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The reinvestment by multinationals as a capital flow: Crises, imbalances, and the cash-based current account [☆]

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ABSTRACT

When the affiliate of a foreign corporation saves a dollar of its profits, the host country records it as an inflow of *retained earnings* foreign direct investment (REFDI). If invested, this dollar arithmetically generates a current account deficit, even though cash does not cross borders. This study explores the empirical macroeconomic of REFEDI, which globally comprises half of FDI inflows. Using international capital flows (1980–2018), we show that REFEDI behaves like national saving in its procyclicality. Unpacking FDI in the analysis also makes a difference for the investment cycle. Moreover, we decompose the long run saving-to-investment correlation, finding a role for REFEDI in the Feldstein-Horioka puzzle. Adjusting the current account for REFEDI matters since REFEDI lowers the probability of macroeconomic crises and sudden stops. Overall, REFEDI is stronger in countries receiving more FDI and it was also strong during the recent commodity boom. We are not challenging that the balance of payments works on nationality and accrual bases. However, our results suggest that the external balance assessment of countries should adjust for REFEDI because it tends to have a different propensity to be invested and to build-up vulnerabilities.

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1. Introduction

When the affiliate of a foreign corporation saves a dollar of its profits, then the Balance of Payments of the host country records it as an inflow of “*reinvested earnings* foreign direct investment” (REFDI). Despite this reinvestment name, in reality it

Abbreviations: TCJA, Tax Cuts and Jobs Act of 2017; FDI, Foreign Direct Investment.

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is a kind of corporate saving or retained earnings, which may be used to invest in fixed assets but it may also be kept as a more liquid component on the balance sheet of the foreign affiliate. Importantly, if this dollar is actually invested in a fixed asset, this arithmetically generates a dollar of current account deficit in the host country, even though cash does not cross any national borders.¹ According to UNCTAD (2020) this retained earnings FDI is in fact massive, representing half of the global FDI flows. This type of capital flow has been largely overlooked by the international finance literature and deserves a systematic analysis.

Our paper contributes to the macroeconomics of international financial flows in two ways that remark retained earnings FDI. On the one hand we offer new measures for cash-based saving and current account that take into account REFDI. These measures are useful to understand capital flows and saving-investment imbalances in countries where this reinvestment matters. That is, those countries intensive in headquarters or those that host subsidiaries. Contemporaneous papers by Fischer et al. (2019) and Allen (2018) also look at REFDI, but comparing the differential treatment of retained earnings in FDI versus equity portfolio investments. In contrast, we look at the difference between accrual and cash based. That means we think through the lens of viewing the saving of a foreign affiliate as if it were comparable to national saving in the host country. That means our work is complementary rather than substitute to this concurrent literature.² On the other hand, a crucial contribution of our paper is to document the empirical macroeconomic properties of REFDI. Namely its cross sectional relation to the level of development and FDI stocks, but also to the time series relations with the business cycle, investment and events of crisis. Previous empirical studies have shown the properties of other sub-components of capital flows, but not REFDI (among many others Broner et al., 2013; Chang and Smith, 2014; Forbes and Warnock, 2021; Cavallo et al., 2018; Catão and Milesi-Ferretti, 2014). Overall, our evidence suggests that unpacking FDI and studying that part of the capital inflow that originates in the same country is empirically relevant for procyclicality, investment and vulnerability. In practice, our work could matter for discussions on External Balance Assessments (Phillips et al., 2013), measurement of external accounts (Adler et al., 2019) or even for how taxation and profit shifting may impact the balance of payments (Hebous et al., 2021; Ren et al., 2020).

International macroeconomic policy worries about excessive capital inflows and their sudden stop, many times using standard current account deficits as a potential headline indicator for crises and external imbalances (e.g., Blanchard and Milesi-Ferretti, 2012).³ In that context, there already is some consensus that foreign direct investment (FDI) flows are less prone to building up these vulnerabilities (e.g. Calvo, 1998; Galati and Moessler, 2013; Jeanne and Korinek, 2020). But here we suggest that in the era of global corporations, the metrics for imbalances should unpack FDI.

Our work complements the literature on the monitoring of external imbalances. In particular, we offer measures that are less sensitive to the nationality of the long-term investor that retains earnings and focus more on the investor's propensity to save in the country. For instance, in our measure, a country like Mexico would be indifferent if \$1 is reinvested by a domestic firm (e.g. Telmex) instead of by the foreign-owned Walmart-Mexico. In the standard accrual-based measure, the difference is that Walmart's reinvestment would deteriorate the current account in \$1, unlike the saving of a national corporation. To clarify, here, we are not challenging that the balance of payments works on nationality and accrual bases. That feature captures reasonably well the ownership of the assets. In contrast, we explore the empirical properties of REFDI and discuss complementary monitoring indicators, since REFDI it empirically behaves different over the cycle and during crises episodes.

The distinction we make is also relevant for the sizable US reinvestment of FDI income abroad. While standard accrual-based measures record REFDI as national saving for the source country, it is unlikely that this retained FDI income impacts the local US economy anytime soon, absent wealth effects or changes in repatriation incentives. Our measure of *cash-based current account* (CBCA) in fact corrects for REFDI, being then insensitive to the nationality of the corporation which is domestically located. In particular, normally the US current account deficit becomes 0.5–1% of GDP deeper than usual when one abstracts the net REFDI, as shown in Fig. 1 (Panel A). The plot shows two notable exceptions to the above mentioned trend in the US, both related to repatriation taxes. In 2005 the accrual and cash based measures tended to converge, related to the "Homeland Reinvestment Act" approved in 2004, which generated transitory incentives for the US multinationals to repatriate

¹ To be clear, the Balance of Payments works in a two step process when working with REFDI. When a foreign corporation gets profits, the BoP records it as a factor payment to the headquarter country. This is for the full amount, no matter whether it is repatriated or retained. In the second step, the balance of payments records an inflow of FDI for the retained earnings amount. But the bottom line of this approach is that a 1\$ of retained earnings, if invested, mechanically generates a current account deficit. This is reasonable for many aspects that the BoP needs to measure. Our point is that Current Account deficits coming from REFDI have a different risk pattern than that of other types of capital flows, and even other types of FDI. We find REFDI to be, on average, less risky. But the particularities may depend on the case under consideration. If Ireland is analyzed and Apple's retained earnings are considered, then the situation might be different. Here, the money is more prone to capital outflows in case of, for example, a repatriation tax holiday. The rest of the study will emphasize that the balance of payments alone cannot indicate the propensity to a sudden capital outflow of each corporation. Therefore, for small open economies, it is important to monitor the motivations behind those retained earnings, as we will discuss later.

² We concentrate on the BoP measurement. In contrast, Lane (2017) and Honohan et al. (2021) focus on how massive capital flows from multinationals and equity could have large impacts on the national accounts, including GDP.

³ For a recent and policy relevant claim, the current account deficits must be reduced; refer to Blanchard and Milesi-Ferretti (2012) who suggest that current account deficits can proxy for distortions. Although the main finding of their policy paper reveals persistent deficits in developed economies rather than developing economies, it is instructive to remark that this is unlikely to be the case when a multinational reinvests earnings. The 1\$ of current account deficit that is created when an MNC invests 1\$ of its retained earnings does not appear as an apparent distortion in the local economy. It must be considered that, even for developed economies, increasing *outward* retained earnings FDI will improve the standard current account but in ways that are not connected to the local economy. If the US oil multinational ExxonMobil decides to reinvest part of its profits in the middle east, at least in the medium-run that money is not coming to the US in any form and does not reflect an improvement of the deficits of the local US economy. Less so if one does not subtract taxes to be paid in the middle east at the moment of repatriation.

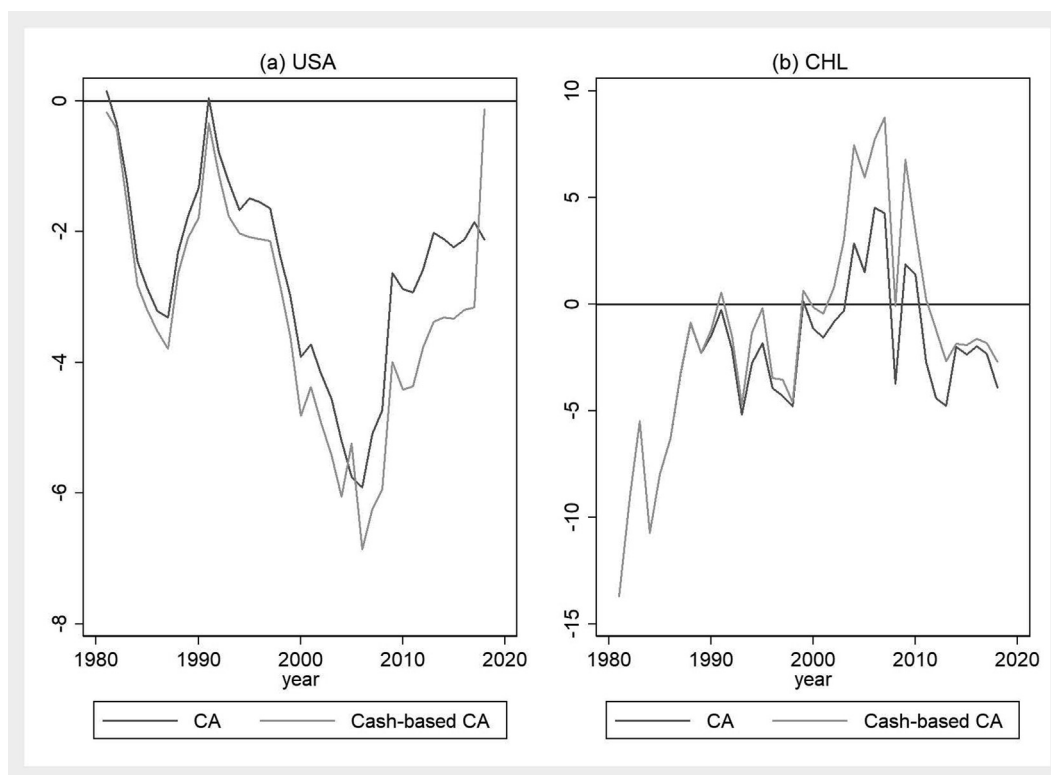


Fig. 1. Current Account Balance (% of GDP): Standard BoP Accrual versus Cash-based measures for the US (deficit) and Chile (with years of surplus). Notes: The figure plots the standard balance of payments (BoP) accrual current account and the cash-based current account for the US and Chile. The cash-based measure is defined as $CashCA_t = CA - netREFDI_t$, with net retained earnings being the difference between outflows and inflows, as in the customary BoP. The US is an important REFDI source country and, on cash basis, the US has an even deeper current account deficit of 0.5 to 1 percentage point of the GDP. The reversal observed in 2005 for the US is associated with the “Homeland Reinvestment Act”. Likewise, the 2018 datapoint is impacted by the Tax Cuts and Jobs Act passed in 2017. Contrarily, Chile in panel B is an important destination for REFDI and, on cash/local basis, Chile had a higher surplus CA Balance of around 1 to 4% of the GDP during the previous commodity price boom.

profits. And they did, for a year.⁴ More spectacular is 2018, where the cash-based current account is almost zero, despite the usual accrual-based deficit was 2% of GDP. Again, this is related to the Tax Cuts and Jobs Act (TCJA), which temporarily reduced repatriation taxes.⁵ Summing up, our paper also relates to the literature on Global Imbalances (e.g., Alberola et al., 2020; Kehoe et al., 2018; Bernanke, 2005; Obstfeld and Rogoff, 2009; Feldstein, 2008; Caballero et al., 2008), especially the valuation channel (Herkenhoff and Sauré, 2021; Gourinchas and Rey, 2007; Gourinchas et al., 2014).

Retained earnings could in part rationalize why some countries hosting large FDI stocks may appear as having a low national saving rate. For example, Panel (b) of Fig. 1 shows that the current account circa the year 2000 in Chile was in deficit, according to the usual accrual-based measure, but it was in surplus when measured on a cash-basis, excluding REFDI. Since around a third of the capital stock in Chile is owned by multinationals, it is not surprising that multinationals make a large fraction of this geography-based saving.

More generally, we find that countries with a larger stock of FDI tend to have a larger share of “cash-based local saving” made by multinationals through retained earnings. We note that this type of corporate saving decision is neither well captured by the gross national saving (GNS) nor by the gross domestic saving (GDS). The difference between national and domestic saving includes all the profits of multinationals located in the country, not only the reinvested part. On a different angle, complementing vulnerability measures with indices based on the geography is useful, especially when financial economists recognize the difficulty of determining what constitutes a “national corporation” (e.g., Desai, 2013).

Our paper uses the IMF’s global database on international capital flows (1980–2018) to show the empirical macroeconomic properties of REFDI. In various ways, this corporate saving of multinationals has some similarity with national saving in the host country. While unpacked FDI inflows appear more procyclical to the domestic business cycle than other capital

⁴ However, more than 90% of the repatriation benefit was taken by the shareholders instead of being invested, as shown by Dharmapala et al. (2011)

⁵ See Ren et al. (2020, 2021, 2020).

flows, this is likely due to the retained earnings component of FDI. Contrarily, the non-retained earning FDI seems comparatively less procyclical.⁶ Unpacking FDI also makes a difference for the investment cycle, because REFDI tends to come in a different moments of the cycle than the rest of foreign investment. Moreover, when we decompose the long run saving-to-investment correlation, we find a role for REFDI in the Feldstein-Horioka puzzle. Countries with more REFDI tend to invest more.

Regarding vulnerability, we find that sudden stops a la [Forbes and Warnock \(2021\)](#) tend to be less harmful to GDP growth when countries have higher levels of REFDI. Also, these negative events are less likely when there are more REFDI. Finally, retained earnings FDI decreases the likelihood of macroeconomic crises, measured as in [Catão and Milesi-Ferretti \(2014\)](#). Importantly, this is the opposite behavior of what one finds for the rest of the current account deficits (i.e. the cash-based component).^{7 8}

Our work is naturally related to both the FDI literature and to the literature on macro-vulnerabilities and volatility. In a review, [Levi-Yeyati et al. \(2014\)](#) suggest that FDI flows tend to be relatively less dangerous than other types of flows.⁹ Our study qualifies this point, suggesting that REFDI behaves differently from the rest of FDI. [Federico et al. \(2013\)](#) question the commonly held belief that the higher the share of FDI as capital inflows, the lower the volatility of the output. They argue that it depends on the covariance between capital flows and GDP, as in a standard portfolio problem. We argue that at least a portion of the empirical covariation between FDI and GDP is mechanical in nature because a fraction of FDI comprises retained earnings.¹⁰ Another stream of the literature is more skeptical about FDI coming from countries like the US and going to low tax jurisdictions, like Ireland, because of tax avoidance (see [Zucman, 2014](#); [Desai et al., 2004](#)). [Guvenen et al. \(2017\)](#) even argues that it is essential to adjust the geography-based US-productivity to partial out the artificial profit shifting.

Our study is also related to papers that analyze gross versus net capital inflows ([Forbes and Warnock, 2021](#); [Forbes and Warnock, 2012](#); [Cavallo et al., 2015](#); [Broner et al., 2013](#)). We provide a different angle to this debate, exploring flows on a cash-basis, as suggested by [Levi-Yeyati et al. \(2014\)](#).¹¹ Our article points out that regulations impacting retained earnings of multinationals (e.g., repatriation taxes) can have meaningful impacts on risks of sudden capital outflows. Various recent papers explore their impact and potential policies to mitigate the externalities created by capital flows (e.g. [Erten et al., 2021](#); [Korinek, 2018](#); [Jeanne and Korinek, 2010](#)).

The rest of the paper is structured as follows. Section 2 introduces a basic framework highlighting the role of REFDI in the measurement of saving and imbalances. Section 3 describes our data and summary statistics. Section 4 shows the basic stylized facts of REFDI. Section 5 studies of REFDI behaves over the business cycle and how it relates to investment. Section 6 explores the behavior of REFDI during extreme events, namely, sudden stops and crisis episodes. Section 7 discusses implications for policy, and, finally, Section 8 offers concluding remarks.

⁶ We do not intend to interpret these coefficients causally, but only as policy-relevant correlations. In fact, there is an obvious endogeneity issue in these estimates because the REFDI was a part of the domestic production and is indirectly considered in GDP. REFDI is very likely to decrease with a slowdown in the GDP growth.

⁷ It is important to reconcile an apparent contradiction that may confuse the reader. In this study, we report that REFDI is more procyclical than the rest of FDI, meaning a high correlation with GDP. However, it does not mean that REFDI enhances the probability of crises, which is something that is expected when a variable is procyclical. Here, it is different because we state that REFDI tends to attenuate macroeconomic crises. The reason behind this apparent contradiction follows the insight of [Baxter and Crucini \(1993\)](#), who show that since investment and GDP are highly correlated, it is almost impossible not to get a high correlation between saving and investment. The fact that REFDI behaves like a type of saving – in the sense that it is locally generated and saved – helps to rationalize our findings. Our findings are in some way equivalent to say that the Feldstein-Horioka puzzle of a high saving-investment correlation is even deeper when one thinks of cash-based-saving in the country, as we propose in this paper, meaning that we include REFDI as part of a broad saving measure. In addition to the standard saving-investment correlation, we assert that there is an even higher correlation between REFDI and investment. In short, for most countries in the world, part of their capital inflows comprises inflows only on an accrual basis, but not on a cash basis, since REFDI does not move.

⁸ [Fernández-Arias and Hausmann \(2001\)](#) show how the probability of sudden stops among emerging and less developed economies is positively associated with non-FDI capital inflows, but no significant correlation is found in the case of FDI. They argue that the safety of FDI for aggregate vulnerabilities is partially attributed to the fact that it is a residual claim that does not suffer from maturity or a currency mismatch. Here, we extend their work in various ways, specifically by splitting FDI into two disjoint groups—REFDI and non-REFDI. For some indicators of crises, these two types of FDI have effects of different magnitudes and even signs.

⁹ Particularly, [Cardarelli et al. \(2010\)](#) show that the end of the inflow episodes typically entail a sharp reversal of non-FDI flows, while FDI proves much more resilient. Regarding the recent global crisis of 2008–2009, [Ostry et al. \(2010\)](#) show that countries with more non-financial FDI had better performance during the crisis. However, [Berglof et al. \(2009\)](#) suggest that FDI had no effects. [Catão and Milesi-Ferretti \(2014\)](#) find that across countries the stock of FDI liabilities is related to a lower crisis propensity, particularly in banking crises ([Joyce, 2010](#)); however, debt flows imply more risk ([Powell and Tavella, 2012](#)). Net portfolio inflow and other net inflows are positively related to output volatility. [Aizenman et al. \(2010\)](#) show that the portfolio inflow and other inflows are more related to output volatility than the FDI inflows. We get similar results concerning FDI and non-FDI, but by using sudden stops indicators as dependent variables. [Combes et al. \(2011\)](#) find that FDI leads to less appreciation than the portfolio flows. We argue that it can be partially attributed to the fact that a part of FDI is internally generated as retained earnings. Having said that, some studies reviewed by [Levi-Yeyati et al. \(2014\)](#) are less conclusive about FDI's relative benevolence as a form of capital flow. [Julian Caballero \(2011\)](#) argues that surges in any form of capital flow may increase the risk of a banking crisis during a lending boom. [Gourinchas and Obstfeld \(2012\)](#) find that the share of external debt in the total external liabilities does not correlate with the probability of banking crises in emerging markets, although the correlation exists in high income countries. [Levchenko and Mauro \(2007\)](#) find that FDI is the least volatile form of financial flow when considering the average size of the net flow (i.e., the coefficient of variation, not standard deviation). FDI is more procyclical than portfolio flows, but swings during the sudden stop episodes are due to swings in other flows.

¹⁰ [Borensztein et al., 1998](#) use changes in FDI by decades to explore the relationship between FDI and growth. Although we are relatively less concerned about a mechanical effect due to the lags, the long-term correlations can partially stem from the fact that REFDI was part of GDP.

¹¹ [Cowan and Raddatz \(2013\)](#) look at the relationship between financial frictions and sudden stops. We also explore a specific type of financial friction, namely the difference between funds internal and external to the firm, and its relative impact on macroeconomic vulnerability. Regarding macro-prudential regulation, [Galati and Moessner \(2013\)](#) provide a survey of recent findings. It focuses more on banking flows and less on non-financial corporations.

2. Basic framework of REFDI

Before focusing on the data, we remark that standard saving measures are not sensitive to the saving decision of multinationals.¹²

It is well known that two aggregate measures of saving are used in macroeconomics—one is national and the other domestic. As part of the national accounts, gross *national* saving (GNS) equals GNI minus overall consumption ($C_t + G_t$). This implies GNS equals investment (I) plus the current account balance (CA). Contrarily, gross *domestic* saving aims to be a geographic concept, and hence it equals GDP minus overall consumption. This means GDS_t is investment plus only the trade balance ($TB \equiv X - M$), and not the whole current account balance. Therefore, all net income emanating from other sources different from net exports of goods and services, like the net payments to investments abroad, is not part of *domestic* saving but still part of the *national* saving.¹³ Formally,

$$GNS_t = I_t + CA_t \quad (1)$$

$$GDS_t = I_t + TB_t \quad (2)$$

To simplify the problem, let us assume a few things that are initially innocuous for our main point. Assume that there are no taxes and no saving by government or households, and only corporations save. Additionally, let us assume that there are no other current transfers in the BoP, besides the income from FDI and the trade balance (no remittances and no debt payments). Furthermore, we assume that all FDI is a liability, implying that residents do not invest abroad, and only foreign multinationals own firms in the domestic economy. It implies that after-tax profits of multinationals in the country, π_t^{MNC} , are the only difference between the trade balance and the current account. Therefore:

$$CA_t = TB_t - \pi_t^{MNC}$$

Plugging this simple result into Eq. 1 and 2 yields that the difference between national and domestic saving is simply the profits of multinationals. Hence, the difference is insensitive to whether these profits are retained in the corporation.

$$GDS_t - GNS_t = \pi_t^{MNC}$$

Remark 1. Neither the domestic (GDS) nor the national saving (GNS) considers the decision of multinationals to retain earnings as part of the saving. While GDS_t includes all profits of foreign-owned corporations as part of saving, GNS does not include any MNC profits. None of these measures are sensitive to the decision of the foreign corporations to keep their savings in the country.¹⁴

In the context of a globalized world, it is not completely clear why we should have such extreme treatment of profits accrued to foreign investors. Particularly, for non-financial corporations with substantial and long-term interest in the country, we believe that it is useful to have a third saving indicator that is truly geographic in nature, and that considers that, under some circumstances, the reinvestment of domestic firms is comparable to that of MNCs.

Definition 1.a. We propose a new saving indicator; we refer to it as the *local* or cash-based saving (CBS_t), which includes the retained earnings of multinationals in the national territory.¹⁵

$$CBS_t = GNS + RE_t^{FDI\text{liability}}$$

In this simplified context, CBS_t is also gross domestic saving minus the dividend payout of multinationals located in the country.

$$CBS_t = GDS_t - D^{NFI\text{liability}};$$

with the profits of multinationals split between payout and retained earnings: $\pi^{NFI\text{liability}} = D^{NFI\text{liability}} + RE_t^{FDI\text{liability}}$, with the last term considered in local saving. The diagram in Fig. 2 shows the three definitions of saving: national, domestic, and our complementary definition of local or cash-based saving.

The definition above is very restrictive because we do not consider any other type of capital flow different from the inward FDI from retained earnings. Hence, for simplicity, we are excluding debt payments. However, for countries where

¹² In a concurrent paper Lane (2017) makes a related contribution. Given the massive fluctuation of the Irish national accounts circa the year 2015, they were finding ways to have a more stable measure of aggregate production and income, particularly, measures that are less sensitive to the retained earnings of multinationals. While sharing some of the concerns in Lane (2017), our point here was independently developed before and has many differences. Particularly, we focus on measures of saving and external imbalance rather than on measures of GDP or GNI.

¹³ National savings emanates from the non-consumed part of GNI, namely $GNS = GNI - C - G = I + CA$, while domestic saving is the non-consumed part of GDP, meaning $GDS = GDP - C - G = I - TB$.

¹⁴ For the sake of simplicity, assume that they simply hold cash as retained earnings, and hence it cannot be considered as an investment.

¹⁵ Here, we are using the term multinationals loosely to keep the terminology simple and to avoid the excessive usage of BOPs 6 and the System of National Accounts (SNA) 2008 jargons. By the term multinationals, we mean the shares of non-financial corporations that have at least 10% of foreign ownership.

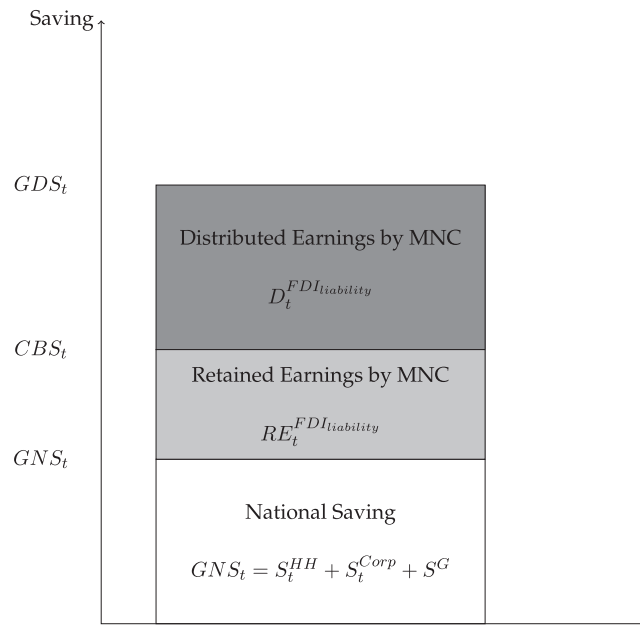


Fig. 2. Comparing the definition of cash-based saving (CBS), gross Domestic saving (GDS), and gross national saving (GNS).

inward FDI is very important, this simple definition provides a first order approximation. It would be trivial to extend it to include foreign debt, but this may not generate additional insights to our main point.

Definition 1.b. A more general definition of the cash-based saving is

$$CBS_t = GNS_t - netREFDI_t$$

where *netREFDI* is the net outflow of the REFDI as classified in the Balance of Payments. It has a negative sign because the outflows of the retained earnings enter positively in the BoP, while the inflows enter negatively. The more the multinationals reinvest in a country, the more negative is the net REFDI and the higher is the cash-based saving. Unlike the definition in 1.b., this definition discounts the profits retained abroad by national corporations.

It can be argued that the retained profits of multinationals do not need to be invested directly, as remarked in Hansen and Wagner (2017), but can be kept as cash. If these profits enter the local banking system, then there would be chances that the profit gets reinvested in the economy by other agents. Additionally, these reinvested profits of multinationals can exit the country as liquid portfolio outflows to other countries. It might be sometimes relevant to use CBS as a complementary indicator of saving because it treats all corporate saving equally. We do not want to argue that CBS always represents a better indicator than the existing national and domestic measures of saving. Similarly, we can define a new index for the current account measured as CBS minus investment, or we can consider the following definition:

Definition 2. The cash-based current account (CBCA) is the current account in the BoP minus the net REFDI. It is expressed as

$$CBCA_t = CA_t - netREFDI_t$$

The above definition gives a measure of the external financing of the local economy, independent of whether the investor has a national or a foreign flag.

The following four sections of the paper would explore the empirical macroeconomic properties of REFDI. These properties would form the basis to recommend the cash-based measures stated above and complement the external balance assessment.

3. Data and descriptive statistics

3.1. Data sources

Our main data source is the International Monetary Fund's (IMF's) Balance of Payments Statistics (BOPS) in yearly flows from 1980 to 2018. The number of countries in the analysis is restricted to those that report information of the FDI components (retained earnings and non-retained earnings). Additional macroeconomic data comes from the World Economic Outlook and the World Bank's World Development Indicators databases. Sudden stops episodes come from Forbes and Warnock

(2021), which updates [Forbes and Warnock \(2012\)](#). For the analysis of macroeconomic crisis, we use information from [Catão and Milesi-Ferretti \(2014\)](#) and from [Reinhart and Rogoff \(2011\)](#)'s dataset.

We restrict our sample to countries that have a population of above 5 million inhabitants, a GDP per capita PPP above \$2,500 in 2018, and that have at least 20 years of observations in the BOPS database BPM6, starting from 1980. A crucial set of variables are the components of FDI. In the BOP data, FDI is composed of equity inflows, retained earnings, and related party debt. The latter is often equity in economic terms, since multinationals use debt and thin capitalization structures to reduce their corporate tax payments. Our grouping of FDI would be between, on the one hand, retained earnings, meaning retained earnings FDI or *REFDI*, and, on the other hand, the sum of equity inflows and related party debt, which we refer to as *non-REFDI*.

3.2. Summary statistics

[Table 1](#) reports descriptive statistics for the main variables in the analysis. The statistics cover the full sample of countries for the period 1980–2018. The Table shows statistics for capital flows in the first panel, sudden stop and macroeconomic crisis in the second panel, and additional variables in the third panel.

The median values of FDI flows, portfolio flows, and other investment flows, as a percentage of GDP, are 1.6%, 1.9%, and 2.3%, respectively. When we unpack FDI flows, the median *REFDI* is 0.2% of GDP and the median of *non-REFDI* is 1.3% of GDP. *REFDI* represents one third of the total FDI income, approximately.

FDI is more volatile than portfolio flows, but significantly less risky than other investment flows—standard deviations for each of these components are 5.3%, 3.2%, and 6.5%, respectively. The figures reflecting the variance are aligned with those reported by [Levchenko and Mauro \(2007\)](#). The Table shows that *REFDI* is less volatile than *non-REFDI*; the standard deviations are 2.2% and 4.3%, respectively. It must be noted that the overall FDI is reported by 101 countries, while the disaggregated *REFDI* and *non-REFDI* is available for only 91 countries.

Regarding sudden stops and macroeconomic crisis, the Table shows a 13.8% unconditional probability of sudden stop, according to the metric provided in [Forbes and Warnock \(2021\)](#), and 5%, according to the metric of [Guidotti et al. \(2004\)](#).¹⁶

4. Where is *REFDI* relevant? Basic stylized facts

This section describes basic stylized facts about *REFDI*. We show that most of the countries have higher cash-based saving than national saving, except for the rich headquarters of multinationals. We also show that *REFDI* is more important in countries with higher stocks of FDI and in commodity dependent countries.

4.1. In all but the very rich “headquarter” countries, cash-based local saving is above national saving

[Fig. 3](#) displays the relevance of our measure of cash-based local saving for different levels of economic development. In particular, it plots the ratio between cash-based local saving to national saving (average 2003–2018) against each country's income per capita (2017). A ratio $GLS/GNS = 1$ means that, on a net basis, foreign companies retain zero earnings in comparison to national companies abroad (i.e. net *REFDI* = 0), as depicted by the horizontal line in the plot. The central point is that for most countries this ratio is meaningfully away from the line. For instance, countries above the line tend to have cash based local saving that is above the usual measure of national saving. The general trend in [Fig. 3](#) is downwards; hence, the richer the country, the less relevant is *REFDI* as a share of national saving (p -value < 0.05, see the Figure's note).

Moreover, high income countries—like Great Britain (GB), the US, Germany (DE) and France (FR)—have significantly less local saving than national saving, because their multinationals save more abroad than what foreign companies save in these rich economies. That is why their ratio of cash-based to national saving is smaller than one. This ratio $GLS/GNS > 1$ is reasonable for “headquarter countries”, with the exception being the Netherlands (NL), in which cash-based *GLS* is larger than *GNS* and therefore lies above the line.¹⁷ Importantly for our central point, local saving is above national saving for most countries in the world, although with relevant dispersion. On the upper end, for example, in Peru (PE) or Chile (CL) the *REFDI* of multinationals makes between 10 to 15% of the local saving ($GNS/GNS > 1.1$), which may represent around 3–5 percentage points of GDP for these economies. These magnitudes could even account for their current account deficits during the investment booms in these countries.

¹⁶ This difference is explained by the number of countries in their respective samples. We build and compare both measures of sudden stops, and, conditional upon using the same sample of countries, both metrics identify a similar number of events. In terms of the crisis episodes reported by [Reinhart and Rogoff \(2011\)](#), the unconditional probability of crises is around 20% for banking, currency, and inflation crisis. This number goes up to around 30% for stock market crises.

¹⁷ The exceptions among rich countries include The Netherlands and Ireland (the latter now shown for scale considerations), where there is a massive presence of foreign companies that retain earnings for tax or institutional considerations (see [Lane, 2017](#))

Table 1
Descriptive Statistics.

Variable	Mean	Median	Std. Dev.	Min	Max	n	T
Financial Account Inflows	0.067	0.049	0.103	-0.084	0.490	91	28
FDI	0.029	0.016	0.053	0.000	0.285	92	30
FDI - Retained Earnings	0.007	0.002	0.022	0.000	0.073	91	25
FDI - Non Retained Earnings	0.022	0.013	0.043	-0.014	0.202	91	25
Portfolio Investments	0.013	0.019	0.032	-0.046	0.133	89	30
Other Investments	0.022	0.023	0.065	-0.137	0.222	89	30
GNS (national saving)	0.224	0.217	0.092	0.016	0.022	89	29
GFCF (investment)	0.225	0.220	0.066	0.068	0.022	89	30
Sudden Stop (Forbes)	0.138	0.000	0.345	0.000	1.000	46	26
Banking Crises	0.204	0.000	0.403	0.000	1.000	58	30
Currency Crises	0.228	0.000	0.436	0.000	2.000	58	30
Inflation Crises	0.196	0.000	0.397	0.000	1.000	58	30
Stock Market Crash	0.286	0.000	0.452	0.000	1.000	41	30
Crises Tally	0.758	0.000	0.428	0.000	1.000	93	31
$\Delta \ln(GDP)$	0.059	0.067	0.177	-2.323	1.958	101	30
$\ln(FDISTOCK)$	8.262	8.241	2.733	-4.605	15.183	102	29

Notes: the table reports summary statistics. Financial account inflows are the sum of all IFS's financial account liabilities but international reserves; portfolio investments are the portfolio investments liabilities from the financial account; FDI is the Foreign Direct Investment liabilities from the financial Account; Other investments are the liabilities in Other investments from the financial account; FDI - Retained Earnings and FDI - Non Retained Earnings are the FDI liabilities separated according Retained Earnings and Non Retained Earnings [All these flows are measure as share of the current GDP]; GNS is gross national saving and GFCF is gross fixed capital formation as share of GDP; $\Delta \ln(GDP)$ indicates the growth of the GDP in logarithm; " $\ln(FDI STOCK)$ " is the logarithm of the stock of FDI from the IFS (International position database).

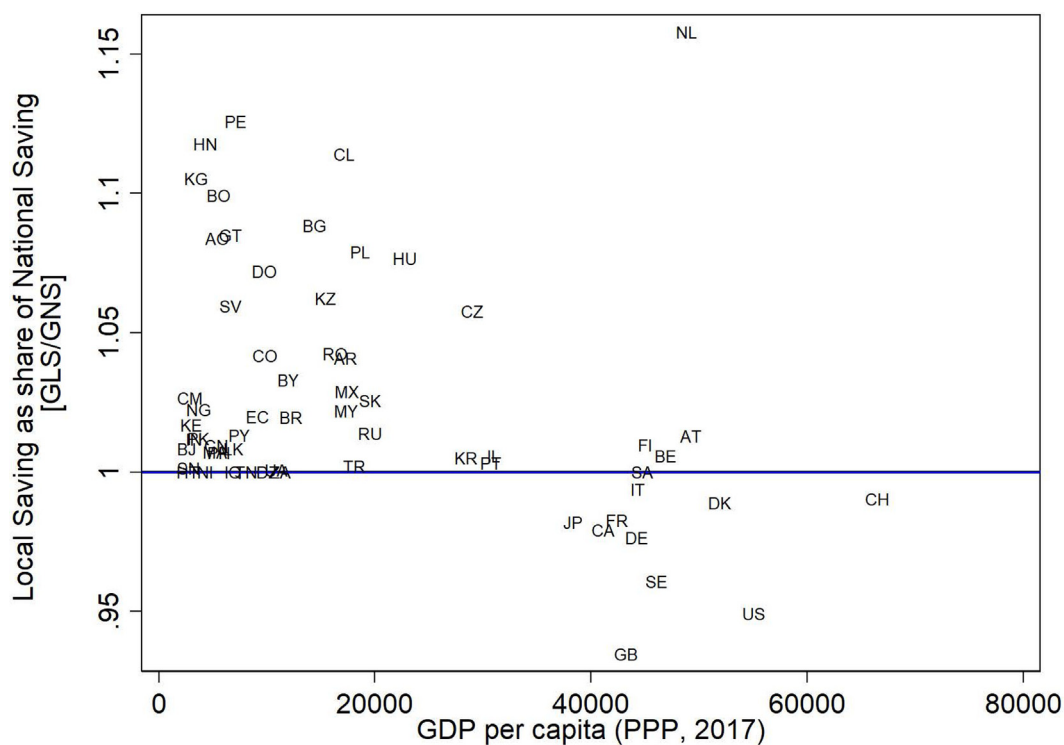


Fig. 3. Cash-based (local) saving as a fraction of national saving according to the country's level of economic development. Notes: (Gross) Local saving defined as the difference between national saving and the net REFDI, namely $GLS = GNS - netREFDI$. Therefore, countries with more RE-FDI outflows than inflows get a weaker GLS and countries with more inflows of RE-FDI get a larger amount. (Gross) National saving and GDP per capita (PPP) come from the World Development Indicators. The plot uses an almost end-of-period GDP per capita (2017) because it is more recent, and therefore easier to interpret. But the qualitative patterns are unchanged when using GDP per capita in 2003, which is a pre-determined variable vis-a-vis the variable in the vertical axis. Values represented by ISO 2 country codes. A cross sectional regression of the plot (not displayed) estimated the average ratio $GLS/GNS = 1.14 - 0.012 \log(GDP pc)$; p-value 0.038. Excluding the Netherlands (NL) yields similar estimate of the slope although with stronger significance (slope -0.015 , p-value 0.004). Regressions that are linear in GDP, instead of log-linear, also yield negative and significant coefficients.

4.2. The higher the stock of FDI in a country, the higher retained earnings vis-à-vis national saving

Countries in which FDI is a stronger part of investment could also be countries in which subsequent local saving is made by multinationals. This is in fact what we find in the cross section. Fig. 4 plots the historical ratio of FDI over Investment (average 2000–2005) on the horizontal axis, against the subsequent relevance REFDI inflows as share of national saving. We left a few years afterwards in order to leave room for reinvestment possibilities in a context of potential time to build (e.g. Hansen and Wagner, 2017). The Figure's regression of the relevance of average retained earnings on the pre-period relevance of FDI for investment; $(REFDI^{Inflow}/GNS)_{2010-2018} = \alpha_0 + \alpha_1 (FDI/Investment)_{2000-2005}$; finds a positive and statistically significant slope of 0.15 (p-value < 0.01), implying that on average a 10 percentage point (pp) increase in the share of investment that came from FDI in the past is associated with a 1.5 pp. increase in the share of retained earnings over national saving. Some countries lie above this average. For example The Netherlands (NL), Belgium (BE), Hungary (HU) or Chile (CL) tend to have large levels of REFDI in part because they have had large previous inflows of FDI. In contrast, other countries like Azerbaijan (AZ) or Denmark (DK) look having surprisingly little REFDI given their previous inflows of FDI.

Overall, the data shows a strong and first order relationship between the significance of multinationals in a country and the relevance of retained earnings as source of local saving in the host country. This result is not totally surprising, but it seems a relevant qualification to make when using current account deficits as a key variable for monitoring of external imbalances. Countries hosting lots of multinationals may have lower national saving, at least in comparison to the counterfactual in which these companies were national.

4.3. Commodity countries increased their retained earnings FDI during the boom

Until now, we discussed the cross-sectional trends. Here we look at time series variation in commodity countries. The point is that in various countries the commodity sector is operated by multinationals. With the commodity boom —of the mid 2000s —there were on average more incentives to invest and therefore retain earnings (see Drechsel and Tenreyro, 2017). Also, the non-traded sector operated by multinationals may also have incentives to increase investment or at least retain profits during a commodity boom. In that context, one could expect REFDI to increase during the commodity boom. Fig. 5 depicts the evolution of REFDI as share of GDP for the median of both commodity and non-commodity countries as defined by UNCTAD's State of Commodity Dependence (2019)¹⁸. The net REFDI flows show a clear pattern, with a sustained jump in commodity countries, likely coinciding with the commodity price boom between the mid 2000s and the mid 2010s. This reflects some support to the idea that REFDI is relevant for commodity countries.

5. Retained earnings FDI: business cycle and investment

In this section, we explore how REFDI comoves with the business and investment cycles of a country, as well as in long term investment trends. In some respects REFDI behaves with some similarity to national saving.

5.1. Procyclicality: REFDI over the business cycle

To explore the procyclicality of REFDI it is useful to stick to an established method used for gross flows, as the one by Broner et al. (2013). As them, we estimate for country i and year t the regression of scaled gross capital flow CF_{it} explained by economic growth on the LHS, plus a country fixed effect and a country specific time trend. As Broner et al. (2013) we also use trend GDP as the denominator of capital flows (e.g. FDI inflows/GDP).¹⁹ This mitigates the arithmetic increases in the ratio when GDP drops in a recession. Similarly, the capital flow ratios were standardized within country, demeaning and dividing by the country's standard deviation. Both Broner et al. (2013) and Drechsel and Tenreyro (2017) report a similar exercise, but unlike in our work, they did not unpack FDI, as we do. In particular, we estimate

$$\Delta(CF_{it}/GDP_{it}^{Trend}) = \alpha_i + \gamma_i time + \beta \Delta \ln GDP \quad (3)$$

Table 2 reports the procyclicality estimates ($\hat{\beta}$) for several types of capital flows and for the national saving. Panel A does it for the full sample of countries. Column (0) reports the sensitivity of total inflows, defined as the sum of FDI, portfolio flows and other flows to the economy. We observe a high degree of procyclicality of total inflows as $\hat{\beta}$ is 1.13 and highly significant. Column (1) shows that foreign investment is procyclical as well, with an estimated coefficient of 0.76 and statistically significant. Interestingly, for the sake of our argument, Column (2) shows that REFDI is much more procyclical than total FDI, with an estimated coefficient of 1.32, which is highly significant. On the other hand, the estimated procyclicality of the non-retained earnings portion of FDI is less sensitive to the business cycle, with an estimated coefficient of 0.37 (Column 3). Thus, unpacking FDI in these two components unmasks important differences that have been overlooked in the literature. A procyclical REFDI is indeed expected as the multinational investment cycle is strongly tied to the business cycle of the domestic economy, while non-REFDI does not need to be that associated with the business cycle. We find that the procyclicality of

¹⁸ https://unctad.org/system/files/official-document/ditcom2019d1_en.pdf

¹⁹ As Broner et al., 2013 we also use an HP filter with smooth parameter 100.

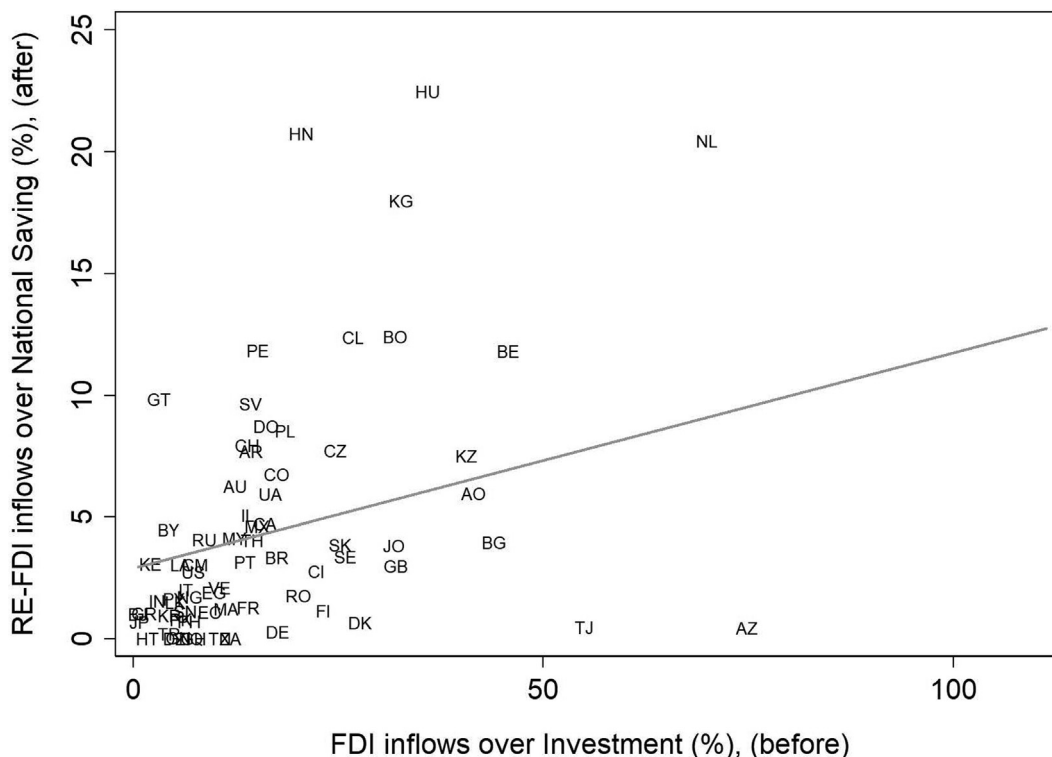


Fig. 4. Relationship between the relevance of FDI for investment and ratio between Multinationals' Retained Earnings over Saving. Notes: The figure plots the relevance of FDI over investment (before: average inflows in 2000 to 2005), against the relevance of RE-FDI over national saving, (after: average of a subsequent period 2010 to 2018). Countries are plotted using their official ISO 2 codes. Omitted countries are Hong Kong and Ireland, which make the relationship even stronger, but this omission does not allow proper visualization of other countries. An estimated liner regression is given by $REFDI/GNS = 2.04 + 0.15 FDI/Inv$, with standard errors in parenthesis. This means that a 10 point increase in the share of investment that came from FDI in the past is associated with a 1.5 point increase in the share of retained earnings over national saving.

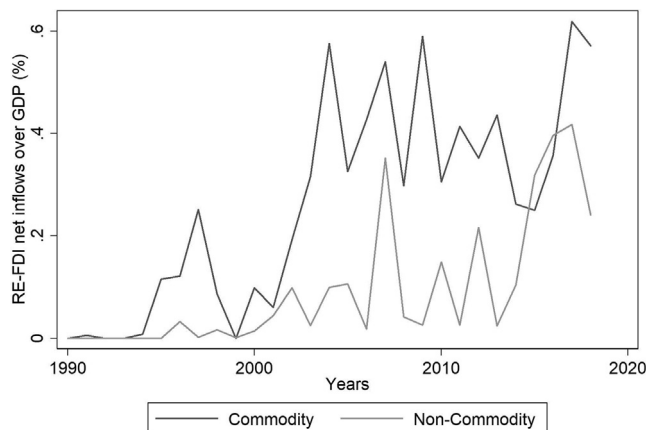


Fig. 5. Evolution of Net Retained Earnings FDI as share of GDP, by commodity dependence of the economy. Notes: This plot displays the median net balance of retained earnings FDI over the period 1990 and 2018. Commodity dependence is defined according to UNCTAD's State of Commodity Dependence (2019).

gross national saving, reported in Column (4), is 1.91. RFDI and national saving behave in a similar manner, over the business cycle.²⁰ As compared to other capital flows, we find that portfolio flows are highly procyclical, with a significant estimated coefficient of 1.08, which is larger than the measure of total FDI procyclicality but smaller than the estimated REFDI procyclicality.

²⁰ In line with this result, [Grigoli et al. \(2018\)](#) show that national private savings, as well as corporate savings, are highly procyclical in a comprehensive sample of 48 countries. In fact, point estimates are statistically indistinguishable from each other in their study (0.44 vs 0.32).

Table 2
Procyclicality regressions of various Capital Flows and Saving on GDP growth.

	Left Hand Side Variable:						
	Inflows (0)	FDI (1)	REFDI (2)	nonREFDI (3)	Other Flows (4)	Portfolio (5)	GNS (6)
Panel A: Full Sample							
<i>GDP growth</i>	1.13*** (0.20)	0.76*** (0.18)	1.32*** (0.17)	0.37** (0.19)	0.19 (0.21)	1.08*** (0.23)	1.91*** (0.15)
Obs.	1,583	1,583	1,583	1,583	1,583	1,583	1,583
R^2	0.21	0.25	0.38	0.17	0.14	0.15	0.52
N countries	75	75	75	75	75	75	75
Panel B: High-FDI Recipients Countries							
<i>GDP growth</i>	1.69*** (0.41)	1.18*** (0.38)	1.67*** (0.34)	0.92** (0.39)	0.75* (0.45)	1.13* (0.61)	2.71*** (0.31)
Obs.	460	460	460	460	460	460	460
R^2	0.22	0.21	0.41	0.15	0.15	0.14	0.45
N countries	22	22	22	22	22	22	22
Panel C: Low-FDI Recipients Countries							
<i>GDP growth</i>	0.13 (0.32)	-0.14 (0.26)	0.68** (0.32)	-0.38 (0.29)	-0.51 (0.37)	0.69** (0.32)	1.00*** (0.23)
Obs.	472	472	472	472	472	472	472
R^2	0.25	0.39	0.40	0.28	0.20	0.15	0.65
N countries	25	25	25	25	25	25	25

Notes: The table presents panel regression estimates of $y_{it} = \alpha_i + \gamma_i t + \beta \text{ GDP growth}_{it} + \varepsilon_{it}$, where y_{it} is gross capital inflow growth rate to country i at time t , normalized by GDP. Countries are classified as High (Low) FDI if they belong to the upper (lower) tercile of the stock of FDI. Standard errors in parenthesis, clustered at the country level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Panel B restricts the sample to countries with a high stock of FDI, defined as those countries in the upper tercile of average stock of FDI in our sample period. We expect to observe a more pronounced effect of REFDI in this subsample, which is indeed the case. The results remain qualitatively the same with the only difference that the estimated procyclicality coefficients are larger and more significant for all the type flows. For example, the procyclicality coefficient of total inflows is 1.69, while for total FDI is 1.18. Estimates for REFDI and non-REFDI again show sizeable differences among them. While REFDI is strongly procyclical with an estimated coefficient of 1.67, non-REFDI is less procyclical with an estimated coefficient of 0.92. Thus, for high FDI recipient countries, we also find that unpacking FDI in these two components is important as they behave very differently.

In this subsample of countries, we also corroborate that REFDI behaves more closely than non-REFDI to the gross national saving, as the estimated procyclicality coefficients are 1.67 and 2.71, respectively. Notably, for the sample of low-FDI recipients countries in Panel C, we also find that REFDI are highly procyclical with a $\hat{\beta}$ estimate of 0.68 and highly significant. On the contrary, non-REFDI appear less affected by the business cycle as the estimated procyclicality coefficient is -0.38 and not statistically significant. In this subsample, we also find that REFDI behaves very similarly to national saving, which produces an estimated procyclicality coefficient of 1.00.

Overall, the evidence reported so far shows that REFDI is a highly procyclical type of capital flows, while non-REFDI is not. Moreover, we observe that REFDI behaves similarly to gross national saving rather than other types of inflows, which is consistent with our argument that retained earnings, as produced locally by multinationals, represent a pseudo national saving for the domestic economy.

5.2. REFDI and Investment in the short and long run

This subsection studies how REFDI comoves with aggregate investment in the host economy. We perform two complementary exercises, a first one focused on the short-run dynamics of the variable of interests, and a second one in which we look at the long-run relationship among them closer to seminal exercise of [Feldstein and Horioka \(1980\)](#), but using cointegration.

5.2.1. Short-run dynamics around the investment cycle

We estimate the investment-saving model with yearly data, but extended with lagged variables. motivated by the well documented effect of time-to-build on aggregate investment. Across specifications, the dependent variable is aggregate investment over GDP. We include the lagged dependent variable and different measures of contemporaneous saving and FDI components. The regressions include country and year fixed effects, to account for the unobserved time-invariant and country-specific heterogeneity.

Table 3
Regressions explaining Investment/GDP, distinguishing by type of FDI (augmented Feldstein–Horioka puzzle).

Left Hand Side: Ratio of Gross Fixed Capital Investment over GDP								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Full Sample								
GNS_t	0.24*** (0.04)			0.21*** (0.04)			0.20*** (0.05)	0.20*** (0.05)
GNS_{t-1}	0.14*** (0.04)			0.11*** (0.04)			0.15*** (0.04)	0.14*** (0.04)
$RE FDI_t$		0.03 (0.03)	0.01 (0.03)	−0.04 (0.03)	0.03 (0.03)	0.02 (0.03)	−0.01 (0.03)	
$RE FDI_{t-1}$		0.14*** (0.03)	0.11*** (0.03)	0.03 (0.03)	0.10*** (0.03)	0.09*** (0.03)	0.05 (0.03)	
$non RE FDI_t$			0.20*** (0.02)	0.15*** (0.02)		0.17*** (0.03)	0.14*** (0.03)	
$non RE FDI_{t-1}$			0.10*** (0.02)	0.07*** (0.02)		0.10*** (0.03)	0.08*** (0.03)	
FDI_t								0.14*** (0.03)
FDI_{t-1}								0.08*** (0.03)
Obs.	1,561	1,534	1,534	1,527	1,534	1,534	1,527	1,561
R^2	0.17	0.07	0.14	0.21	0.12	0.17	0.24	0.23
Panel B: High-FDI recipients countries								
GNS_t	0.21*** (0.07)			0.17** (0.07)			0.22** (0.09)	0.25*** (0.09)
GNS_{t-1}	0.16** (0.06)			0.16** (0.07)			0.18** (0.08)	0.16* (0.08)
$REFDI_t$		0.00 (0.05)	−0.02 (0.05)	−0.02 (0.05)	0.02 (0.05)	0.01 (0.05)	0.01 (0.05)	
$REFDI_{t-1}$		0.19*** (0.05)	0.18*** (0.05)	0.14*** (0.05)	0.15*** (0.06)	0.16*** (0.06)	0.13** (0.05)	
$non REFDI_t$			0.10** (0.05)	0.02 (0.05)		0.03 (0.05)	−0.04 (0.05)	
$non REFDI_{t-1}$			0.02 (0.04)	−0.04 (0.04)		−0.03 (0.05)	−0.09* (0.05)	
FDI_t								−0.02 (0.05)
FDI_{t-1}								−0.03 (0.05)
Obs.	459	455	455	452	455	455	452	459
R^2	0.18	0.11	0.12	0.20	0.17	0.17	0.26	0.25
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	N	N	N	N	Y	Y	Y	Y

Notes: The table presents panel regression estimates of $y_{it} = \alpha_i + \gamma_t + \beta X_{it-1} + \varepsilon_{it}$, where the left hand side variable I/Y is the Gross fixed capital formation of country i as percentage of GDP at time t . All right hand side variables enter the regression as share of GDP as well. Robust standard errors clustered by country in parenthesis: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Note one cannot add all the rest of the capital flow measures (portfolio, other) otherwise one runs into the quasi identity Investment = Saving + Foreign Saving. The sample covers the period 1990 to 2018. Panel A reports estimates from the full sample and Panel B using the sub-sample of high-FDI recipient countries, i.e., those countries in the upper tercile of stock of FDI.

Table 3 displays the results. Panel A reports results for the full sample, and panel B for the sub-sample of high-FDI countries. As a benchmark, Column (1) replicates, to some extent, the baseline Feldstein–Horioka puzzle of high comovement between investment and saving. The estimated contemporaneous correlation between aggregate investment and national saving is positive (0.24) and significant. The estimated coefficient for the lagged dependent variable is also positive (0.14) and significant confirming that there exists some degree of persistence in the investment–saving relationship. Our point estimates, when add up, are aligned with the results reported in the existing literature on the Feldstein–Horioka puzzle.²¹

Column (2) reports the estimates of a model in which REFDI variables are the only regressors, besides the country's FE. The estimated contemporaneous coefficient is 0.03, while the lagged estimated coefficient is 0.14. While the former estimate appears not statistically significant at standard level of confidence, the latter coefficient it is, indicating a significant relation of REFDI with aggregate investment. Column (3) includes non-REFDI variables as additional regressors. In this case, the esti-

²¹ Column (1) reports a positive (0.47) and statistically significant correlation between saving and investment in our sample. This is in line with the bulk of recent literature, which shows that this correlation is still significant. However, the beta coefficient has declined below one, which was the magnitude originally reported by Feldstein and Horioka (1980). Since that seminal paper was a cross section of a 15-year average, it cannot be considered a true panel regression. The recent literature is different and truly consider panels. For example, Herwartz and Xu (2010), use a global sample of 97 countries, reporting an estimated saving retention coefficient of 0.43. Additionally, Cavallo and Pedemonte (2016) use a sample of 107 countries, estimating a coefficient of 0.47, coincident with our same point estimate. See Apergis and Tsoumas (2009) for a recent survey of this literature.

mated coefficients for REFDI variables are similar to those in Column (1). Interestingly, we find that non-REFDI regressors appear more strongly correlated with aggregate investment than REFDI regressors. Indeed, the estimated coefficients are 0.20 and 0.10 for the contemporaneous and lagged effects, respectively, with both of them highly statistically significant. Columns (4) also includes national saving as a regressor. In this case, the results for REFDI becomes statistically weaker, while those for non-REFDI remain similar.

Columns (5) to (7) re-estimate the models in Columns (2) to (4), but now including time fixed effects to the specification. The goal is to control for aggregate common macroeconomic shocks that may be potentially driving our results. We find that this is not the case, as the estimation results are quantitatively unaffected. Column (8) bundles all the FDI together to get a benchmark for evaluating our previous results. We find a significant point estimate of 0.14 for overall FDI and 0.08 for its lagged value. It is worth noting that this estimate is closer to the non-REFDI point estimate than to the REFDI point estimate. This result also confirms our point that unpacking FDI is important for monitoring external balances, because they behave differently during the investment cycle.

Panel B re-estimate prior specifications for the subsample of countries with high FDI stock, for which we expect a stronger differentiated effect between REFDI and non-REFDI. Column (1) shows that the impact of gross national saving on aggregate investment is comparable to the ones in Panel A, with estimated coefficients of 0.21 and 0.16 for current and lagged national saving, respectively. A worth noting difference observed in the set of regressions reported in columns (2) to (4) is that REFDI comoves strongly with investment than the non-REFDI. For example, estimates in column (4) reports estimates of -0.02 and 0.14 for current and lagged REFDI, respectively, with the latter highly significant. On the contrary, the estimated coefficients for non-REFDI variables are not statistically significant. Adding year fixed effects in columns (5) to (7) corroborates this result, as the (lagged) REFDI coefficient is positive and significant across specifications while for non-REFDI this is not the case. Only in column (7), we observed that the (lagged) non-REFDI variable is statistically significant but with a negative coefficient (-0.09) rather than a positive one, as expected.

Our short-term results support our argument that REFDI behaves differently than the non-REFDI, when analyzed in a dynamic investment-saving framework. Besides, if we focus on the subsample of high-FDI countries, we observe that REFDI tends to positively comove with investment, similarly to gross national saving, while non-REFDI tends to comove negatively.

5.2.2. Long-run cointegration relationship

Having studied the short-run year-to-year dynamics, here we use cointegration techniques to explore the long-run relationship between investment, national saving and retained earnings FDI.²² In some way this extends cointegration exercises of the Feldstein-Horioka relationship (Kumar and Bhaskara Rao, 2011; Cavallo and Pedemonte, 2016; Chang and Smith, 2014).

As a starting point, we find that in the long-run, investment, national saving and retained earnings FDI are in fact cointegrated as shown by several panel cointegration tests on Table 4 Panel A, with p-values < 0.05 or stronger for the Pedroni tests, the Kao residual Cointegration test and the Johansen Fisher panel cointegration test.

Panel B reports estimates of a panel cointegration model, where the left hand side variable I/Y is the Gross fixed capital formation of country i as percentage of GDP at time t . This long-run relationship is estimated using a dynamic fixed effect model (DFEM) and a fully modified OLS method (FMOLS). In column (1), we estimate a long-run “saving retention” coefficient for GNS of 0.40, which is consistent in magnitude with estimates in prior literature (see, e.g. Chakrabarti, 2006).²³ Column (2) reports that the estimated long-run coefficient associated with REFDI is 0.36, which is close to the one for national saving. Columns (3) and (4) report long-run cointegration estimates that include both GNS and REFDI. We find that both variables are significantly correlated with aggregate investment. The long-run saving retention coefficients in these specifications are lower than previous estimates (0.34 and 0.28), though, but highly significant. Most important for our purposes, the estimates for the REFDI coefficients (0.15 and 0.01) are also smaller than before, but significant as well.

Thus, our panel cointegration estimates capturing long-run relationship confirm that retained earnings FDI is correlated with aggregate investment, even after controlling for national saving. Thus, it also matters for the Feldstein-Horioka puzzle.

6. Retained earnings during extreme events: sudden stops and crises

This section explores how REFDI behaves during extreme negative events, such as sudden stops and macroeconomic crises, finding that REFDI decrease the likelihood of these bad events, unlike a standard current account deficit.

6.1. Retained earnings as moderator of the lower GDP growth around sudden stops

Here we study the quarterly economic growth during sudden stops, depending on the level of retained earnings FDI. In practice, we estimate the regression model $y_{it+k} = \beta_0 + \beta_1 SS_{i,t} + \beta_2 SS_{i,t} \times RE_{t-1} + \beta_3 RE_{t-1} + \alpha_i + \gamma_t$; where y_{it+k} is the growth of GDP k periods ahead; SS is a dummy that is 1 if there a standard sudden stop as defined by Forbes and Warnock (2012),

²² Rossini and Zanghieri (2003) follow a different line of the Feldstein-Horioka puzzle and subtract FDI from investment. They find this approach weakens the saving coefficients when explaining investment.

²³ Using standard panel techniques, Herwartz and Xu (2010), report an estimated saving retention coefficient of 0.43 for a global sample of 97 countries. Additionally, Cavallo and Pedemonte (2016) use a sample of 107 countries, estimating a coefficient of 0.47 See Apergis and Tsoumas (2009) for a recent survey of this literature.

Table 4
Panel Cointegration Tests and Estimation.

Panel A: Panel Cointegration Tests (p-value; H_0 : No cointegration)				
Pedroni Res. Test (modified Phillips-Perron t)	0.000			
Pedroni Res. Test (Phillips-Perron t)	0.002			
Pedroni Res. Test (Augmented Dickey-Fuller t)	0.000			
Kao Residual Coint. Test	0.003			
Johansen Fisher Panel Coint. Test	0.000			
Panel B: Panel Cointegration Estimation				
	(1)	(2)	(3)	(4)
GNS	0.408*** (0.052)		0.341*** (0.068)	0.284*** (0.029)
REFDI		0.364*** (0.070)	0.150** (0.073)	0.011** (0.004)
Estimation Method	DFEM	DFEM	DFEM	FMOLS

Notes: Panel A reports panel cointegration tests between gross-fixed capital formation (investment), gross national saving (GNS) and retained earnings (REFDI). Panel B reports estimates of a panel cointegration model where the left hand side variable I/Y is the Gross fixed capital formation of country i as percentage of GDP at time t . This long-run relationship is estimated using a dynamic fixed effect model (DFEM) and a fully modified OLS method (FMOLS). All right hand side variables enter the regression as share of GDP as well. Robust standard errors clustered by country in parenthesis: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Note one cannot add the rest of the capital flow measures (portfolio, other) otherwise one runs into the quasi identity Investment = Saving + Foreign Saving. The sample covers the period 1990 to 2018.

Forbes and Warnock, 2021 and zero otherwise. RE is the share of retained earnings FDI to GDP of country i during a quarter, lagged to avoid circularity with capital flow. For our purposes, the most important coefficient of interest is β_2 , with the interaction of a sudden stop in a context of high reinvestment. Our argument is that RE partially mitigates the harmful relation between Sudden Stops and growth.

Columns t to $(t + 2)$ of Table 5 confirm the expected result that sudden stops are associated to lower to economic growth, with negative coefficients of -1.2% , -0.8% and -0.5% , respectively (p -values < 0.01 , 0.05 and 0.1). Most important for our purposes, the interaction term for $SS_{i,t} \times RE_{t-1}$ is positive and significant (p -value < 0.1), for quarters t and $t + 1$. This result is coherent with some role for REFDI as a mitigating factor during a sudden stop.²⁴

6.2. REFDI and the probability of crises or Sudden stops

Instead of using the whole sample, here we study specific macroeconomic events to explore the role of retained earnings FDI. We start by following Catão and Milesi-Ferretti (2014)'s definition of crisis²⁵, with the innovation of unpacking FDI into two components (i.e. REFDI vs the rest). As discussed before, the consensus in the literature is that FDI inflows are safer than non-FDI inflows for host economies. For example, Fernández-Arias and Hausmann (2001) nicknamed FDI as “good cholesterol” in the sense that it is a capital flow that can be useful for macroeconomic health in the long-run. Here, we study whether REFDI and non-REFDI are differentially “beneficial” for the domestic economy. Following Catão and Milesi-Ferretti (2014), we estimate the model

$$\Pr[\text{crisis}_{it} = 1] = \beta \text{Liability Stocks}_{i,t} + \gamma \text{CA}_{i,t} + \eta X_{i,t} + \epsilon_{i,t} \quad (4)$$

where crisis_{it} is a dummy variable accounting for episodes of different types of economic crisis. On the right-hand side of the regression, $\text{Stocks}_{i,t}$ represents a vector of net asset positions for various types of items in the BoP. In line with the baseline specification in Catão and Milesi-Ferretti (2014), we include the current account $\text{CA}_{i,t}$ and some other macroeconomic controls $X_{i,t}$ like GDP per capita. In some specifications, we also consider country fixed effects, although there are few events per country. Unlike the previous exercise in Catão and Milesi-Ferretti (2014), we unpack the current account measure into the cash-based current account and the net REFDI, as in Section 2. Similarly, we split the stock of FDI in the stock of REFDI and the stock of non-REFDI. We also include the stock of FDI assets, net debt, and net portfolio. Finally, we also control for foreign reserves, as in the baseline paper.

Table 6 shows the results. Column (1) confirms that a better current account balance provides protection during crises, meaning that deficits are associated to crises; qualitatively replicating Catão and Milesi-Ferretti (2014). Column (2) splits the standard current account into cash based CBCA_t and netREFDI . As expected, the CBCA has a negative sign, and hence a CBCA deficit increases the probability of a crisis. In contrast, net REFDI has a positive coefficient. This implies that an inflow of

²⁴ Cavallo et al. (2018) explored GDP growth around events of sustained current account deficits, but depending on the level of FDI. They find that “FDI flows seem to deliver higher post-episode growth. But, the difference between the high vs low FDI paths is not statistically significant”. In contrast, we find a difference for the case of REFDI.

²⁵ Catão and Milesi-Ferretti (2014)'s definition of external crises “encompasses defaults and rescheduling events as well as events associated with large IMF support, defined as IMF loans at least twice as large as the respective country's quota in the IMF, when all net disbursements are computed from program's inception to end. This definition focuses on major external crisis events.” (see their paper in Section 2, second paragraph)

Table 5
GDP growth around sudden stops by level of retained earnings

	Dep Variable: GDP growth in quarters t to $t + 4$				
	t	$t + 1$	$t + 2$	$t + 3$	$t + 4$
SS_t	-0.0123*** (0.00316)	-0.00796** (0.00313)	-0.00484* (0.00288)	-0.00393 (0.00296)	-0.00190 (0.00276)
$SS_t \times RE_{t-1}$	0.000972* (0.000510)	0.00107* (0.000625)	-0.000766 (0.000526)	0.000516 (0.000446)	3.16e-05 (0.000242)
RE_{t-1}	3.59e-05 (5.78e-05)	-3.83e-05 (6.06e-05)	1.43e-07 (3.92e-05)	5.40e-05 (7.55e-05)	-3.79e-05 (4.39e-05)
Obs.	3,696	3,676	3,656	3,636	3,616
R^2	0.427	0.425	0.423	0.419	0.417
Country FE	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES

Notes: This table displays panel regression estimates for $y_{it+k} = \beta_0 + \beta_1 SS_{it} + \beta_2 SS_{it} RE_{t-1} + \beta_3 RE_{t-1} + \alpha_i + \gamma_t$; where y_{it+k} is the growth of GDP k periods ahead; SS is a dummy that is 1 if there a standard sudden stop as defined by [Forbes and Warnock \(2012\)](#), [Forbes and Warnock, 2021](#) and zero otherwise. RE is the share of retained earnings FDI to GDP of country i at quarter t . Robust standard errors clustered by country in parenthesis: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 6
Regressing macroeconomic crises on stocks and flows of external imbalances (follows Catao Milesi-Ferretti, 2014).

	Probit of 1[crisis dummy according to Catao & Milesi-Ferretti 2014]				
	(1)	(2)	(3)	(4)	(5)
Standard CA balance (Flow, accrual)	-6.76*** (1.735)		-5.61** (2.684)	-7.73*** (2.637)	
Cash-Based CA (Flow, cash)		-9.401*** (2.081)			-7.317** (3.518)
Net RE-FDI (Flow)		21.70*** (7.395)			17.69 (11.45)
Net FDI (Stock)			-0.217 (0.610)		-0.745 (0.519)
RE-FDI Liabilities (Stock)				-2.215 (1.843)	
NONRE-FDI Liabilities (Stock)				1.328** (0.544)	
FDI Assets (Stock)				0.817 (0.557)	
Net Debt (Stock)			-1.551** (0.732)	-1.280* (0.658)	-1.190 (0.768)
Net Portfolio (Stock)			1.507 (1.262)	1.831 (1.448)	1.836 (1.352)
Reserves			-6.955*** (2.511)	-9.476*** (2.155)	-7.147*** (2.586)
Relative GDPpc	-1.077*** (0.374)	-1.437*** (0.379)	-2.678*** (0.670)	-3.632*** (0.870)	-2.662*** (0.669)
Observations	916	916	916	916	916

The table shows the estimates, but not the marginal effects, of probit regressions using the model $\Pr[crisis_{it} = 1] = \beta Stocks_{it} + \gamma CA_{it} + \eta X_{it} + \epsilon_{it}$; where the crisis measure comes from [Catão and Milesi-Ferretti \(2014\)](#). Columns (1) and (3) replicate with our sample the findings and main specifications of [Catão and Milesi-Ferretti \(2014\)](#). In comparison to (1), column (2) splits the components of the current account into local current account and net retained earnings, since our definition $CA_t = LocalCA_t - netREFDI$. In comparison to column (3), Column (4) splits the net FDI stock into three components: the stock of retained earnings FDI liabilities, the stock of non retained earnings FDI liabilities and the stock of FDI assets, meaning the integral of the FDI outflows. Reserves are country.

REFDI decreases the probability of a crisis. The F-test for the difference between retained earnings vis-à-vis the rest of the current account is statistically significant (p -value < 0.001). These differences among the components of the current account is robust to controlling for the stock of the net FDI in Column (5). This implies that the “protective” effect of REFDI is not a property of FDI in general.

Looking at net asset positions, Column (3) again replicates [Catão and Milesi-Ferretti \(2014\)](#), who find no significant coefficient for net FDI positions. But when we split the net FDI position into three sub-components, we get meaningful differences. The stock of retained-earnings liabilities has a negative point estimate of -2.2 , implying that these inflows can provide protection during a crisis, although the coefficient is not statistically different from zero. Contrarily, the rest of the FDI liabilities (non-REFDI) tend to have a positive relationship with crises, with a statistically significant coefficient of 1.3. The F-test for the difference between retained earnings versus the rest of the FDI is statistically significant (p -value

of 0.068), and hence we again conclude the existence of a difference when unpacking FDI. Finally, it reassuring that income per capita, reserves, and the net debt position of a country reduce the probability of a macroeconomic crisis, similar to the findings of the benchmark study.

Table 7 performs additional tests. Columns (1) to (3) use Forbes and Warnock (2021) for a sudden stop in gross inflows. Again, while a current account deficit is correlated with crises, an inflow of REFDI does not have that property and, if any, it has a point estimate that is consistent with being protective of crises. Columns (4) and (5) follow Catao and Milei Ferretti, but exploit only the within-country variation. Our results remain robust, supporting the idea that retained earnings are different from the rest of the current account deficit of a country. While the current account deficit increases the probability of a crisis, measured as in Catão and Milesi-Ferretti (2014), an inflow of retained earnings has a point estimate that suggests that it is protective of crises, although it is statistically not different from zero. Importantly, though, the difference between coefficients is statistically significant in column (5).

Summing up, these tests support the view that REFDI is a peculiar type of capital inflow, which lowers probability of extreme negative events. Unpacking FDI could be important when assessing vulnerabilities.

7. Discussing policy implications

The previous sections document that REFDI behaves differently than the rest of FDI. Here, we discuss how our findings can contribute toward the monitoring of external imbalances and policy-making.

It is instructive to start with Jeanne and Korinek (2010)'s framework, which explores policies to mitigate a deleveraging externality. In their framework, foreign debt accumulation and asset prices magnify credit booms. In the subsequent Korinek (2018) calibration, the optimal Pigouvian tax for debt is positive, but it is almost zero for FDI, because it is a long term liability.²⁶ However, we argue that there are some overlooked risks in FDI flows. For example, because not all REFDI is reinvested as capital expenditures. In fact, despite the name of "Reinvested Earnings" some or all of it could remain as current assets. A concern is that, in countries with large stocks of REFDI in cash or equivalents, a change in future fundamentals may generate an exit of that capital. For example, if fundamentals for future investment suddenly go sour in Peru, then multinationals could quickly repatriate that cash, thereby generating a bunching of capital outflows. These changes in cash stockpiling could also happen if there is a change in future expected taxation of retained earnings (see Almeida et al., 2004). If the retained profits of a commodity boom are stored at least partially in the local financial system, they can have asset price effects along the lines of Jeanne and Korinek (2010), with an externality when multinationals perceive a sudden drop in the long-term copper prices. This channel may amplify the downturn of commodities.²⁷ This case challenges Korinek (2018)'s prescription of a different Pigouvian capital control for FDI and foreign debt. In case a bad expectation triggers a sudden outflow of accumulated REFDI, the consequences may depend on the location of the "stockpiled cash". Regulators should explore in advance whether these stocks of accumulated earnings were redirected overseas (e.g. as Related Party Debt among subsidiaries), or remain in the local financial system, creating a macro-prudential risk, as if it were debt. In economies with large FDI stocks a proactive monitoring must find out where the money is parked, since this cannot be solely understood from the aggregates in the BoP. Such monitoring should create a specific narrative for systemically important sectors or firms, and use it as input for a stress test of sudden outflows.

Also from a regulatory perspective, Ostry et al. (2012) find that FDI tends to have relatively fewer capital controls. They arrive at this conclusion by surveying regulations made in various countries before and after the great recession. However, there are implicit policies that may act as a potential "capital control." but that are not captured in their study. One such policy is the repatriation tax in the headquarter country, as well as the reporting rules for accounting profits abroad (Graham et al., 2011). Host country taxation, especially deferred income taxes for reinvested earnings, can also create a wedge against repatriation (Desai et al., 2004; Desai et al., 2006; Desai et al., 2007; Desai et al., 2008). These wedges create an inaction zone that induces stockpiling of liquid assets, without repatriation. As shown in the discussion of Fig. 1, the repatriation incentives associated to the 2017 Tax Reform are a vivid example of this implicit "capital control" for other countries.²⁸

Finally, monitoring must also focus on the proper accounting of the net foreign asset positions of the headquarter countries like the US or the UK. When a foreign affiliate gets profits and the money is repatriated, some host countries allow for a deferral of a part of the corporate income taxation. As discussed, this policy is known to promote FDI reinvestment. While the market valuation of multinationals in different jurisdictions accounts for these future taxes to be paid at repatriation (Desai et al., 2001), the BoP does not discount them. This happens despite the future taxation would not come back to the headquarter, absent a regulatory change. Taking this aspect into account can increase the US current account deficit. So under-

²⁶ The optimal Pigouvian tax in their model restricts capital inflows during booms, with a mirror of reducing the potential outflows during busts. Since their model is about debt, possibly amplified by a balance sheet channel, calibrate for Indonesia an optimal tax of 1.54% for foreign currency-denominated debt, but an almost zero Pigouvian tax for FDI inflows. Apparently, in the logic of over-borrowing, FDI flows should not be a problem. This is because, on the one hand, it is a residual claim rather than a fixed payment, and, on the other hand, it is a long-term liability. For example, the Chang and Velasco (2001) model purposefully does not allow for FDI in its extension of the Diamond-Dybvig setting because, otherwise, it would not be possible to model a bank run.

²⁷ Multinationals operating in the non-traded sector may also have such perceptions. Nonetheless, instead of perceiving a drop in the commodity price as a fundamental, they can overreact if they perceive a massive drop in the expectations for future growth, and therefore a lower return over future investments. When future fundamentals drop, the canonical Almeida et al. (2004) model of cash holdings would predict a repatriation.

²⁸ See Almeida et al. (2004) for a theoretical discussion and Hansen and Wagner (2017) for an application of the theory on copper mines that stockpile cash.

Table 7
Additional regressions with country Fixed Effects and/or Forbes and Warnock (2012)'s sudden stops.

	Probit: SS Forbes-Warnock (2021)			Linear Panel: CMF (2014)	
	(1)	(2)	(3)	(4)	(5)
Standard CA balance (Flow, accrual)	-1.96** (0.94)		-2.133** (0.961)	-0.312* (0.159)	
Cash-Based CA (Flow, cash)		-2.12** (1.00)			-0.346* (0.174)
Net RE-FDI (Flow)		6.45 (4.48)			0.118 (0.204)
Net FDI components:					
RE-FDI Liabilities (Stock)			-0.211 (0.920)		
NONRE-FDI Liabilities (Stock)			1.024*** (0.387)		
FDI Assets (Stock)			-0.383 (0.278)		
Net Debt (Stock)			-0.0268 (0.275)		
Net Portfolio (Stock)			0.387 (0.239)		
Reserves			1.339** (0.624)		
Relative GDPpc	0.06 (0.11)	0.11 (0.12)	0.480** (0.227)	0.0275 (0.0194)	0.0276 (0.0192)
Obs.	803	803	701	916	916
N of Countries	42	42	42	60	60
Country FE	No	No	No	Yes	Yes

Notes: The table is robustness check of the results on Table 6. It shows the estimates of probit and linear probability panel regressions using the model $\Pr[\text{crisis}_{it} = 1] = \beta \text{Stocks}_{it} + \gamma \text{CA}_{it} + \eta X_{it} + \epsilon_{it}$. In columns (1) to (3) the crisis measure is a Sudden Stop in gross inflows measured a la Forbes and Warnock (2012, 2021) and labeled Probit SS Forbes-Warnock. Column (1) and (2) correspond to the same specifications of Table 6. Column (3) corresponds to specification (4) of Table 6. Columns (4) and (5) use the crisis definition of Catão and Milesi-Ferretti (2014), labeled CMF, but unlike in Table 6 the estimation is done in a panel linear probability model with country fixed effects. Specifications (4) and (5) are analogous to specifications (1) and (2) in Table 6. In the panel specification standard errors are clustered at the country level. Standard errors in parenthesis; * is 10%, ** is 5% and *** is 1% statistical significance.

standing REFDI can be a relevant factor in the discussion about Global Imbalances (e.g. Feldstein, 2008; Obstfeld and Rogoff, 2009).

8. Concluding remarks

This study examines the retained earnings of multinationals (REFDI) from a macroeconomic perspective. For host countries, the literature usually identified FDI as a relatively safe kind of capital inflow. While we agree with that statement, we offer some qualifications to this consensus and highlight the relevance of unpacking FDI. Particularly, for many countries with strong presence of multinationals, REFDI corresponds to a sizable portion of local corporate saving, although this saving decision is neither captured by Gross National Saving nor by Gross Domestic Saving. Our paper offers a novel and complementary measure of saving that captures this distinction: cash-based saving and cash-based current account. In fact in 2018 the US *cash-based* Current Account closes to almost zero, due to the massive profit repatriation.

While FDI might be more procyclical than other flows, we show that this is mostly due to the procyclicality of REFDI. These retained earnings are in fact much more sensitive to the country's business cycle than the rest of the FDI. This is natural since it emerges from its deep relation with local activity. Moreover, short-run investment regressions show that unpacking FDI is meaningful to explain their relation. In the long run, the cointegration analyses are coherent with retained earnings acting a bit like saving, although with a smaller "saving retention". This could be understood as a novel angle of the Feldstein-Horioka Puzzle.

We also find that REFDI is either less harmful than the rest of a current account deficit, or even provides protection during macroeconomic crises (as in Catão and Milesi-Ferretti, 2014) and sudden stops.

Overall, our results suggest that the macroeconomic assessment of external balance Phillips et al. (2013), should complement its analysis with *cash-based* measures of saving and current account, especially in countries that are either large sources or hosts of FDI. Our findings are, in general, supportive of the view that REFDI in host countries can generate a current account deficit for "good reasons," as per the terminology used by Blanchard and Milesi-Ferretti (2012). Having said that, there are cases in which a large stock of REFDI can cause concerns. For instance, there can be a case wherein the REFDI is not invested but stockpiled as liquid assets, which could quickly leave the country if fundamentals or expectation deteriorate. An agenda for further research is the potential impact of cash-based measures on exchange rate movements and its relationship with uncertainty.

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