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**Analysing sectoral capital
flows: Covariates, co-
movements, and controls**

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Analysing sectoral capital flows - covariates, co-movements, and controls

by

Etienne Lepers and Rogelio Mercado, Jr. *

This paper assembles a comprehensive sectoral capital flows dataset for 64 advanced and emerging economies from 2000-18. This includes direct, portfolio and other investments to and from five sectors: central banks (CB), general government (GG), banks (BKs), non-financial corporates (NFCs) and other financial corporates (OFCs) and a corresponding dataset on capital controls imposed on these sectors. The paper uses this data to examine the usefulness of a sectoral approach in assessing capital flow covariates, co-movements, and the effectiveness of capital controls. The findings show that: 1) private sectoral flows have varying sensitivities to global financial conditions and different cyclicalities with respect to output growth. For instance, unlike other flows, NFCs respond to global commodity prices but not global risk aversion and, unlike banks, OFCs cut foreign investment in periods of domestic investment; 2) co-movements of resident and non-resident OFC sectoral flows add to the observed positive correlation between gross inflows and outflows; and, 3) the tightening of capital controls on NFCs and OFCs appear effective in reducing the volume of flows to these sectors.

Authorised for release by Greg Medcraft, Director, OECD Directorate for Financial and Enterprise Affairs

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Table of contents

1. Introduction	5
2. Sectoral capital flows data and stylised facts	8
2.1 Sectoral capital flows dataset	8
2.2 Sectoral flows stylised facts	11
3. Sectoral capital flows covariates	12
3.1 Motivation	12
3.2 Empirical specification of sectoral flow covariates	13
3.3 Sectoral flow covariates results	13
4. Sectoral flows co-movements	15
4.1 Theoretical and empirical motivation	15
4.2 Empirical specification of sectoral flows co-movement	16
4.3 Resident and non-resident sectoral flow correlations	16
4.4 Global factors and correlations of sectoral resident and non-resident flows	17
5. Sectoral flows and capital controls	18
5.1 Empirical motivation	18
5.2 Sectoral CFMs and stylised facts	19
5.3 Empirical specification	20
5.4 Results, sensitivity tests, and extensions	21
6. Concluding remarks	24
References	25
Figures and tables	29
Appendix 1: Sectoral flows data summary	44
Appendix 2: Country classification	45
Appendix 3: Data definitions and sources	46
Appendix 4: Coding capital controls dataset	47
A4.1 Coding rules in the Lepers and Mehigan (2019) dataset	47
A4.2 Coding rules for sector-specific capital controls	48
Appendix 5. OECD working papers on international investment	49

1. Introduction

Capital flows have been studied from various angles, such as determinants or covariates, cyclicity of capital flows, gross flow correlations or co-movements, and the impact of capital account openness.¹ Existing studies have generally focused on aggregate or specific types of flows, highlighting the importance of the composition of capital flows and the importance of differentiating resident and non-resident gross flows in understanding capital flow dynamics. More recently, several papers considered capital flows along sectoral lines to reveal sectoral specificities in observed patterns of capital flows, notably providing evidence on the centrality of banking flows and its significant procyclicality (Avdjiev et al. 2018; Hoggarth et al 2016; and Cerutti and Hong 2018).

This recent focus on sectoral capital flows is warranted. First, different sectors undertake different cross-border financial transactions and react differently to shocks. For example, the surge and sudden stop before and during the global financial crisis (GFC) of 2008-09 can be largely explained by banking sector flows (Milesi-Ferretti and Tille, 2011), as well as the moderate levels of gross flows post-GFC (McCauley et al., 2019; McQuade and Schmitz, 2017). In contrast, the sudden stop experienced by many countries during the recent COVID-19 crisis appeared to be mainly driven by investment funds, which are non-bank financial institutions or other financial corporates, while the banking sector acting as countercyclical sector (Lane, 2020).

Second, the past decades have seen structural changes in the actors engaged in financial systems: in many countries, the relative importance of non-bank financial institutions has dramatically increased with traditional deposit taking institutions playing a lesser role in financial intermediation (Patalano and Roulet, 2020). In the case of the United States for instance, the assets of non-bank financial institutions have increased from 44% of GDP in 1980 to 155% in 2016, with the ratio of deposit bank assets to non-bank assets decreasing from 142% to 40% in the same period. Large non-financial multinationals and domestic corporates have also become more integrated in global and national financial systems, with many of them now engaging in financial intermediation and acting as banks (Bruno and Shin, 2017a; Caballero et al., 2015). These stylised facts highlight both the importance of a sectoral lens and the need for a comprehensive approach to the analysis of financial account dynamics.

Although recent studies have significantly extended the understanding of sectoral flow patterns, to date they have provided a partial account only of sectoral flows by focusing on a specific type of flows to and from broader sectoral groupings, primarily debt flows to corporates, sovereigns, and banks (Avdjiev et al., 2018; and Cerutti and Hong, 2018).² This paper fills a gap in the literature by providing a more

¹ On covariates using global (push) and domestic (pull) factors, see Calderon and Kubota (Calderón and Kubota, 2013), Calvo et al. (1993), Cavallo and Frankel (2008), Chuhan et al. (1998), Forbes and Warnock (2012), Fratzscher (2012), Ghosh et al. (2014), Li et al. (2018), Mercado and Park (2011), Mercado (2018), Puy (2016), and Reinhart and Reinhart (2008). Regarding the cyclicity of capital flows, refer to Kaminsky et al (2004). Regarding correlations, see Avdjiev et al. (2018), Alfaro et al. (2014), Broner et al. (2013), and Davis and van Wincoop (2018). On capital controls, see Ahmed and Zlate (2014), Chamon and Garcia (2016), Forbes et al (2015), Lepers and Mehigan (2019), and Magud and Reinhart (2006).

² Avdjiev et al. (2018) focused on debt flows to and from banks, corporates, and sovereigns at a quarterly frequency from 1996 to 2014 for 81 advanced and emerging economies. Cerutti and Hong (2018) considered portfolio and other investment inflows to corporates, banks, and sovereigns for 43 advanced and emerging economies. Hoggarth et al (2016) focuses on debt inflows from bank or non-bank creditors.

complete sectoral assessment of gross capital flows that includes both equity and debt type investments. It also includes a sectoral breakdown of sovereigns into central bank and general government sectors and corporates into non-financial corporate and other financial corporate sectors which is crucial for a more accurate understanding of sectoral capital flows.

This paper first captures sectoral flows across almost all functional categories of the Financial Account of the Balance of Payments.³ Considering resident and non-resident equity and debt flows is crucial to obtaining a complete sectoral picture of gross capital flows and thus a comprehensive analysis of their covariates and co-movements. In particular, almost half of non-resident capital flows to emerging Asian economies are in the form of foreign direct investments. Excluding FDI flows, which go primarily to non-financial corporates, would provide an incomplete assessment of sectoral flows.

Five main sectors are then considered: central bank/monetary authority (CB); general government (GG); banks (BKs); non-financial corporates (NFCs); and other financial corporates (OFCs). Differentiating between CB and GG and, more importantly, between NFCs and OFCs, is critical as resident and non-resident flows to these various sectors are driven by different factors and exhibit varying patterns. For example, NFCs undertake a greater controlling stake and long-term corporate investments, while OFCs (pension, insurance, money market and investment funds) are financial actors with radically different investment objectives and horizons compared to NFCs.

This paper uses these finer sectoral groupings and more comprehensive BoP coverage to revisit the determinants of different sectoral flows using the “push” and “pull” framework; and the co-movements between gross capital inflows and outflows of different sectors. It also provides the first empirical analysis of the effectiveness of capital controls from a sectoral perspective.

The final sectoral flow dataset includes 28 advanced economies (AEs) and 36 emerging economies (EMEs) from 2000-18. It covers all types of flows (equity and debt investments) with finer sectors grouping (including CB, GG, BKs, NFCs, and OFCs). It is mainly based on the IMF’s Balance of Payments Statistics (BPM6) but is significantly expanded by applying sectoral weights computed from various published data sources on reported capital flows data. The breakdown between OFCs and NFCs reveals important stylised facts, namely that OFCs have become the largest outward investing sector in advanced economies, and that NFCs are by far the largest inflow recipient in emerging economies.

In addition, the paper presents a newly constructed sectoral capital controls dataset leveraging and extending the Lepers and Mehigan (2019) capital controls dataset across the sectors of interest. The final capital controls dataset is unique in the literature insofar as it provides both an instrument and a sectoral breakdown and codes all tightening and easing actions to capture adjustments in controls and not simply the absence or presence of restrictions. This addresses several issues usually plaguing research on capital controls, namely the lack of differentiation across types of controls, the issue of the intensity of the controls, and the small number of capital control “actions”. Leveraging these two new datasets, the present paper highlights several important new findings.

For sectoral flow covariates, a finer breakdown of private and public sectors reveals new sectoral heterogeneities overlooked by previous work. Regarding domestic conditions, while inflows to all different private sectors are positively associated with domestic GDP growth, the data shows that an increase in domestic GDP is associated with an increase in domestic banks’ investment abroad but a decrease in domestic OFCs (debt) investment abroad. OFCs thus appear to reduce their foreign investments when the domestic economy expands, consistent with theoretical priors. This also confirms the countercyclical role of the public sector vis-a-vis the domestic business cycle but show that this is driven by governments and not central banks. Regarding the responsiveness to global conditions, the

³ Sectoral breakdown of resident and non-resident financial derivatives is excluded as they are mostly reported in net basis.

results confirm previous findings whereby the private sector generally receives more inflows and increases investment abroad during global expansions. This notwithstanding, risk aversion (VIX) does not appear to be a significant driver of flows to and from NFCs. In addition, global commodity price explains both higher NFC investment abroad and higher (equity) inflows to NFCs while BKs receive less flows, implying that investors shift investment away from financial sectors to NFCs during global commodity booms.

These results have in turn implications for resident and non-resident flows co-movements, which this paper formally tests. It starts by confirming that same sector inflows and outflows are an important part of the total inflows and outflows positive correlation, with intra-BK sector flows the largest, consistent with results in Avdjiev et al (2018). But looking into inter-sectoral inflow and outflow patterns, it emphasises the importance of OFC sectoral flows by explaining the observed positive correlation between gross inflows and outflows across sectors, being the only sector significantly correlated with all other private sector flows. In addition, the findings show that it is equity flows more than debt flows that are driving private sector co-movements. The impact of global risk aversion on these intra-sectoral inflow-outflow correlations varies across sectors, amplifying the correlation for NFC and OFC while mitigating it for BK.

Finally, the paper provides the first analysis assessing the effectiveness of capital controls on sectoral flows by classifying capital controls along sectoral lines, i.e. whether they apply to BK, NFC, and OFC sectors. It uncovers a sector-specificity for many of the controls, which may have been overlooked in past work. Focusing on emerging market economies, there is evidence that tighter capital controls on non-resident flows to NFC and OFC are associated significantly with lower flows to these sectors. This contrasts with existing research, which generally finds no volume effect using aggregate or instrument-based capital control datasets. On the other hand, no strong evidence for banking sector controls or for controls on flows from resident sectors emerges.

The results reveal the value added of a sectoral approach for the understanding of capital flows and have several theoretical, empirical, and policy implications. Theoretical work on the observed positive correlation between inflows and outflows must consider that this correlation is mainly driven by same sector inflows and outflows, in line with Davis and van Wincoop (2018) and Davis (2015). Recent work by Kumhof et al (2020) argues that gross inflows and outflows are necessarily correlated as an automatic result of accounting rules as all financial transactions are settled through opposite flows in the banking system. While this can explain the high correlation between BK inflows and outflows, the relatively high correlations for NFC and OFC sectoral flows remains unexplained and additional research will be welcome.

Regarding capital flow statistics, this sectoral dataset is the first to decompose direct investment flows, portfolio, and banking flows into a common sectoral mapping. The inclusion of direct investment (DI) provides a more accurate assessment on the behaviour of NFC sectoral flows which drive a large part of FDI and a more accurate picture of sectoral flows in EMEs for which FDI is often the most important type of flow. Applying a common data compilation and reporting standard for all sectors of the financial account balance, including direct investment, will improve the understanding of capital flow dynamics. Going forward, this paper calls for sectoral decompositions of direct investment flows to be part of BoP sectoral reporting and ongoing efforts in this direction at the IMF and OECD are thus particularly welcome⁴. In addition, this paper emphasises the importance of capturing OFC flows as a separate sector to account for its growing role in cross-border investments, especially for advanced economies.⁵

In terms of policy implications, this paper highlights the usefulness of a sectoral approach to issues of capital flow management. It shows that the effectiveness of capital controls in emerging economies

⁴ See for instance <https://www.imf.org/en/Data/Statistics/BPM/DITT>

⁵ See Section 2.2 on the discussion on OFC sectoral flow values.

varies depending on the sector in which they are imposed and that outflow controls on a specific sector may be circumvented through other sectors. In addition, the intra-sectoral procyclicality of resident and non-resident flows in all private sectors adds another argument for a countercyclical approach to prudential policy (Araujo et al., 2017; Lane and McQuade, 2014).

This paper proceeds as follows. Section 2 presents the sectoral capital flows dataset and stylised facts. Section 3 discusses sectoral flows covariates. Sectoral flows co-movements are then discussed in Section 4; while Section 5 turns to analysis of the effectiveness of sectoral capital controls. Section 6 provides concluding remarks.

2. Sectoral capital flows data and stylised facts

2.1 Sectoral capital flows dataset

The sectoral breakdown in the IMF Balance of Payment Statistics

The primary data source for the sectoral capital flows dataset is the IMF's Balance of Payments Statistics (BoP). The BoP statistics report a sectoral breakdown for portfolio debt; portfolio equity; currency and deposits; loans; trade credits and advances; insurance and pension funds; and, other receipts and payables for resident (assets) and non-resident (liabilities) flows.⁶ The reported sectors include central banks/monetary authorities (CB), general government (GG), banks (BKs), non-financial corporations (NFCs), and other financial corporations (OFCs).⁷ Reported sectoral breakdowns are based on the residency principle of cross-border financial transactions. For financial account assets, the sectoral classification refers to the resident or source sector undertaking a net acquisition of foreign assets. For financial account liabilities, sectoral classification pertains to the resident investee or recipient sectors of non-resident flows, which represent a net incurrence of liabilities to non-residents.

As the IMF's BoP Statistics reports the sectoral breakdown for portfolio and other investment flows, the lion share of the sectoral breakdown are actual flows data. However, some economies do not report a detailed breakdown of Other Sector flows into NFC and OFC flows for some or all years. In addition, there are years when some countries do not report specific sectoral flows for CB, GG, and/or BK. In these cases, missing values are filled where possible from other data sources or proxied by the value based on weights from stock data.

⁶ See Avdjiev et al. (2014) and Avdjiev et al. (2018) for discussions on sectoral capital flows using BoP Statistics.

⁷ Based on Balance of Payments Manual 6, banks (BKs) are deposit-taking corporations except the central bank. Non-financial corporations (NFCs) include non-financial corporations, households, and non-profit institutions. Other financial corporations (OFCs) include money market funds, investment funds, other financial intermediaries, financial auxiliaries, captive financial institutions and money lenders, insurance corporations, and pension funds. For earlier years, BoP statistics group NFC and OFC flows as Other Sector flows. In contrast to Avdjiev et al. (2018), we used reported data for NFCs and OFCs and estimated missing values for these two sectors.

Additional data filling steps

A few straightforward data filling steps are proposed. For cases when data for either CB, GG, BKs, or Other Sector is unreported, the difference between total flows and the three reported sectors is taken to come up with the value for the missing sector, similar to Avdjiev et al. (2018). For filling-in the breakdown of Other Sector flows into NFC and OFC sectors for years without a breakdown, reported classification for years with available breakdown. For instance, if a country classifies Other Sector flows into NFC for 2013-2018 but reports Other Sector flows for 2000-12, then the unclassified values from 2000-2012 will be classified under NFC flows. The same method is applied even if there are reported OFC values (whether zero or non-zero) for later years, say from 2015-18, as the values from 2013-14 must be attributed to NFCs. For trade credit and advances, unclassified reported Other Sector flows data are classified under NFCs based on classification of most reporting economies. For insurance and pension flows, unclassified reported Other Sector flows data are classified under OFCs based on classification of most reporting economies.

Computing missing values from average sectoral weights of missing sectors

Next, on data computation, for cases when values for two or more sectors are missing, data are calculated by multiplying the reported total flows by the average sectoral weight(s) of the missing sector(s). Similarly, for years with missing Other Sector breakdown between NFC and OFC sectors, values for either NFCs or OFCs are derived by multiplying the reported Other Sector flows by the average sectoral weight for the missing sector. Values for the remaining missing sector are then computed as the difference between the value for reported Other Sector flows and the computed value for NFC or OFC flows. In both cases, the average sectoral weights are derived as the share of reported sectoral holding to total holdings.

For portfolio flows, the weights are primarily derived from the IMF's International Investment Position (IIP), then the IMF's Coordinated Portfolio Investment Survey (CPIS) where IIP data is not available, in that order. For other investment flows, weights were taken from IIP and then Bank for International Settlements Locational Banking Statistics (BIS LBS). The use of IIP sectoral breakdown is the preferred data source because it is the stock equivalent of the Financial Account Balance of the BoP Statistics. Among the sources, LBS is used last as the data pertains to banking sector counterparty data only⁸.

Among the different types of capital flows, sectoral breakdowns of direct investment and foreign direct investment are most difficult to compute. Unfortunately, the BoP Statistics does not provide a sectoral breakdown for direct investment flows. However, excluding direct investments would provide an incomplete picture of total gross sectoral flows. Instead of assuming that direct investment flows are all NFC flows as is usually done, this paper seeks to compute a more precise sectoral breakdown, as other sectors like OFCs and BKs also undertake direct investments. Consequently, it classifies sectoral direct investment flows into BKs, NFCs, and OFCs as GG and CB are not expected to undertake direct investments.

The sectoral values for direct investment resident and non-resident flows are calculated based on derived average weights of BK and OFC sectors to total direct investment of an economy. Direct investment weights for BKs and OFCs are derived based on reported stock or flow values on direct investment abroad (assets) and foreign direct investment (liabilities) by economic activity.

For some economies, detailed DI breakdown between BKs and OFCs are reported, in which case the weights for both BKs and OFCs are computed relative to total direct investment abroad and foreign direct investment; while the weights for NFCs are derived as the residual value of shares such that the total of NFC, BK, and OFC shares must sum to one (1). Consequently, NFC sectoral weights refer to

⁸ See Luna and Hardy (2019) for a discussion on BIS LBS sectoral data.

the share of all economic activity excluding financial services to total direct investment abroad or foreign direct investment. Data on direct investment abroad and foreign direct investment by economic industry are sourced from the OECD Foreign Direct Investment Database (FDI positions) and national sources accessed through the CEIC.⁹ For the few remaining economies without industry breakdown on financial services for direct investment abroad and foreign direct investment, sectoral weights for BKs and OFCs are computed as the share of financial services to total direct investments multiplied by the respective shares of BKs and OFCs assets to total domestic financial system assets. These shares are derived using their respective asset holdings to total domestic financial system assets as reported by the IMF's Financial System Stability Assessment (FSSA) country reports for available years.

Average sectoral weights are used instead of annual (time-varying) weights to smoothen sharp fluctuations in weights (especially for weights based on flows data such as the case for some of our direct investment flows).¹⁰ In addition, the computed sectoral flows, based on average weights, are interpreted as "expected" sectoral flows, which can be viewed as "*how much a sector is expected to invest or borrow from abroad over time*". The practical choice of using average weights is also driven by data constraints. For instance, sectoral holdings data from BIS LBS, which is used for other investment flows, are only available for 2013-2018. For instance, average weights from 2013-18 were used to classify values for NFCs and OFCs for 2000-12. OECD sectoral FDI positions are also patchy for many countries in many of the years. Although the composition of sectoral financial holdings changes over time, we believe that average weights provide the best option in the context of scarce and uneven annual sectoral data. Consequently, the average weights computed here provide the best available estimate of which of the sectors are "expected" to receive more and less flows.¹¹

To complete the dataset, we classify official reserve assets as belonging to CB and other equity flows are assumed to fall under GG as it includes transactions pertaining to quasi-corporations and international institutions. Data on financial derivatives are mostly reported in net asset basis, hence they are excluded from the dataset. All reported zero values are included in the dataset. But for filled-in and computed sectoral flows, missing values are not left blank, i.e., not replaced by zero values.

Finalising the sectoral capital flow dataset

After compiling sectoral flows for each financial account component, data are then added by sector, yielding total sectoral capital flows, which includes all types of investments. The final sectoral capital flows dataset runs from 2000 to 2018 for over 41 economies for resident sectoral flows and 64 economies for non-resident sectoral flows. The difference between the number of economies for resident and non-resident flows is due to fact that some economies do not have reported breakdowns of direct investment abroad by economic activity. Consequently, these economies are excluded from the sample, yielding only 41 economies for resident sectoral flows.

The final sectoral capital flows dataset comprises 73% of reported values, 7% of filled-in values, and 20% of computed (expected) values across five sectors and different types of investment flows.¹²

⁹ Such data sources classify direct investment by economic activity according to the ISIC classification (International Standard Industrial Classification of All Economic Activities). This paper maps this classification into the BoP sectoral breakdown that is available for portfolio and other flows: namely, banking sector (BK) are activities engaged in monetary intermediation, while non-bank financial corporate (OFC) are those for insurance and pension funds, trust funds, and holding companies.

¹⁰ Sectoral weights are averaged from all available annual data from 2000-18.

¹¹ Sensitivity tests are conducted by dropping 8 economies whose sectoral flows are mostly derived values. Our baseline results hold. Refer to Section 3.3.

¹² See Appendix 1 for data computation summary; and refer to metadata for review.

Sectoral direct investment flows data account for the largest share of computed values, as such breakdown is not reported in IMF BoP statistics.

2.2 Sectoral flows stylised facts

Using the sectoral capital flows dataset, this section presents several stylised facts. Figures 1 and 2 show sectoral resident and non-resident flows, respectively. Both figures document the dramatic rise and fall of banking sector (BK) flows around the global financial crisis of 2008-09. Moreover, the figures show that the banking sector has not fully recovered in the years that followed, consistent with McCauley et al. (2019) and McQuade and Schmitz (2017). Figure 1 also indicates the growing importance of resident OFC flows. In fact, for 2017-18, resident OFC flows dominate resident flows, outpacing NFCs and consistent with the substantial reduction in outward investment restrictions for OFCs, notably in advanced economies.¹³ Nonetheless, flows to NFCs remain the largest sectoral inflows since 2008. These global trends closely follow those of advanced economies, shown in Figures 3a and 3b, which is not surprising given the volume of AEs cross-border transactions. For emerging economies, resident flows are dominated by BK, NFC, and CB sectors in recent years (Figure 4a).¹⁴ For EM non-resident flows (Figure 4b), inflows to NFCs are the largest, in line with Avdjiev et al. (2014), followed by non-resident BK flows.

Table 1 presents summary statistics of sectoral flows. For total sectoral flows, both NFC and OFC resident flows register the largest flows of more than US\$25 billion, on average, while NFC and BK sectors have the largest non-resident total flows of more than US\$15 billion, on average. In terms of volatility, BK and OFC flows are the most volatile for outflows, while BK sector flows are the most volatile for inflows. Splitting by periods, this highlights the significant reversal of BK and OFC resident and non-resident sectoral flows in the crisis years of 2008-09. But of interest is the resilience of NFC resident and non-resident sectoral flows across periods. Non-resident GG flows jumped from around US\$7 billion, on average, in the period crisis period to around US\$10 billion, on average, in the crisis and post-crisis period, suggesting increasing public sector debt. In terms of volatility, BK sector flow variability has dropped significantly from the pre-crisis years to post-crisis period.

These stylised facts based on the sectoral capital flows data confirm the general patterns of gross capital flows highlighted in past research (Milesi-Ferretti and Tille 2011; McQuade and Schmitz 2017). BK sector flows account for the huge rise of gross flows pre-GFC; their subsequent drop during the GFC; and for the tepid flows post-GFC. NFC flows have been rising, especially in EMEs while inflows to GG have also risen. BK sector flows have traditionally been the most volatile, particularly in the pre- and crisis years. What is new in the stylised facts is that these sectoral flows now include all types of capital flows. More importantly, they document and quantify the growing importance of resident OFC sector flows, especially in advanced economies.

¹³ See Appendix 2 for country list and classification.

¹⁴ Resident sectoral flows for emerging economies exclude Brazil, China, Indonesia, and Russia, which are large emerging economies, due to data unavailability for sectoral direct investment flows.

3. Sectoral capital flows covariates

3.1 Motivation

Capital flows are driven by push and pull factors. Existing studies on capital flows have tested the relevance of these two factors in determining the magnitude and volatilities of capital inflows and their components; the occurrence of sudden stops and surges; the size of capital flows during extreme episodes, and the proportion of variance attributed to each of these factors.¹⁵ The use of the push and pull framework as an analytical tool in understanding the covariates of capital flows has important policy implications. If push factors are more relevant, policymakers have little control over capital flows and hence, they must rely on domestic financial resilience to counter the adverse consequences of huge and volatile capital inflows. On the other hand, if pull factors are more relevant, policymakers have more levers to influence the size, composition, and volatility of cross-border financial inflows.

Empirical studies provide strong evidence for the relevance of push or global factors such as global or advanced economy output growth, global interest rates, global commodity price levels, global liquidity and global investor risk aversion.¹⁶ More recent papers propose that global factors that drive capital flows relate to financial conditions in advanced economies. Financial conditions in advanced economies impact risk aversion and uncertainty, leading to co-movements in capital flows and asset prices, constituting a global financial cycle (Rey, 2016, 2013). Yet most studies also highlight the importance of pull or domestic factors. Strong output growth, lower macroeconomic risks, trade and financial openness, quality of governance, and financial depth of receiving economies are associated with *larger capital inflows*.¹⁷ Of importance is the significance of domestic growth on gross flows as it suggest cyclicity of capital flows in relation to domestic output. If the domestic growth and capital inflows are procyclical, then this may exacerbate financial fragilities and may lead to financial instability. For instance, strong domestic growth may lead to larger external borrowings of BK and NFC sectors. On

¹⁵ Refer to Ahmed and Zlate (2014), Byrne and Fiess (2016), Fratzscher (2012), Mercado and Park (2011), Milesi-Ferretti and Tille (2011), and Wang (2018) on the size or magnitude of capital flows; Calderon and Kubota (2013), Cavallo and Frankel (2008), Forbes and Warnock (2012), and Reinhart and Reinhart (2009) on the occurrence of sudden stops and/or surges; Ghosh et al. (2014), Li et al. (2018) and Mercado (2018) on the occurrence of surges and associated magnitude of capital flows; Calvo et al. (1993) on global factor principal component analysis; and Cerutti et al. (2019), Chohan et al. (1998), Puy (2016), Sarno et al. (2016), and Shirota (2015) on variance decompositions of global and domestic factors.

¹⁶ Higher global growth is significantly correlated with higher inflows in EMs (Li et al., 2018), while higher global interest rate is strongly associated with lower capital inflows to emerging economies (Byrne and Fiess, 2016; Giordani et al., 2017; Ghosh et al., 2014; Li et al., 2018; and Mercado, 2018). Higher commodity prices tend to increase capital inflows to emerging/developing economies (Byrne and Fiess, 2016; Mercado, 2018; Reinhart and Reinhart, 2008). Higher global risk aversion leads to reversals of inflows, more so during periods of financial stress (Ahmed and Zlate, 2014; Fratzscher, 2012; Ghosh et al., 2014; and Giordani et al., 2017).

¹⁷ Higher domestic growth signifies higher potential profits (Giordani et al., 2017; Mercado and Park, 2011). Lower or stable inflation signals macroeconomic policy stability, while higher domestic interest rate, relative to world or foreign interest rate, relates to higher expected returns (Li et al., 2018). Byrne and Fiess (2016), Ghosh et al. (2014), Mercado and Park (2011) and Mercado (2018) also affirm the importance of trade and financial openness, governance, and financial depth.

the other hand, gross flows and domestic growth may be countercyclical as growth slows, since economic sectors may borrow more abroad, leading to large gross inflows.

This section aims to assess the significance of capital flow covariates, with emphasis on global financial conditions and domestic output growth, considering total gross flows from a sectoral angle. Avdjiev et al. (2018) found evidence that adverse change in global financial conditions led to decline in inflows to banks and corporates, while domestic banks and corporates invest less abroad, decreasing their outflows. The next section undertakes a similar empirical analysis extending the results from debt flows to total sectoral flows (particularly important in the case of emerging economies which receives FDI flows), as well as providing a finer sectoral classification that includes OFCs, which may react very differently than NFC.¹⁸ Specifically, this section asks: 1) *are sectoral flows responsive to global financial conditions*; and, 2) *are sectoral flows procyclical, countercyclical or acyclical to domestic output growth*? Considering the responsiveness of sectoral resident and non-resident flows to a common set of push and pull covariates allows us to highlight common or differing sensitivities for the CB, GG, BK, NFC, and OFC sectors.

3.2 Empirical specification of sectoral flow covariates

To address the questions, this section considers a common set of covariates and assess their significance on sectoral capital flows. Specifically, it estimates:

$$CF_{i,j,t} = \alpha + X_t^G \beta' + X_{i,t}^D \gamma' + \varepsilon_{i,j,t} \quad (\text{Equation 1})$$

where CF refers to resident and non-resident sectoral flows of country *i*, sector *j*, and time *t* in percent of nominal GDP. *X* pertains to row vector of contemporaneous global (G) and domestic (D) covariates. For global factors, the equation includes global growth, global liquidity, global risk aversion, and global commodity price.¹⁹ These global factors are included in the empirical specification in their contemporaneous values as capital flows respond instantaneously with global covariates, all the more so as this paper uses annual values (Ghosh et al., 2014; Mercado, 2018). On the other hand, domestic GDP growth is lagged by one year. Equation 1 is estimated with country-fixed effects to account for unobserved heterogeneities, and robust standard errors clustered at country level are used. The estimation involves annual values from 2000-18. Table 2 presents the summary statistics of resident and non-resident sectoral flows in percent of GDP and global and domestic covariates.

3.3 Sectoral flow covariates results

Table 3 presents the covariates of resident and non-resident sectoral flows. Several key findings are noted. Regarding domestic conditions, while inflows to all different private sectors are positively associated with domestic GDP growth, results are that domestic GDP growth is procyclical with resident BK flows but countercyclical with resident OFC flows. The latter result is consistent with the theory given that stronger domestic growth should encourage investment, pension, and insurance funds to invest more in the domestic market. It is also countercyclical with non-resident GG flows, consistent with Alfaro et al. (2014) but uncovering that this is driven by governments and not central banks.

¹⁸ In most sectoral flow work, OFC and NFC sectors are grouped as “corporate sector”.

¹⁹ Global GDP growth and domestic GDP growth are year-on-year change in percentage terms. Global liquidity, global risk aversion, and global commodity price are indices. Sensitivity tests are run using growth rates for global liquidity and global commodity price. Refer to Appendix 3 for data definitions and sources.

Regarding the responsiveness to global conditions, results confirm previous findings showing that private sectors generally receive more inflows and increase investment abroad during global expansions. Higher global liquidity is positively associated with private sector inflows and outflows for all private sectors (BK, NFC, and OFC). This notwithstanding, risk aversion (VIX) does not appear a significant driver of flows to and from NFCs. In addition, unlike OFCs and BKs, resident and non-resident NFC flows are positively linked to global commodity prices. International investors thus seem to shift investment away from financial sectors to NFCs during global commodity booms.

These findings hold in several sensitivity tests, including 1) removing 8 economies whose sectoral flows data had significantly more computed values to check whether the baseline findings are sensitive to the computation methodology; 2) adding lagged sectoral flows in each specification to account for capital flows persistence; 3) using lagged global factors; 4) using unclustered robust standard errors; 5) adding additional global and domestic covariates; 6) winsorising resident and non-resident sectoral flows at the top and bottom 10%; 7) replacing VIX with risk premia; 8) using global liquidity growth, instead of levels; and 9) including domestic macroeconomic volatility in the baseline specification.²⁰

Aside from the baseline results and sensitivity tests, several extensions are conducted. First, splitting the sample into advanced and emerging economies reveals the baseline results are driven by advanced economies (Table 4). For emerging economies, few covariates are significant (Table 5). But the negative association between OFC outflows and domestic GDP growth, the countercyclical role of inflows to governments, and the importance of global commodity prices for NFCs are also confirmed in EMEs. Second, the sample is split into equity and debt flows, where equity flows include direct and portfolio equity, and debt flows are portfolio debt and loans. For equity flows, higher global liquidity is positively associated with higher private sector resident and non-resident sectoral flows, while some sectors are responsive to global risk aversion (Table 6). For debt flows, resident and non-resident private sector flows are responsive to global liquidity conditions, but less so for global risk aversion (Table 7). For non-resident debt flows, there is a clear distinction between private and public sector cyclicalities with domestic GDP growth. Lastly, the sample is also split between pre-GFC (2000-07) and post-GFC (2010-18) periods to assess changes in covariates. These results indicate that post-GFC sectoral flows were less responsive to global covariates, in contrast to pre-GFC period, consistent with Forbes and Warnock (2020)²¹.

In summary, this section illustrates resident and non-resident sector flow heterogeneities in responses to global and domestic covariates. Private sectors generally receive more inflows and increase investment abroad during global expansions; but NFC flows do not respond to global risk aversion while responding to global commodity prices. Regarding the procyclicality to the domestic business cycle, while inflows to all private sectors increase with domestic GDP growth, inflows to governments decrease and OFCs reduce their foreign investments and when the domestic economy expands.

²⁰ Results available upon request.

²¹ Results available upon request.

4. Sectoral flows co-movements

4.1 Theoretical and empirical motivation

Results in the previous section already anticipate potential co-movements between sectoral inflows and outflows, as they show that some covariates are driving resident and non-resident flows in the same direction. This section thus seeks to more formally analyse co-movements in sectoral flows. Real business cycle models predict that higher productivity raises expected returns, leading to higher non-resident inflows but lower resident outflows. Under the same framework, higher perceived riskiness of domestic asset returns leads to a decline in non-resident inflows but an increase in gross outflows. Hence, resident and non-resident gross capital flows are expected to be negatively correlated. But existing studies show an increasingly positive correlation between resident and non-resident flows (Broner et al., 2013). This raises a puzzle to which more recent theoretical and empirical work have tried to provide answers.²² The positive correlation between gross inflows and outflows may raise concerns as it can reinforce global imbalances, especially if they are attributed to financial frictions and asymmetries between economies (Broner et al., 2013; Tille and van Wincoop, 2010).²³

While most studies on the correlation between gross inflows and gross outflows focus on aggregate flows data, several recent papers have analysed these correlations through a sectoral lens. Davis and van Wincoop (2018) suggest that when capital inflows lead to an accumulation of official reserves, this may be combined with official reserve outflows, thereby reinforcing a positive correlation, especially for emerging economies. Davis (2015) proposes that the positive correlation may be driven by bank liquidity management where banks reduce their outward investment to manage liquidity shortfalls when faced with lower non-resident inflows. Using sectoral debt flow data, Avdjiev et al. (2018) find that, while a positive correlation is seen for all cross-sector combinations, the size of the correlation for banking sector flows is by far the most important, particularly in advanced economies. On the conceptual side, recent work by Kumhof et al (2020) argues that gross inflows and outflows are necessarily correlated from an accounting perspective, as all financial transactions are settled through opposite flows in the banking system, potentially explaining the centrality of banks found in Avdjiev et al. (2018).

This section contributes to the literature on correlations or co-movements between resident and non-resident total sectoral flows. Specifically, it asks: *which resident and non-resident total sectoral flows exhibit positive correlation?* Again, the aim is to deepen existing evidence through a finer sectoral

²² Broner et al. (2013) emphasize that the positive correlation between capital inflows and outflows may be attributed to asymmetries between economies. Tille and Van Wincoop (2010) develop a model which shows capital inflows and outflows are positively correlated due to different optimal hedging of resident and non-resident investors against inflation or future expected returns or non-asset income. Davis and van Wincoop (2018) provide empirical evidence on the role of financial globalisation in explaining observed positive correlation.

²³ Hnatkovska (2010) and Tille and van Wincoop (2010) argue that positive correlation may arise from productivity shocks even without financial frictions.

classification and by covering total capital flows.²⁴ Finally, it provides empirical tests of some of the channels, which drive the underlying correlations in light with insights from the covariates analysis.

4.2 Empirical specification of sectoral flows co-movement

This section considers sectoral correlations between resident and non-resident total sectoral flows. It estimates the contemporaneous conditional correlations based on the following equation:

$$CF_{i,j,t} = \alpha + X_t^G \beta' + X_{i,t}^D \gamma' + SCF_{i,j,t} \delta' + \varepsilon_{i,j,t} \quad (\text{Equation 2})$$

where CF refers to sectoral flows of country *i*, sector *j*, and time *t* in percent of nominal GDP. *X* pertains to the row vector of contemporaneous global (G) and domestic (D) covariates as discussed in Section 3. SCF is the row vector of other sectoral flows of country *i* at time *t*. Resident (non-resident) sectoral flows are regressed on non-resident (resident) sectoral flows. If the estimated coefficients are positive and significant, then this confirms which sectors may explain positive correlations between gross non-resident and resident flows.

The estimated coefficients for Equation 2 thus pertain to conditional correlations. They are conditional on given values of global and domestic factors as well as other sectoral flows. Using simple pairwise correlations may overestimate the magnitude and significance of conditional correlations. Hence, the inclusion of other sectoral flows in the conditional correlations is warranted. The estimation involves annual values from 2000-18; and robust standard errors clustered at the country level are used.

4.3 Resident and non-resident sectoral flow correlations

Table 8 presents the sectoral correlations between resident and non-resident flows. First, same sector resident and non-resident flows are significantly and positively correlated. This observation is true for all sectors, including CB and GG. It implies that intra-sectoral flows are an important driver of the positive correlation between gross inflows and outflows, consistent with Davis and van Wincoop (2018) on CB flows and Davis (2015) on BK sector flows. Second, resident NFC and OFC sectoral flows positively co-move with non-resident NFC and OFC flows and conversely. Non-resident BK and OFC flows positively co-move with resident BK and OFC flows. Interestingly, resident and non-resident NFC and BK flows do not display significant co-movements. Thus, the OFC sector appears crucial in driving co-movements in private sector resident and non-resident flows.

The positive sectoral correlations between sectoral gross inflows and outflows hold in advanced economies, and to a lesser extent for emerging economies.²⁵ Going deeper by distinguishing equity and debt flows, it is equity flows and in particular OFC equity flows which seem to be driving these private sector co-movements, implying the importance of considering equity flows in assessing capital flows correlations.²⁶

Taken together, the observed positive correlation between gross inflows and outflows is mainly driven by 1) intra-sectoral flows; 2) OFC flows co-movements with other private sectors; and, 3) equity flows.

²⁴ The empirical analysis is extended by considering equity and debt sectoral correlations separately with the aim of contrasting our results with previous papers.

²⁵ Results available upon request.

²⁶ Results available upon request.

4.4 Global factors and correlations of sectoral resident and non-resident flows

Given that global covariates, such as global liquidity and risk aversion, are significantly correlated with both resident and non-resident sectoral flows, we assess whether changes in global risk aversion exacerbates the positive co-movement between resident and non-resident sectoral flows. We address this extension by including an interaction term between sectoral flows and VIX. We plot in Figures 5a-5e the marginal effects of sectoral flow X on sectoral flow Y conditional on the level of the VIX.²⁷ To save space, we only display significant interaction terms and focus on the most significant patterns raised above.

First, the VIX has, as we expected, a significant impact on intra-sectoral resident and non-resident co-movements, but its impact is surprisingly heterogeneous across sectors. Higher risk aversion increases the intra-sectoral correlations of both OFC and NFC flows (Figures 5a and 5b). In contrast, higher risk aversion decreases intra-sectoral correlations of resident and non-resident BK flows (Figure 5c). While the VIX is negatively associated with bank inflows and outflows, a higher VIX mitigates the synchronisation between such inflows and outflows for banks, while in the case of OFCs and NFCs, it increases it – OFCs and NFCs cut investment abroad while receiving less inflows.

Second, higher global risk aversion significantly affects other resident and non-resident sectoral correlations. Higher risk aversion increases the correlation between resident BK flows and non-resident GG flows; and lower correlation between non-resident BK flows and resident NFC flows, even turning negative as resident and non-resident investors behave asymmetrically at high levels of uncertainty (Figures 5d and 5e).

In this section, we again highlight that the significance and strength of the positive co-movement between gross inflows and outflows appear heterogeneous across sectors, country income groups, and equity and debt splits. Unlike in previous studies, this section highlights the contribution of OFC sectoral flows as well as intra-sectoral resident and non-resident flows in driving the positive correlations. Finally, we point to the role of global risk aversion in driving these correlations, mitigating BK inflow-outflow correlation while increasing it for OFC and NFC.

²⁷ Marginal plots are presented instead of the regression results, as the interaction terms are both continuous variables. Hence, the marginal analysis is more relevant in the discussion of results.

5. Sectoral flows and capital controls

5.1 Empirical motivation

A third research area where a sectoral approach may provide new insights is on capital controls and their effectiveness. The effectiveness of capital controls remains an unsettled question despite decades of empirical work. The literature traditionally finds that capital controls have no impact on the volume of inflows but may affect the composition of inflows, e.g., shift inflows from short-term towards longer maturity instruments. More recent work using new methodologies and more refined capital controls data still finds no impact on capital flows (Forbes et al., 2016) or at best a temporary one (Baba and Kokenyne, 2011; Pasricha et al., 2018). Some works find limited impact on a cumulative basis and in the specific post-GFC period (Ahmed and Zlate, 2014). The recent literature has thus shifted to an assessment of the impact of capital controls on other variables than flows, notably in the context of a broader discussion on the prudential role of controls.²⁸ On the other hand, empirical evidence on capital controls for outflows remain sparse and also point to limited effectiveness with the exception of Malaysia (Magud and Reinhart, 2006) or when supported by strong fundamentals and institutions, and if existing restrictions are already comprehensive (Saborowski et al., 2014).

In this section, we complement recent work attempting to disaggregate capital flows and capital controls to yield more targeted results (Lepers and Mehigan, 2019). Specifically, we extend the analysis by looking into the effectiveness of tighter sectoral controls in reducing sectoral flows. The approach of this paper differs from previous studies which considered aggregate or instrument-based capital control measures.

A shift to a sectoral approach is neither obvious nor trivial. After all, controls are usually applied to specific transactions rather than specific sectors. Hence, all capital controls classifications to date have taken, if any, an instrument-based approach (Fernández et al., 2015; Lepers and Mehigan, 2019; Pasricha et al., 2018). But a more detailed look at controls themselves reveal the usefulness of a sectoral approach.

First, perhaps most clear-cut is the case of outward controls on domestic financial institutions, where the sector and not the transaction is the prime feature of the control. In many countries, banks, insurers, pension funds, and investment funds are subject to dedicated limits on their foreign assets as percentage of their equity or technical reserves in the case of insurers and pension funds. These institutions are engaged in different business activities and are usually supervised by different regulators, which explain to a large extent the existence of sector-specific controls. Horizontal limits on the foreign assets of banks have, however, become less common. For instance, no OECD country currently maintains such limits (OECD, 2019a). Limits on foreign assets of insurers were also

²⁸ The findings in this literature are also mixed. Forbes et al. (2015) finds no impact of capital controls on exchange rate, inflation, equity indices, different volatilities, and interest rate differential, while Ostry et al. (2012) find that controls are associated with lower share of FX lending and lower share of portfolio debt in external liabilities. Pasricha et al. (2018) show that controls lead to increased monetary policy autonomy. In the specific case of Brazil, Chamon and Garcia (2016) find that the controls generally had some impact on the spread between onshore and offshore dollar interest rates but no significant effect on exchange rate appreciation. Alfaro et al. (2014) use firm level data point to the negative microeconomic impact of controls such as harder access to funding for firms that depend on external finance, typically for small and medium sized firms.

dismantled in many countries, as most regulators and supervisors decided to move to risk-based rather than residency-based approaches (OECD, 2015). This is notably the case under the Solvency II framework of the European Union. Limits on pension fund investments abroad are more frequent, although gradually reduced in many countries, as highlighted by the OECD annual survey on investment regulation of pension funds (OECD, 2019b). The problem of classifying such controls in traditional instrument-based approaches is that these controls are horizontal, applying in most cases to all foreign assets of an institution. This concern is recognised by the IMF's AREAER, which dedicates a separate section to such controls (XII. Provisions Specific to the Financial Sector), and which most capital control datasets decide not to include. As these represent the bulk of outward controls, a sectoral approach thus appears appropriate.

Second, another straightforward application of a sector classification on the inflow side concerns FDI and equity. FDI restrictions are largely sectoral by nature, such that foreigners are allowed to invest in certain sectors but not in others, or under certain equity limits, as shown for instance in the OECD FDI Restrictiveness Index, which provides a split along 22 economic sectors. But other controls also lend themselves naturally to a sectoral classification. Many controls apply to natural persons, some controls are specific to the banking sector in the case of credit intermediation, while many other controls, such as on external borrowing, are also specific to certain types of corporates.²⁹ For these reasons, considering the effectiveness of sector-specific capital controls on sectoral flows is warranted.

Therefore, this section looks at the impact of controls imposed on a given sector on corresponding resident and non-resident sectoral flows. It is expected that the more restrictions are imposed on a sector, the lower the volume of gross sectoral flows. This research question is relevant for emerging economies as capital controls may, in certain cases, be found useful in addressing capital flow surges and sudden stops. Hence, the focus of this analysis is on emerging economies; and on tightening measures, as opposed to easing or liberalising restrictions. The focus is limited here to BK, NFC, and OFC sectors as these sectors are those that are most likely affected by capital control measures.

5.2 Sectoral CFMs and stylised facts

Datasets on capital controls have evolved significantly and improved in recent years. While initial datasets were aggregate indices based on a small set of binary dummies (Chinn and Ito, 2006) or later on the absence or presence of controls per instrument (Fernández et al., 2015), recent efforts have sought to move beyond indices based on the presence/absence of restrictions to capture both the extensive and intensive margins of controls, i.e., the introduction and removal of restrictions and the tightening or easing of existing measures (Lepers and Mehigan, 2019; Pasricha et al., 2018). These datasets capture the dynamic aspect of capital account liberalisation while accounting for the intensity of measures.

The dataset of Lepers and Mehigan (2019) provides the most comprehensive data on capital control adjustments with over 2,300 adjustments for a set of 51 economies since 1999. The data is mainly sourced from the yearly changes in restrictions of the IMF's AREAER reports.³⁰ It is then complemented

²⁹ To name a few examples: India increased at several occasions quantitative limits on foreign borrowing ("ECB" program: External Commercial Borrowing) by specific sectors (e.g. infrastructure, manufacturing etc). South Africa allowed in 2014 subject to authorisation primary listing abroad and foreign borrowing for technology, media, and telecommunication companies. Indonesia required in 2015 that nonbank corporates which borrow abroad hedge 25% of their net offshore liabilities through domestic banks. Slovenia in 1999 restricted the purchase abroad of certain shares by residents other than banks, investment funds and insurance companies.

³⁰ More specifically, the dataset includes restrictions specified in "Section XI: Capital Transactions" of the IMF AREAER reports which provide qualitative information on every policy change classified by the type of investments affected, including capital and money market instruments, derivatives, credit operations, direct investment, as well

with additional sources, notably public and internal OECD reports in the context of the *OECD Capital Movements Code* mapping restrictions on cross-border transactions for the Code's adherents, as well as data from the *OECD Survey on Investment Regulations of Pension Funds* and similar surveys covering the insurance sector. The textual description of the policy change is then transformed into numerical format and classified at a granular level—by inflow/outflow and by asset category.

This dataset is used as a starting point and reclassify each of the policy adjustment along sectoral lines, i.e., whether they apply to the BK, NFC or OFC sector or a combination thereof. To match our sectoral flow data, the classification is made based on the resident sector, i.e., the investor sector for outflow controls and investee sector for inflow controls.³¹ The resulting capital controls dataset is available at daily frequency and aggregated at annual frequency. The number of capital control adjustments is summed up in each year within each sectoral control category for each country. The final annual sectoral capital controls dataset pertains to the count values of capital control adjustments.

Table 9 presents the number of capital control adjustments broken down by sectors and key instrument for all economies included in the capital controls dataset.³² While the number of BK and NFC controls for resident and non-resident flows appear to be in the same range, controls on resident OFC portfolio equity, portfolio debt and collective investment security are larger. Controls on direct investment are less frequent, while credit controls are (unsurprisingly) applied more to the BK sector. Figures 6a and 6b plot yearly adjustments in non-resident and resident sectoral capital controls, from 2000 onwards; while Figures 7a and 7b plot the cumulative adjustment in capital controls from 2000 onwards for resident and non-residents, respectively.

Several patterns stand out. First, the figures capture the well-known continuous trend of capital account liberalisation in most countries over the last two decades. For controls on resident flows, the OFC sector has clearly been most liberalised, reflecting the dismantling, described above, of limits on foreign assets by insurers and pension funds. For controls on non-resident flows, the NFC sector has seen more liberalisation. Overall, restrictions on banks have been liberalised relatively less, partly due to higher initial openness in 2000. Second, the cumulative measures indicate a temporary stagnation, post-GFC, of the liberalisation of resident flows and a temporary reversal of the liberalisation of non-resident flows. Controls on non-resident flows have been used in the post-GFC period in the context of surges in emerging economies that experienced surges. Controls on resident flows were reintroduced slightly later in 2011-15, in response to deepening financial turbulence in certain countries like Greece and Iceland. From a sectoral perspective, controls on non-resident flows mostly targeted BKs, and to some extent NFCs, while controls on resident flows mostly applied to OFCs and NFCs.

5.3 Empirical specification

To test the effectiveness of capital controls from a sectoral perspective, a policy variable capturing the changes in sectoral capital controls in country i in year t is added to the baseline specification (Equation 1). Different regressions are run by matching sector-specific flows with their corresponding sector-specific controls. For instance, BK non-resident flows are regressed on BK non-resident controls. Specifically, the new equation becomes:

as “Section XII: Provisions Specific to the Financial Sector” which details restrictions specific to a type of financial institution – banks, pension funds, insurance, and funds. All coding rules are discussed in Appendix 4.

³¹ All coding rules are discussed in Appendix 3.

³² Stylised facts are presented for the complete sample of advanced and emerging economies in our capital controls dataset to show global sectoral trends. But the empirical analysis is focused on emerging economies.

$$CF_{i,j,t} = \alpha + X_t^G \beta' + X_{i,t-1}^D \gamma' + \delta Controls_{i,j,t-1} + \varepsilon_{i,j,t} \quad (\text{Equation 3})$$

where CF refers to sectoral resident and non-resident flows of country *i*, sector *j*, and time *t* in percent of nominal GDP. *X* pertains to the row vector of global (G) and domestic (D) covariates, where domestic factors are lagged while global factors are included in their contemporaneous values. CONTROLS are sector *j* specific controls for resident and non-resident flows of country *i* at time *t*-1. They are count variables reflecting the introduction of new restrictions or the tightening of existing ones imposed on a given sector each year. The specification involves annual values from 2000-18 and includes country fixed effects. Robust standard errors clustered at the country level are again used.

The sample includes 23 emerging economies for non-resident flows and 11 emerging economies for resident flows.³³ The focus is narrowed to emerging markets as these economies are more likely to struggle with volatile capital flows and resort more to the use of capital controls. As previously mentioned, only the introduction or tightening of sector-specific capital controls are considered for the empirical analysis.³⁴ Consequently, Equation 3 assesses the effectiveness of tightening actions in reducing sectoral flows and not on the more structural trend of capital account liberalisation.

The capital controls variable is lagged for several reasons. First, lagged regressors limit potential endogeneity issues where capital controls are tightened in reaction to large capital flows. Second, capital flows are expected to react with a lag following policy implementation. Third, most of the tightening adjustments happen in the first half of the year, giving additional motivation to lag the capital controls variable.³⁵

5.4 Results, sensitivity tests, and extensions

Tables 10 and 11 present the results on the effectiveness of sector-specific capital controls on sectoral non-resident and resident flows, respectively. Results present only the estimated coefficients and standard errors of corresponding sector-specific capital controls for BK, NFC, and OFC sectoral flows to save space.³⁶ Two key results stand out. First, controls on inflows to NFCs are associated with lower non-resident flows to NFCs, a result that is statistically significant at the 5% level. This suggests that even though NFCs FDI constitutes a huge share of capital inflows to EMEs, capital controls imposed on other types of NFC investments may reduce the volume of NFC inflows. Second, controls on inflows to OFCs are also associated with lower non-resident flows to OFC, albeit of smaller magnitude and statistically significant at the 10% level. These results are notable in relation to the earlier literature, which usually does not find a significant impact of capital controls in reducing the magnitude of non-resident flows. This suggests the importance of considering the sectoral dimension in assessing the effectiveness of capital controls to complement the use of an instrument-approach. The impact of

³³ The sample for non-resident sectoral flows includes 23 emerging economies, namely: Argentina, Brazil, Bulgaria, Chile, China, Colombia, Croatia, Hungary, India, Indonesia, Malaysia, Mexico, Peru, Philippines, Poland, Romania, Russia, Serbia, South Africa, Thailand, Turkey, Ukraine, and Uruguay. For resident sectoral flows, 11 emerging economies are included, namely: Bulgaria, Chile, Colombia, Croatia, Hungary, India, Malaysia, Poland, Thailand, Turkey, and Ukraine.

³⁴ This is warranted by the fact that this paper is interested in the effectiveness of different tools in mitigating extreme episodes of capital flows, but also from an empirical point of view because easing and tightening adjustments may be expected to have an offsetting impact on sectoral flows.

³⁵ Other empirical studies using quarterly data consider the impact of controls over a four-quarter period. A sensitivity test includes implemented capital controls in the same year to test whether they compact capital flows quickly.

³⁶ Full results available upon request.

controls on inflows to BKs, on the other hand, is negative but statistically insignificant. Table 11 shows that tighter restrictions on resident flows are largely ineffective in lowering corresponding sectoral resident flows, at least in this setting.

One of the main issues plaguing research on capital control effectiveness beyond the (in)appropriateness of capital control data (discussed above) is the issue of endogeneity. This may arise as policymakers may tighten capital controls in response to high capital inflows/outflows. This would lead to downward biases estimates and could lead to coefficients going in the opposite direction (capital controls leading to increasing flows) as well discussed in Erten et al (2019). This concern is addressed by following Ahnert et al. (2020), Auerbach and Gorodnichenko (2013) and Furceri et al. (2018)'s methodology to estimate seemingly "exogenous" policy shocks, thereby removing the potential for endogenous adjustments.³⁷ A two-stage regression framework is thus run: in the first stage, it estimates the likelihood of adjusting capital controls from a range of variables, notably capital flows themselves and the baseline regressors. The first stage highlights the difficulty to predict changes in capital controls with standard macroeconomic variables, in particular, inflow capital controls do not seem to react to the volume of capital inflows, consistent with Pasricha (2017). Among significant factors, higher global liquidity appears associated with tighter controls on inflows to BKs, while higher domestic GDP growth appears associated with tighter controls on inflows to NFCs and OFCs.³⁸

In the second stage, the baseline model is rerun, replacing the capital control variable with the residuals obtained from the first stage (i.e., the variation of the policy changes that is not explained by macro-financial variables). The baseline results hold at similar magnitude and similar significance.

Several tests are conducted to check the consistency of these baseline results. First, regressions are estimated using the standard OLS. Second, sectoral flows data is winsorised.³⁹ Third, a pooled OLS specification is used. Fourth, unclustered robust standard errors are reported. Fifth, contemporaneous controls are added to test the potential impact on capital flows within the same year when the controls are introduced. But there is evidence of a negative impact of lagged NFC controls on contemporaneous NFC flows.

An alternative sector-specific capital controls aggregation method is used to avoid putting too much emphasis on economies that frequently tighten controls but by a small margin. To this aim, the sector-specific control variables are transformed into a binary dummy variable taking the value of 1 if there was tightening of controls and 0 otherwise. While the results on OFC hold and are of much stronger in magnitude, the results for non-resident NFC flows lose statistical significance, albeit with the correct sign. Finally, regressions control for simultaneous adjustment of different sectoral controls within the same year. This will test whether the sectoral results are driven by simultaneous restrictions in other sectors, which may indirectly impact sector specific flows. Again, NFC sectoral controls lose significance while the OFC controls result holds.

Table 11 presents the same results for resident sectoral flows and resident sector-specific controls. The results are almost all insignificant with conflicting signs. The results may be attributed to the fact that tightening resident outward flows has rarely been used by the 11 emerging economies in the sample. Nonetheless, the result on resident OFC flows from the tightening of OFC controls within the same year is negative and significant.

³⁷ Other possible methodologies to account for endogeneity include instrument variable approaches, as done in Ostry et al (2012) but available instruments such as the signature of BITs with the US and EU membership have overall low predictive power on adjustments of controls and hence are weak instruments.

³⁸ Full results of the first and second stages are available upon request.

³⁹ Sectoral flows data are winsorised at the top and bottom 10% of the sample.

Finally, the analysis is extended by considering potential circumvention from capital controls through a sectoral approach. Recent efforts have highlighted geographic and asset spillovers from capital controls. From a lender/investor perspective, investors reallocate lending and investment portfolios to countries that are economically similar or to neighbouring economies (Forbes et al., 2016; Giordani et al., 2017; Gori et al., 2020; Pasricha et al., 2018). But from a domestic perspective, there may also be asset spillovers whereby controls on specific transactions may lead to the build-up of vulnerabilities through other transactions not covered by the control.

For analysing domestic circumvention, a sectoral approach may prove particularly suitable. Recent work on macroprudential policies demonstrate that a macroprudential policy that typically targets banks, shifts the risk to other sectors like shadow banks or foreign bank branches filling in the credit gap (Aiyar et al., 2012) or with NFCs taking on additional currency risks (Ahnert et al., 2018). Other studies show that capital controls are evaded through the operations of multinational affiliates raising money offshore and lending it back to the parent as disguised FDI (Bruno and Shin, 2017b; Caballero et al., 2015).⁴⁰

To test the circumvention of capital controls through sectoral shifts, the baseline estimates are tweaked by regressing NFC+OFC flows on BK controls, BK+OFC flows on NFC controls, and NFC+BK flows on OFC controls. The capital control variables are this time sector specific controls, dropping controls applying simultaneously to other sectors. The estimates for resident and non-resident flows are summarised in Table 12. The results provide no evidence of any circumvention through an increase in flows to other sectors when controls on non-resident flows are tightened. In contrast, tighter controls on resident NFC flows are associated with a strong and significant increase in resident financial sector outflows, pointing to potential circumvention through resident BK and OFC flows. Splitting between BK and OFC flows, this result appears solely driven by BK flows: NFCs outflow controls thus appear circumvented through the banking sector.⁴¹ This result is robust to potential endogeneity using the above-mentioned two stage approach and to replacing the NFC control variable by all NFC controls (including those common to other sectors).⁴²

One possible explanation for why outflow controls and not inflow controls are circumvented through other domestic sectors is that in the case of inflow controls, investors can simply deflect their investment in the same asset class to other neighbours as shown in Gori et al (2020) and to the same sector. There is no such geographic diversification opportunities in the case of outflow controls if the money cannot exit the country – thus providing incentives to exit the money through other sectors.

In summary, this section provides new evidence that tighter capital controls on non-resident flows to NFC and OFC sectors are significantly associated with lower NFC and OFC non-resident sectoral flows. There is no conclusive evidence for BK non-resident controls as well as for resident sector-specific controls. Nonetheless, there is evidence of potential circumvention of tighter controls on resident NFC flows through the resident banking sector.

⁴⁰ This in turn has productivity implications as NFCs may engage in carry trade rather than investing.

⁴¹ Detailed results available upon request.

⁴² These results are available upon request.

6. Concluding remarks

This paper seeks to revisit and deepen the study of capital flow covariates, co-movements, and effectiveness of capital controls by adopting a sectoral approach to these questions. To this aim, it assembles a unique dataset of sectoral capital flows for 64 advanced and emerging economies, from 2000-18, including direct, portfolio, and other investment to and from five sectors: namely, central banks (CB), general government (GG), banks (BKs), non-financial corporates (NFCs) and other financial corporates (OFCs). Secondly, a sectoral capital controls dataset is constructed, classifying adjustments in capital controls along the five sectors studied over the same time.

Armed with data, this paper shows that: first, while global financial cycles and domestic output growth generally drive private sector flows, there are notable differences in the way certain sectoral flows respond to these variables. Second, intra-sectoral co-movement and movements in OFC sectoral flows explain a large part of the observed positive correlation between gross inflows and outflows found in previous studies. Third, the introduction or tightening of capital controls applied to NFCs and OFCs appear effective in reducing capital inflows to these sectors. These results hold across sensitivity tests and extensions.

The findings of this paper highlight the usefulness of a sectoral approach for the understanding of capital flows and raise several implications for researchers and policymakers. Research on capital flow covariates and co-movements must consider potentially divergent sectoral behaviour of sectors. As for policy, this shows that the effectiveness of capital controls may depend on the sector on which they are imposed and that a sectoral lens may also help understand regulatory circumvention⁴³. This is notably of relevance to the ongoing discussion on the appropriateness of macroprudential policy beyond banking (See e.g. ESRB 2016).

⁴³ Only one of the many avenues for circumvention of sectoral capital controls has been explored here, and more research and discussion would be deserved. In particular, the shift from a residency to a nationality approach would prove particularly useful as there is evidence that NFCs raise funds from affiliates abroad when restricted at home (Bruno and Shin, 2017b; Caballero et al., 2015).

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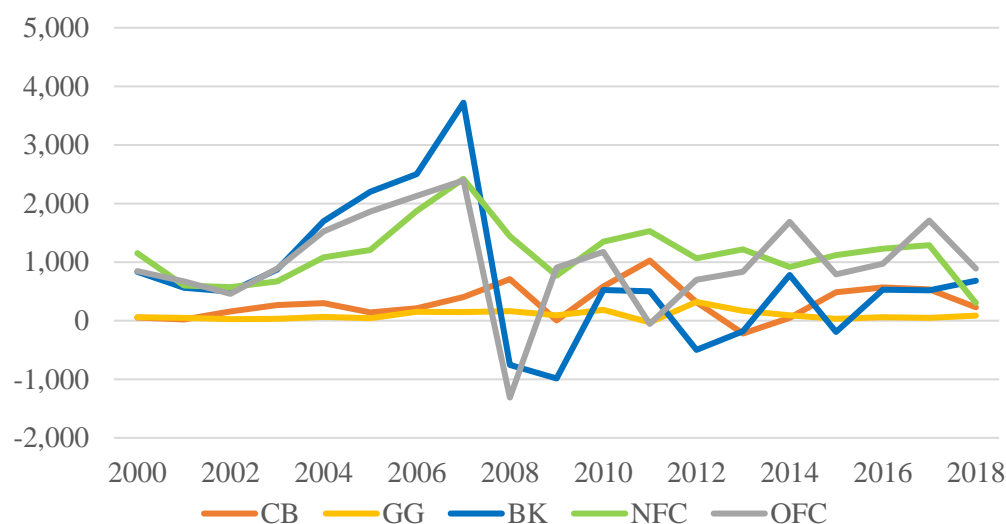
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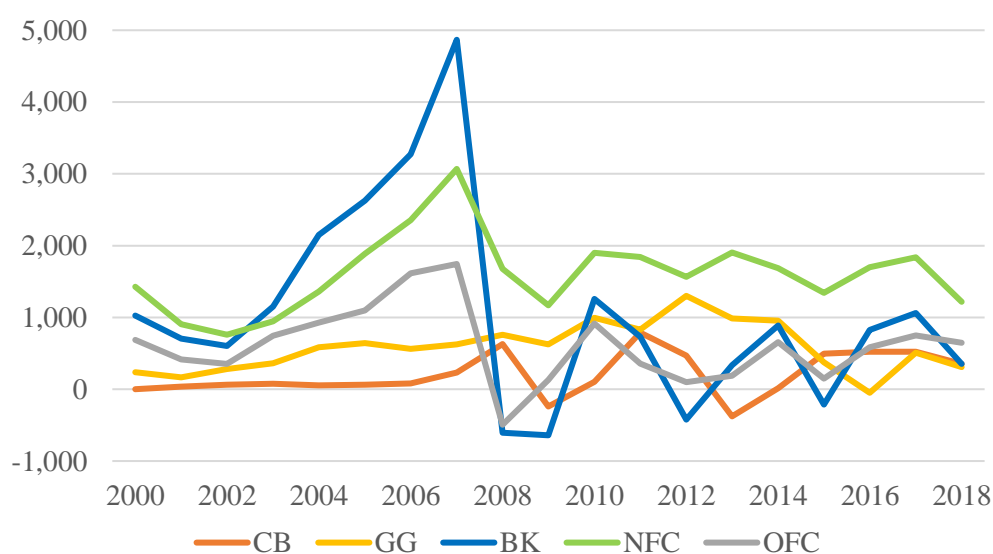
Figures and tables

Figure 1: Sectoral resident flows (US\$ billion)



Notes: Resident sectoral flows are financial account assets of central bank (CB), general government (GG), banks (BK), non-financial corporates (NFC), and other financial corporate (OFC) across types of investments including direct, portfolio, and other investments. Source: Data taken from IMF's Balance of Payments Statistics and authors' computations.

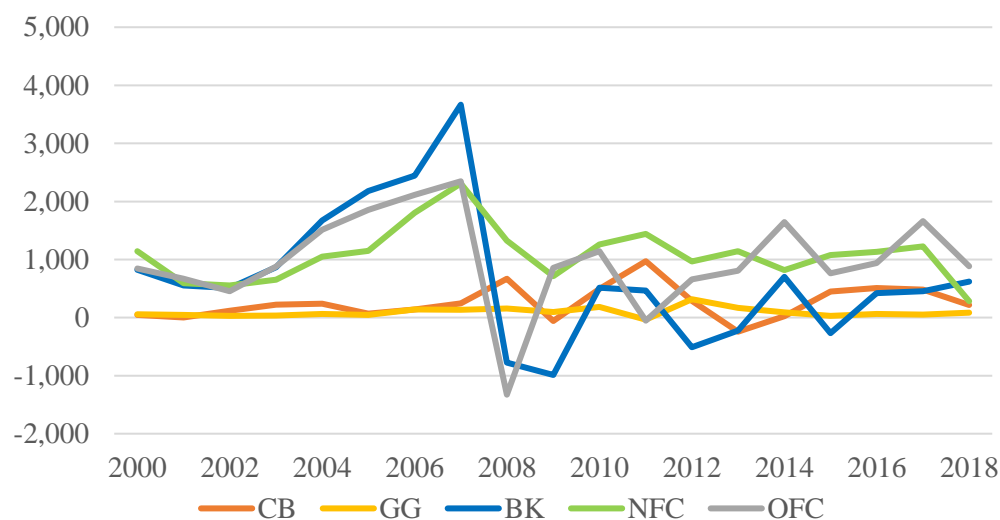
Figure 2: Sectoral non-resident flows (US\$ billion)



Notes: Non-resident sectoral flows are financial account liabilities of central bank (CB), general government (GG), banks (BK), non-financial corporates (NFC), and other financial corporate (OFC) across types of investments including direct, portfolio, and other investments.

Source: Data taken from IMF's Balance of Payments Statistics and authors' computations.

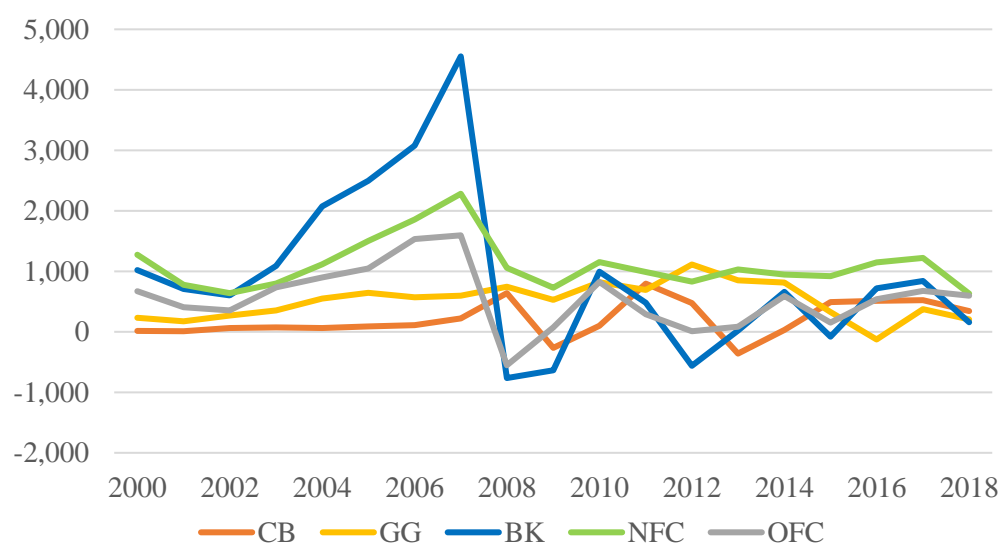
Figure 3a: Sectoral resident flows (US\$ billion), advanced economies



Notes: Resident sectoral flows are financial account assets of central bank (CB), general government (GG), banks (BK), non-financial corporates (NFC), and other financial corporate (OFC) across types of investments including direct, portfolio, and other investments. Refer to Appendix 2 for the list of advanced economies.

Source: Data taken from IMF's Balance of Payments Statistics and authors' computations.

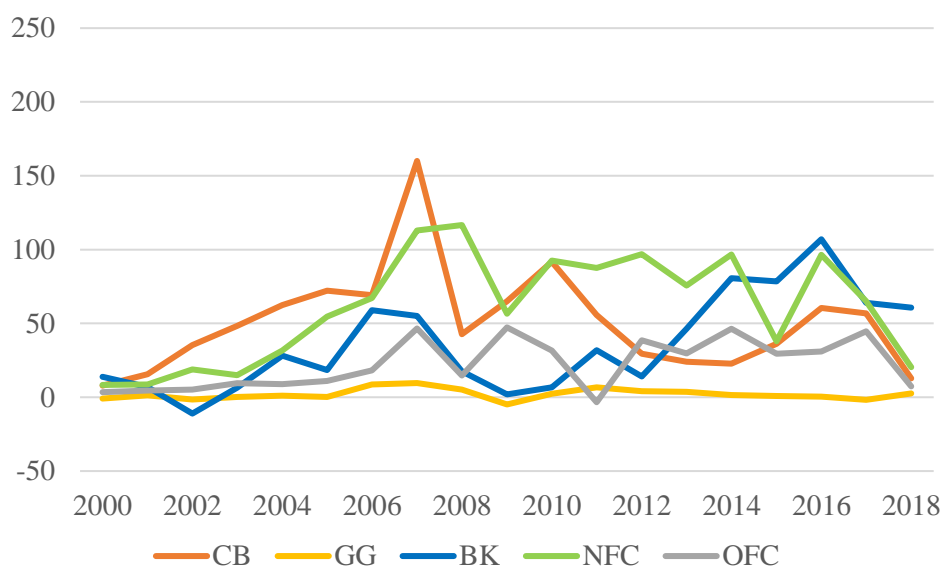
Figure 3b: Sectoral non-resident flows (US\$ billion), advanced economies



Notes: Non-resident sectoral flows are financial account liabilities of central bank (CB), general government (GG), banks (BK), non-financial corporates (NFC), and other financial corporate (OFC) across types of investments including direct, portfolio, and other investments. Refer to Appendix 2 for the list of advanced economies.

Source: Data taken from IMF's Balance of Payments Statistics and authors' computations.

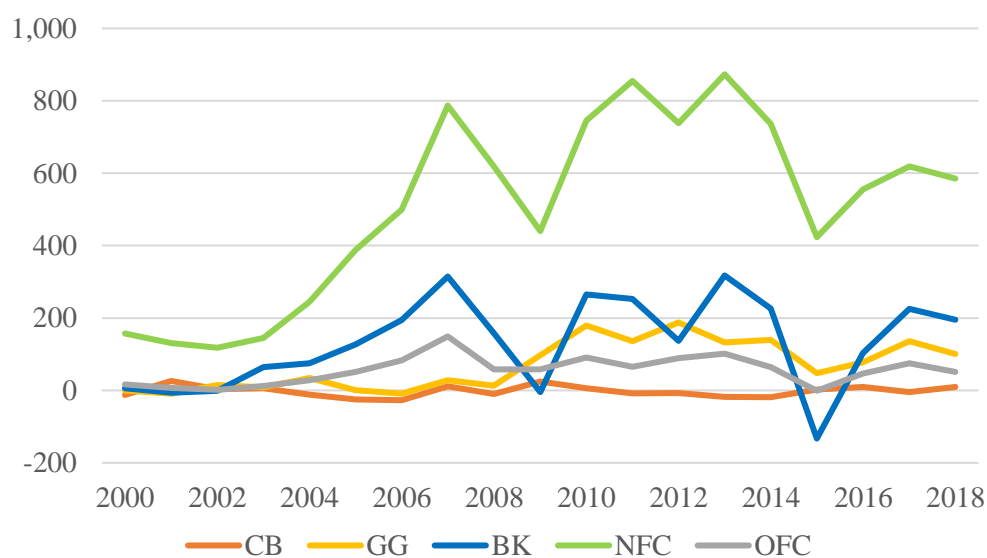
Figure 4a: Sectoral resident flows (US\$ billion), emerging economies



Notes: Resident sectoral flows are financial account liabilities of central bank (CB), general government (GG), banks (BK), non-financial corporates (NFC), and other financial corporate (OFC) across types of investments including direct, portfolio, and other investments. Refer to Appendix 2 for the list of emerging economies.

Source: Data taken from IMF's Balance of Payments Statistics and authors' computations.

Figure 4b: Sectoral non-resident flows (US\$ billion), emerging economies

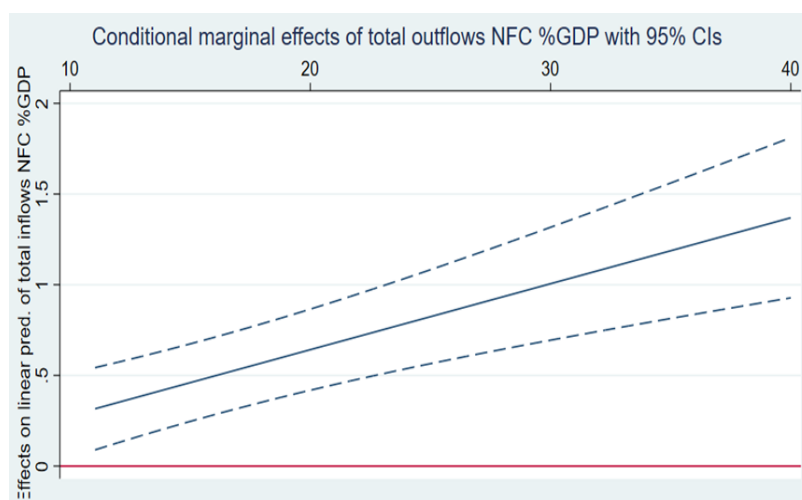


Notes: Non-resident sectoral flows are financial account liabilities of central bank (CB), general government (GG), banks (BK), non-financial corporates (NFC), and other financial corporate (OFC) across types of investments including direct, portfolio, and other investments. Refer to Appendix 2 for the list of emerging economies.

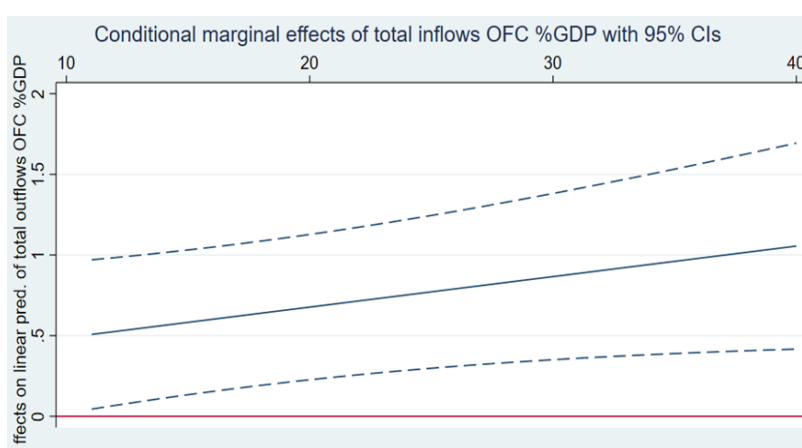
Source: Data taken from IMF's Balance of Payments Statistics and authors' computations.

Figure 5: Conditional marginal effects of sectoral correlations on higher VIX

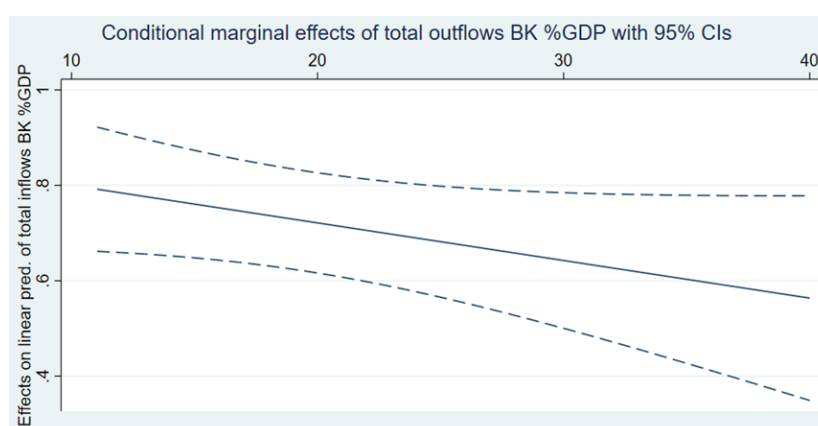
Resident and non-resident NFC flows



Resident and non-resident OFC flows



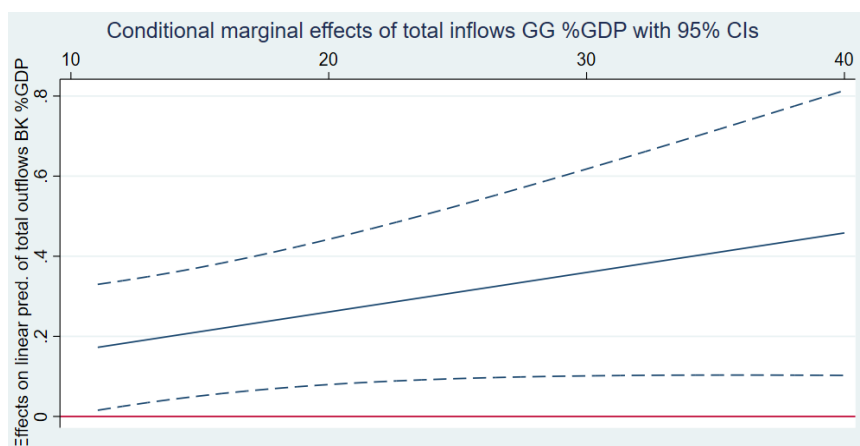
Resident and non-resident BK flows



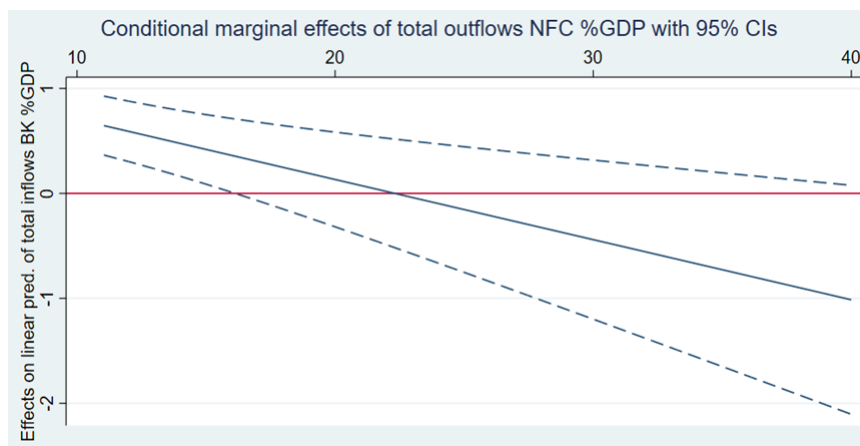
Note: Plots traces the correlations between sectoral flows given increasing VIX.

Source: Authors' estimates.

Resident BK flows and non-resident GG flows



Resident BK flows and non-resident NFC flows



Note: Plots traces the correlations between sectoral flows given increasing VIX.

Source: Authors' estimates.

Figure 6a: Yearly adjustments of sectoral controls on sectoral non-resident flows

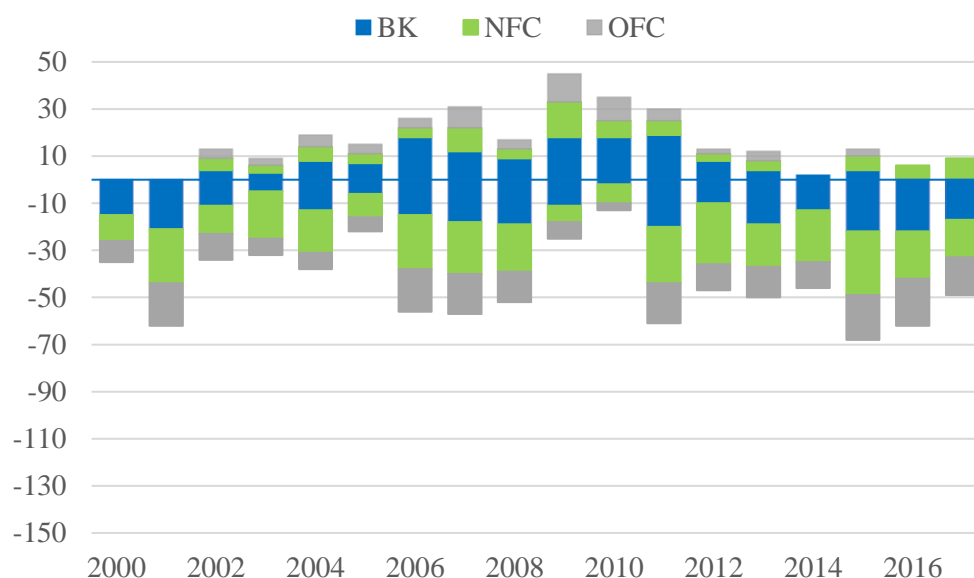
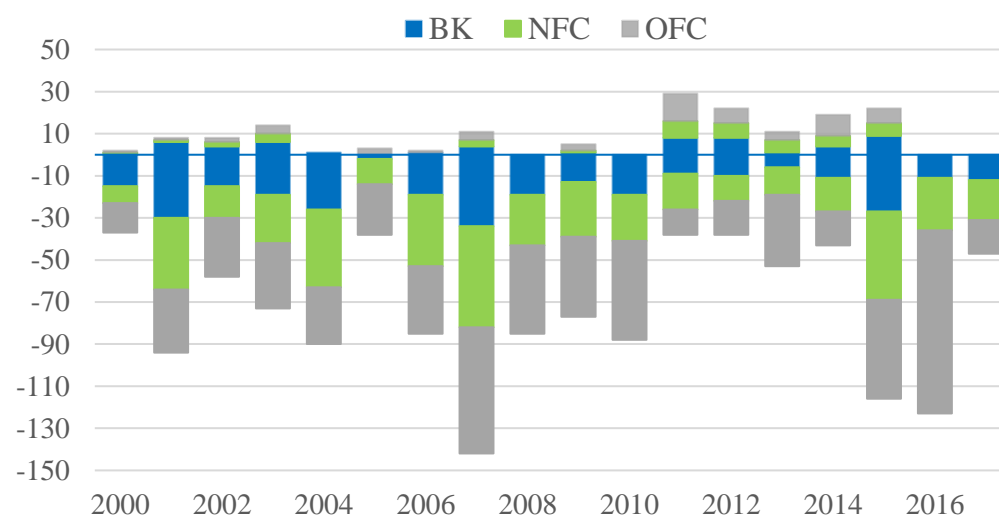


Figure 6b: Yearly adjustments of sectoral controls on sectoral resident flows



Notes: BK = banking sector, NFC = non-financial corporates, OFC = other financial corporates. Values refer to the count of annual changes on sectoral controls for both non-resident (Figure 6a) and resident (Figure 6b) sectoral flows. Positive values refer to tightening measures while negative values are easing measures.

Source: Authors' classification and computations based on Lepers and Mehigan (2019).

Figure 7a: Cumulative adjustments of sectoral controls on non-resident flows

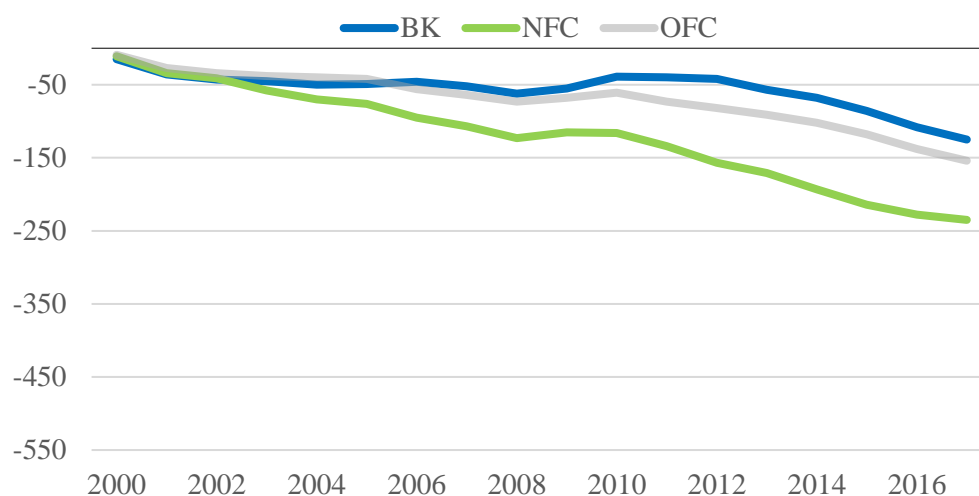
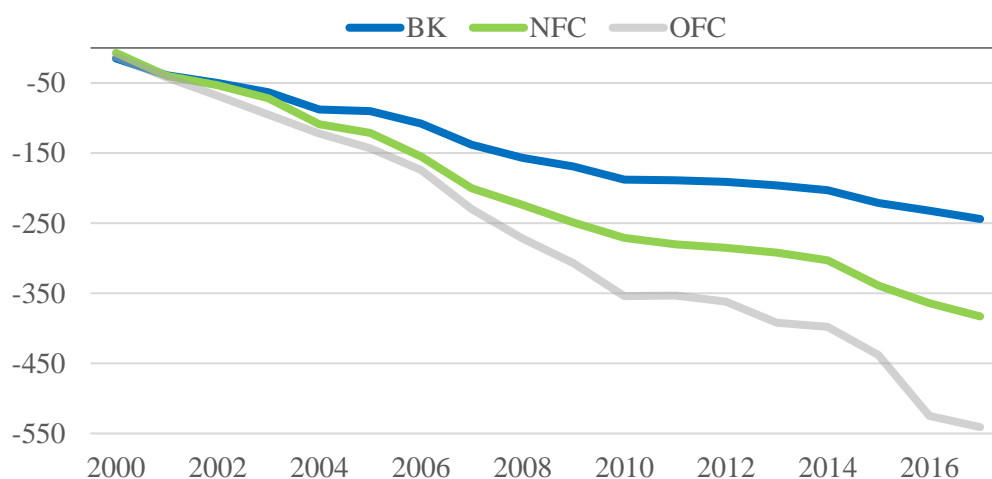


Figure 7b: Cumulative adjustments of sectoral controls on resident flows



Notes: BK = banking sector, NFC = non-financial corporates, OFC = other financial corporates. Values refer to the cumulative count of sectoral controls for both non-resident (Figure 7a) and resident (Figure 7b) sectoral flows. Declining values pertain to easing measures. Source: Authors' classification and computations based on Lepers and Mehigan (2019).

Table 1: Descriptive statistics: Dependent variables and regressions

	Obs	Mean	Std. Dev.	Min	Max
<i>Total Sectoral Flows</i>					
Resident Flows - CB	772	1.47	3.5	-24.0	26.0
Resident Flows - GG	703	0.61	2.6	-7.5	29.3
Resident Flows - BK	772	1.99	6.7	-53.2	51.8
Resident Flows - NFC	772	3.25	6.0	-24.5	59.8
Resident Flows - OFC	762	1.97	3.3	-20.0	22.4
Non-Resident Flows - CB	1,068	0.30	2.9	-27.9	34.1
Non-Resident Flows - GG	1,191	1.23	2.9	-20.9	35.5
Non-Resident Flows - BK	1,198	2.26	7.4	-50.8	87.2
Non-Resident Flows - NFC	1,198	4.16	4.4	-14.2	46.0
Non-Resident Flows - OFC	1,181	0.72	2.0	-12.1	23.9
<i>Global Factors</i>					
Global GDP Growth	1,216	3.86	1.3	-0.1	5.6
Global Liquidity Index	1,216	46.32	6.9	35.6	63.4
VIX	1,216	19.94	6.9	11.0	40.0
Global Commodity Price Index	1,216	117.07	40.2	56.1	182.7
<i>Domestic Factors</i>					
Domestic GDP Growth	1,214	3.36	3.6	-15.1	17.3

Notes: Resident and non-resident sectoral flows are financial account assets and liabilities, respectively, of central bank (CB), general government (GG), banks (BK), non-financial corporates (NFC), and other financial corporate (OFC). Values for sectoral flows are in percent of nominal GDP, taken from the IMF's World Economic Outlook Database. Data on global GDP growth are year-on-year changes of world real GDP. Global liquidity, VIX, and global commodity price are indices. Data on domestic GDP growth are year-on-year changes of domestic real GDP. Refer to Appendix 3 for data definition and sources.

Source: Authors' computations.

Table 2: Sectoral flows covariates – baseline

	Non-Resident Flows					Resident Flows				
	(1) CB	(2) GG	(3) BK	(4) NFC	(5) OFC	(6) CB	(7) GG	(8) BK	(9) NFC	(10) OFC
Global GDP Growth	-0.026 (0.120)	0.055 (0.092)	0.908*** (0.245)	0.641*** (0.127)	0.208*** (0.068)	-0.075 (0.149)	0.147 (0.116)	0.961*** (0.283)	0.649*** (0.176)	0.018 (0.129)
Global Liquidity	0.003 (0.010)	0.011 (0.014)	0.202*** (0.043)	0.102*** (0.026)	0.032*** (0.011)	0.034 (0.021)	0.005 (0.008)	0.174*** (0.037)	0.130*** (0.046)	0.071*** (0.019)
VIX	-0.007 (0.026)	0.057*** (0.017)	-0.066* (0.034)	0.048 (0.031)	-0.001 (0.009)	-0.028 (0.033)	0.013 (0.010)	-0.071 (0.044)	0.030 (0.033)	-0.059*** (0.018)
Global Commodity Price	0.001 (0.002)	0.010*** (0.003)	-0.029*** (0.008)	0.003 (0.006)	-0.006** (0.002)	-0.005 (0.006)	-0.001 (0.002)	-0.030** (0.011)	-0.003 (0.004)	-0.019*** (0.005)
Domestic GDP Growth	0.032 (0.031)	-0.153*** (0.027)	0.329*** (0.078)	0.253*** (0.050)	0.063*** (0.014)	-0.009 (0.042)	0.003 (0.026)	0.096** (0.045)	0.142** (0.059)	-0.041** (0.019)
Observations	1068	1191	1198	1198	1181	772	703	772	772	762
R-squared	0.063	0.232	0.332	0.390	0.239	0.114	0.580	0.202	0.441	0.388
Country F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: CB = central bank; GG = general government; BK = banks; NFC = non-financial corporates; and, OFC = other financial corporate. Dependent variables are sectoral flows in percent of nominal GDP for non-resident (column 1-5) and resident (column 6-10) sectoral flows. Regressors are in contemporaneous values, except for domestic GDP growth which was lagged. All specifications include country fixed effects. Values in parentheses are clustered robust standard errors, at country level.

* p<0.10, ** p<0.05, and *** p<0.01.

Source: Authors' estimates

Table 3: Sectoral flows covariates – advanced economies

	Non-Resident Flows					Resident Flows				
	(1) CB	(2) GG	(3) BK	(4) NFC	(5) OFC	(6) CB	(7) GG	(8) BK	(9) NFC	(10) OFC
Global GDP Growth	0.153 (0.299)	0.214 (0.162)	1.599*** (0.529)	0.773*** (0.172)	0.419*** (0.129)	-0.195 (0.201)	0.177 (0.157)	1.357*** (0.384)	0.920*** (0.233)	0.087 (0.182)
Global Liquidity	0.001 (0.020)	0.034* (0.018)	0.378*** (0.077)	0.082** (0.030)	0.043** (0.018)	-0.006 (0.022)	0.005 (0.009)	0.233*** (0.045)	0.126** (0.057)	0.079*** (0.026)
VIX	-0.015 (0.066)	0.085** (0.031)	-0.128* (0.075)	0.043 (0.041)	0.004 (0.018)	-0.037 (0.048)	0.019 (0.014)	-0.090 (0.063)	0.050 (0.045)	-0.084*** (0.023)
Global Commodity Price	0.004 (0.005)	0.011* (0.005)	-0.062*** (0.016)	-0.011* (0.005)	-0.013*** (0.005)	-0.001 (0.008)	-0.001 (0.003)	-0.041** (0.016)	-0.005 (0.005)	-0.027*** (0.006)
Domestic GDP Growth	0.138 (0.088)	-0.198*** (0.059)	0.518*** (0.128)	0.213*** (0.066)	0.095*** (0.028)	-0.007 (0.065)	-0.001 (0.040)	0.126 (0.076)	0.157** (0.073)	-0.062** (0.029)
Observations	453	525	525	525	525	525	503	525	525	525
R-squared	0.058	0.252	0.410	0.313	0.272	0.118	0.588	0.234	0.485	0.378
Country F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: CB = central bank; GG = general government; BK = banks; NFC = non-financial corporates; and, OFC = other financial corporate. Dependent variables are sectoral flows in percent of nominal GDP for non-resident (column 1-5) and resident (column 6-10) sectoral flows. Refer to Appendix 2 for the list of advanced economies. Regressors are in contemporaneous values, except for domestic GDP growth which was lagged. All specifications include country fixed effects. Values in parentheses are clustered robust standard errors, at country level.

* p<0.10, ** p<0.05, and *** p<0.01.

Source: Authors' estimates.

Table 4: Sectoral flows covariates – emerging economies

	Non-Resident Flows					Resident Flows				
	(1) CB	(2) GG	(3) BK	(4) NFC	(5) OFC	(6) CB	(7) GG	(8) BK	(9) NFC	(10) OFC
Global GDP Growth	-0.130** (0.049)	-0.068 (0.098)	0.399*** (0.109)	0.500*** (0.177)	0.027 (0.044)	0.163 (0.209)	0.064 (0.095)	0.155 (0.159)	0.082 (0.201)	-0.187** (0.067)
Global Liquidity	0.007 (0.010)	-0.012 (0.021)	0.075** (0.030)	0.123*** (0.039)	0.027* (0.014)	0.125*** (0.036)	0.008 (0.015)	0.047 (0.050)	0.140* (0.076)	0.056** (0.024)
VIX	0.009 (0.007)	0.035* (0.020)	-0.006 (0.027)	0.043 (0.044)	-0.006 (0.010)	-0.011 (0.033)	-0.006 (0.012)	-0.022 (0.034)	-0.012 (0.046)	-0.012 (0.020)
Global Commodity Price	0.001 (0.001)	0.008*** (0.003)	-0.000 (0.005)	0.012 (0.009)	0.000 (0.002)	-0.015* (0.008)	0.001* (0.001)	-0.004 (0.004)	0.002 (0.006)	-0.001 (0.003)
Domestic GDP Growth	-0.025 (0.027)	-0.110*** (0.020)	0.201*** (0.057)	0.227*** (0.061)	0.021 (0.014)	-0.037 (0.055)	0.004 (0.010)	0.067* (0.036)	0.110 (0.100)	-0.048* (0.026)
Observations	615	666	673	673	656	247	200	247	247	237
R-squared	0.095	0.209	0.189	0.447	0.157	0.189	0.129	0.107	0.249	0.411
Country F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: CB = central bank; GG = general government; BK = banks; NFC = non-financial corporates; and, OFC = other financial corporate. Dependent variables are sectoral flows in percent of nominal GDP for non-resident (column 1-5) and resident (column 6-10) sectoral flows. Refer to Appendix I for the list of emerging economies. Regressors are in contemporaneous values, except for domestic GDP growth which was lagged. All specifications include country fixed effects. Values in parentheses are clustered robust standard errors, at country level.

* p<0.10, ** p<0.05, and *** p<0.01.

Source: Authors' estimates.

Table 5: Sectoral flows covariates – equity flows

	Non-Resident Flows					Resident Flows				
	(1) CB	(2) GG	(3) BK	(4) NFC	(5) OFC	(6) CB	(7) GG	(8) BK	(9) NFC	(10) OFC
Global GDP Growth	...	-0.008 (0.008)	0.053 (0.039)	0.440*** (0.136)	0.074** (0.029)	0.000 (0.008)	-0.079 (0.079)	0.067** (0.028)	0.376** (0.143)	0.025 (0.052)
Global Liquidity	...	-0.000 (0.001)	0.041* (0.023)	0.071*** (0.023)	0.014 (0.008)	-0.002 (0.001)	0.014 (0.014)	0.026* (0.013)	0.093** (0.043)	0.030** (0.012)
VIX	...	-0.000 (0.002)	-0.010 (0.008)	0.046 (0.032)	0.009 (0.006)	0.000 (0.002)	-0.004 (0.004)	-0.002 (0.005)	0.015 (0.026)	-0.014 (0.010)
Global Commodity Price	...	0.000 (0.000)	-0.000 (0.001)	0.002 (0.006)	-0.002** (0.001)	0.000 (0.000)	0.001 (0.002)	-0.001 (0.001)	0.000 (0.003)	-0.005*** (0.001)
Domestic GDP Growth	...	-0.001 (0.001)	0.012 (0.011)	0.173*** (0.052)	0.015 (0.010)	0.002 (0.002)	-0.005 (0.012)	0.017* (0.009)	0.077* (0.042)	-0.010 (0.015)
Observations	...	189	1198	1198	1166	114	513	772	772	753
R-squared	...	0.424	0.481	0.298	0.194	0.193	0.565	0.222	0.454	0.374
Country F.E.	...	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: CB = central bank; GG = general government; BK = banks; NFC = non-financial corporates; and, OFC = other financial corporate. Dependent variables are sectoral flows in percent of nominal GDP for non-resident (column 1-5) and resident (column 6-10) sectoral flows. Equity flows include direct investment and portfolio equity flows. Regressors are in contemporaneous values, except for domestic GDP growth which was lagged. All specifications include country fixed effects. Values in parentheses are clustered robust standard errors, at country level.

* p<0.10, ** p<0.05, and *** p<0.01.

Source: Authors' estimates.

Table 6: Sectoral flows covariates – debt flows

	Non-Resident Flows					Resident Flows				
	(1) CB	(2) GG	(3) BK	(4) NFC	(5) OFC	(6) CB	(7) GG	(8) BK	(9) NFC	(10) OFC
Global GDP Growth	-0.063 (0.050)	0.044 (0.090)	0.301*** (0.102)	0.075 (0.046)	0.092*** (0.033)	-0.098 (0.139)	0.296 (0.176)	0.324** (0.130)	0.064*** (0.024)	-0.083 (0.073)
Global Liquidity	0.008 (0.008)	0.009 (0.014)	0.073*** (0.015)	0.028*** (0.009)	0.018** (0.008)	0.019 (0.013)	-0.011 (0.009)	0.069*** (0.019)	0.007 (0.005)	0.029** (0.013)
VIX	0.006 (0.007)	0.057*** (0.017)	0.002 (0.016)	-0.001 (0.010)	-0.009 (0.005)	-0.040 (0.031)	0.027*** (0.009)	-0.012 (0.030)	0.007* (0.004)	-0.046*** (0.013)
Global Commodity Price	0.002 (0.001)	0.010*** (0.003)	-0.007** (0.003)	0.001 (0.002)	-0.003** (0.001)	-0.009** (0.004)	-0.001 (0.003)	-0.009* (0.005)	-0.002*** (0.001)	-0.014*** (0.003)
Domestic GDP Growth	-0.037* (0.021)	-0.143*** (0.029)	0.090*** (0.032)	0.076*** (0.023)	0.059*** (0.014)	-0.039 (0.037)	0.029 (0.035)	0.031 (0.035)	0.013 (0.009)	-0.014 (0.016)
Observations	708	1191	1129	1162	1058	311	607	742	715	696
R-squared	0.057	0.234	0.320	0.198	0.230	0.274	0.209	0.181	0.150	0.296
Country F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: CB = central bank; GG = general government; BK = banks; NFC = non-financial corporates; and, OFC = other financial corporate. Dependent variables are sectoral flows in percent of nominal GDP for non-resident (column 1-5) and resident (column 6-10) sectoral flows. Debt flows include portfolio debt and loans. Regressors are in contemporaneous values, except for domestic GDP growth which was lagged. All specifications include country fixed effects. Values in parentheses are clustered robust standard errors, at country level. * p<0.10, ** p<0.05, and *** p<0.01.

Source: Authors' estimates.

Table 7: Co-movement between resident and non-resident sectoral flows

(Conditional on Baseline Covariates and Country Fixed Effects)					
Non-Resident Flows					
	CB	GG	BK	NFC	OFC
Resident Flows - CB	0.195***	0.066*	0.551***	0.102**	0.044**
Resident Flows - GG	-0.039	0.738***	-0.056	0.109*	-0.041
Resident Flows - BK	0.044	0.036	0.801***	0.018	0.042
Resident Flows - NFC	0.084	-0.044	0.355	0.459***	0.152***
Resident Flows - OFC	-0.135*	0.097	0.414***	0.119***	0.353***
Observations	623	700	700	700	700
R-squared	0.153	0.398	0.802	0.605	0.575
Country F.E. & Controls	Yes	Yes	Yes	Yes	Yes
Resident Flows					
	CB	GG	BK	NFC	OFC
Non-Resident Flows - CB	0.154	0.032	0.439***	0.295***	0.029
Non-Resident Flows - GG	0.093	0.297**	0.315**	0.051	0.111**
Non-Resident Flows - BK	0.066	-0.003	0.601***	0.204*	0.076***
Non-Resident Flows - NFC	0.045	0.037	0.026	0.568***	0.083**
Non-Resident Flows - OFC	-0.081	-0.055	0.080	0.659***	0.274***
Observations	671	623	671	671	671
R-squared	0.155	0.677	0.630	0.763	0.616
Country F.E. & Controls	Yes	Yes	Yes	Yes	Yes

Notes: CB = central bank; GG = general government; BK = banks; NFC = non-financial corporates; and, OFC = other financial corporate. Values refer to estimated coefficients of the regression resident (non-resident) sectoral flows on global and domestic covariates and non-resident (resident) sectoral flows (in rows). All specifications are regressed with country fixed effects and clustered robust standard errors at the country level. * p<0.10, ** p<0.05, and *** p<0.01.

Source: Authors' estimates

Table 8: Number of capital control adjustments by sector and instrument

	BK		NFC		OFC	
	Non-Resident		Non-Resident		Non-Resident	
	Flows	Flows	Flows	Flows	Flows	Flows
Direct investment	42	44	47	56	38	44
Portfolio equity	38	47	38	66	36	101
Portfolio debt	58	51	46	64	40	113
Collective investment	26	42	25	54	26	102
Credit	75	54	71	18	50	41

Notes: BK = banking sector, NFC = non-financial corporates, OFC = other financial corporates. Values refer to the total number of sectoral controls for both non-resident and resident sectoral flows across different types of investments.

Source: Authors' classification and computations based on Lepers and Mehigan (2019).

Table 10: Non-resident sectoral flows on non-resident sectoral controls (summary of estimates)

ALL COUNTRIES									
Non-Resident Flows	Pooled OLS			Two-Step, no FE			Fixed Effects		
	BK	NFC	OFC	BK	NFC	OFC	BK	NFC	OFC
Corresp. Sectoral Controls (Tightening)	-0.351* (0.191)	-0.115 (0.111)	-0.149*** (0.051)	-0.194 (0.186)	-0.004 (0.098)	-0.091* (0.047)	-0.004 (0.183)	0.106 (0.094)	-0.036 (0.045)
R-squared	0.138	0.145	0.074	0.144	0.152	0.076	0.349	0.360	0.231
Corresp. Sectoral Controls (All)	-0.028 (0.087)	-0.025 (0.064)	0.014 (0.022)	-0.078 (0.094)	0.006 (0.061)	0.010 (0.023)	-0.147* (0.089)	-0.118* (0.063)	-0.036* (0.021)
R-squared	0.136	0.144	0.073	0.144	0.152	0.075	0.350	0.362	0.232
Global and domestic factors		Y			Y			Y	
Observations		907			853			907	
EMERGING ECONOMIES									
Non-Resident Flows	Pooled OLS			Two-Step, no FE			Fixed Effects		
	BK	NFC	OFC	BK	NFC	OFC	BK	NFC	OFC
Corresp. Sectoral Controls (Tightening)	-0.140* (0.080)	-0.249* (0.146)	-0.076* (0.040)	-0.144* (0.078)	-0.044 (0.132)	-0.070* (0.039)	-0.046 (0.081)	0.096 (0.137)	-0.052 (0.039)
R-squared	0.093	0.173	0.060	0.102	0.156	0.061	0.171	0.402	0.177
Corresp. Sectoral Controls (All)	-0.082** (0.040)	0.029 (0.061)	-0.030 (0.021)	-0.086** (0.041)	0.070 (0.058)	-0.026 (0.030)	-0.097** (0.043)	-0.081 (0.063)	-0.026 (0.020)
R-squared	0.093	0.171	0.059	0.102	0.158	0.061	0.173	0.403	0.177
Global and domestic factors		Y			Y			Y	
Observations		408			384			408	

Notes: BK = banks; NFC = non-financial corporates; and, OFC = other financial corporates. Values refer to estimated coefficients of the regression sectoral flows on global (contemporaneous) and domestic (lagged) baseline regressors and corresponding sectoral controls. Country sample is restricted to EMEs. Values in parentheses are clustered robust standard errors, at country level.

* p<0.10, ** p<0.05, and *** p<0.01.

Appendix 1: Sectoral flows data summary

Types of Investments	Sector	Reported Zeros	Reported Values	Total Reported	Computed	Filled-In	Total Computed
Direct Investment Abroad	BK	0	0	0	772	0	772
Direct Investment Abroad	NFC	0	0	0	772	0	772
Direct Investment Abroad	OFC	19	0	19	753	0	753
Foreign Direct Investment	BK	0	0	0	1198	0	1198
Foreign Direct Investment	NFC	0	0	0	1198	0	1198
Foreign Direct Investment	OFC	47	0	47	1151	0	1151
Portfolio Equity Assets	CB	380	75	455	39	0	39
Portfolio Equity Assets	GG	216	324	540	39	11	50
Portfolio Equity Assets	BK	66	522	588	102	0	102
Portfolio Equity Assets	NFC	8	357	365	199	124	323
Portfolio Equity Assets	OFC	20	349	369	286	31	317
Portfolio Debt Assets	CB	285	201	486	36	0	36
Portfolio Debt Assets	GG	164	406	570	54	0	54
Portfolio Debt Assets	BK	3	616	619	86	0	86
Portfolio Debt Assets	NFC	14	357	371	223	128	351
Portfolio Debt Assets	OFC	31	322	353	313	27	340
Portfolio Equity Liabilities	CB	427	9	436	0	0	0
Portfolio Equity Liabilities	GG	423	23	446	10	1	11
Portfolio Equity Liabilities	BK	114	710	824	124	0	124
Portfolio Equity Liabilities	NFC	48	506	554	267	260	527
Portfolio Equity Liabilities	OFC	124	414	538	413	87	500
Portfolio Debt Liabilities	CB	599	184	783	22	0	22
Portfolio Debt Liabilities	GG	62	1010	1072	73	0	73
Portfolio Debt Liabilities	BK	112	823	935	97	1	98
Portfolio Debt Liabilities	NFC	79	509	588	197	246	443
Portfolio Debt Liabilities	OFC	150	397	547	376	9	385
OI Assets Equity	GG	127	316	443	0	0	0
OI Assets Currency and Deposits	CB	191	362	553	0	0	0
OI Assets Currency and Deposits	GG	180	385	565	3	0	3
OI Assets Currency and Deposits	BK	25	691	716	30	0	30
OI Assets Currency and Deposits	NFC	6	412	418	0	310	310
OI Assets Currency and Deposits	OFC	41	307	348	276	19	295
OI Assets Loans	CB	379	131	510	3	0	3
OI Assets Loans	GG	194	453	647	6	6	12
OI Assets Loans	BK	8	691	699	40	2	42
OI Assets Loans	NFC	28	352	380	0	260	260
OI Assets Loans	OFC	74	287	361	243	40	283
OI Assets Insurance and Pensions	CB	265	0	265	0	0	0
OI Assets Insurance and Pensions	GG	270	9	279	0	0	0
OI Assets Insurance and Pensions	BK	255	12	267	0	1	1
OI Assets Insurance and Pensions	NFC	166	131	297	0	21	21
OI Assets Insurance and Pensions	OFC	87	233	320	21	22	43
OI Assets Trade Credits and Advances	CB	280	24	304	0	0	0
OI Assets Trade Credits and Advances	GG	254	242	496	1	0	1
OI Assets Trade Credits and Advances	BK	251	96	347	0	0	0
OI Assets Trade Credits and Advances	NFC	8	368	376	19	305	324
OI Assets Trade Credits and Advances	OFC	133	156	289	93	1	94
OI Assets Others	CB	309	173	482	8	0	8
OI Assets Others	GG	201	387	588	30	0	30
OI Assets Others	BK	127	427	554	60	1	61
OI Assets Others	NFC	102	260	362	0	259	259
OI Assets Others	OFC	74	231	305	227	21	248
OI Reserve Assets	CB	0	772	772	0	0	0
OI Liabilities Equity	GG	339	175	514	0	0	0
OI Liabilities Currency and Deposits	CB	198	716	914	3	22	25
OI Liabilities Currency and Deposits	GG	497	184	681	17	0	17
OI Liabilities Currency and Deposits	BK	28	1074	1102	44	0	44
OI Liabilities Currency and Deposits	NFC	380	54	434	0	146	146
OI Liabilities Currency and Deposits	OFC	367	92	459	139	22	161
OI Liabilities Loans	CB	336	605	941	3	0	3
OI Liabilities Loans	GG	49	1084	1133	22	10	32
OI Liabilities Loans	BK	202	773	975	39	28	67
OI Liabilities Loans	NFC	0	615	615	0	533	533
OI Liabilities Loans	OFC	72	493	565	478	43	521
OI Liabilities Insurance and Pensions	CB	380	0	380	0	0	0
OI Liabilities Insurance and Pensions	GG	418	0	418	0	0	0
OI Liabilities Insurance and Pensions	BK	368	0	368	0	0	0
OI Liabilities Insurance and Pensions	NFC	364	20	384	0	8	8
OI Liabilities Insurance and Pensions	OFC	175	307	482	8	58	66
OI Liabilities Trade Credits and Advances	CB	416	39	455	0	0	0
OI Liabilities Trade Credits and Advances	GG	478	225	703	3	0	3
OI Liabilities Trade Credits and Advances	BK	368	114	482	1	0	1
OI Liabilities Trade Credits and Advances	NFC	28	598	626	128	318	446
OI Liabilities Trade Credits and Advances	OFC	233	238	471	142	0	142
OI Liabilities Others	CB	459	271	730	8	0	8
OI Liabilities Others	GG	428	425	853	41	5	46
OI Liabilities Others	BK	191	719	910	67	1	68
OI Liabilities Others	NFC	201	342	543	1	361	362
OI Liabilities Others	OFC	177	316	493	337	37	374
Total		14,578	25,501	40,079	11,341	3,785	15,126
Share				72.6	20.5	6.9	

Appendix 2: Country classification

Advanced Economies	Emerging Economies
Australia	Albania ^{^*}
Austria	Argentina [^]
Belgium	Armenia ^{^*}
Canada	Belarus [*]
Czech Republic	Bosnia and Herzegovina ^{^*}
Denmark	Brazil [^]
Estonia	Bulgaria
Finland	Chile
France	China [^]
Germany	Colombia
Greece	Croatia
Israel	Georgia ^{^*}
Italy	Hungary
Japan	India
Korea	Indonesia [^]
Latvia	Kazakhstan ^{^*}
Lithuania	Kosovo ^{^*}
Netherlands	Malaysia
New Zealand	Mexico [^]
Norway	Mongolia ^{^*}
Portugal	Morocco [*]
Slovakia	North Macedonia ^{^*}
Slovenia	Pakistan ^{^*}
Spain	Paraguay ^{^*}
Sweden	Peru [^]
Switzerland	Philippines [^]
United Kingdom	Poland
United States	Romania [^]
	Russia [^]
	Serbia [^]
	South Africa [^]
	Thailand
	Turkey
	Ukraine
	Uruguay [^]
	Zambia ^{^*}

Notes: (^) indicates emerging economies without resident sectoral flows data. (*) indicates emerging economies without available data for sectoral controls. The use of the data for Israel is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

Appendix 3: Data definitions and sources

Data	Notes	Sources
Sectoral capital flows	Refer to Section 2.1 for detailed discussions on data computations and sources	Authors' calculations based on IMF Balance of Payment Statistics, IMF Coordinated Portfolio Investment Survey, IMF International Investment Position, BIS Locational Banking Statistics, OECD Direct Investment Dataset, IMF FSSA reports, and national sources accessed through CEIC database
Nominal GDP	US dollar billions	IMF World Economic Outlook Database 2019
Global GDP growth	Year-on-year change in percent of global real GDP	IMF World Economic Outlook Database 2019
Global liquidity	Index measuring the ease of financing (credit) in global financial markets	Bank for International Settlements
VIX	Index measuring 30-day expected volatility of the U.S. stock market, derived from real-time, mid-quote prices of S&P 500® Index (SPXSM) call, and put options	Chicago Board of Exchange
Global Commodity Price	Index pertaining to IMF's Primary Commodity Prices	International Monetary Fund
Domestic GDP Growth	Year-on-year change of real GDP	IMF World Economic Outlook Database 2019
Governance	Average of individual country percentile ranking on measure pertaining to voice and accountability; political stability; government effectiveness; regulatory quality; rule of law; and control of corruption	Worldwide Governance Indicators
Financial depth	Domestic credit provided by the financial sector in percentage of nominal GDP	World Bank's World Development Indicators
Financial Openness	Standardised capital account openness measure	Chinn and Ito (2006)
Risk premia	Difference between U.S. long-term government bond yields and Moody's Baa corporate bond yields	IMF International Financial Statistics and national source.
Global Liquidity Growth	Annual year-on-year change of Global Liquidity Index	Authors' calculations
Domestic Macroeconomic Volatility	Five year moving standard deviation of domestic inflation, where inflation is sourced from the IMF World Economic Outlook Database 2019	Authors' calculations
Sectoral capital controls	Refer to Section 5.2 for detailed discussions on data computations and sources	Authors' calculation using sector-specific capital controls based on Lepers and Mehigan (2019), IMF AREAER, and OECD data.

Appendix 4: Coding capital controls dataset

A4.1 Coding rules in the Lepers and Mehigan (2019) dataset

Removal or easing of a policy measure are coded as -1 and introduction or tightening of a measure as +1, episodic changes are considered. This enables the analysis to get closer to the intensity of a measure rather than simply its presence or introduction or removal. The policy data is available at daily frequency. In the context of their work, data is aggregated at the yearly frequency. Within the same year, there can be several policy actions. In transforming the list of policy actions into an annual database, all tightening and easing actions taken in the same year are added up.

The following coding rules have been followed in the construction of the dataset:

- Restrictions are coded at their date of implementation, not announcement. While this prevents the analysis of the immediate reaction of economic actors to announcements, it allows a much more consistent timing of actions across countries and importantly increases the coverage. The IMF's AREAER notably provides only the date of implementation.
- Restrictions made to specific countries based on political or national security reasons are not included.
- Restrictions derived from bilateral free trade agreement or investment agreement that applies to specific countries are not included.
- Restrictions on FDI are coded regardless of whether they are sector specific or general restrictions.
- Restrictions on use of accounts are coded as restrictions to the targeted cross border capital operation, as it is the case under the OECD Capital Movements Code.
- Restrictions on FDI in real estate are not considered as FDI restrictions, since these pertain to a different category in the AREAER, and thus classified under the investment in real estate category.
- Requirements of repatriation of the income from a sale in foreign markets are considered controls.
- In the case of securities, restrictions on purchase locally by non-residents, and on sale or issue abroad by residents are coded as controls on capital inflows, as usual in the literature.
- Conversely, restrictions on the purchase abroad by residents, and sale or issue locally by non-residents are coded as controls on capital outflows, as usual in the literature.
- Requirements of "reporting", "registration" or "notification" are dropped as they pertain to formalities.
- Measures impacting several categories of operations are recorded several times as they will impact several capital movements.
- A measure that affects both the inflow and outflow dimension of a specific operation is coded twice, as inflow and outflow action.
- With regards to restrictions on derivatives, when there is no obvious way to tell whether the restrictions is impacting inflows or outflows (derivatives like FX swaps involve both inflow and outflow components), the restriction is coded twice as inflow and outflow action, as usual in the literature.
- Restrictions on foreign investment by resident institutional investors, including insurance companies and pension funds, are included as restrictions.

A4.2 Coding rules for sector-specific capital controls

- Sectors have been classified by resident sector, i.e., for controls on inflows, we code the invested/recipient sector. Outflow controls are coded according to the investing/source sector.
- Sectors are classified based on the manual reading of the description of the measure in the IMF's AREAER or any other sources coded by Lepers and Mehigan (2019).
- Measures are classified according to whether they impact the BK, NFC, or OFC sector. The government and central bank sector are left out as specific rules generally apply despite some of the controls impacting the public sector, i.e., regarding sovereign bonds. On the other hand, operations involving state-owned enterprises as NFCs, OFCs or Banks are treated depending on the nature of their operations.
- When several sectors are mentioned in the description, they are coded as controls impacting each of the sector mentioned. When all sectors are indiscriminately concerned by the measure, it is coded as impacting all sectors. For the empirical analysis, additional aggregation technics and variables are computed, recording BK-only, NFC-only, or OFC-only controls, i.e., measures that are sector-specific.
- To match our flow classification, when a measure applies to individuals, it is classified under NFCs.
- For securities, restrictions on the issuance are generally allowed for classifying the specific issuing sector, while for purchase and sale of securities, all sectors may be involved.
- When no specific sector is mentioned in the description, specific assumptions are made based on manual reading of the measure and likely impact:
 - Farmland, agriculture, and commercial real estate such as hotels are classified as NFCs even though the financial sector is now a major real estate investor for speculative purposes or long-term investment.
 - Residential real estate is classified also in NFCs as it is assumed that it is mostly individuals who are buying and selling residential real estate. In practice, the financial sector may also be involved.
 - If unspecified and unless it concerns relations with affiliates abroad, restrictions on outward financial credit and financial guarantees and sureties are classified under Banks, assuming NFCs traditionally do not engage in financial credit provision and lending by OFCs is relatively less significant.
 - Restrictions on inward credit related to international commercial transactions/ import/exports are classified as NFCs.
 - Matching our capital flow classification, when unspecified, inward and outward FDI restrictions are not systematically classified as NFC restrictions, as FDI may be involving banks and OFCs. All categories are added in this case.
- When a transaction is simply intermediated by financial institutions on behalf of other sectors, the investing sector is coded, not by intermediary sector.
- Restrictions on financial derivatives were left out to match the breakdown of our capital flow dataset.

Appendix 5. OECD working papers on international investment

www.oecd.org/investment/working-papers.htm

2021

2021/3 - The future of investment treaties – possible directions

2021/2 - Business responsibilities and investment treaties

2021/1 - Assessing the effectiveness of currency-differentiated tools: The case of reserve requirements

2020

2020/1 - The most favoured nation and non-discrimination provisions in international trade law and the OECD codes of liberalisation

2019

2019/3 - Drivers of divestment decisions of multinational enterprises - A cross-country firm-level perspective

2019/2 - The Broad Policy Toolkit for Financial Stability: Foundations, Fences and Fire Doors

2019/1 - The Determinants of Foreign Direct Investment - Do Statutory Restrictions Matter?

2018

2018/1 Societal benefits and costs of International Investment Agreements: A critical review of aspects and available empirical evidence

2017

2017/5 Adjudicator Compensation Systems and Investor-State Dispute Settlement

2017/4 Have currency-based capital flow management measures curbed international banking flows?

2017/3 Addressing the balance of interests in investment treaties: The limitation of fair and equitable treatment provisions to the minimum standard of treatment under customary international law

2017/2 The balance between investor protection and the right to regulate in investment treaties: A scoping paper

2017/1 Foreign direct investment, corruption and the OECD Anti-Bribery Convention

2016

2016/3 State-to-State dispute settlement and the interpretation of investment treaties

2016/2 Investment policies related to national security

2016/1 The legal framework applicable to joint interpretive agreements of investment treaties

2015

2015/3 Currency-based measures targeting banks - Balancing national regulation of risk and financial openness

2015/2 Investment Treaties over Time - Treaty Practice and Interpretation in a Changing World

2015/1 The Policy Landscape for International Investment by Government-controlled Investors: A Fact Finding Survey

2014

2014/3 Investment Treaties and Shareholder Claims: Analysis of Treaty Practice

2014/2 Investment Treaties and Shareholder Claims for Reflective Loss: Insights from Advanced Systems of Corporate Law

2014/1 Investment Treaty Law, Sustainable Development and Responsible Business Conduct: A Fact Finding Survey

2013

2013/4 Temporal validity of international investment agreements: a large sample survey of treaty provisions

2013/3 Investment treaties as corporate law: Shareholder claims and issues of consistency

2013/2 Lessons from Investment Policy Reform in Korea

2013/1 China Investment Policy: an Update

2012

2012/3 Investor-state dispute settlement: A scoping paper for the investment policy community

2012/2 Dispute settlement provisions in international investment agreements: A large sample survey

2012/1 Corporate greenhouse gas emission reporting: A stocktaking of government schemes

2011

2011/2 Defining and measuring green FDI: An exploratory review of existing work and evidence

2011/1 Environmental concerns in international investment agreements: a survey

2010

2010/3 OECD's FDI Restrictiveness Index: 2010 Update

2010/2 Foreign state immunity and foreign government controlled investors

2010/1 Intellectual property rights in international investment agreements

2006

2006/4 OECD's FDI regulatory restrictiveness index: Revision and extension to more economies

2006/3 Interpretation of the Umbrella Clause in Investment Agreements

2006/2 Investor-State Dispute Settlement in Infrastructure Projects

2006/1 Improving the System of Investor-State Dispute Settlement: An Overview

2005

2005/3 Corporate Responsibility Practices of Emerging Market Companies - A Fact-Finding Study

2005/2 Multilateral Influences on the OECD Guidelines for Multinational Enterprises

2005/1 Transparency and Third Party Participation in Investor-State Dispute Settlement Procedures

2004

- 2004/6 Mobilising Investment for Development: Role of ODA - The 1993-2003 Experience in Vietnam
- 2004/5 ODA and Investment for Development: What Guidance can be drawn from Investment Climate Scoreboards?
- 2004/4 Indirect Expropriation and the Right to Regulate in International Investment Law
- 2004/3 Fair and Equitable Treatment Standard in International Investment Law
- 2004/2 Most-Favoured-Nation Treatment in International Investment Law
- 2004/1 Relationships between International Investment Agreements

2003

- 2003/2 Business Approaches to Combating Corrupt Practices
- 2003/1 Incentives-based Competition for Foreign Direct Investment: The Case of Brazil

2002

- 2002/2 Managing Working Conditions in the Supply Chain: A Fact-Finding Study of Corporate Practices
- 2002/1 Multinational Enterprises in Situations of Violent Conflict and Widespread Human Rights Abuses

2001

- 2001/6 Codes of Corporate Conduct: Expanded review of their contents
- 2001/5 The OECD Guidelines for Multinational Enterprises and other corporate responsibility instruments
- 2001/4 Public policy and voluntary initiatives: What roles have governments played?
- 2001/3 Making codes of corporate conduct work: Management control systems and corporate responsibility
- 2001/2 Corporate Responsibility: Results of a fact-finding mission on private initiatives
- 2001/1 Private Initiatives for Corporate Responsibility: An Analysis

2000

- 2000/5 Recent trends, policies and challenges in South East European countries
- 2000/4 Main determinants and impacts of FDI on China's economy
- 2000/3 Lithuania: Foreign Direct Investment Impact and Policy Analysis
- 2000/2 Investment Patterns in a Longer-Term Perspective
- 2000/1 Bribery and the business sector: Managing the relationship

1999

- 1999/3 Rules for the Global Economy: Synergies between Voluntary and Binding Approaches
- 1999/2 Deciphering Codes of Corporate Conduct: A Review of their Contents
- 1999/1 Southeast Asia: the Role of FDI Policies in Development

1998

- 1998/1 Survey of OECD work on international investment