the other.

Columns 5 and 6 of table 3 contain additional specifications in which global factors are removed as regressors. The results for the domestic variables remain qualitatively the same.

[8] We compute these magnitudes for the relationships between variables on the basis of the descriptive statistics provided in table A3.

[9] Although an in-depth analysis of the impact of capital account controls on HNFC outflows should be conducted in another, more specific study, we go on to further consider the relationship with alternative measures of capital controls in section V.2 (e) below.

In annex 4, we repeat the exercises performed in columns 1–4 of table 3 but use alternative versions of the dependent variable. Columns 1–4 of table A3 evaluate whether the results hold when only the original HNFC outflows series taken directly from the IMF balance-of-payments database are considered (i.e. without performing the internal filling procedure shown in section II). Columns 5–8 are there to ascertain whether the results are robust to the inclusion of FDI outflows in our measure of HNFC outflows.

Overall, the main results summarized above hold when we use these alternative measures for HNFC outflows. It is worth mentioning that when FDI outflows are included, the negative relationship between global risk and HNFC outflows lessens somewhat, and global interest rates begin to show a systematic negative relationship. However, the results for the current account balance and gross inflows to the HNFC sector are the same.

2. Robustness checks and further exercises

This section presents further exercises to evaluate the robustness of the foregoing results and consider in more detail additional relevant factors that are likely to affect HNFC outflows. Five main areas of concern are addressed:

(i) Are the results robust to alternative estimation methods?

(ii) Are the results sensitive to the removal of one country at a time?

(iii) Do the results hold when we consider different subperiods of time?

(iv) Do outflows have any relationship with FDI or official inflows?

(v) Are outflows sensitive to different sets of capital controls?

(a) Alternative methodologies and endogeneity issues

First, we use a number of alternative estimators to evaluate the robustness of our results, as discussed in section IV. A detailed discussion of the alternative methods and the findings is provided in annex 5. Overall, the results presented in section V.1 are confirmed. In addition, a positive relationship with domestic growth appears.

(b) Alternative country subsamples

The results could be biased by the inclusion of one or other of the individual economies in our sample. We therefore repeat the exercise performed in table 3 but remove one country at a time from the sample. Table A6 in annex 6 presents the results of these robustness checks. We observe that the main results for the domestic variables hold. However, contrary to the findings for the entire sample, we detect a departure from the general results for the global financial cycle variables when Chile is excluded from the sample. This implies that the importance of global risk in accounting for HNFC outflows might be weaker if we focus only on the remaining five countries. Thus, foreign assets held by Chilean residents are much more likely to be repatriated in response to heightened global risk than those held by residents of any other country in our sample.

(c) Different subperiods

Several studies have shown that heightened international bond issuance activity by non-financial corporations leads to more widespread use of carry trade strategies and the accumulation of domestic financial assets (Bruno and Shin, 2017; Caballero, Panizza and Powell, 2016). However, to the best of

our knowledge, no study has shown how foreign inflows to non-financial firms during the most recent period are related to the accumulation of foreign assets. We therefore attempt to throw a spotlight on these dynamics by splitting the full period analysed above into different subperiods.

More specifically, we consider four phases: (i) the years up to 2002, which cover a different timespan depending on the country (the beginning of the sample period varies by country); (ii) 2002–2010; (iii) 2010–2019; and (iv) 2002–2019. The results are shown in table A7 of annex 7.

For the period 2010–2019, we do not find any substantial qualitative changes relative to our baseline results.

Interestingly, our main findings regarding the positive relationship linking the global financial cycle, the current account and financial inflows to HNFC outflows do not hold before 2002. However, the original results hold when one country at a time is removed from the sample.

Lastly, we observe that domestic growth became one of the factors contributing to HNFC outflows after 2002, most likely through the portfolio growth mechanisms discussed above.

(d) The relationship of household and non-financial corporate sector outflows to FDI and official inflows

The literature on capital flows to emerging market economies during the past decade points out that corporations operating in these countries take advantage of their offshore affiliates to circumvent capital controls, which mainly target banking flows (Bruno and Shin, 2017; De Camino, Pérez Caldentey and Vera, 2023; Kim and Shin, 2021).

Domestic firms accelerate their foreign asset accumulation by capitalizing on the foreign exchange availability that FDI inflows provide. In other words, FDI inflows partly driven by carry trade opportunities might fuel corporate outflows. We analyse this possibility by including FDI inflows as a percentage of GDP in our baseline model. The results are presented in table A8 in annex 8. Overall, the results confirm that this relationship is both positive and significant. We also consider the robustness of this finding when one country at a time is dropped and find that the positive relationship is unaffected.

A similar conclusion emerges when official inflows are considered instead of FDI inflows. When this variable is included, it is positive and statistically significant for the entire sample. However, when Mexico is excluded from the sample, this result is not statistically significant. We thus infer that this result is mainly driven by Mexico.

(e) Capital controls

Table 3 shows that there is no apparent association between HNFC outflows and an aggregate measure of capital controls such as the Chin-Ito index measure considered. In annex 9, we pay closer attention to this association, considering not only aggregate measures of capital controls but also outflow-specific and asset type-specific measures. We draw on Fernández and others (2016) and use measures of outflow restrictions for different asset classes.

We find that the aggregate measure of capital controls shows a significant negative relationship with HNFC outflows, suggesting that these are sensitive to restrictions on capital movements. However, only equity, direct investment and real estate restrictions seem to have a negative and significant impact on outflows. Overall, the main results discussed in section V.1 remain valid. However, as stated above, a more in-depth analysis of the impact of restrictive policies on HNFC outflow dynamics is beyond the scope of our study and should be performed properly in the future.

Our results might also be affected by various tax amnesties implemented in the region. Although the following is not an exhaustive list, such tax policies were applied in Argentina (several times over the sample period, with the tax amnesty of 2016 being the most effective), Brazil (2016), Chile (2014), Colombia (2015 and 2020), Peru (2017 and 2020) and Mexico (2017 and 2020) (Reyes-Tagle and Ospina, 2020). The net impact of such measures on HNFC outflows is nonetheless ambiguous, as each programme is designed differently, either promoting voluntary disclosure of offshore wealth or encouraging asset repatriation, and their effectiveness may vary greatly.

VI. Concluding remarks

The tendency of private, non-financial residents to hold foreign financial assets is important for Latin American economies, which often face episodes of extreme external financial vulnerability. In this context, separating out and focusing on financial outflows from the HNFC sector in particular is an effort worth making, given that they are quantitatively substantial as a source of foreign exchange demand and seem to show distinctive patterns.

Moreover, if anything, the prominence gained by the corporate sector as a key driver of global financial movements in the aftermath of the global financial crisis has only increased the need to clearly understand its overall international financial behaviour, considering both liabilities and assets. Against this backdrop, we show that HNFC outflows are quantitatively similar to inflows to the sector. This contrasts with the results for the whole economy, where inflows are clearly greater, and indicates the need for a more nuanced approach in the discussion of whether "sudden inflow stops" can be offset by retrenchments in residents' outflows.

Despite the importance of these movements, to the best of our knowledge no study has attempted a direct empirical characterization of their dynamics in recent decades.

We document several findings for HNFC outflows that appear robust across different exercises. First, these outflows are, on average, negatively correlated with risk in global financial markets. Second, they are positively associated with the current account balance (and the trade balance), showing that current international transactions contribute directly to the accumulation of foreign assets. Moreover, although it is less robust, we find a positive relationship between domestic economic growth and HNFC outflows. This points to the prevalence of portfolio growth factors, whereby higher savings and foreign exchange availability spur foreign asset accumulation.

Third, we also find a robust positive relationship between HNFC inflows and outflows for the accumulation of domestic financial assets by corporations in emerging market economies with the proceeds of foreign bond issuances. Besides the asymmetry between residents and non-residents in the impact of risk, highlighted by previous research, this might stem from portfolio growth factors or be part of a hedging strategy whereby residents acquire foreign assets as a means of mitigating exchange-rate risk.

Fourth, we fail to find any major indications of HNFC outflows being affected by domestic asset returns or risk, even after controlling for sovereign risk, sovereign debt ratings, exchange-rate expectations, inflation, etc. This leads us to conclude that, on average, HNFC outflows are relatively insensitive to considerations of optimal portfolio reallocation.

These results have implications for countries' external sustainability and financial stability. First, insofar as outflows grow primarily during phases of external and domestic expansion, their role as sources of balance-of-payments and foreign exchange market crises might go unnoticed or at least be underestimated. Second, since foreign inflows to the sector are at least partially matched by outflows,

these results should lead to a revised evaluation of the risks involved in corporate foreign bond issuances. In particular, financial and currency mismatch risks resulting from dollar appreciation and international credit tightening might be lower for firms with larger shares of foreign financial assets.

Lastly, additional research is needed to further clarify the following issues, among others: (i) the prevalence of "HNFC outflow-driven sudden stop" or "sudden flight" episodes in Latin America; (ii) the way the relationships documented here change during such episodes; (iii) the dynamics immediately before and after the implementation of different capital control measures, and particularly their impact on the relationships documented; and (iv) the specific response of outflows to different domestic crisis episodes, whether these are financial, fiscal, political or of some other kind.

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