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Findings of the recent literature on international capital flows: Implications and suggestions for further research

Stéphanie Guichard

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FINDINGS OF THE RECENT LITERATURE ON INTERNATIONAL CAPITAL FLOWS: IMPLICATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

ECONOMICS DEPARTMENT WORKING PAPERS No. 1410

By Stéphanie Guichard

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Authorised for publication by Catherine L. Mann, Chief Economist, Head of the Economics Department.

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Abstract/Résumé

Findings of the recent literature on international capital flows: implications and suggestions for further research

Financial globalisation has given international capital flows a central role in the functioning of the global economy and has therefore led to considerable economic research over the past 30 years. Making the most of capital flows by allowing countries to reap their benefits while reducing associated risks has always been a challenge. This challenge became however even more acute in the past decade: following the Global Financial Crisis new concerns have indeed emerged related to the complexity of global financial relations, their role in shock transmission as well the ability of fundamentals to protect countries from financial instability. Against this background, recent research has focused on understanding better the implications of financial globalisation for economic stability and the design of policies. This literature review assesses these recent developments. After reviewing the most important trends in capital flows over the past decade, it takes stock of the discussion on the role of the global financial cycle in driving cross-border capital flows and financial instability, reviews the new findings on the real impact of international capital flows on recipient economies, and provides an overview of the ongoing debates on the role of capital controls and the need for policy coordination.

Keywords: cross-border capital flows, financial globalisation

JEL: F32, F42, F21

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Revue de la littérature récente sur les flux de capitaux internationaux : implications et suggestions de nouveaux travaux de recherche

La globalisation financière a donné aux flux internationaux de capitaux un rôle central dans le fonctionnement de l'économie mondiale, donnant par conséquent lieu à de nombreux travaux de recherches économiques sur ce sujet au cours des 30 dernières années. Tirer au mieux parti des avantages des flux de capitaux tout en réduisant les risques associés a toujours été un défi. Ce défi est toutefois devenu encore plus aigu au cours des dix dernières années, la crise financière mondiale suscitant de nouvelles préoccupations liées à la complexité des relations financières mondiales, leur rôle dans la transmission des chocs ou encore la capacité des fondamentaux à protéger les pays de l'instabilité financière. Dans ce contexte, les recherches récentes se sont attachées à mieux comprendre les implications de la globalisation financière pour la stabilité économique et l'élaboration des politiques. Cette revue de la littérature évalue ces développements récents. Après avoir examiné les grandes tendances des flux de capitaux au cours des dix dernières années, elle fait le point sur le débat concernant le rôle du cycle financier global sur les flux internationaux de capitaux et l'instabilité financière, les nouveaux résultats sur l'impact réel des capitaux internationaux sur l'économie des pays qui les reçoivent bénéficiaires, ainsi que les débats en cours sur le rôle des contrôles de capitaux et la nécessité d'une coordination internationale des politiques.

Mots clés : flux internationaux de capitaux, globalisation financière

JEL : F32, F42, F21

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FINDINGS OF THE RECENT LITERATURE ON INTERNATIONAL CAPITAL FLOWS: IMPLICATIONS AND SUGGESTIONS FOR FURTHER RESEARCH[1]

By Stéphanie Guichard

Growing financial openness and integration around the world brought annual gross cross-border capital flows from about 5% of world GDP in the mid-1990s to around 20% in 2007 and gross external liabilities from 60% to 180% of global GDP[2]. This financial globalisation process has given international capital flows a central role in the functioning of the global economy.

There is now a wide consensus that international capital flows can bring both good and bad. On the one hand, international capital flows support long-term growth through a better international allocation of saving and investment; when taking the form of foreign direct investments (FDI), they can also induce technology and management improvements; and, when taking the form of portfolio investments, they can enhance transparency and corporate governance by exposing recipients to international investors. On the other hand, they can complicate macroeconomic management of recipient countries, increase financial vulnerabilities, and can lead to financial crises and sudden stops with negative implications for economic growth. Capital inflows may also amplify domestic distortions, especially where poor corporate governance and financial regulation allow corporates and banks to take excessive risks and expand through international leverage.[3]

Capital account liberalisation issues have therefore generated considerable economic research over the past 30 years, especially on how recipient countries can make the most of international capital flows. This research has notably concluded that (i) capital flow liberalisation should only be engaged once a country has reached a sufficient level of financial and institutional development and has to be accompanied by policies to foster financial stability and avoid resource misallocations; (ii) the impact of capital inflows on recipient economies depends largely on the type of inflows, with FDI inflows being the most beneficial and short-term debt inflows the potentially most harmful[4], so structural policies that can improve the composition of flows have a key role to play;[5] (iii) appropriate macroeconomic policies, including allowing the exchange rate to appreciate or tightening fiscal policy as needed, help to reduce the magnitude of the credit cycle during capital inflow surges, while international reserves help countries protect themselves against financial crisis caused by outflows.[6]

Following the Global Financial Crisis, the financial globalisation process has marked a pause.[7] Global imbalances have narrowed. The fundamentals in many EMEs - which had often faced international-capital-

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1. Stephanie Guichard is currently on leave from the OECD, she can be contacted at st_guichard@hotmail.com. She would like to thank Catherine L. Mann and Sebastian Barnes (OECD Economics Department) and Anna Maria de Crescenzio (OECD Directorate for Financial and Enterprise Affairs).

2. OECD (2011).

3. Lane (2015).

4. This finding was confirmed by recent OECD analysis (Caldera-Sánchez *et a*l., 2016).

5. For instance, Furceri *et al*. (2012a) have found notably that pro-competition product market regulation and avoidance of overly stringent employment protection are associated with a higher share of FDI and a lower share of debt.

6. OECD (2011).

7. There have even been suggestions of a de-globalisation that would be due not only to investors preferences but also unconventional monetary policies and their interactions with regulatory policy and microprudential capital requirements, see Forbes, Reinhardt, and Wieladek (2016).

flow-related crises - have improved (IMF, 2016b). Nonetheless new concerns have emerged and international capital flows continue to be a major research and policy issue.

- First, the Global Financial Crisis (GFC) has shown that the transmission of shocks across the global financial system has become increasingly complex as a result of financial globalisation and the transformation of the financial industry by ICT[8]. The GFC has also exposed the limits of existing vulnerability monitoring and analysis.

- Second, the years since the crisis have been marked by a surge in capital inflows to EMEs, especially when advanced economies started the implementation of QE, and then by several episodes of potentially harmful capital flow reversals, especially during the "taper tantrum" that followed anticipation of the tapering off of quantitative easing in the United States.

- Third, global imbalances have started to rebuild.[9]

- Fourth, the expected further monetary tightening in the US has the potential to revive global financial tensions with major effects on EMEs.

- Last, the nature of capital flows has changed substantially over the past few years. While gross capital flows relative to GDP are still about half their pre-GFC level, the flows to EMEs now account for more than a third of total inflows, double their pre-GFC share.[10] This partly reflects the sharp contraction of cross border flows between advanced economies following the crisis and low returns in these economies associated with monetary accommodation, but also further financial liberalisation in EMEs. Capital flows to EMEs have slowed, reflecting slower growth, a higher dollar and the fall in commodity prices[11], but EME financial integration is set to continue with the welcomed further capital account liberalisation in many EMEs, notably China, but also India and South Africa which have continued to move toward greater capital account openness.[12]

Against this background, the direction of recent research has been driven by the need to better understand the mechanisms that have led to the GFC and more generally the implications of financial globalisation and the wider integration of EMEs to global finance, as well as the challenges they create for policy makers around the world. Global financial integration has not only led to an increase in the size of capital flows but has also affected the drivers of these flows, the transmission and contagion mechanisms with implications for a wide range of policies (including related to surveillance, prevention, and how to deal with inflows and outflows). Understanding these relations is essential to design policies to make the most of capital flows by allowing countries to reap their benefits while reducing associated risks.

The purpose of this paper is to take stock of where recent empirical and theoretical research stands in terms of understanding the current situation, associated risks and required policy packages, focusing on the most debated issues.

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8. See for instance Lo (2016) on how advances in computing hardware, software, telecommunications and data have transformed the financial industry and associated challenges.

9. IMF (2016a).

10. IRC Task Force on IMF issues (2016).

11. IMF (2016b); Clark *et al*. (2016), IRC Task Force on IMF issues (2016).

12. IMF (2016d).

The paper starts by reviewing the most important trends that have characterised capital flows in recent years, beginning with the growing decoupling between gross and net flows since the late 90s (section I) and then turning to the more recent phenomenon of EMEs non-financial corporations external borrowing (section II). It then takes stock of the discussion on the role of the global financial cycle in driving cross-border capital flows and financial instability (section III) and of new findings on the real impact of international capital flows on recipient economies (section IV). Turning to policy discussions, it reviews the ongoing debates on the role of capital controls and more generally capital flow management (section V) and the main issues related to policy coordination (section VI).

The decoupling between gross and net flows and its implications

Overview

One of the key lessons from the Global Financial Crisis has been the "decoupling" between gross and net flows and the associated vulnerabilities. The pre-crisis gross cross-borders flows between US and Euro Area are good illustration of the issue. As documented for instance by Mihaljek (2016), in the years just before the crisis, the Euro Area had a quasi-balanced current account; net capital flows to the US, although large, were stable. However, gross flows between the two regions intensified as European banks massively contracted short-term loans from the United States and invested back in US securities backed by subprime mortgages. This made the euro area extremely vulnerable to the US subprime crisis.

More generally, with global financial integration, surplus countries do not necessarily "finance" deficit countries, and economies with a balanced current account may still get important financing from abroad. Externally fed credit booms or sudden stops may hence occur even in the absence of current account deficit or even when a country has a current account surplus. Overall, a balanced current account with offsetting flows and positions may provide a "false sense of safety" (Tarashev et al., 2016). Moreover, given the size of gross flows, valuation effects tend to blur the traditional relationship between current accounts and net investment positions via valuation effects. Last, gross outflows have the potential to amplify or mitigate the impact of gross inflows fluctuations which have been the main focus of surveillance and empirical analysis. This traditional focus on inflows reflects to a large extent the succession of booms and bursts driven by foreign capital flows to EMEs following capital account liberalisation but has become less relevant following the progressive financial integration of EMEs.

Implications for economic research

The increasing size of gross capital flows has several implications for theoretical models. First the importance of gross cross-border flows shifts the way to deal with capital flows from an approach that treats them as the simple echo of real phenomena, such as savings and investment to be reflected in net flows, to an approach that treats them as flows of funds driven by financial choices (Bonizzi, 2017). The drivers of capital flows have therefore to be reconsidered and the determinants of financial choices including risk aversion and demand for liquidity better taken into account.

In addition, the relationship between current accounts and exchange rates, which used to largely focus on trade flows, is affected as current account balances depend increasingly on investment income (see Forbes *et al.* (2016) for further details and examples). Moreover, the "triple coincidence" between the GDP area, decision-making unit and the currency area of capital flows exporters or importers that is traditionally assumed is questioned (Avdjiev *et al*, 2015).

The changes induced by the growing size of gross flows have been reflected to some extent in the empirical research on the role of the global financial cycle and drivers of capital flows (section III.2) but as argued in this paper, empirical analysis still falls short of full coverage, especially as regards outflows.

The economic literature has also started to incorporate the implications of global financial integration in macroeconomic frameworks and investigate how financial shocks are transmitted across border through banks balance sheet constraints (section III.3). While research continues in this area a key challenge ahead is to formally incorporate these findings in macro-modelling approaches of open economies.

Implications for surveillance

From a more practical point of view, the role played by current accounts in international finance and global surveillance has been increasingly debated.[13]

In particular, current accounts have likely become a less relevant predictor of crisis than in past decades. Their monitoring has become insufficient to ensure global financial stability and needs to be complemented by a monitoring of gross international financial flows and positions (Obstfeld, 2012). Borio and Disyatat (2015), while recognising the importance of current accounts, especially if large and persistent, argue against their "*persisting centrality in international finance analysis and policy debates*". As mentioned above, a balanced current account cannot be taken as evidence of the absence of imbalances. On the other hand, to the extent it is large, a current account imbalance most likely still reflects other underlying imbalances or distortions and warrants further investigation.[14] Overall, this calls for a broad set of indicators, including a breakdown of the current account main components and gross capital flows, to be used for surveillance purposes, but broadening the set of indicators has to be balanced against the risks of making its analysis more difficult.

The monitoring of gross flows and gross international positions needs to go beyond the size of these flows and requires important data collection efforts. Recent work by the BIS stresses the importance of the sectoral composition of these positions, their currency denomination, and the borrowers' and lenders' nationality which may not coincide with their location (Avdjiev *et al*., 2015; Tarashev *et al*., 2016). One implication is the need for more comprehensive data as BOP statistics only give a partial measure of gross flows and vulnerabilities. For instance, standard measures of residents' external debt do not include dollar bank debts contracted locally nor bonds issued by foreign affiliates offshore. Avdjiev *et al*. (2017) have built a quarterly new dataset for 85 countries complementing BOP data with other sources (see Table 3 for more details) and shown that NFC external borrowing in advanced economies was much higher than suggested by BOP data in the years to the GFC; this is also case now for NFC external borrowing in EMEs. The BIS most recent efforts to collect new data have focused on better grasping the geography of international banking using detailed locational banking statistics and identifying the claims and liabilities of banks in each reporting country on counterparties in more than 200 countries (BIS, 2016).[15] In addition, Emerging Portfolio Fund Research (EPFR) data that tracks mutual funds flows in and out EMEs has been increasingly used as a complement or substitute to BOP bond and equity inflows (as for instance in Khatiwada, 2017). These efforts also involve getting a better grasp of intrafirm cross-border financial transactions (see next section on their importance in the current context) which will require some changes in corporate balance sheet reporting.

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13. See CEPR (2010) for some examples of importance of current account imbalances in policy debates, including related to the Global Financial Crisis.

14. This is especially the case in the current zero lower bound situation where current account imbalances may have a greater destabilising potential. Gourinchas and Rey (2016) argue in particular that at the zero lower band, external surpluses tend to propagate stagnation as countries attempt to get a higher share of depressed global demand via a weaker currency, increasing the potential for negative spillover and currency wars.

15. The data can be downloaded from the BIS website, http://www.bis.org/statistics/full_data_sets.htm.

Vulnerabilities associated with rise in EME corporate debt

More attention paid to gross flows and positions and efforts to collect more comprehensive data point to current sources of vulnerability that an analysis limited to current accounts and domestic credit growth may not fully appreciate. While gross flows to EMEs as measured by BOP data have slowed since 2010, foreign debt accumulated by EMEs non-financial corporation (NFC) has increased substantially and become an important source of concern.

A multiform increase in foreign borrowing by EMEs NFC

Before the Global Financial crisis, cross-border banking flows, especially between advanced economies but also between advanced economies and EMEs, accounted for the largest share of international gross capital flows. Now, bond issuance by EMEs NFCs, including in offshore financial centres account for a large share of international capital flows. The reduction in the share of bank flows to EMEs not only reflects a retrenchment in global banking activities after the GFC, but also the domestic financial deepening in EMEs (Obstfeld, 2015). The increase in foreign borrowing by EMEs NFC, qualified by Eichengreen (2016a) as "*the not-well-understood corporate debt problem*", is documented in several studies - including Chui *et al*. (2014), Tarashev *et al*. (2016), McCauley *et al*. (2015), Acharya *et al.* (2016), Serena and Moreno (2016), Caballero *et al.* (2015) and Caballero *et al.* (2016) - which have benefited from on-going work to collect relevant data while also contributing to these efforts. Table 1 summarizes the source and coverage of the data used in the empirical analysis included in these studies.

These studies show in particular that:

- A large share of NFC external borrowing has taken place in foreign currencies. McCauley et al. (2015) estimate that dollar denominated borrowing accounts for two-thirds of corporate debt in Mexico, half in Indonesia, close to one-third in Turkey and South Africa. This share is much lower in China (5%) because of the restrictions on foreign currency borrowing but Chinese NFCs account for 73% of the total dollar corporate debt in EMEs.

- The rapid growth in dollar debt has taken different forms and channels that can be linked to policies and especially macro-prudential measures. According to McCauley et al (2015), despite a rapid increase in dollar bond emissions, dollar bank loans still account for the largest share of NFC borrowing in foreign currency in China, India, Russia and Turkey. These loans were distributed mostly by resident banks, except in India. While these loans are not per se foreign borrowing, they nonetheless constitute a major external exposure of NFCs. The source of the dollars lent by banks also varies, with Chinese and Russian banks relying on dollar deposits and Turkish banks issuing dollar bonds and borrowing dollars from foreign banks. In the other EMEs, bonds emissions have increased much faster than bank loans and now account for more than half of dollar debt.

- Bond emissions have increased substantially almost everywhere and a striking feature has been the growing share of off-shore emissions that are not fully captured as they are not reported as cross-border portfolio inflows in standard BOP statistics. According to Tarashev et al. (2016), roughly half of the new external financing by NFCs has occurred offshore through subsidiaries abroad. This phenomenon has been driven by the combination of the underdevelopment of financial markets in EMEs with the improvement of external financing conditions (Serena and Moreno, 2016) and firms with poorer credit quality, less ability to cope with regulation or more informational asymmetries have tended to issue in the least regulated markets (Fuertes and Serena, 2016).

Associated vulnerabilities

These findings complement another stream of empirical research that has focused on corporate leverage in EMEs (IMF, 2015a) and suggests that there has been a significant increase in EME corporate leverage especially in vulnerable sectors (e.g. construction, but also gas and oil and mining that are sensitive to global economic cycle). This increase also seems to have been accompanied by a deterioration of firm-level characteristics, including rising foreign exchange exposure.

Against this background, a key question is whether the increase in corporate external exposure is likely to lead to destabilising dynamics, especially when the dollar appreciates and NFCs with liabilities in dollars and assets in local currency face a deterioration of their balance sheets and, most likely, tighter credit supply. This issue is still debated. But most recent empirical analysis points to high risks.

First, data on currency risk hedging suggests that NFC have not systematically hedged against currency mismatches (Caballero *et al*., 2016).

Second, studies on the use of US dollar financing by EMEs point to vulnerabilities. Risks can be contained when foreign currency borrowing is driven by trade finance and FDI motivations. This is also the case when foreign currency borrowing finances fixed asset investments in domestic tradable sectors, although in that case NFC external financing can generate maturity mismatch on corporate balance sheets and increase volatility (Converse, 2015). However, risks increase when foreign currency borrowing finances fixed asset investments in the non-tradable sector, as seems to be somewhat the case (IMF, 2015a). Moreover, when foreign currency borrowing is used to fund financial investments at home or abroad and motivated by carry trade activities, risks are much higher. It is quite difficult to document how foreign currency borrowing is being used, especially when the funds are borrowed off-shore by affiliates which can then lend them directly to their headquarters, unrelated NFCs, non-bank financial institutions or public entities, or deposit them in a local bank. Several studies suggest nonetheless the importance of NFC trying to take advantage of interest rates differentials through foreign borrowing. In particular, Chui *et al.* (2014) and Bruno and Shin (2015) have found evidence of increases in cash holdings associated with off-shore borrowing. Serena and Moreno (2016) have found evidence of offshore bond proceedings being used for investment in short-term financial assets. Caballero *et al.* (2015) have found evidence in the same direction and shown that non-financial corporations are more likely to act as financial intermediaries when returns from carry trades are high (which has been the case over the recent period) and there are controls on capital inflows.

Overall, there is evidence suggesting that a significant share of new foreign currency borrowing by non-financial corporations in EMEs has been financing financial assets acquisitions or deposited in local banks rather than investment in fixed assets. This has been supported by the favourable carry trade opportunities resulting from the low dollar interest rates. A USD appreciation and an increase in dollar interest rates could hence lead to a fast unwinding on some of these positions.

Table 1. Overview on empirical work on foreign borrowing by EMEs NFC

	Country coverage / Time coverage	Methodology	Main data sources
Serena and Moreno (2016)	NFCs from 34 EMEs and 7 small AEs Annual, 2000-2015	Panel estimation	Multiple sources including Bloomberg,
Caballero *et al.* (2015)	NFCs from 18 EMEs Annual, 2000-2014	Panel estimation	Firm balance sheet from Worldscope database Bond issuances from Dealogic, DCM database
Caballero *et al.* (2016)	NFCs from 17 EMEs Annual, 2000-2014	Panel estimation; SVAR	Stocks of corporate debt from BIS Bond issuances from Dealogic, DCM database Option adjusted spreads from Bloomberg
Bruno and Shin (2015)	NFCs of 47 countries both EMEs and AEs (excl. US) Annual, 2002-2014	Logit, Tobit	Bond issuance activity from the SDC Platinum New Issues Database (Thomson Reuters) Balance sheet from Worldscope database

Implication for economic research and policy

Further analysis is needed on how these imbalances may unfold. As explained below, most of the recent studies of the crisis transmission mechanisms ignore the role of NFCs. In addition, more research is needed on the potential role of legal frameworks for corporate insolvency, the resolution of non-performing loans (NPLs) and financial regulation in mitigating these vulnerabilities. How financial regulation could be extended from banks to corporates or off-shore/shadow banking and contribute to prevent excessive NFC foreign-currency debt is an important area where more investigation would be useful.

A related issue is the need to discourage corporations from building up excessive levels of foreign-currency debt. While policies to reduce the existing tax bias in favour of corporate debt (see below) could play a role, little has been said on how - as suggested by Eichengreen (2016b) - improvement in corporate governance frameworks, notably in EMEs (e.g. disclosure requirements), could help.

The global financial cycle and its implications

The capital inflow surge to EMEs that followed the implementation of QE in advanced economies, the "taper tantrum" episode, the vulnerabilities associated with EME corporate borrowing have all revived the debate on EMEs vulnerabilities to global financial shocks, especially the monetary policy stance in advanced economies.[16]

- On the one hand, some cautious optimism on the risks of major financial turmoil comes from improvements in the situation in EMEs over the past decade including stronger policy frameworks with more flexible exchange rate regimes, better anchoring of inflation, higher levels of foreign reserves (IMF, 2016b) and the ability of macroeconomic stabilisation policies and prudential tools in managing financial vulnerabilities (Acharya et al., 2016).

16. The abundant empirical literature focusing specifically on the impact of QE on inflows to EMEs is not reviewed here. An up-to-date overview can be found in Khatiwada (2017).

- On the other hand, the improvements in EMEs fundamentals and macroeconomic management as a shield against financial turmoil and sudden stops may be undermined by the growing importance of the global financial cycle resulting from global financial integration (Eichengreen and Gupta, 2016).

Against this background, a large stream of the recent empirical literature on capital flows has been devoted to disentangling push or global factors (such as global risk aversion, global liquidity, interest rates or growth in advanced economies) from pull or local factors in receiving countries (such as domestic macroeconomic fundamentals and structural policy settings). In addition, more analytical work has been devoted to better understand the transmission mechanisms behind the global financial cycle.

This literature is of crucial relevance at a time shocks on global push factors, such as the appreciation of the US dollar, the increase in US interest rates and the tapering to QE in Europe, may be forthcoming. It is a key input in defining and designing policies to deal with capital flows and in particular whether the priority should be policies to further improve domestic fundamentals or to mitigate the impact of global shocks.

This section first gives an overview of previous empirical findings (III.1) and presents the most recent empirical evidence (III.2). It then reviews the recent analytical research on the mechanisms behind the global financial cycle (III.3) as well as the on-going debate on the best policies to deal with it (III.4). It concludes on the needs for further research (III.5).

Previous empirical findings

The interest in push and pull factors in driving capital flows is not new and dates from the early 1990s when capital flows returned to Latin American countries after the debt crisis of the early 80s (see for instance Calvo *et al.*, 1992). The abundant literature since then has produced mixed results, which partly reflect the variety of country samples and subperiods under study. The key findings are summarised in the literature review by Koepke (2015) which analyses 40 studies devoted to push and pull factors from 1996 to 2014. A main conclusion of this review is that the drivers of capital flows have been found to vary over time and across countries as well as across the different types of capital flows. In particular, there seems to be quite robust evidence that push factors are the leading drivers of portfolio flows, and pull factors the leading drivers of banking flows and even more FDI flows (See Table 2 taken from Koepke (2015)). A more recent literature review that includes studies of the 2013 taper tantrum concludes that pull factors tend to dominate in quiet times, while push factors tend to dominate during crisis (see IRC Task Force on IMF issues, 2016).

Table 2. Drivers of EM Capital Flows identified by Koepke (2015)

Type	Driver	Portfolio Equity	Portfolio Debt	Banking Flows	FDI
Push	Global risk aversion	–	–	–	?
	Mature economy interest rates	–	–	–	?
	Mature economy output growth	+	+	?	?
Pull	Domestic output growth	+	+	+	+
	Asset return indicators	+	+	+	?
	Country risk indicators	–	–	–	–

+	Strong evidence for positive relationship
+	Some evidence for positive relationship
?	Mixed evidence, no clear relationship
–	Some evidence for negative relationship
–	Strong evidence for negative relationship

Source: Koepke (2015).

New empirical evidence

Recent work has gone further in analysing the mechanisms by which push factors affect EMEs (or even AEs; see Table 3) and the sensitivity of the different types of flows to global factors. The issue has not only been whether global factors have become more important following global financial integration but also, against the background of the differentiated impact of the taper tantrum on EMEs, whether some fundamentals affect the sensitivity of countries to these factors. Hence, instead of opposing the role of fundamentals to the role of global factors, the focus has been increasingly on how they interact and on the role of country structural characteristics in mitigating the impact of the global financial cycle.

A first stream of empirical literature has relied on time series analysis and assessed the role of global factors via the identification of common components or co-movements of capital inflows to EMEs rather than identifying global push factors in an ad-hoc way (Cerutti *et al*., 2015; Sarno *et al.*, 2015; Byrne and Fiess, 2016; see Table 3). It is only once a global component has been identified that it is linked to global variables. Among the global factors under consideration (US rates, commodity prices, uncertainty and risk aversion as measured by the VIX, US exchange rate, growth in advanced economies), the VIX has been found to play a prominent role in recent years. Most studies have confirmed the importance of global factors as a driver of capital inflows to EMEs; they could account for over 80% of the movements in international portfolio flows (Sarno *et al*., 2015) and have a permanent effect on capital inflows while individual country shocks only have a temporary effect (Byrne and Fiess, 2016).

The findings on the determinants of countries' sensitivity to global factors are mixed. This likely reflects the sensitivity of the results to the sample under study and the choice of flow data and fundamentals (see Table 3), but also the need for further disaggregation of flows by type of flows and borrowers. On the one hand, Sarno *et al.* (2015) have not found any major cross-country differences in the sensitivity of countries to push factors. On the other, other studies have found that country characteristics shape the sensitivity to global factors but do not always agree on these characteristics. For instance, Byrne and Fiess (2016) have found that the impact of global shocks is stronger for bank and equity flows than for bond flows and also depends on countries' financial openness and institutions. Hoggarth *et al.* (2016) have also found that the impact of global factors is larger for bank flows, and especially when loans are in foreign currency. They have found that the impact of global factors is smaller for countries with better capitalised banking systems and larger for countries with higher financial openness. IMF (2016b) has found that countries with higher financial openness are more exposed to global shocks while flexible exchange rates regimes, higher reserves and lower public debt reduce this exposition. However, Cerutti *et al*, (2015) have found a limited role for fundamentals such as the level of reserves, trade openness and exchange rate regime in the sensitivity of bond flows to global factors and a much larger role for market structure characteristics (i.e. the deepness of the financial sector and the exposure to international funds and global banks).

Avdjiev *et al.* (2017) have gone one step further in the analysis by splitting gross debt inflows by the recipient sector (government, central bank, banks, and NFCs) and found that the impact of global risk aversion varies with the borrowing sectors and the type of countries. They show in particular that when risk aversion increases foreign capital borrowed by banks and NFCs in both advanced and emerging economies and by sovereigns in EMEs declines, but that debt inflows to advanced economies sovereign increase. A step further would be to assess how fundamentals and structural settings affect these relations.

Another new extension of the empirical analysis is the study of outflows. Eichengreen *et al.* (2017) have notably found that, as with non-FDI inflows, non-FDI outflows respond negatively to increases in global risk aversion and that FDI outflows from emerging markets also respond negatively to increases in global risk aversion while FDI inflows into emerging markets where mostly driven by pull factors. They have also shown that the sensitivity of outflows from EMEs to global risk aversion has increased overtime. This analysis starts filling a gap in empirical analysis that had been so far quite limited on outflows.

IMF (2016b) has proposed some analysis of outflows but concluded that the estimation results are less robust and more difficult to interpret than for inflows. Adler *et al.* (2014) have investigated the role played by domestic investors in offsetting the behaviour of non-resident investors in response to global shocks. Using a panel VAR they have shown that asset repatriation seems to offset inflow reversals triggered by global uncertainty shocks but that this effect is more limited following a shock on long-term U.S. interest rates. The study has pointed to cross-country differences but there is no attempt to link them to structural/fundamental country characteristics. Alonso Álvarez (2015) has studied both outflows and inflows but in a long run perspective and shown that countries with strong institutions may repatriate flows during stressed times which would mitigate inflow reversals.[17]

17. Ghosh and Qureshi (2016) study the different impact of resident/non-resident flows on EMEs and conclude that their impact is the same, but they do not study what drives the outflows.

Table 3. Overview on most recent empirical work on global push factors

	Country coverage / Time coverage	Type of capital flows	Methodology	Main data sources for capital flows
Cerutti *et al*. (2015)	34 EMEs 2001Q1- 2013Q4	Breakdown following BOP classification Global Bank flows Mutual Fund Flows	Latent factor model	IMF's Balance of Payment EPFR BIS
Sarno *et al.* (2015)	55 countries (EMEs and AEs) Jan. 1988 Nov. 2013	Monthly international bond and equity flows		US Treasury International Capital database
Hoggarth *et al.* (2016)	31 AEs and 21 EMEs 1995Q1–2015 Q3	Gross inflows with breakdown following BOP classification Gross banking inflows	Cross-country panel regression	IMF IFS BIS, International Banking Statistics EPFR
Byrne and Fiess (2016)	64 EMEs 1993Q1-2009Q1	Equity, bond and bank flows	Principal components and PANIC methodology	Euromoney Bondware and Loanware
Avdjiev et al (2017)	25 AES, 28 EMEs, and 4 developing countries 2001Q3-2014Q4[1]		Cross-country panel regression	IMF (BOP and IIP); BIS: (locational banking statistics, consolidated banking statistics, and international debt securities) World Bank: the Debt Reporting System Quarterly external debt statistics the IMF and World Bank
IMF (2016b)	22 EMEs 2000Q1-2015Q2	Gross inflows and outflows, equity flows, debt flows	Time series Cross-country panel regression	IMF's Financial Flows Analytics database
Shaghil *et al.* (2014)	7 episodes of EME financial stress 20 EMEs		Cross-section regressions	
Eichengreen *et al.* (2017)	34 EMEs 1990Q1-2015 Q4	Gross inflows and outflows with breakdown following BOP classification	Cross-country panel regression Probit	IMF's Balance of Payments Statistics
Eichengreen and Gupta (2016)	1991Q1-2014Q4 20 to 34 EMEs	Gross portfolio inflows Gross other inflows	Probit	IMF IFS

1. The full data set on capital flows includes 25 AEs, 34 EMEs and 26 developing economies from 1996Q1 to 2014Q4.

Another stream of studies has focused on turmoil times and has also produced mixed evidence. Shaghil *et al.* (2014) have found more differentiation by international investors since the financial crisis and in particular during the tantrum episode than in the 90s and 2000s and suggested that EMEs with stronger economic fundamentals (including macroeconomic fundamentals, openness and financial development) suffered less during the 2013 taper-tantrum episode. Recent IMF research on the taper tantrum focusing on the drivers of market reaction suggests that during initial phase of acute stress, countries were hit indiscriminately, but differentiation grew over time, with good macroeconomic fundamentals helping dampen market reactions (see Sahay *et al.* (2014) for a summary). On the other hand, Eichengreen and Gupta (2016), who have studied sudden stops in EMEs using a probit model, have found that since 2002 sudden stops have been increasingly driven by global factors, including global risk aversion measured by the VIX (while role of US monetary policy has declined) and that domestic and regional factors have played a smaller role, leading to the conclusion that the benefits from better fundamentals have been offset by larger external global shocks.

The global banking channel

The implications of the increased size of gross cross-border flows and the existence of a global financial cycle have started to be reflected in theoretical approaches of open macroeconomy, particularly with more analytical work on the specification of the core mechanisms behind the transmission of global shocks. Many studies have focused on the role of global banks in propagating liquidity/financial conditions shocks. This reflects the role played by cross-border banking flows, especially between advanced economies, in propagating the US subprime crisis across the international system during the global financial crisis.

The introduction of capital markets frictions affecting banks' balance sheets and risk taking behaviours in the traditional Keynesian open economy approach allows for the global banking channel to transmit financial shocks alongside the traditional interest rate channel. In this approach, exchange rate fluctuations are transmitted, not only via net exports, but also via the balance sheets of financial intermediaries that borrow in foreign currency. They can generate financial instability, credit booms and credit contractions.

- Bruno and Shin (2015) have proposed a model of international banking where global and local bank leverage plays a central role in transmitting global financial conditions across borders. In this model, exchange rate movements, especially US dollar fluctuations, become a source of global shocks through the financial system via leverage effects.

- In the same way, Aoki et al. (2016) have proposed a small open economy model with international financial markets where local banks fund capital investment by issuing deposits to domestic households and borrowing abroad. A depreciation of the local exchange rate reduces the net worth and intermediation capacity of local banks that have borrowed in foreign currency. The impact is amplified if the exchange rate depreciation leads to inflation and hence tighter monetary policy.

- Banerjee et al. (2015) have used a DSGE model with global banks and local banks facing balance sheet constraints to explore the sources of spillovers through spreads, leverage, and reduced loans to EME local banks. They have concluded that in such a framework, exchange rate flexibility does not suffice to shield economies from the impact of global shocks.

There is empirical support for this international banking channel and the associated global credit cycle. Cesa-Bianchi *et al.* (2017) have found evidence of a common factor explaining up to half of the variance of domestic credit growth in 38 advanced and emerging countries in recent years and support for the transmission channels being mostly through the financial sector rather than trade and real effects. Baskaya *et al*. (2017a, 2017b) have also found supporting evidence in the case of Turkey.

Policy implications

The empirical and analytical research on the role of global factors as drivers of capital flows and on the transmission mechanisms has given rise to several important policy debates, first on the role of country fundamentals in protecting countries from financial turbulences, and second on the effectiveness of monetary policy under a flexible exchange rate regime combined with capital account openness. Two of the main consensus views on capital flows have hence started to be questioned: the role of good fundamentals and the role of flexible exchange rates derived from the Mundell Fleming trilemma.

The mixed findings from the push-pull literature have questioned the broad consensus that better institutions and fundamentals reduce countries' exposure to adverse global financial shocks. They have played an important role in the rehabilitation of some potential for capital controls in the policy toolkit (see below, section V) on the grounds that sound domestic macroeconomic policies and structural policies may not suffice to shield EMEs from the impact of a global financial cycle driven by financial conditions in advanced economies, uncertainty and risk aversion. Still, most studies point to a lower sensitivity of FDI to global factors. As the consensus on the role of the composition of inflows for financial stability is not questioned (see further evidence in section IV below) and given the role played by good fundamentals in the composition of inflows, this suggests that good institutions and fundamentals remain essential policies against financial instability. Moreover, the increased role of NFC in driving directly external borrowing points to the need for policies to reduce the debt bias including changes in the tax treatment of debt and corporate governance.

The existence of a global financial cycle that affects countries independently of their exchange rate regime has questioned the ability of the move towards more exchange rate flexibility by many EMEs over the past two decades to shield them better from financial turbulences than the less flexible regimes of the 90s. This is especially the case as exchange rate fluctuations may amplify the impact of financial shocks via balance sheets effects.[18] While this point is largely shared by recent analyses, the further implications for policy making including monetary policy and for how countries receiving inflows can mitigate the domestic impact of the global financial cycle is under debate.

On the one hand, Rey (2016) and Han and Wei (2016) argue that under full capital mobility, countries outside the US lose monetary autonomy, even with flexible exchange rate. This conclusion, that flexible exchange rates cannot guarantee monetary autonomy in a world where capital moves freely, goes against one of the key principle of open economy textbooks, the Mundell-Fleming traditional trilemma. According to the trilemma while is impossible to have simultaneously a fixed exchange rate, full capital mobility and monetary policy independence, two of the three can coexist. This research calls for policies to curb excessive leverage and credit growth, and mute the credit channel. Prudential policies become essential, but also capital controls have a role as they can, in addition, restore some monetary independence.

On the other hand, Banerjee *et al.* (2015) and Obstfeld (2015) reject the view that monetary policy becomes ineffective under open capital account and flexible exchange rates but rather stress that central bankers have to deal with worse trade-offs related to financial stability issues. Banerjee *et al.* (2015) propose a model in which these trade-offs can be addressed with optimal monetary policy in EMEs. The

18. This does not mean however that exchange rate flexibility does not have advantages over fixed exchange rates including avoiding the buildup of real exchange rate overvaluation/undervaluation and speculation. Caldera Sánchez and Gori (2016) find for instance that have a more flexible exchange rate is associated with a lower risk of currency crises.

debate hence goes to central bank objectives, and whether they should include financial stability and "lean against the wind", and the available instruments to do that.[19]

Another implication of the role of global push factors is the importance of policies in countries from which capital flows originate (IMF, 2012). For instance, Ostry and Ghosh (2013) called for action in source countries to raise the cost of risky carry trade activities. Some EMEs called for the Fed to take into account the impact of its policy on EME (Rajan, 2014) and triggered a debate of the need for monetary policy coordination (see section IV).

Need for further research

Overall current research points to global financial integration leading to a global financial cycle driven by policy developments in advanced economies and risk aversion but it is still unclear about the policies that can help recipient countries deal with this cycle. There are several areas where more analysis is needed.

First, the understanding of the forces at play does not seem comprehensive enough to reflect the implications of financial globalisation, although the gap in empirical analysis is filling quickly. In particular, the empirical literature on push factors while benefiting from new econometric approaches and looking into more disaggregated data is incomplete and there is room for new contributions in at least two main directions.

- Little attention has been put on who are the recipients of the international capital flows (especially whether they are private or public, to which economic sector they belong) despite their potential influence on the behaviour of flows (Koepke, 2015). A few studies have looked into the impact of global factors on corporate leverage but they do not separate domestic and external borrowing. IMF (2015a) has studied the drivers of corporate leverage growth, bond issuance, and spreads in EMEs and shown that the contribution of global drivers has increased at the expense of firm- and country-specific characteristics. Alter and Elekdag (2016) have studied the impact of global financial conditions on EME corporate leverage growth and found a positive role U.S. monetary conditions. Avdjiev et al. (2017) is so far the most comprehensive study splitting gross inflows by recipient sectors. Building on this type of study and the newly built datasets to look into how country characteristics affect the drivers of corporate external borrowing could bring further insight on the current risks and vulnerabilities and help identify the type of fundamentals that could best shield countries from the impact of the global financial cycle.

- In addition, with the growing financial integration of EMEs, outflows may mitigate or amplify the impact of inflows slowdown or reversals or even surges. However, little empirical research has been devoted to outflows besides the very recent empirical analysis in Eichengreen et al. (2017). A deeper analysis of outflow behaviour is all the more important that the liberalisation of the Chinese and Indian capital account is still on-going and may lead to even more important role of outflows. It is also necessary to better understand how specific policies in advanced economies (or even EMEs) can affect outflows.

- More generally, with EMEs more integrated in the global financial system, the drivers of inflows may change as more flows take place between EMEs rather than between EMEs (as recipients) and advanced economies (as investors) as is already the case to some extent with FDI.

19. See for instance Filardo and Rungcharoenkitkul (2016) for some support to leaning against the wind and Svensson (2017) and (IMF 2015b) for opposite views.

Second, the analytical work devoted to the transmission of financial shocks across borders could be extended in two directions.

- One of these directions is a more explicit introduction of NFC with external exposure in modelling and theoretical frameworks. While most of the literature refers to the interaction between global and local banks in transmitting financial and monetary shocks, the same type of mechanisms could occur if instead of local banks, the financial intermediaries were large NFCs with foreign branches and borrowing offshore. In this case, the transmission channel is more complex because of the interactions between corporates and local banks balance sheets. The deterioration of the balance sheets of externally exposed NFCs could indeed lead to a deterioration of the quality of assets (loans or securities) of local banks. Their liabilities could also be affected if NFCs withdrew deposits to meet their foreign obligations (Acharya et al., 2015). These mechanisms have not yet been incorporated formally in theoretical frameworks. Further work is hence needed not only to monitor NFC foreign exposures but also to identify policies that can help contain currency-mismatches and avoid spillovers.

- In addition, more empirical analysis is needed to assess the relative magnitude of the trade and balance sheet channels of the exchange rate and how it varies across countries and why.

More evidence on the real impact of capital flows

Capital inflows, allocation of resources and productivity

Another stream of empirical research has looked into the real impact of capital flows on recipient countries. In particular, it has investigated whether the traditional views, according to which capital account liberalisation increases aggregate productivity through a more efficient allocation of resources and capital controls prevent capital to flow where it is most productive, hold and under which conditions. These concerns are not new and were examined in the past in the context of the link between financial opening and economic growth.

This recent literature has found further evidence that capital inflows may create important distortions in the allocation of resources that harm productivity and amplify the impact of subsequent flow reversals; it has also found evidence that the pre-crisis financial boom led to labour misallocation.[20] Focusing on countries (both EMEs and AEs) that have experienced a surge of inflows over the past 35 years, Benigno *et al.* (2015) have found evidence of a stronger shift of labour out of manufacturing during these 155 episodes associated with a sharper contraction afterwards. However, the accumulation of international reserves during surges seems to limit the extent of labour reallocation. Reis (2013), Benigno and Fornaro (2014) and Gopinath *et a*l. (2016) have shown that capital inflows caused a transfer of economic resources from tradable to non-tradable sectors in Portugal, Spain and Italy in the years to the Global Financial Crisis. To the extent that non- tradable sectors are characterised by slower productivity growth this has also reduced aggregate productivity.

20. This complements other analyses focusing on credit booms such as Borio *et al* (2015), which, using a sample of 21 advanced economies over the past 40 years, have found evidence of credit booms undermining productivity growth through misallocation of labour across sectors, even larger and persisting impact when they burst.

More analysis on the composition of capital flows and policy implications

Empirical research has also been devoted to further document the differentiated impact of the different types of capital flows, and especially focusing on the difference between debt and equity flows. This is particularly relevant at a time a large share of inflows to EMEs are driven by NFCs external debt. On a sample of 53 EMEs over 1980–2013, Gosh and Qureshi (2016) have confirmed previous evidence that debt flows are more likely to result in economic overheating and domestic credit boom than equity flows[21] while Eichengreen *et al*. (2017) and Pagliari and Ahmed Hannan (2017) have shown that debt flows remain the most volatile type of flows. Moreover, Igan *et al* (2016) [22], Hoggarth et al (2016) and Converse (2015)[23] have found evidence that debt inflows are associated with higher output growth volatility than equity inflows (even though debt inflows are associated with stronger growth in financially constrained sectors). This research points to the role of well-functioning domestic financial markets and banking systems to deal with the volatility of associated with debt flows.

With NFC playing a more important role in external borrowing, a policy implication is the need to shift NFC financing from debt to equity financing as this could help shifting the composition of capital flows towards more equity. This is in line with recent OECD findings summarised in Cournède *et al.* (2015), which, in the broader context of financial stability, point to the need to deal with the debt bias in NFC financing. The IMF (IMF, 2016e) has estimated that this corporate debt bias increases debt ratios by on average 7% of total assets, including for financial institutions. Landgedijk *et al.* (2015) have also found some empirical evidence of the role of tax bias in increasing financial instability. Reducing this bias would require reforms of national tax systems that treat equity less favourably than debt. This could be done either by limiting or eliminating the tax deductibility of debt service payments for banks and corporates or providing some allowance for returns on equity (Mooij and Hebous, 2017; Eichengreen, 2016b; FSB, 2015). But a possible tradeoff in doing so is that equities are perceived as risky and reducing debt issuance may reduce the supply of international liquidity (Eichengreen, 2016b).

Need for further research

The link between capital inflows and productivity issues deserved further investigations. It is indeed essential to go beyond the analysis of the impact of capital flows on resources allocation and productivity and identify the structural settings that can limit misallocation, including the role of capital inflow composition.[24]

The debate on capital flow management policies

One of the most important, and yet unsettled, policy debate regarding international capital flows relates to the use of capitals control or more generally capital flow management (CFM) measures. [25] As the risks

21. On previous studies see for instance Furceri *et al* (2012b).

22. On a sample of 22 emerging market economies from 1998 to 2010.

23. On a sample of EMEs and AEs since 1990.

24. For instance, there is some evidence that FDI inflows are not only less volatile than debt and equity inflows but may be associated with lower risks of misallocation of capital than equity or debt inflows because they reduce asymmetries of information between foreigners and locals (see for instance Kirabaeva and Razin, 2010).

25. CFM measures include both capital controls and some prudential measures designed to reduce capital flows (IMF, 2012). Macro prudential measures are prudential tools primarily designed to limit systemic financial risk and maintain financial system stability.

associated with international capital flows have become more obvious, there has been a slow shift in the post-Bretton woods consensus view that capital should be allowed to move freely across countries and that the use of capital control, even in face of large inflows or sudden stops, was unwarranted.

This renewed support for some role for capital controls raises several questions that the recent literature has sought to address: What is the economic rational of these controls? Are they effective in the country that implements them and what are their costs and benefits? When (surge or crisis) should they be used and under which form (tax, other)? Do capital controls in one country lead to capital flows diversion to other countries?

A rehabilitation, under conditions

As mentioned above, up to the global financial crisis, the mainstream view admitted that full capital account opening should only take place once a sufficient level of financial and economic development was reached and required adequate accompanying policies, but it regarded free movement of capital as the ultimate objective. While capital controls have always had supporters, the debate on the rehabilitation of controls in the policy toolkit started in the context of the Asian crisis, when Malaysia used capital controls instead of seeking IMF financial support. It intensified when several EMEs introduced capital controls to tame the capital inflow surges that followed the exceptional monetary accommodation in advanced economies after the global financial crisis. The debate also took place in the context of the wider consensus on the role of macroprudential policy in buttressing financial stability.

Right after the GFC unfolded, IMF research (Ostry et al 2010, Ostry et al 2011 IMF 2011, IMF 2010) concluded that capital controls before the crisis had been associated with reduced financial vulnerabilities during the crisis, although Blundell-Wignall and Roulet (2014) noted sensitivity of the Ostry et al (2010) findings to the inclusion of specific countries. This research led to the IMF institutional view in 2012 (IMF, 2012) that stated that "*the temporary re-imposition of CFM measures under certain circumstances is consistent with an overall strategy of capital flow liberalisation*", hence rehabilitating capital controls in the policy toolkit. This rehabilitation has been nonetheless conditional. The IMF only recommends CFM on inflows when the exchange rate is already overvalued, reserves are already at adequate level and the economy is overheating. The IMF institutional view also stresses that in times of crisis, controls should not substitute for adequate macroeconomic policies, and should be transparent, targeted, temporary, and preferably non-discriminatory.[26]

The OECD Code of Liberalisation of Capital Movements has always allowed the introduction of new capital flow restrictions in certain circumstances. But the OECD remained more cautious in the debate, stressing the uncertainty on the efficiency of capital controls and the distortions they may create if implemented and maintained. It recommended that "*such controls are best seen as a last resort and as temporary solution and should preferably be subject to multilateral surveillance as in the framework created by the OECD Code of Liberalisation of Capital Movements*", OECD (2011).

Since then, the discussion on the ability of countries to maintain monetary policy independence under capital account liberalisation (see section III.4 above) has brought more, although also controversial, support to the role of capital controls. This view would support a more durable role for CFM than intended in IMF or OECD views.

26. Moreover, the IMF does not recommend the use of capital controls on outflows outside crisis time, when, macroeconomic policies and financial supervision/regulation should be able to mitigate the negative effects of capital outflows.

Another perspective on the use of capital controls comes from the limits of macroprudential policies in addressing financial instability associated with international capital flows that are not intermediated through banks, which have increased since the crisis. For instance, Aoki *et al* (2016) using a model of a small open economy integrated into international financial markets have found some support for the role of prudential policies to deal with external financial shocks if financial intermediaries are banks but reckon that if financial intermediaries are NFC this role will limited.

When should CFM be used?

Several analyses support the view that capital controls should be used countercyclically, especially in good times to limit external borrowing. This is because restricting capital inflows during boom times reduces the potential outflows during busts and hence the externalities associated with the deleveraging cycle, and hence can lead to higher welfare as demonstrated using small open economy models by Jeanne and Korinek (2010), Bianchi (2011) or Benigno *et al. (*2016).

This counter-cyclical use of capital controls has received some empirical support, including from Blundell-Wignall and Roulet (2014) who have found that capital restrictions on inflows when capital flows into a country tend to be associated with higher growth outcomes (and lower growth outcomes when applied in crisis times). However, there is also some rational for pro-cyclical capital controls (reduced during boom, tightened during crisis) as shown for instance by Schmitt-Grohé and Uribe (2016).

In practice, surges have been limited since 2012 and CFM measures have been used essentially in times of stress. The IMF has recently reviewed the use of CFM measures since it issued its institutional view in 2012 (IMF, 2016d). It has found that CFM measures were generally used in crisis or imminent crisis circumstances as part of a broad policy package. They consisted mostly in measures on outflows and concerned less than half the countries facing outflows. In these circumstances, they were qualified by the IMF as mostly temporary, nondiscriminatory, and comprehensive and hence in line with the 2012 institutional view and the 2015 IMF principles on managing outflows (IMF, 2015c). Only a few countries implemented new CFM measures on inflows during this period but those who had adopted some before 2012 kept them (even if they were eased).

On a longer period, Fernandez et al. (2015 a) do not find any evidence of a link between changes in capital controls and the business cycle nor macroeconomic booms or busts, suggesting that on average capital controls have not been used in a counter-cyclical manner nor a pro-cyclical one. Eichengreen and Gupta (2016) find that only few countries altered capital controls in response to sudden stops, with half of the countries doing so tightening CFM and the other half easing them. On the other hand, considering 17 EMEs over 2005–2013, Gosh et al (2017) find that EMEs tend to tighten capital controls during episodes of large inflows but also point to important cross-country differences in policy responses of inflow surges and associated risks.

How effective are capital controls?

Measuring empirically the effectiveness of capital controls or CFM measures and more generally macroprudential policies is a difficult task. First, changes in CFM often respond to changes in the variables they target, leading to some selection bias (Forbes *et al*., 2015). Moreover, as evidenced by the IMF, they are often adopted as part of broader policy packages, which include several types of capital controls, macroprudential measures and changes in the macroeconomic stance. In addition, the diversity of measures adopted by the different countries limits what can be drawn from panel data analysis while single country results are difficult to generalise.

Second, the measurement of capital controls and macroprudential measures is another challenge. One approach has consisted in avoiding any explicit measurement and comparing the sensitivity to the cycle of countries with and without capital controls and macroprudential measures (Bruno and Shin, 2013; Blundell-Wignall and Roulet, 2015).

Other researchers have built and used explicit measures of capital controls. At least six different separate datasets have been constructed in recent years taking the IMF AREAER as a starting point and supplementing it with other sources of information, including the OECD Code of Liberalisation of Capital Movements. They are quite different in terms of frequency, country and time coverages and in most cases are *de jure* rather than *de facto* measures.

- Ghosh et al. (2014) have built a dataset of CFM measures over 1995–2012, disaggregated by asset types and covering 31 countries at the origin of flows and 76 recipient countries.

- Zhang and Zoli (2014) database covers the major prudential measures adopted in 13 Asian economies and 33 countries from other regions from 2000Q1 to 2013Q2 and indices of macroprudential policies and capital flow measures.

- Pasricha et al. (2015) have identified 193 CFM measures between 2001-2011 in 17 EMEs on a quarterly basis. [27]

- Forbes et al. (2015) have identified weekly changes in controls on inflows and outflows and macroprudential measures related to international transactions from 2009 to 2011 for 60 advanced and emerging countries; the dataset includes a breakdown by type of flows affected.

- Fernandez et al. (2015) have produced an annual dataset for 100 countries 1995 to 2013 with a decomposition by types of flows.[28] This is may be the most comprehensive data set in terms of time length and number of countries. It is used in Caballero et al (2015), Serena and Moreno (2016) which focused on NFC borrowing (see above).

- De Crescenzio et al. (2015) have collected data of Currency-Based Measures (CBMs) directed at banks for 49 countries between 2005 and 2013. These measures are bank regulations that apply a discrimination−e.g. a less favourable treatment−on the basis of the currency of an operation, typically foreign currencies, rather than only on the basis of the residency of an operation.

A useful contribution to the empirical literature would be to compare these datasets and assess when possible the sensitivity of the empirical results to the selected dataset.

The main question investigated by the recent literature is the impact of CFM measures on financial variables, beyond their impact on the size of flows and their compositions. Findings from both country case studies and cross-country analyses are mixed. Baskaya *et al.* (2016) have found that foreign currency borrowing in Turkey usually declines after the adoption of macroprudential measures, but not if there is a global capital flow surge affecting all EMEs. Pandey *et al.* (2015) have found that capital controls in India have had no impact on exchange rate and financial conditions. Many other country case studies have been devoted to Brazil and most, but not all, seem to suggest that the CFM measures have decreased the targeted inflows, and mitigated macroeconomic and financial stability risks (IMF, 2016d, box 6 for a review).

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27. See http://www.nber.org/data/international-finance/.

28. See http://www.nber.org/data/international-finance/.

Given the diversity of the measures of capital control used, the time horizon and countries (Table 4) it is not completely surprising that results from cross-country analyses are mixed.

- On a panel of EMEs, Forbes et al. (2015) haven't found any significant impact of capital control measures on targeted financial variables (exchange rates, net capital flows, interest-rate differentials or financial fragility) while macroprudential regulations seem to have helped reduce financial fragility.

- Blundell-Wignall and Roulet (2015) have found a limited or null impact of CFM in reducing the sensitivity of countries to global factors, hence challenging previous results using the same methodology by Bruno and Shin (2013) who found a positive impact of currency-based CFMs on decoupling the economy from global credit cycles. They concluded against the use of CFM measures, also noting the price distortions caused by CFM measures, and the risks of objections from other governments.

- Zhang and Zoli (2014) have found important cross-country differences in the impact of CFM measures on credit, house prices and inflows. In particular, CFM measures do not seem to have had any significant impact on overall credit growth since 2006 in the sample of EMEs under review, nor in Asia over a longer sample, but seem to have helped dampen the housing boom in emerging Europe and had impact on equity inflows in some countries outside Asia. In these countries, the spillovers to other asset classes have been limited so that CFM measures induced an overall reduction of inflows rather than just a composition effect.

- Pasricha et al. (2015) have found an only limited impact of capital controls on net inflows, exchange rates and a measure of monetary policy autonomy (Aizenman-Chinn-Ito index). Moreover, this impact seems to have declined after the GFC and they found evidence of gross outflows (driven by residents) offsetting the impact of capital control actions on gross inflows. This latter finding points to the need to investigate further outflow behaviours, as already stressed in the sections above.

- Bruno et al. (2015) have assessed the impact of both MPMs and CFMs on banking and bond inflows in 12 Asia-Pacific economies over 2005-2013. They have found that CFMs do affect inflows and that sectoral-type policies affect the composition of capital flows: after 2009 they find that controls on bond flows stimulate bank capital flows, and prior to 2007, controls on bank flows affected bond flows.

- De Crescenzio et al. (2017) found that currency based CFMs reduce short-term cross-border banking flows and they are more effective in reducing loans than securities or deposits. As a result, they also affect the composition of international banking flows and they can have an impact on the interest rates of different debt instruments and may introduce price distortions in the domestic market for debt.

Macroprudential policies - that are much wider than CFM measures as they include measures to reduce financial instability not all linked to international capital flows- are increasingly used either as substitute or complement for capital controls or CFM measures. The assessment of their effectiveness in reducing financial fragility is also challenging and rather inconclusive so far as it seems to depend on country specific characteristics. A review of these policies can be found in Claessens (2014). Cerutti, Claessens, and Laeven (2015) have found that over 2000-2013 macroprudential policies have had an impact on credit growth, but this impact was reduced for more advanced and open economies, possibly because more sophisticated financial markets permits avoidance; Beirne and Friedrich (2016) have found evidence that the effectiveness of macroprudential measures used as a tool to deal with capital flows depends on the structure of the domestic banking sector, with higher regulatory quality, higher credit-to-deposit ratio and lower cost-to-income ratio (i.e. higher profitability) increasing their effectiveness.

Table 4. Overview of the most recent empirical cross-country studies on CFMs

	Countries/period	CMF data	Methodology
Blundell-Wignall and Roulet (2014)	37 EMEs 2003-11	Schindler index	Cross country panel regression
Fernandez *et al.* (2015 a)	22 AEs 45 EMEs 24 developing economies 1995- 2011	Schindler index (updated) - available online on Journal of Monetary Economics	Cross country panel regression
Bruno and Shin, (2013)	48 AEs and EMEs 1996 Q1 to 2012 Q1		Cross country panel regression
Blundell-Wignall and Roulet (2015)	27 advanced economies 22 EMEs 1996Q1- 2014Q4		Cross country panel regression
Pasricha *et al.* (2015)	17 EMEs 2001Q1-2011Q4	Own dataset	Panel VAR
Forbes *et al* .(2015)	60 AEs and EMEs Weekly 2009-2011	Own dataset	Propensity-score matching
Zhang and Zoli (2014)	46 AEs and EMEs 2000Q1-2013Q1	Own dataset	Cross country panel regression
Bruno *et al.* (2015)	12 Asia-Pacific economies 2004Q1 – 2013Q3	Chantapacdepong and Shim (2014)	Cross country panel regression
Giordani *et al.* (2014)	78 EMEs and developing economies 1995-2009	Schindler index	Cross country panel regression
Gosh *et al*. (2014)	76 AEs and EMEs 1995–2012	Own dataset	Panel on gravity-type model
Gosh *et al*. (2017)	17 EMEs 2005–2013	Ahmed *et a*l. (2015)	Probit

What is the impact of CFM measures on other countries?

To the extent that capital flow management measures have an impact on the volume of flows or their composition in recipient countries, another important issue is the international spillovers. Several empirical studies have found evidence of these spillovers, showing that CFM measures have a significant impact on flows to other countries and that this impact depends on the similarity with the country implementing CFM measures. In the case of Brazil, Forbes *et al.* (2012) have found evidence of signalling effect of CFM measures. Using both investors interviews and portfolio-level analysis of how investors respond to capital controls to study the impact of increases in Brazil's tax on capital inflows, they have shown that these increases led investors to reduce portfolio allocations to Brazil in both bonds and equities but also to countries viewed as more likely to use capital controls. On the other hand, allocations to other countries increased.

Giordani *et al*. (2014) using a sample of 78 developing and emerging countries have found a strong positive spillover effect of inflows restrictions in one country to countries with similar macroeconomic characteristics, but no effect of the geographical location. They have for instance estimated that gross inflows to South Africa would have been between 0.5 and 1.0 percent of GDP lower if Brazil had not increased inflow restrictions in 2009. Ghosh *et al.* (2014), focusing on bank flows, have found evidence of positive spillovers driven by country characteristics but also location. Pasricha *et al.* (2015) have found evidence that spillovers have become more important since the GFC.

These spillovers have important policy implications not only for the countries that receive diverted flows but also for the countries imposing controls, especially if the countries receiving the diverted flows respond by also increasing controls. Theoretical research supporting controls tends indeed to conclude that capital controls while potentially beneficiary when imposed unilaterally, have more ambiguous effects when imposed simultaneously in several countries (Heathcote and Perri (2016)). In any case, this raises the question of the need of international coordination of CFM policies (section VI).

Avenues for future research

Overall, most of the issues regarding the use, effectiveness and spillover effects of capital control remain largely open. More systematic analysis is hence needed. First as mentioned above a useful contribution to the empirical literature would be to compare the different datasets of CFM measures that have been built in recent years and assess when possible the sensitivity of the empirical results to the choice of CFM measures. Second, more analysis of the costs of capital controls is needed. There are indeed few studies devoted to the cost associated with capital controls. Alfaro *et al.* (2014) study on Brazil after the GFC has found that capital controls reduced external financing and firm-level investment, hitting particularly small non-exporting firms dependent on external finance. A broader analysis of these costs could help make the case in favour or against capital controls and assess in which conditions they could be used.

The debate on International coordination of policies

Deeper global financial integration means that monetary and financial shocks are transmitted through the financial system across countries and that imbalances or credit booms abroad can affect the domestic economy and its stability, as seen during the financial crisis. Domestic policies, especially monetary and financial policies, may spill over to other countries and even have spillback effects on the domestic economy.

In this context, international cooperation and coordination of policies have been put forward to deal with international capital flows, including by the IMF institutional view of 2012. However, the presence of spillovers is not a sufficient condition for coordinated policies to produce a better outcome for all. This point has recently been illustrated by Korinek (2017) using an Arrow-Debreu-style framework, with the view of shifting the debate to the type of inefficiencies that policy cooperation/coordination can address.[29]

There are three main areas for potential international policy cooperation and coordination: monetary policy; capital control management and more broadly financial policies; the global safety nets.

Monetary policy cooperation and coordination

The calls for monetary policy cooperation and coordination represents a shift from the approach according to which each country pursuing a rule-based monetary policy targeting its domestic objectives leads to better outcomes than international coordination of monetary policy (Taylor 2013, 2016).[30] They have emerged in the context of the currency war debate, initiated by Brazil in response to QE in advanced

29. The paper points to three conditions that under which cooperation can be justified from a theoretical point of view. First, policymakers do not act competitively in the international market; second, policymakers do not have sufficient policy instruments to target the external transactions of their country; third, international markets are imperfect.

30. The difference between monetary coordination and cooperation is not always clear-cut although the first one involves agreed actions while the second one can be limited to information exchanges and discussions. In practice both terms seem to be used alternatively in many papers.

economies, and have been fed by concerns associated with the tapper tantrum, when India's central bank governor called for the US Federal Reserve to take into account the impact of its policy on EMEs.

In practice, as pointed by Ostry and Ghosh (2013), outside crisis times, there haven't been many examples of international macroeconomic policy coordination for the past forty years. Positions from academia and policy makers on these issues are quite diverse with monetary policy coordination seen either as needed but undoable, undoable but not necessary, needed and doable with the current international settings or needed but requiring new international cooperation framework.

First, even if needed, monetary policy coordination may not work in practice because international spillovers may conflict with the domestic mandates of central banks (Rey, 2016) or because central bankers have different models in mind which makes monetary policy coordination very difficult except in specific occasions (Frankel, 2016).

Second, using 2-country theoretical models Blanchard (2016) and Banerjee *et al.* (2015) have both shown that, even following financial globalization, monetary policy coordination does not necessarily lead to better outcomes for all than uncoordinated monetary policy. They however differ on the implications of this result on how to deal with monetary spillovers and the effects of the global financial cycle, with Blanchard (2016) pointing to a role for capital controls and Banerjee *et al.* (2015), even though acknowledging a possible role for capital control and macro-prudential policy, stressing the need to include financial stability as part of the monetary policy objectives. Taylor (2016), while supporting rule-based monetary policy over coordination, sees a need for some sort of cooperation, which could take the form of all central banks (including in EMEs) describing and committing to rules, while still allowing deviation from these rules in exceptional situations.

If monetary policy coordination was to take place, the other issue is whether the current approach to monetary policy coordination via international fora is enough, as suggested by Coeuré (2014), or should be overhauled. For instance, Ostry and Ghosh (2013) propose a global assessor for macroeconomic policy coordination, played by IMF.

Coordination of financial sector and capital control policies

While policies to promote financial stability in one country have the potential to improve financial stability globally, capital controls and macroprudential policies are also associated with leakages and negative spillovers, raising the issue of the coordination of financial sector policies (see for instance Jeanne, 2014). This issue also follows the "financial trilemma" -according to which financial stability, financial integration and national financial policies are incompatible but any two of the three objectives can be combined- described by Schoenmaker (2011) with a focus on financial institutions and interpreted more broadly in Obstfeld (2015). The issue is of crucial importance within Europe and at the roots of the progress towards the banking union (not discussed here).

A particularly relevant issue is the institutional tools for an international coordination of CFMs. The OECD Code of Liberalisation of Capital Movements allows for temporary capital control measures while ensuring disclosure, transparency and international scrutiny. There is however a need to investigate further the best institutional tools for the coordination of financial sectors policies, and especially CFMs.

The global financial safety net

The other important dimension of international policy cooperation in the current context is the Global Financial Safety Net (GFSN), which has received renewed attention since the crisis and is essential to deal with financial stability risks. The GFSN combines domestic and multilateral policies. It is usually

understood as including foreign exchange reserves, IMF financing, central bank swap lines and regional financing arrangements.

Scheubel and Stracca (2016) have provided an overview of existing financial safety nets, including their theoretical foundations, existing features and impact in recent years. They have also proposed a new dataset of indicators of GSFN for over 150 countries over 1960-2015. The key findings of this literature review are that (i) there is no consensus on the optimal design of the GFSN; (ii) there is empirical evidence that benefiting from actual or potential access to the GFSN reduces the severity of sudden stop episodes, but also that these benefits are small (not always economically significant and mostly limited to the first two years after a sudden stop).

A highly-debated issue has been the role played by the accumulation of international reserves. Since the Asian crisis, reserves have become an important tool to mitigate the effect of capital flows as countries have accumulated huge amount of foreign exchange reserves. Overall, reserves as percentage of world GDP increased from about 12% in 1990s, to 17% before the crisis and over 20% in 2016, slightly down from their 2009 peak. This reflects countries' willingness to self-insure against external shocks rather than relying on global or regional insurance mechanism such as those provided by IMF lending facilities or swap lines between central banks.[31] The accumulation of foreign reserves also responds to the increased size of gross international positions and can be seen as a response to potential effect of exchange rates movements on bank and NFC balance sheets. They can indeed be deployed to meet demands for foreign currency hedges and protect the domestic financial system by signalling the capacity of the central bank to respond to foreign exchange funding stress (Obstfeld, 2015).

The cost and efficiency of such self-insurance strategies has however been questioned. OECD analysis has pointed to excess levels (Vujanovic, 2011; OECD, 2011) and the IMF has stressed a high cost associated of such strategies compared to the potential benefits (IMF, 2012). The Bank of England has estimated that the cost for countries to issue high-yielding local currency debt to purchase reserves has an annual cost of around 0.5% of GDP for emerging market economies (Shafik, 2015).

It is however difficult to assess fully the cost and benefits of reserves holding beyond these directs costs. For instance, on the one hand it has been argued that reserves accumulation contributes to the so-called savings glut but on the other hand, as mentioned above, Benigno *et al*. (2016) have found that the accumulation of foreign exchange reserves during the episodes of large capital inflows tends to limit the extent of labour reallocation and the impact of capital flow reversal. Quantifying these types of indirect benefits or costs is however difficult.

Conclusion

This review of the recent literature on international capital flows shows important on-going analytical and empirical efforts to better understand the implications of global financial integration on the functioning of the global economy. New areas of financial fragility and how they can unfold, notably NFCs external borrowing, are also being investigated and included in surveillance and analytical frameworks. In addition, the policy implications of these findings to make the most of global capital flows are being further investigated.

There are several areas where empirical evidence to date remains either mixed or still insufficient and where further investigation is needed. These include the role of fundamentals in protecting countries

31. The role of the IMF and the reform of its quota system and lending facilities has also been highly debated but goes well beyond this review.

against the risks associated with capital account openness (section III.5), the impact of exchange rate fluctuations taking into account its multiple transmissions channels (III.5), the impact of capital inflows on productivity (IV.3), the costs and benefits of capital controls (V.5), financial policy spillovers (VI.2), the costs and benefits of the different aspects of the global financial safety net (VI.3). Some areas need much deeper investigation, including in particular the drivers of capital outflows (III.5), especially as China is further liberalising its capital account, how the characteristics of the sectors receiving/exporting inflows affect the drivers of the flows (III.5) and their impact on the economy (IV.3).

More empirical analysis in these areas could contribute to on-going policy debates on the role of capital controls, reserve accumulation, fundamentals, monetary policy design as well as policy coordination in dealing with international capital flows.

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