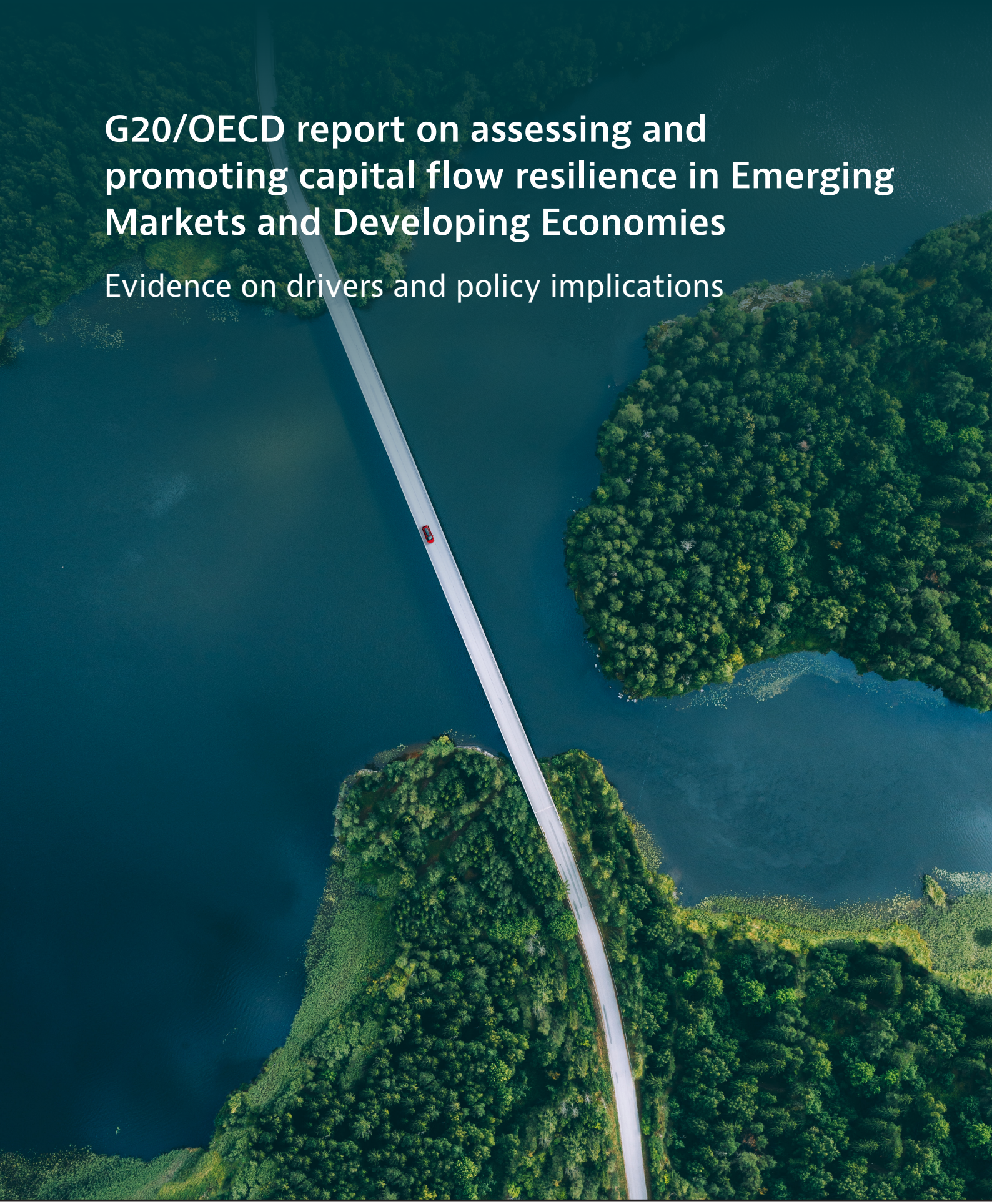
G20/OECD report on assessing and promoting capital flow resilience in Emerging Markets and Developing Economies

Evidence on drivers and policy implications



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G20 BRASIL 2024 BUILDING A JUST WORLD AND A SUSTAINABLE PLANET

G20/OECD report on assessing and promoting capital flow resilience in Emerging Markets and Developing Economies: Evidence on drivers and policy implications

This document was prepared by the Secretariat of the Organisation for Economic Co-operation and Development (OECD) as an input for discussions in the G20 International Financial Architecture (IFA) Working Group in 2024 with the aim for the note to be acknowledged as part of the G20 Brazilian Presidency. It is based on an outline presented at the G20 IFA Working Group in June 2024.

This report has been submitted to G20 leaders as a key deliverable of the G20 Brazilian presidency.

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Key issues

Evidence on drivers of resilient capital flows

This report analyses the role of push and pull factors in ensuring longer-term and more stable capital flows to Emerging Markets (EMs), with a focus on the resilience of portfolio flows to global shocks in the post-Global Financial Crisis (GFC) period.

Foreign direct investment (FDI) has proved a stable and substantial capital source to EMs. Portfolio inflows, which have significantly higher volatility than other types of flows, have grown in importance in the post-GFC period on the back of the rise of Non-Bank Financial Institutions (NBFI) intermediation and the prevalence of passive investment strategies. Increasing the resilience of portfolio flows is thus a crucial policy question for EMs.

The analysis in this report confirms that portfolio flows have been consistently associated with various global factors such as global risk aversion, uncertainty, commodity prices, US dollar movements, and monetary policy. With global factors continuing as important drivers of capital flows, enhancing macroeconomic policy co-ordination and communication of monetary policy across countries remains key.

In addition, global and country-specific geopolitical risk has been a significant and separate driver of such flows in recent years marked by a sharp rise in geopolitical tensions. In contrast, a more positive development has been a clear reduction in EMs' sensitivity to the global shocks post-GFC. This overall strengthened resilience hides, however, notable differences among EMs in their sensitivity to global shocks, which may be attributed to structural policy differences. Key findings demonstrate that:

- Higher central bank independence is strongly correlated with reduced sensitivity of portfolio flows to global shocks, with EMs with more independent central banks exhibiting better absorption of shocks
- Lower levels of government debt are also associated with lower portfolio outflows in times of negative global shocks

Enhancing central bank independence and avoiding high levels of government debt may thus be avenues on EM policymakers' agenda to increase capital flow resilience: by doing so, countries can lower the likelihood of destabilising outflows in times of global shocks.

- Whereas there is limited evidence that more stringent macroprudential policies are associated with reduced portfolio outflows when global risk rises, macroprudential policy has increased the resilience of banking sectors, credit provision and GDP, as established in recent literature.

Evidence on drivers of green capital flows to EMs

While long-term and stable capital flows are essential for scaling development financing in EMs, capital will specifically need to flow to finance the transition to low-emission economies. Despite the recent surge in sustainable investing, only a small fraction of portfolio capital reaches green companies in EMs. Recent OECD analysis highlights that:

- The investor base matters, with younger funds, retail investor funds, funds with domestic mandates, and sustainable funds (despite potential greenwashing) more likely to invest in green companies.
- Country-specific capital market characteristics, such as the inclusion in benchmarks and lower firm ownership concentration, are significant drivers of green investment, while greater portfolio flow openness and economic freedom are also positively associated with higher green holdings. Additionally, a country's renewable energy generation capacity and its share in green exports are significant determinants of fund allocation toward green sectors.

The critical role of benchmarks in driving investment, including green investments, points to the importance of index inclusion of green companies. Structural issues in global capital markets such as concentration of firm ownership and its impact on free-float levels as well as biases towards large companies for inclusion in an index act as barriers for such investments in EMs.

The level of capital account openness and economic freedom are drivers considered common drivers of investment in general and are found to also impact green investment. OECD analysis shows that the renewable energy generation of the country and the country's share in green exports are also important drivers of investment funds' asset allocation towards green companies.

Working on benchmark inclusion and maintaining openness and a good investment climate, while developing green sectors domestically to ensure a pool of green competitive and investable companies are all avenues that may be on policymakers' agendas in this area.

1 Introduction

Context

This report presents recent developments related to resilient and sustainability-related capital flows, as discussed at the G20 International Financial Architecture (IFA) Working Group meeting on 10 June 2024.[1] The report was presented at the IFA Working Group in September 2024 and further adjusted in light of comments received orally and through the ensuing written process.

The report has been prepared by the OECD Secretariat, pursuant to the request of the Brazilian G20 Presidency, to document the drivers of resilient capital flows to Emerging Markets (EMs), as one of the priority topics of the Presidency under the G20 International Financial Architecture Working Group. It is based on discussions with the Brazilian G20 Presidency and also the work done in the OECD, including presentations in the Advisory Task Force on the OECD Codes of Liberalisation (ATFC) in April 2024. Once formally approved by the IFAWG, it is expected to be submitted to the G20 FMCBG in October and referenced in its communiqué.

Long-term and stable capital flows can help scale up development financing in EMs. G20 technical discussions, backed by a number of International Organisations' analyses, show that capital flows to EMs have remained relatively low due to tighter global financing conditions and rising borrowing costs. Institutional investors' limited interest in these markets has also hampered development financing.

EMs can adopt pragmatic policies and act as the first line of defense, carefully weighing policy trade-offs affecting capital flow volatility. Creating a favorable environment for stable capital flows requires sound macroeconomic policies and robust regulatory frameworks. Thus, domestic policy efforts should aim to further enhance EM resilience, reduce short-term volatility, and attract long-term investments, considering trade restrictions and cross-border technology constraints. Meanwhile, external factors beyond EMs' control, such as geopolitical tensions, trade restrictions, tight monetary policies, and global financial stability shocks, also significantly impact capital flows.

While the issue of assessing and promoting resilient capital flows is being discussed by a number of International Organisations and in various *fora*, this report contributes to the current debate on the topic by focusing on recent drivers that have emerged in the post-Global Financial Crisis (GFC) period. The aim of the analysis is the identification of set of factors that can bolster portfolio capital flow resilience in EMs and the drivers of sustainable portfolio flows.

Structural factors underpinning resilient and green capital flows

This report discusses the structural drivers of EMs resilient capital flows. While EMs all face common global shocks, they have also shown varying degrees of resilience. In particular, despite some outflows experienced by EMs, the 2022 tightening of monetary policy by major central banks has not yet resulted in disruptive episodes of exacerbated stress in EMs, as seen in past experiences, such as the late 1970s, the early 1980s, the mid-1990s and the "taper tantrum" of 2013.

A vast strand of analysis has already identified significant changes in the composition of EM capital flows since the GFC[2], highlighting the increased role of non-bank financial institutions and portfolio investors (FSB, 2022[1]) and the pivotal role played by global factors in driving capital inflows to EMs post-GFC (CGFS, 2021[2]).

Several conjunctural factors to the current tightening cycle, broader changes in the global financial system, as well as changes in EM policy frameworks and fundamentals over the past decade may have contributed to the increased resilience of EMs in the current cycle (Hardy, Igan and Kharroubi, 2024[3]). This report elaborates on this last set of factors, focusing on structural drivers which may be able to explain not only EM overall higher resilience, but also the important heterogeneity across EMs. In doing so, it will seek to explore:

- Why do some EMs perform better than others, while facing the same global shocks?
- Which structural factors drive portfolio inflows towards different EMs and how are they important at the tail of the portfolio flow distribution, during periods of stress? Have traditional push (global) and pull (country-specific) factors evolved since the GFC?
- How can EMs promote and strengthen their portfolio flow resilience?

The empirical analysis that follows will focus on portfolio flows, which proved the most volatile component of capital flows, although some insights on Foreign Direct Investment (FDI) are also discussed. The EM country sample of this study and data sources are provided in Annex A.

Also, under the 2023 G20 Indian Presidency, the IFA Working Group has started discussing the importance for EMs of attracting and retaining green capital flows. The discussion conducted within the IFA Working Group highlighted that EMs will need increasing amounts of foreign private capital to finance their climate transition. EMs, especially those with limited and shrinking fiscal capacity and small domestic investor bases, will have to rely heavily on foreign private investment to achieve their net zero carbon emission goals, and to support mitigation and adaptation.

The OECD (2023[4]) has provided evidence that despite the ongoing sustainable investing boom, investment funds are directing only a tiny share of their investments into green companies in EMs. Bringing this analysis one step further, the report delves into the crucial need for EMs to draw in and maintain green capital flows and explores the drivers behind such green portfolio allocations. This study is based on micro-level data on FDI and investment funds. In this section, the areas of exploration are:

- Which are the drivers of allocation of green investments towards EMs on both the investor and recipient side?
- Which funds are most or least likely to invest in green assets and which features make certain EMs receive more green capital than others?

2 Regional differences in capital flow composition, volatility and investor base

Regional differences in composition and volatility

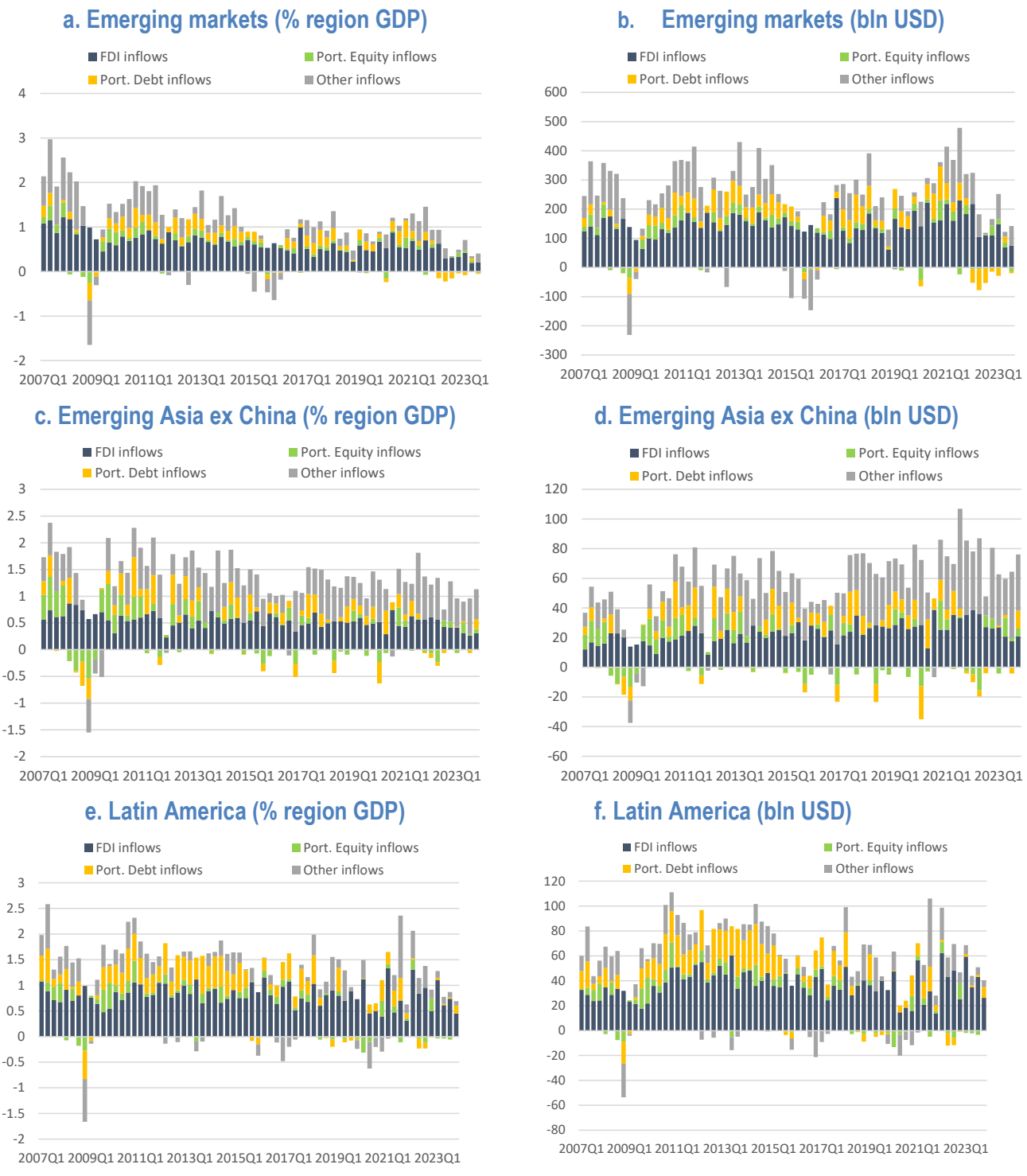
Capital flows patterns show different and evolving regional dynamics, with different composition of flows and as a result, different volatility of capital flows[3].

Emerging Asia excluding the People's Republic of China (hereafter China) has exhibited relatively stable capital inflows, largely driven by FDI and other types of inflows such as banking flows – in particular, this latter category has fluctuated within a high range, frequently exceeding $60 billion per quarter in certain periods, reflecting the region's strong appeal to banking flows. In contrast, Latin America's capital flows demonstrate greater volatility and strong but less stable FDI inflows.

A significant distinction between the two regions lies in the behavior of portfolio flows: Emerging Asia (excluding China) shows a moderate yet stable contribution from portfolio debt and equity inflows, with bouts of volatility materialised by outflows. In contrast, Latin America's portfolio flows, especially debt, represented a much larger share of flows in the first half of the decade before exhibiting greater volatility since. Latin America's banking flows also tend to experience more pronounced fluctuations. Over time, Emerging Asia (excluding China) capital flows display a more consistent upward trajectory relative to Latin America, which continues to experience more cyclical patterns (Figure 1).

Figure 1. Comparison of capital flow dynamics in Emerging markets

Capital inflows (2007q1-2023q4) – by asset class

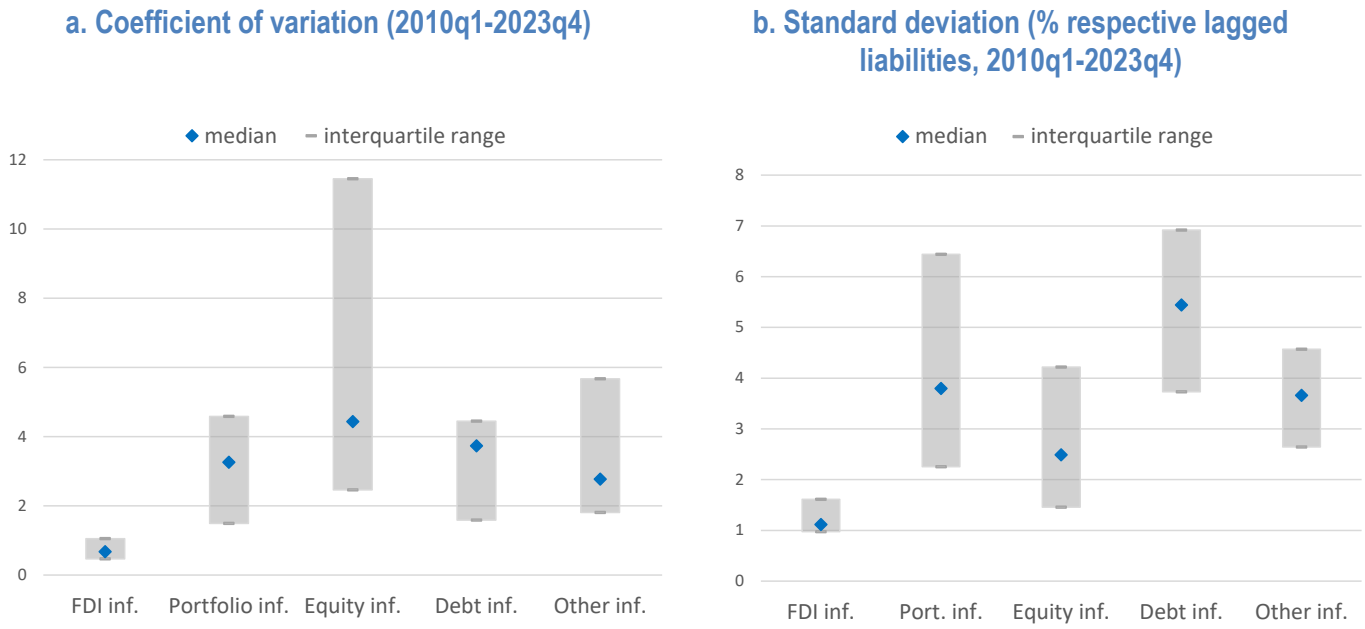


Source: IMF BoP, OECD, OECD calculations. EM sample listed in the Annex. Left hand side charts scaled by the sum of quarterly GDP of countries in the region.

The volatility of capital flows also differs significantly between the two regions: In Emerging Asia, equity inflows have been significantly volatile, as indicated by a broad interquartile range, while Latin America has experienced only moderate variability across different asset categories, with portfolio flows, and particularly debt, displaying higher volatility. Overall, FDI flows continue to the most resilient component (Hoggarth, Jung and Reinhardt, 2016[5]), (Figure 2).

As policymakers are confronted with the challenge of how to attract more FDI and specifically sustainable FDI, policies promoting FDI liberalisation, sustainability impact assessments, and a supportive policy environment are crucial for maximizing the benefits of sustainable investments while minimizing potential drawbacks (Box 1).

Figure 2. Portfolio flows are the most volatile type of flows to EMs, FDI the least volatile



Source: IMF, OECD calculations. Note: EM sample (See Annex). The coefficient of variation (panel a) is obtained dividing the standard deviation of capital inflows by the absolute value of mean flows for all countries. The standard deviation (panel b) is inflows (% lagged IIP liabilities for a given asset class). The figures plot the country at the median, 25th percentile and 75th percentile in terms of coefficients of variation. Portfolio inflows are debt plus equity inflows.

Box 1. Promoting sustainable and stable capital flows: the role of foreign direct investment (FDI)

FDI plays a crucial role as a stable and sustainable source of finance for EMs, especially when compared to more volatile portfolio flows. Unlike portfolio investments, which can rapidly fluctuate in response to market conditions and investor sentiment, FDI typically represents a long-term commitment by multinational enterprises, fostering economic stability and sustainable development[4]. As EMDEs strive for sustainable growth, FDI provides a reliable funding source that supports infrastructure development and industrialisation, ultimately contributing to resilience against external shocks and economic volatility.

While FDI can foster sustainable development, it can also have adverse effects – such as environmental degradation or gender inequality – if not managed properly. This complexity underscores the need for robust indicators and tools to measure the sustainability impacts of investments and policies to strengthen these positive impacts.

Liberalisation of FDI

The OECD Capital Movements Code is the only multilateral instrument promoting liberalisation of the full range of international capital movements, including FDI, both pre- and post-establishment. Liberalising FDI regulations can significantly enhance a country's attractiveness to investors. The OECD's FDI Regulatory Restrictiveness Index shows that a 10% reduction in restrictions could boost bilateral FDI stocks by over 2%, thereby unlocking further productivity gains. However, enhanced market access alone cannot address major societal and environmental challenges. Like domestic investments, FDI that supports the sustainable development goals (SDGs) can be encouraged through policies going beyond those policies conducive to investment in general. These policies can be divided into five categories: governance, domestic and international regulation and legislation, technical and financial support, information and facilitation services and development co-operation (OECD, 2022[6]). In addition, taking a holistic approach to the liberalisation of FDI regulations can enable host economies to not only attract more FDI, but improve its quality while managing any security implications, as discussed in the strategy for "*Supporting EMDEs in attracting more, better and safer FDI*".[5]

The importance of a favourable policy environment

For sustainable investment to flourish, a supportive policy environment is essential. Such an environment mobilises capital, skills, and technology, enabling firms to channel resources efficiently and effectively. OECD standards (such as the Policy Framework for Investment and the FDI Qualities Recommendation and Policy Toolkit) can guide OECD and EMDE governments in creating an environment conducive to sustainable investment.

Promoting sustainable investment

Investment promotion agencies (IPAs) are crucial in the sustainable investment ecosystem. A recent OECD survey revealed that 87% of IPAs prioritise job creation and skills development when attracting investment, while 50% consider decarbonisation indicators. Such indicators can allow IPAs to track and target investment projects, which contribute to sustainable development and the low carbon transition. By bridging information gaps, IPAs not only facilitate sustainable investment but also advocate for policies that align with business sustainability goals as well as help with capacity building.

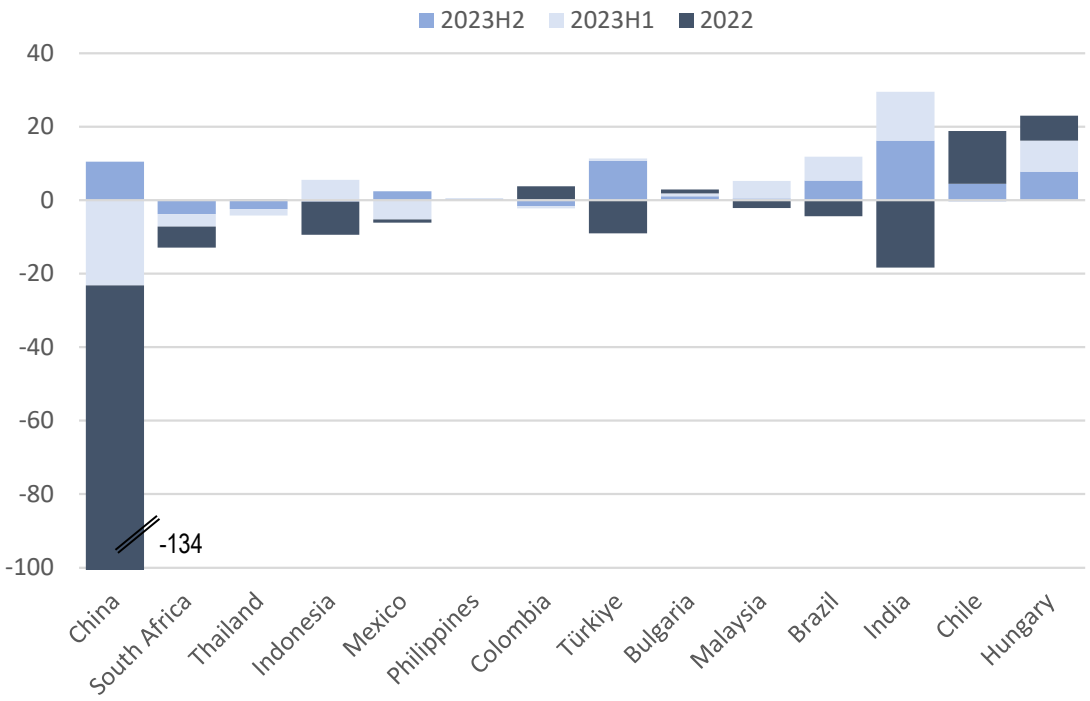
Many countries use targeted investment tax incentives to promote sustainable development. According to the OECD Investment Tax Incentives Database, among 52 developing economies covered, 46 offer at least one SDG-related incentive, nearly half provide incentives focused on environmental sustainability and job creation. However, the effectiveness of these incentives is often not evaluated, making regular assessment crucial to prevent wasteful spending and inefficient use of public resources.

Sources: (OECD, 2022[6]), (Financial Times, 2024[7]), (OECD, 2023[8])

Portfolio flows for their part have proved volatile in recent years. While EM outflows were limited in the current monetary policy cycle compared to past episodes, country-specific data reveal important heterogeneity across the EM group (Figure 3). In absolute terms, China experienced substantial portfolio outflows in 2022 and 2023. South Africa, Mexico, Indonesia and Thailand also experienced outflows in aggregate over the last two years, while India, Colombia, Malaysia, Brazil, Hungary and Chile had positive aggregate inflows.

Figure 3. Divergent Monthly Portfolio Inflows to EMs since 2022

Monthly portfolio inflows to EMs (2022-Nov 2023) - bln USD



Note: See OECD Monthly Capital Flow dataset and (De Crescenzio and Lepers, 2024[9]) for detailed data description and coverage.
Source: OECD Monthly Capital Flow dataset

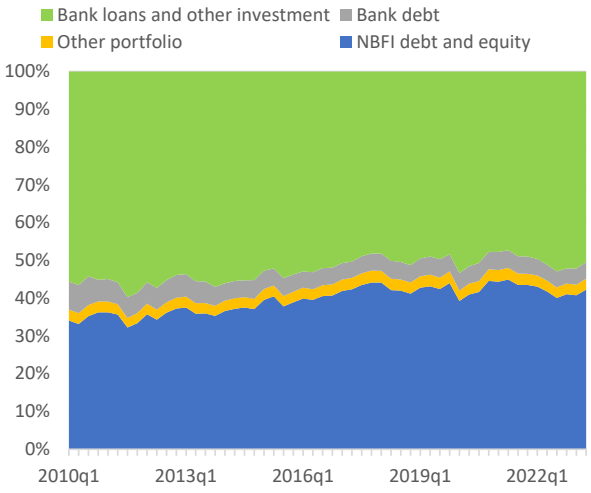
Capital flow volatility in EMs has been influenced by recent common trends across countries, which have shaped the post-GFC era: first, the emergence of Non-Bank Financial Institutions (NBFIs) and, second, a notable development linked to NBFIs, the rise of index-based investing, which has significantly affected investor behaviour and capital allocation. The impact of these two trends is summarised in the next two sections.

Differences in the investor base: The role of NBFI intermediation

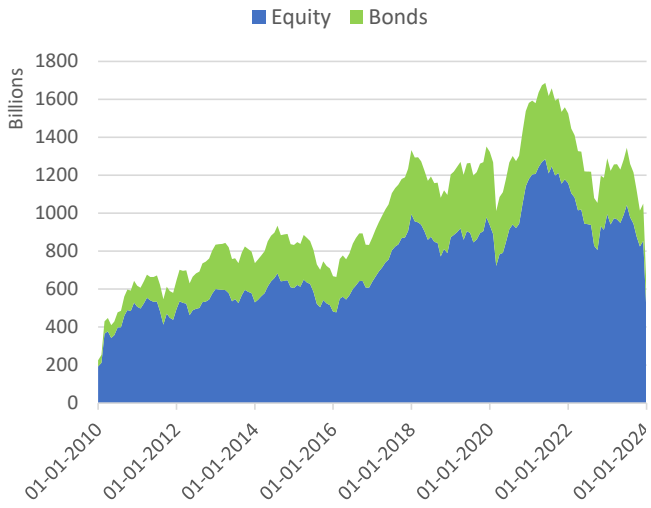
The rise of NBFIs intermediation is an often-referenced structural trend in the post-GFC period that has significantly impacted the volatility of capital flows to EMs. As shown in Figure 4b, the size of assets under management (AUM) of global EM funds has grown substantially since 2010, especially for equity funds. As well described elsewhere (FSB, 2022[1]; CGFS, 2021[2]), the share of foreign NBFIs now represents between 40 to 50% of EM external financing (Figure 4a). Overall, investment funds alone account for a very large portion of this, especially as far as equity liabilities are concerned, as shown in Figure 5 below.

Figure 4. The rise of NBFIs in Emerging Markets

a. NBFI share of EM external financing (%)



b. AUM of global EM mutual funds (USD)

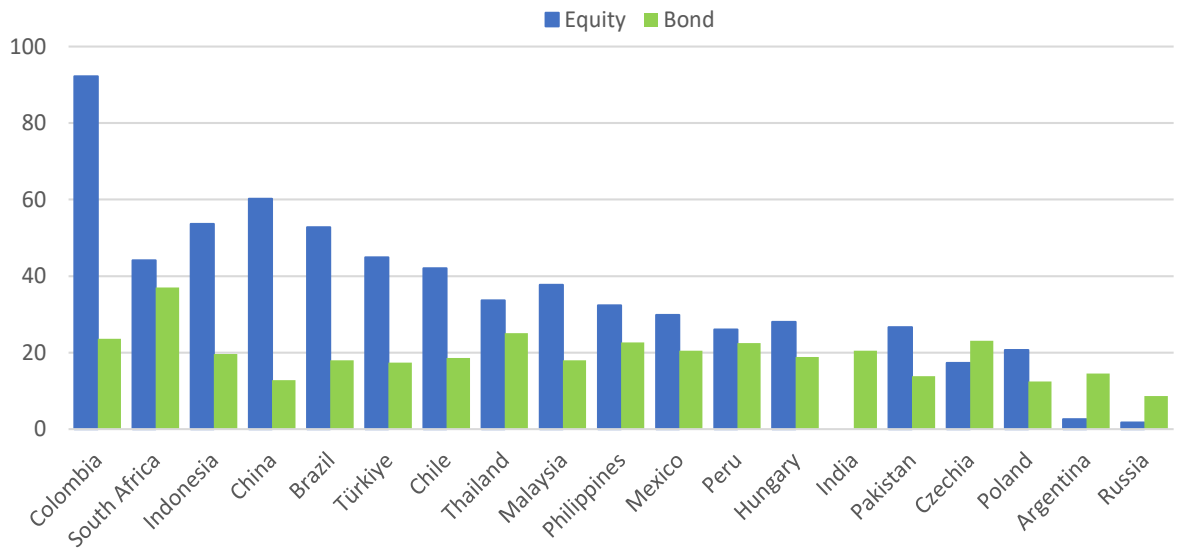


Note: Panel a: Methodology for computing external liabilities to NBFIs following FSB (2022[1]). Panel b: Sample of 2000 largest global EM fixed income funds, and 3400 largest global EM equity funds, with AUM> USD 1 mln. Source: BIS, IMF, Morningstar, (OECD, 2024[10]).

Figure 5 also shows that EMs differ widely in terms of the importance of foreign investment funds in external financing, with some countries having limited access to foreign investment fund financing, while in others (Colombia, South Africa, Indonesia, China) foreign funds account for a large share of external liabilities.

Figure 5. Investment funds have varying importance in different EMs

Assets under management of foreign investment funds (% a country's respective external portfolio liabilities - 2023Q2)



Note: Share of equity (bond) external liabilities financed by foreign equity (fixed-income) funds. Equity series for India not available. "Foreign" defined based on fund domicile.
Source: IMF, Morningstar, (OECD, 2024[10]).

The importance of foreign investment funds for a given country has been found, in turn, to impact the sensitivity of different EMs to global shocks. A higher share of foreign investment funds in external portfolio debt and equity liabilities increases the sensitivity of EM to global risk and increases exchange rate volatility (Schmidt and Yeşin, 2022[11]). More specifically, facing global financial tightening, sovereign bonds with a higher institutional ownership by foreign investment funds suffer a larger price drop (Zhou, 2023[12]). This increased sensitivity to global risk is especially prominent in passive and regional funds (Moro and Schiavone, 2022[13]).

The March 2020 turmoil particularly underscored the need to strengthen resilience in the NBFI sector, as key funding markets experienced acute stress (FSB, 2022[1]). As far as EMs are concerned, the depreciation of their currencies against the dollar led to mark-to-market losses on local currency assets for foreign (AE-based) funds seeking returns in USD – the so-called "original sin redux" (Carstens and Shin, 2019[14]). Facing high investor redemptions and at the same time raising cash buffers for liquidity management (Schrimpf, Shim and Shin, 2021[15]), at the peak of the March 2020 sell-off episode investment funds sold both risky and less risky assets, including AE government bonds, amplifying liquidity stress. At the same time, as financial market volatility spiked, investment funds had to post higher margins on their derivatives positions, which led to a "dash for cash". This episode highlighted investment funds as potential amplifier of market stress and the vulnerabilities of the sector.

The role of index-based investing

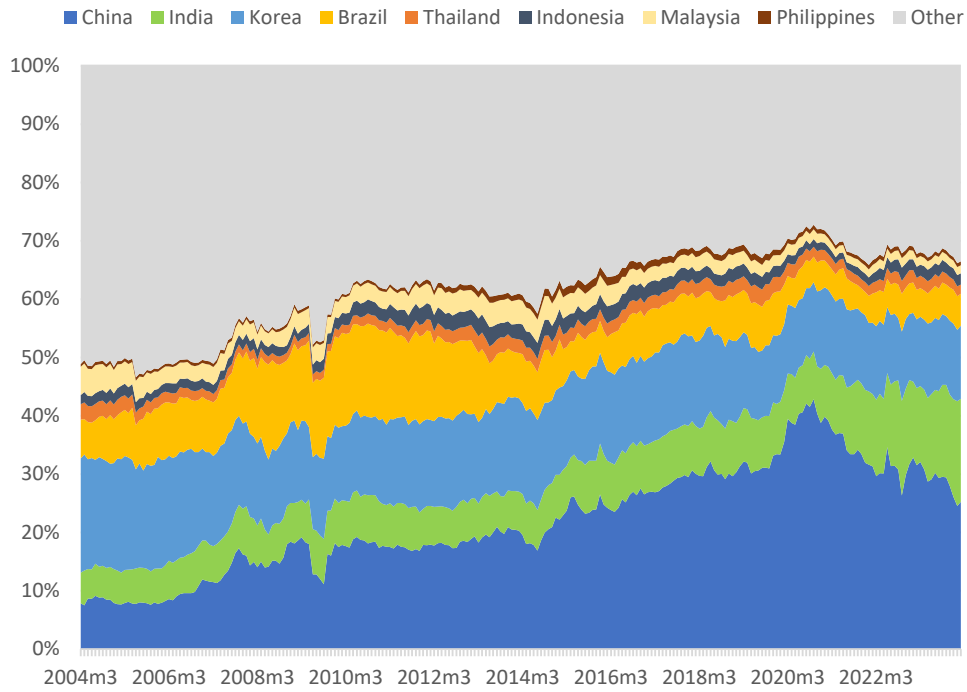
A related change associated with the rise of NBFIs since the GFC is the growing prominence of index investing in shaping investor behaviour and capital allocation. Since the mid-2000s, there has been a

fivefold increase in the amount of assets benchmarked against widely-followed EM local-currency bond indices, reaching approximately $300 billion by 2020 (Arslanalp et al., 2020[16]).

Not only did the share of passive or index-based management approaches increase significantly, but the country weights in the relevant indices also display important variation over time (Raddatz, Schmukler and Williams, 2017[17]) as shown in Figure 6. A major trend in recent years in EM equity indices has been the growing index weight of India and decreasing weight of China. China's weight decreased from close to 40% in 2021 to around 25% in 2024, while India doubled its weight from 9 to 18% over the same period.

Figure 6. Changes in country weights in indices are frequent and significant drivers of portfolio flows

Country weights in MSCI EM growth Index (%)



Source: Morningstar, MSCI, (OECD, 2024[10])

These changes in country weights in major indices have had substantial repercussions on portfolio inflows in the post-GFC period, as shown in Figure A1 in the Annex, which shows the positive impact on portfolio flows to EMs from a positive change in benchmark country weight.

3 The evolving role of global factors

This section discusses the evolving role of different global drivers (See Box 2 for a discussion) and the varying sensitivity of different EMs to such global push factors.

Global push factors are consistently significant drivers affecting post-GFC portfolio flows to EMs

Empirical analysis of the impact of various global push factors on portfolio inflows to EM (specification detailed in Annex A) in the post-GFC period confirm their crucial role as drivers affecting inflows despite capturing different dimensions of global financial shocks.

Box 2. Global financial push factors are diverse and their measurement matters

Much work has been dedicated in recent years to showing the impact of global factors on capital flows, with the idea, developed in several variants, of a global financial cycle with "gross capital inflows, leverage, credit growth and asset prices dancing largely to the same tune" (Rey, 2013[18]).

To proxy for global risk, most of the literature has used the VIX, which captures stock market expectations of volatility based on the S&P500. Critics of the VIX have pointed to the inability to separate the price of risk (risk aversion) and the quantity of risk (economic uncertainty), leading to the development of separate indices (Bekaert, Engstrom and Xu, 2022[19]). In addition, some work points to the declining explanatory power of the VIX as a driver of capital flows in the post-GFC period (Forbes and Warnock, 2021[20]; De Crescenzio and Lepers, 2024[9]; Avdjiev et al., 2020[21]). Finally, the VIX is specific to US equity markets while one may wish to also capture developments in fixed income (for example the MOVE Index capturing US treasury volatility or corporate bonds spreads like the US corporate BBB yield (Gelos et al., 2022[22])). Others have attempted to extract common factors from a range of asset price series, such as the global financial cycle measure of (Miranda-Agrippino and Rey, 2015[23]) or the risk on/risk off index of (Chari, Dilts Stedman and Lundblad, 2020[24]).

An obvious correlate of the global financial cycle is US monetary policy, with a large literature seeking to derive measures of monetary policy shocks or surprises e.g. (Iacoviello and Navarro, 2019[25]). More recently, recognising the central role of the dollar in the global financial system and its correlation with most global variables, work has looked directly at USD movements against a basket of AE or EM currencies, i.e. the "global dollar cycle" (Obstfeld and Zhou, 2023[26]).

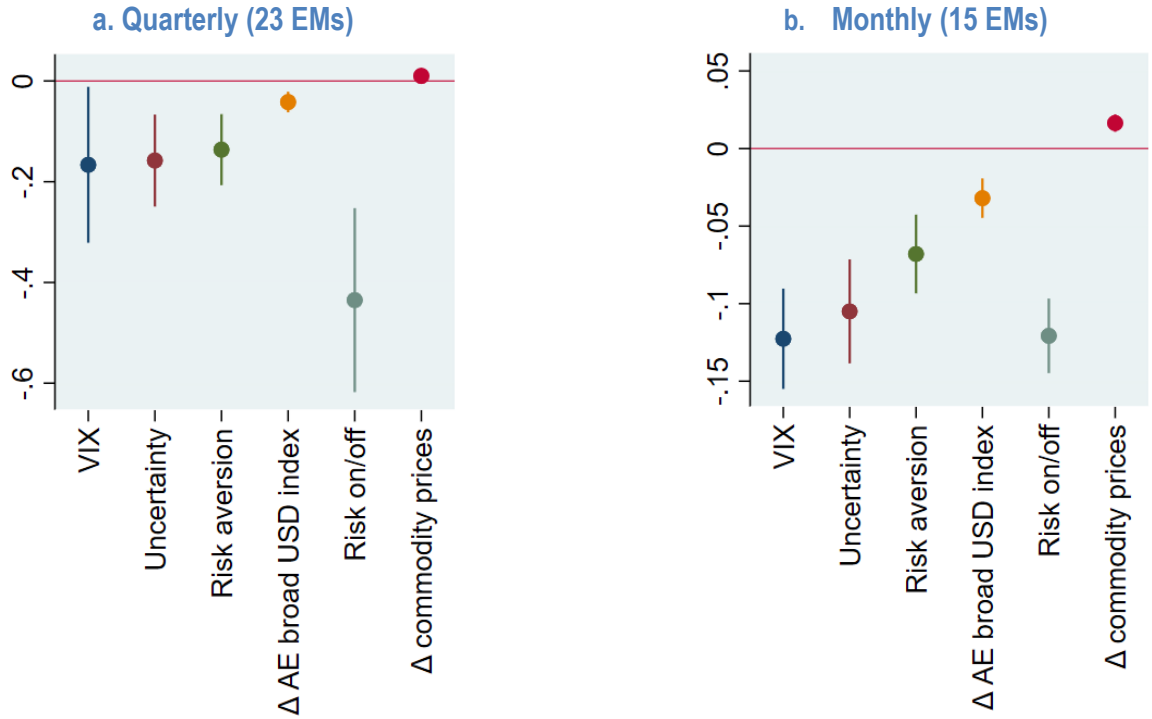
Finally, other relevant global drivers may include global commodity or oil prices, economic policy uncertainty, or geopolitical risk, which may be more or less correlated to the previously mentioned measures.

There are limited correlations among key sets of global drivers (Table A1 and A2 in the Annex), with the exception of the dollar cycle, US monetary policy, and commodity prices. The correlation between the global dollar cycle and global risk aversion (VIX, risk on/off) is limited, and geopolitical risk is not correlated with measures of global risk aversion. Therefore, these variables capture somewhat different dimensions of global risk and financial conditions and should thus be tested comprehensively.

Figure 7 (a) shows quarterly analysis, where coefficients represent the impact of global factors on portfolio inflows into 23 EMs from Q1 2010 to Q4 2023[6]. Negative coefficients and bars that are different from zero, highlight a negative impact of such global shocks on portfolio inflows to EMs. As such, higher global uncertainty, higher global risk aversion, appreciation of the USD against other AEs[7], a risk-off shock, or lower commodity price growth are all found to be significantly associated with lower portfolio inflows to EMs in the post-GFC period. Investors become more cautious and retreat from EMs when hit with such different global shocks.

Figure 7. Global factors were consistent significant drivers of EM portfolio inflows post-GFC

Coefficients of global factors on portfolio inflows to EMs post-GFC

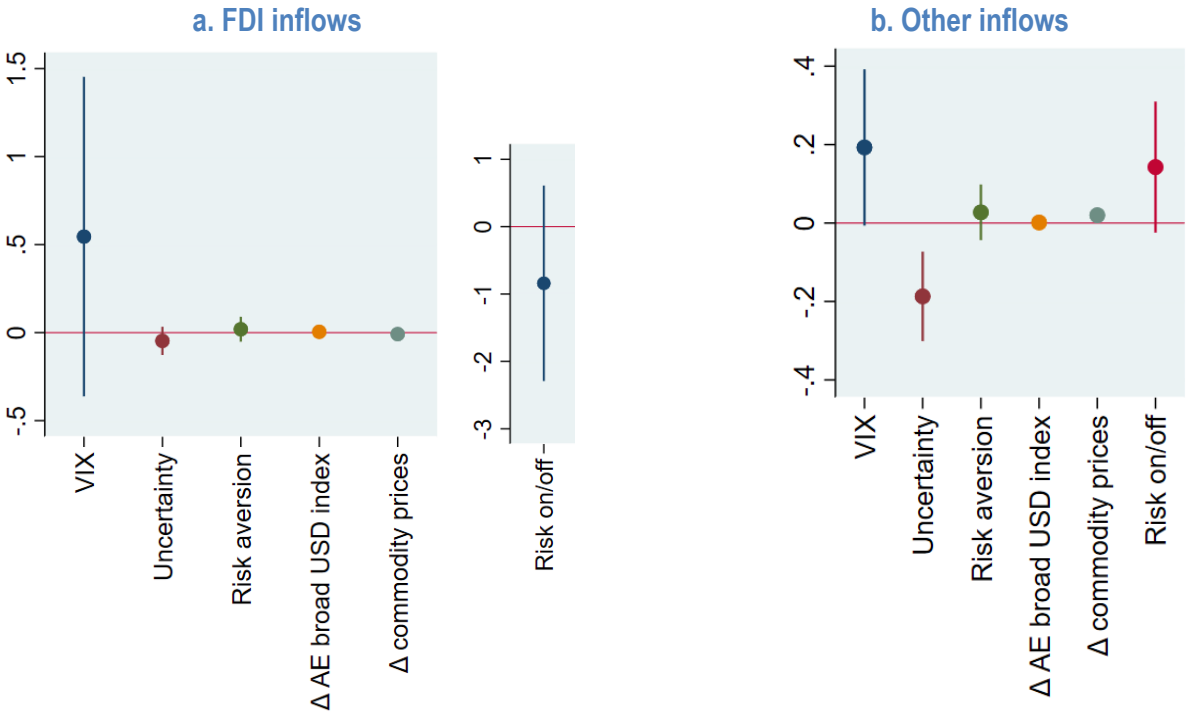


Note: Coefficients plot from quarterly regressions of portfolio inflows for 23 EMs from 2010q1 to 2023q4 and monthly regressions for 15 EMs from 2010m1 to 2023m12 (See OECD Monthly Capital Flow dataset for coverage). Global factors enter in separate regressions. Bars show the 90% confidence interval. See Annex A (Equation 1) for full specification including description of controls.

These results persist across different temporal frequencies, and in particular in the analysis conducted with monthly data (Figure 7 (b) and Table A3b). Importantly, the consistently significant impact of this set of global factors do not extend to other types of capital flows: FDI inflows show no association with any of these global factors in the post GFC period[8], and other (banking) inflows is only associated with uncertainty and commodity price changes but not with measures of risk aversion or USD movements (Figure 8).

Figure 8. The impact of global factors on FDI and other inflows

Coefficients of global factors on FDI and other inflows to EMs (2010q1-2023q4)



Note: Coefficients plot from quarterly regressions of FDI and other inflows (%GDP) for 23 EMs from 2010q1 to 2023q4. Global factors enter in separate regressions. Bars show the 90% confidence interval. See Annex A (Equation 1) for full specification including description of controls.

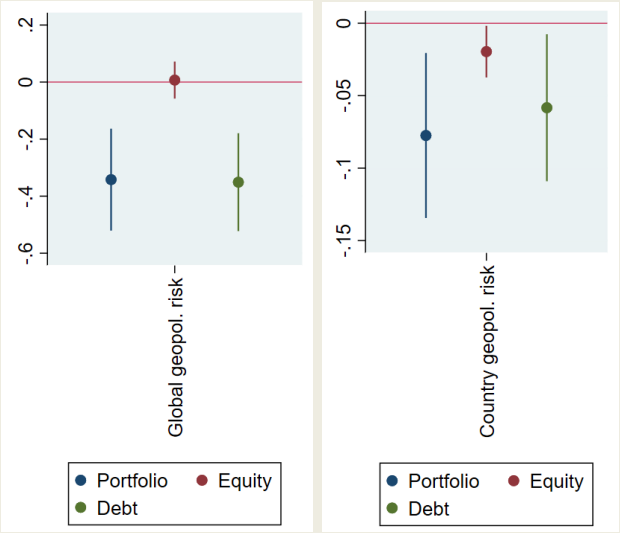
Box 3. A forgotten risk brought back into the spotlight: global and country-specific geopolitical risk

Recent geopolitical tensions have spawned a number of empirical analyses and commentaries on their impact on global financial flows and possible early signs of – and material risk from – fragmentation in the global financial system (Aiyar et al., 2023[27]). While such work has mainly focused on testing different proxies of geopolitical distance on bilateral flows (Aiyar, Malacrino and Presbitero, 2024[28]; IMF, 2023[29]), there has been little analysis of the direct impact of geopolitical risk on overall portfolio flows. Along this approach, geopolitical risk would merely be another facet of risk for international investors. Using the recently developed indices of Caldara and Iacoviello (2022[30]), recent OECD analysis tests the role of such risk in a wide range of settings and confirms a strong role for geopolitical risk in the post-GFC period, and all the more so since the beginning of 2022 (See Figure A.3).

Figure 9a below shows the impact of global and country-specific geopolitical risk on aggregate quarterly portfolio, equity and debt flows. Coefficients are negative, especially for debt inflows, highlighting that higher global and country geopolitical risk is associated with lower inflows.[9] Using micro-level data from investment funds, Figure 9b also presents the impact of country geopolitical risk on changes in fund country allocations. Both equity and especially bond funds lower their relative allocation in countries with higher country-specific geopolitical risk.[10]

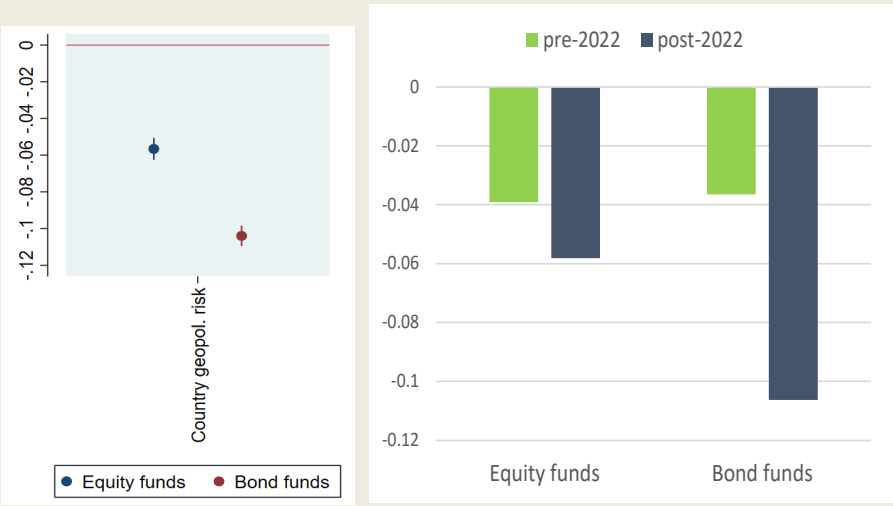
Figure 9. Higher global and country geopolitical risk is associated with lower aggregate portfolio inflows and with lower country allocation of investment funds

a. Impact of global and country geopolitical risk on EM portfolio inflows



Note: Coefficients plot from quarterly regressions of EM portfolio inflows from 2010q1 to 2023q4. Left-hand side panel's variable of interest is global geopolitical risk, right-hand side panel is country specific geopolitical risk. See Annex A (Equation 1) for full specification including description of controls.

b. Impact of global and country geopolitical risk on country allocation of investment funds



Note: Sample of 2000 global EM fixed income funds, and 3400 global EM equity funds, with AUM> USD 1 mln for the 2010m1-2023m12 period. Coefficients from panel regressions of changes in individual fund's country allocation. Right-hand side panel features the overall impact of geopolitical risk conditional on the time period, through an interaction term between country geopolitical risk and a dummy taking the value of 1 for the period starting in February 2022. See Equation 5 in Annex A for full description of specification and controls.

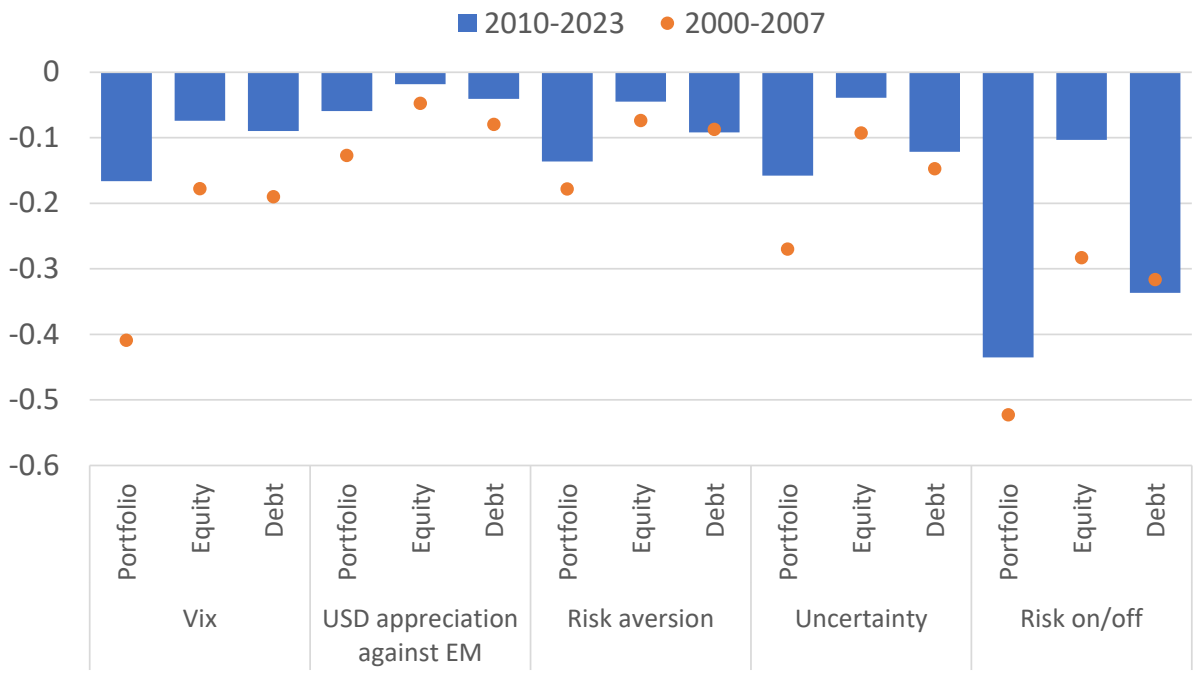
Source: (OECD, 2024[10])

EMs have managed to reduce their sensitivity to the global financial cycle in the post-GFC period

Have there been changes in the sensitivity of EM portfolio flows to global shocks? Figure 10 compares pre- and post-GFC estimates of the sensitivity of EM portfolio (equity and debt) inflows to five global factors: the VIX, indices of global risk aversion and uncertainty, the risk on/off index as well as the global USD cycle. It clearly highlights a broad-based reduction in the sensitivity of portfolio flows to key global factors and across asset class (equity and debt). Overall, portfolio equity inflows appear less sensitive than debt inflows to global shocks.

Figure 10. EM portfolio flow resilience to a broad range of global shocks has increased significantly

Sensitivity of EM portfolio inflows to global shocks pre- and post-GFC



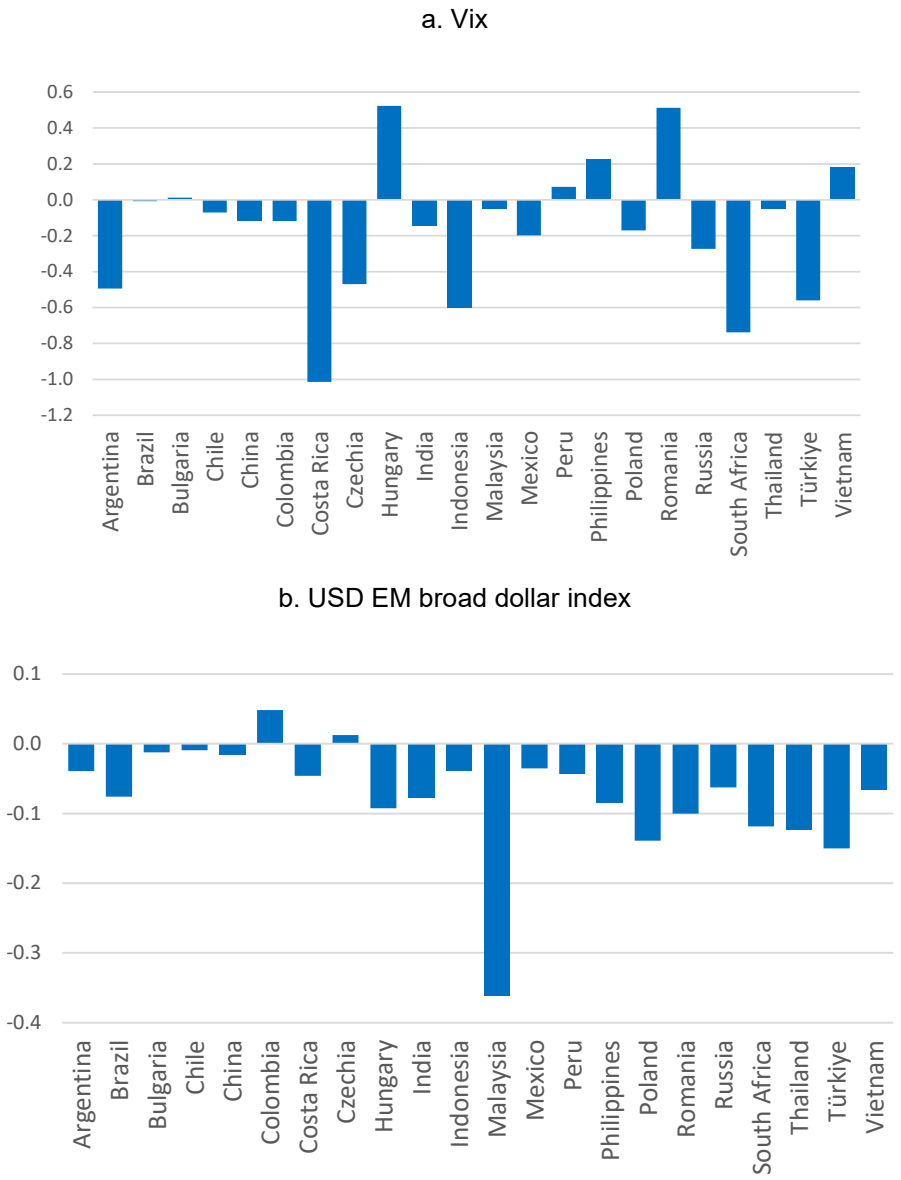
Note: Coefficients from quarterly panel regressions of portfolio inflows to GDP on different global factors separately in the 2000q1-2007q4 and 2010q1-2023q4 periods – see Equation 1 in Annex A for full specification including controls. Risk on/off index starts in 2003q1. Sample of 23 EMs.

Despite this strengthened resilience, there remains wide heterogeneity across EMs in their sensitivity to global shocks

Do all EMs have similar sensitivity to global shocks? The very diverse capital flow response to the latest monetary policy cycle (See Figure 3 earlier) hints at varying sensitivities above and beyond what may be explained by the different cyclical positions of EMs. Existing evidence shows for instance large heterogeneity in the response of AE and EM economic activity to U.S. interest rate surprises (Iacoviello and Navarro, 2019[25]).

Figure 11. Global financial variables do not hit EMs in the same way

Sensitivity of portfolio inflows to global factors post-GFC (2010q1-2023q4)



Note: Coefficients from country-specific time series regressions of portfolio inflows to GDP on a set of controls and in panel a) the log of the VIX and in panel b) the USD EM broad dollar index. See Annex A Equation 1 for full specification including controls. Estimated over the 2010q1-2023q4 period.

Figure 11 plots country-specific coefficients estimated from time series regressions for each country. It confirms the very heterogeneous sensitivity of portfolio flows to global factors in the post-GFC period, both regarding global risk aversion as well as the US dollar cycle. The transmission of global shocks to different regions and EMs will differ depending on the type of global factor analysed (equity/fixed income/exchange rate/ US based index) and the underlying exposure of the country to that asset class or market. Beyond, it may reflect some more general differences in resilience, in part reflecting different policy features and frameworks. The next section will seek to provide further clarity on such heterogeneity.

4 Mitigating the sensitivity of flows to global shocks: The role of policy

This section turns to the structural policy factors that may explain the heterogeneity identified earlier. While a large body of research over the last decades has analysed the direct impact of different country factors on capital flows (Koepke, 2019[31]), fewer efforts have been dedicated to the understanding of the indirect role of policy in mitigating the sensitivity of capital inflows to global shocks, as well as the cross-country heterogeneity in this sensitivity. As such, this section seeks to analyse specifically the differences in the sensitivities of different EMs to common global shocks, in the spirit of a strand of recent literature devoted to this topic (Obstfeld, Ostry and Qureshi, 2019[32]; Bergant et al., 2023[33]; Kalemli-Özcan and Unsal, 2024[34]; Obstfeld and Zhou, 2023[26]).[11]

Because global shocks may have important implications, not only for the overall distribution of EM flows but also for the tails (Eguren-Martin et al., 2020[35]; Gelos et al., 2022[22]; Chari, Dilts Stedman and Lundblad, 2022[36]), the analysis also looks at whether the drivers are more or less prominent at the tail of the distribution, and more specifically at the bottom 25th percentile that broadly corresponds to EM outflows (negative non-resident inflows) (Table A.3 in the Annex). The analysis highlights the factors that may amplify sudden stops or increase the resilience and stickiness of flows.

The list of policy variables that may have a possible impact on the sensitivity of EM capital flows to global shocks is long – from financial policy frameworks (FX regime, monetary policy framework, macroprudential policy, capital account openness) to macro fundamentals (current account balance, fiscal deficit, income per capita, reserves), to broader institutional (quality of governance, rule of law),

While a comprehensive exploration of all possible variables is beyond the scope of this report, the set of policy factors tested in this report has been selected for a combination of relevance to the G20 agenda, complementarity with existing work, and data quality/availability.

In particular, this report focuses on three sets of policy variables:

1) monetary policy frameworks (and more specifically central bank independence);

2) macroeconomic fundamentals (particularly the level of government debt);

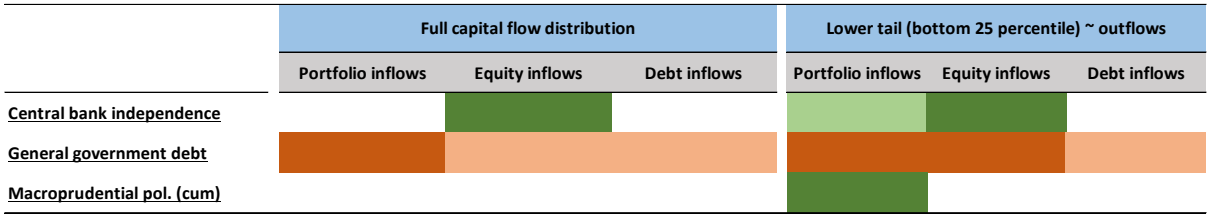
3) macroprudential and capital account policy.

The section attempts to review existing evidence on additional variables, and future work may provide additional tests of different factors, also as data quality improves.

Table 1 below presents a summary of the main significant findings in the econometric investigation:

Table 1. Selected policy variables are found to amplify or mitigate the sensitivity of EM portfolio flows to global factors

Summary of coefficients of the sensitivity of portfolio inflows to risk-on/off shock, conditional on policy variables



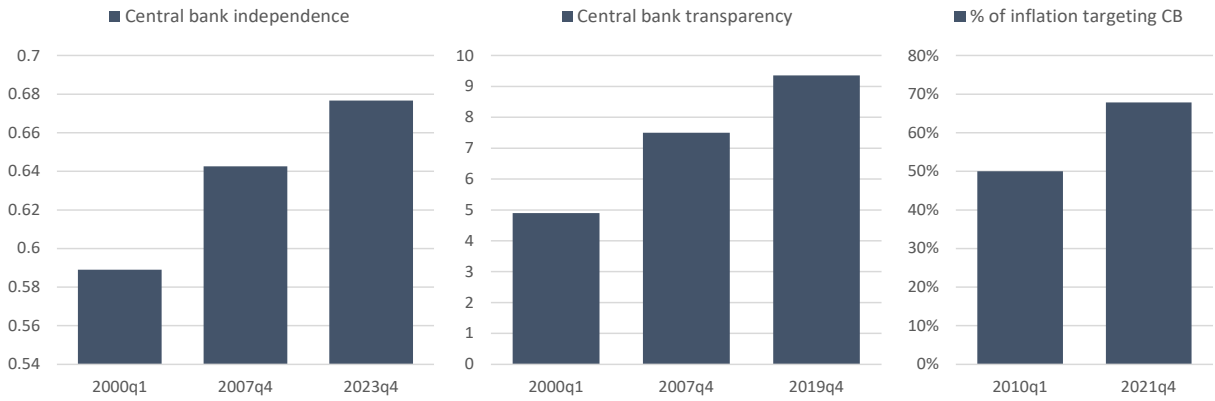
Note: Summary of coefficients on the sensitivity of portfolio inflows (% GDP) to the global risk-on/risk-off index of (Chari, Dilts Stedman and Lundblad, 2022[36]), conditional on the lagged variables in the 1st column. Regressions are restricted to 2010q1-2023q4. Color-coding based on statistical significance of the coefficients: dark:1% significance level, medium 5%, light 10%. Green highlights a positive coefficient while brown highlights a negative coefficient. See Annex A for empirical specification and full set of results with other global factors in Table A4, A5, and A6. LHS panel estimates Eq.2 using panel OLS as per previous sections. RHS panel estimates Eq.4 using a quantile regression framework.

In a nutshell, the analysis finds that strengthening the independence of central banks and ensuring sustainable and low government debt levels can help mitigate the impact of global financial shocks on EMs and enhance capital flows' resilience. The rest of this section will present in turn the evolution and heterogeneity across EMs along these sets of policies and describe these key results in more detail.

The role of monetary policy frameworks and governance

EM monetary policy frameworks have evolved substantially since the GFC along a number of dimensions (Figure 12). Governance-wise, central bank independence has substantially increased over the last 25 years, together with central bank transparency. Regarding monetary policy frameworks, in the last 10 years the share of EM central banks that have a determined inflation target grew from 50% to close to 70%. Floating exchange rates have become the norm, with varying degrees of intervention, hard pegs being progressively replaced (Hardy, Igan and Kharroubi, 2024[3]).

Figure 12. Changes in EM monetary policy frameworks



Note: 28 EMs, average. Left hand panel is central bank independence score [0-1] with 1 being most independent. Middle panel is central bank transparency score with higher score meaning more transparent central banks. Right side panel is the share of countries that have inflation targeting monetary policy frameworks. Source: Romelli (2022[37]) , Dincer and Eichengreen (2014[38]), IMF AREAER, OECD calculations

Have these changes in monetary policy frameworks and governance improved the ability of EM to better weather global shocks?

Existing evidence on the role of floating exchange rate regimes shows that the transmission of global financial shocks to domestic credit, house price growth, domestic output as well as capital flows, is magnified under fixed exchange rate regimes relative to more flexible regimes (Obstfeld, Ostry and Qureshi, 2019[32]). While EMs with fixed exchange rate regimes attract more net capital flows than intermediate and floating regimes, capital flows also react particularly negatively in these countries when the global financial cycle turns. More recent evidence also shows that more exchange rate flexibility strengthens an EM's resilience against a dollar appreciation shock (Obstfeld and Zhou, 2023[26]).

These works confirm that the trilemma may be binding for EMs, and that the absorption of shocks by floating exchange rates may still be (partially) working in the context of a global financial cycle, i.e. EM are not purely facing a dilemma between monetary policy autonomy or free capital mobility (Rey, 2013[18]).

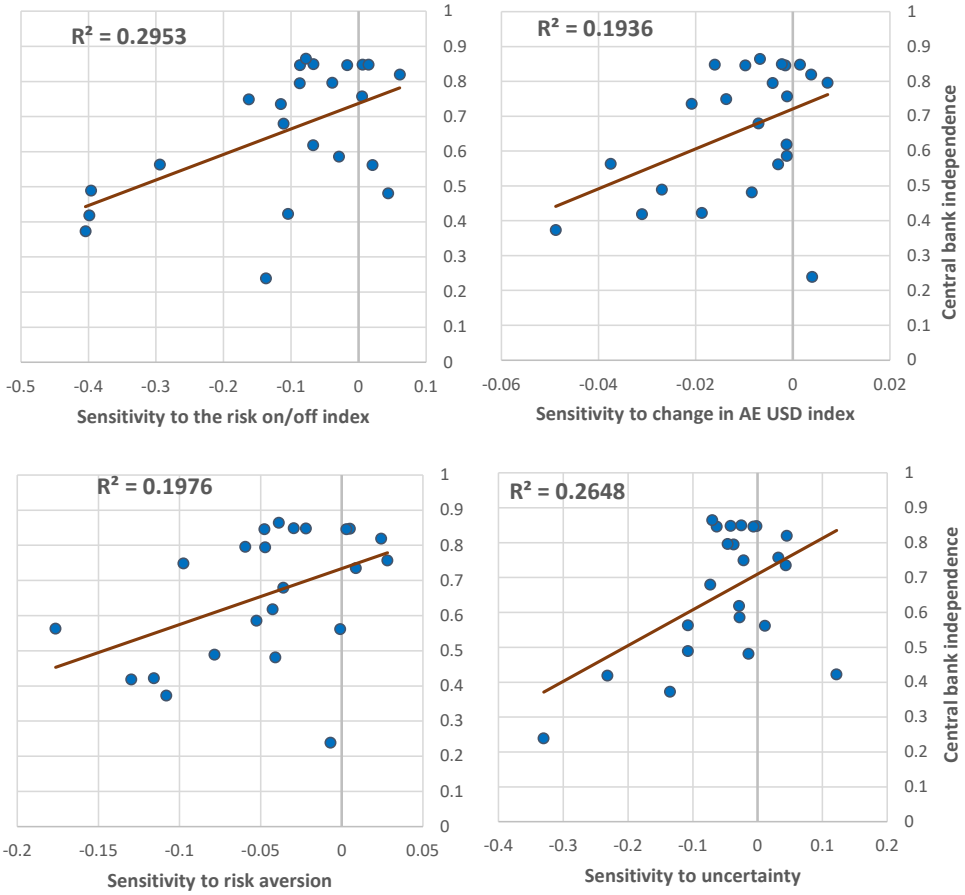
In parallel, it may be expected that monetary policy credibility may strengthen investor confidence in times of global risk spikes, and allow the exchange rate to absorb shocks without a de-anchoring of inflation expectations. Preliminary evidence also shows that an inflation-targeting monetary framework mitigates the sensitivity of EM macroeconomic variables to the global dollar cycle (Obstfeld and Zhou, 2023[26]). Inflation targeting has also been found to improve macroeconomic performance following exogenous shocks (Fratzscher, Grosse-Steffen and Rieth, 2020[39]). In addition, recent work shows that a lack of credible monetary policy (described as a combination of independence and accountability, policy and operational strategy, as well as communication) is a key factor explaining the rise in EM risk spreads, depreciating exchange rates, declining GDP and capital outflows in periods of US monetary policy tightening. Accordingly, the capacity of EMs to raise rates ahead of AEs in the latest tightening cycle, responding to their own inflation, may have been enabled by improved credibility (Kalemli-Özcan and Unsal, 2024[34]).

The figures below start by analysing central bank independence (CBI), which is part of a credible monetary policy and has up-to-date coverage of the EMs studied in this report. As explained in (Unsal, Papageorgiou and Garbers, 2022[40]), a well-established monetary policy framework safeguarding policy continuity and ensuring clarity to the public in forming policy expectations, reduces uncertainty, and ultimately makes monetary policy more effective. CBI and credible monetary policy anchor expectations reduce uncertainty and ensure policy continuity and coherence (Bernanke, 2017[41]), which should be valued by investors.

From a cross-sectional perspective, similar to the approach taken by Zhou (2023[12]), Figure 11 examines the country-specific sensitivity to global factors by plotting simple correlations with *de jure* CBI [12]. It reveals a strong positive correlation between CBI and the sensitivity of equity flows to global factors, indicating that higher central bank independence is associated with decreased sensitivity of these flows to global shocks.

Figure 13. The degree of central bank independence is associated with lower sensitivity of equity inflows to global shocks

Cross-sectional relationship between CBI (vertical axis) and the sensitivity of EM equity inflows to global shocks



Note: Cross-sectional relationship between central bank independence (vertical axis) and the sensitivity of EM equity inflows to global shocks (coefficients from country-specific quarterly time series regressions of equity inflows on a given global shock, and controls, as described in Annex A - Equation 1). Regressions are restricted to 2010q1-2023q4. Central bank independence is averaged in the post-GFC period (2010-2023). Sample of 23 EMs.

Turning now to the time series dimension of the data[13], the analysis shows strong evidence that CBI reduces the sensitivity of EM portfolio (primarily equity) flows to global shocks (Tables A5 and A6 in the Annex). This is the case for the full portfolio flow distribution, but even more important at the lower tail of the distribution, highlighting that equity investors pull out less from countries that have more independent central banks in times of high global risk.

Existing datasets regarding other aspects of monetary policy frameworks such as inflation targeting or central bank transparency do not allow the same empirical exercise over a period including COVID, the US monetary policy cycle and its aftermath. However, tests on shorter time periods or extending these indices with latest values show that the findings presented above on CBI do not appear to be driven either by central bank transparency or a higher adoption of inflation targeting frameworks, which are found statistically insignificant.

The role of macroeconomic fundamentals

The sensitivity of capital flows in periods of changing global risks may also be explained by differences in country macroeconomic fundamentals, whereby investors pull out first from countries with worse fundamentals.

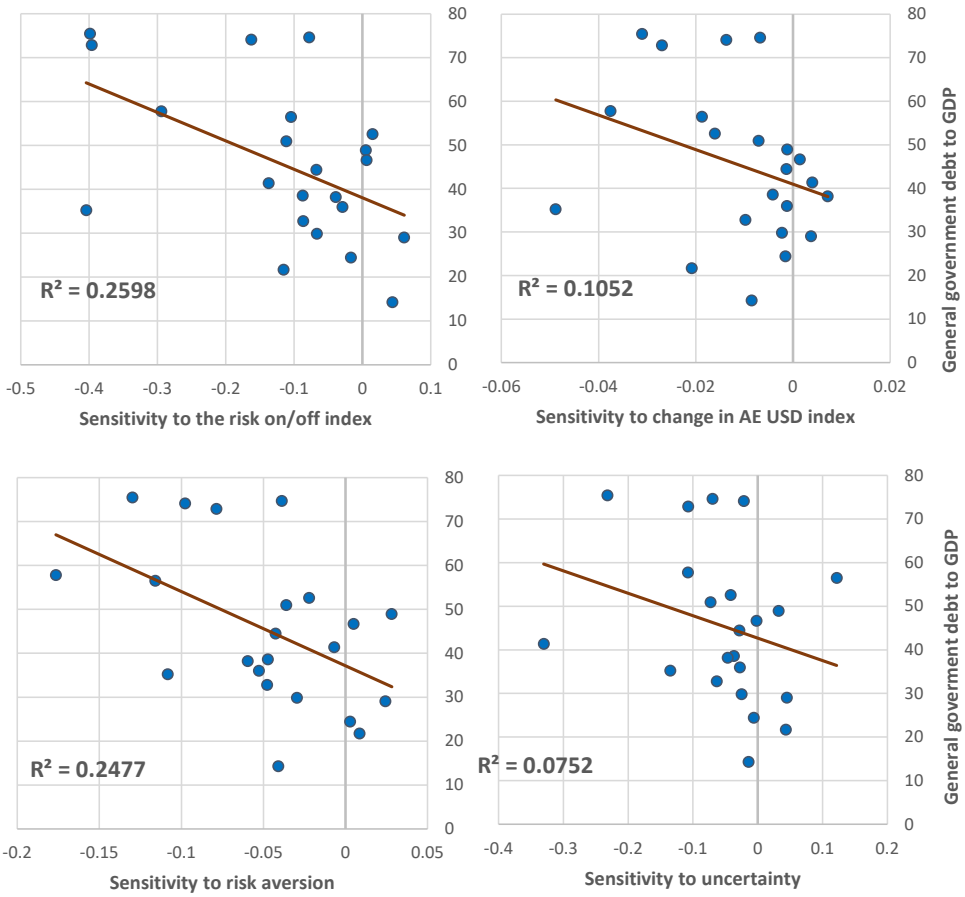
There is a range of country macroeconomic fundamentals that may impact the sensitivity of individual EMs to global shocks. Recent work shows that strong fundamentals like current account balance, international reserves, and inflation were all important determinants of EM exchange rate resilience during the last five cycles of US Fed monetary tightening and easing (Aizenman et al., 2024[42]). Specifically to the 2021-22 Fed tightening, an additional 10 percentage points of FX reserves/GDP held ex-ante was found to be associated with 1.5 to 2% less exchange rate depreciation (Ahmed et al., 2023[43]). During the previous taper tantrum episode, there was mixed evidence on the role of fundamentals in providing insulation to EMs: (Eichengreen and Gupta, 2016[44]) found no evidence for a role of fundamentals in improving EMs' resilience, such as a, lower public debt, a higher level of international reserves, and higher economic growth; while others found that countries with better fundamentals suffered less from the deterioration in financial markets (Ahmed, Coulibaly and Zlate, 2017[45]).

This section tests how capital inflows react to global risk, and, as it can't test all possible fundamentals, focuses on a specific variable, government debt level, as a core aspect that investors are likely to monitor in normal as well as in risk-off periods.[14]

Conducting the same analysis as in the previous section, it appears that there is overall a clear negative relationship between the level of general government debt to GDP and the sensitivity of portfolio inflows to global factors. This is the case in cross-sectional analysis in the post-GFC period, as displayed in Figure 12 along all major global drivers (albeit with different strength of the correlation).

Figure 14. Government debt levels are associated with higher sensitivity to global shocks

Cross-sectional relationship between general government debt to GDP (vertical axis) and the sensitivity of EM equity inflows to global shocks



Note: Cross-sectional relationship between the level of general government debt to GDP (vertical axis) and the sensitivity of EM equity inflows to global shocks (coefficients from country specific quarterly time series regressions of equity inflows on a given global shock, and controls, as described in Annex A). Regressions are restricted to 2010q1-2023q4. General government debt is averaged in the post-GFC period (2010-2023). Sample of 22 EMs.

This is also the case when exploiting the time series dimension of the data: Table A7 and 8 shows that the sensitivity to global factors depends on the level of government debt (negative interaction term between the global risk factor and government debt). This is especially the case in risk-off periods, at the tail of the capital flow distribution (bottom 25 percentile), and for equity inflows rather than debt inflows.

Testing additional proxies within the same framework, no evidence is found that a stronger FX reserves position per se (as proxied by the IMF ARA metric) mitigates the sensitivity of capital flows to global risk shocks.

Macroprudential policy stringency and capital account policy restrictiveness

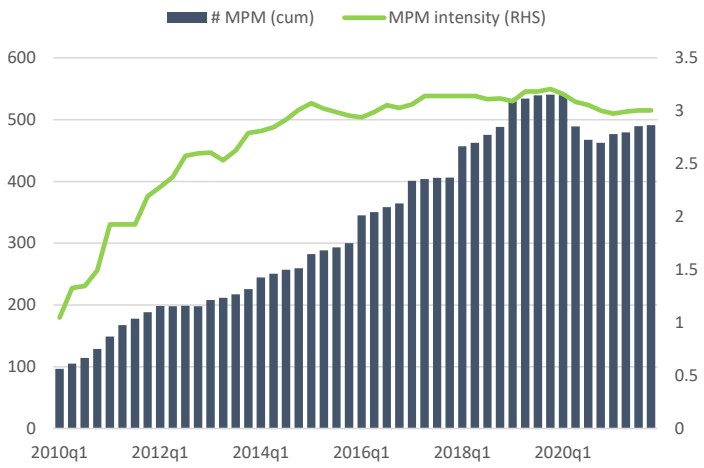
A final set of policy factors that may have changed the sensitivity of capital flows to global shocks post-GFC relates to macroprudential and capital account policy. The conduct of macroprudential policy has profoundly changed since the GFC. While in the pre-GFC period EMs had already used a variety of

regulations that may be called “macroprudential”, the GFC marked a clear consensual shift from a micro- to a macroprudential perspective to financial regulation, with governments assigning new financial stability mandates to dedicated authorities. Macroprudential policy actions increased post-GFC in both AEs and EMs. This is the case not only looking at cumulative counts of macroprudential tightening actions but also regarding measures capturing macroprudential intensity (Figure 15). The COVID-19 shock halted this trend of macroprudential tightening with a relaxation across the board of macroprudential tools. The 2021 pick-up hints at the temporary nature of this relaxation.

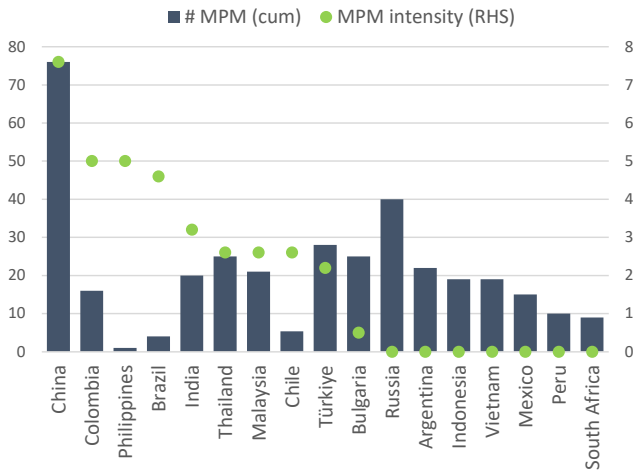
On the other hand regarding capital account policies, EMs overall gradually liberalised capital inflow restrictions over the period, with a continuous liberalisation trend since 2011 (Figure 16a). Despite this general trend, in 2019 (the latest year available for the capital account restrictiveness index) there remained strong heterogeneity in capital account openness of EMs, with China and India scoring as restricted, while countries like Costa Rica, Chile and Peru appearing very open to capital inflows (Figure 16b).

Figure 15. Changes in EM macroprudential policy activity in the post-GFC period

a. Changes in EM macroprudential policy activity in the post-GFC period



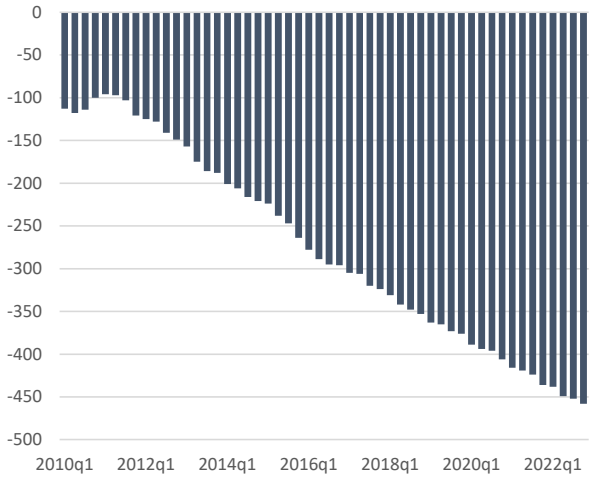
b. Macroprudential stringency (2021q4)



Note: Bars are the cumulative sum since 1990 of net tightening – easing macroprudential policy actions summed over 27 EMs. Line and dots are the mean EM macroprudential intensity, captured as the sum of the countercyclical capital buffer (CCyB) rate plus a coded loan to value (LTV) cap variable [(100-LTV cap)/5 following Eller et al (2020[46])]
Source: IMF iMaPP, BIS, ESRB, OECD calculations

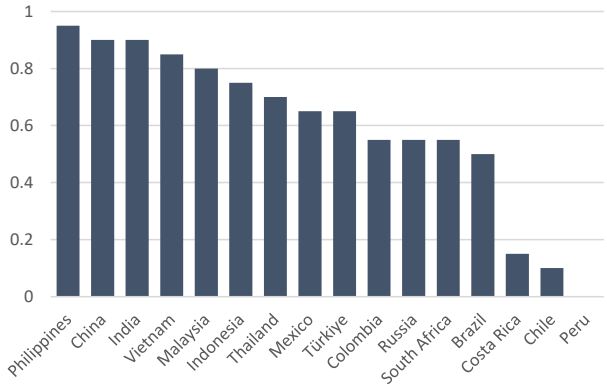
Figure 16. Capital account restrictions in the post-GFC period in EMs

a. Changes in EM inflow CFMs



Source: Lepers and Mehigan (2019), OECD calculations
Note: Bars are the cumulative sum since 1995 of net tightening – easing inflow CFM actions summed over 27 EMs. Negative bars indicate net liberalisation of controls.

b. Capital account restrictiveness (inflow) – 2019



Source: Fernandez et al (2015). Note: 2019 (latest year available).

What may be the impact of macroprudential policy regarding the transmission channel explored in this report ? There is only limited evidence that traditional macroprudential policy has a direct impact on capital inflows (Forbes, 2020[47]; Eller et al., 2019[48]; Lepers and Mehigan, 2019[49]). Unlike currency-based measures or capital flow management measures, which target respectively foreign currency assets or liabilities or non-resident transactions, traditional macroprudential measures are less directly linked to cross-border capital flows. Therefore, the impact of macroprudential policy on the sensitivity of capital flows to global shocks is likely to materialise more through indirect channels. Recent evidence finds that a tighter macroprudential stance amplifies the negative impact of risk-off shocks (causing larger bond outflows) and risk-on shocks (causing larger bond inflows) (Chari, Dilts-Stedman and Forbes, 2022[50]). This may be attributed to sectoral spillovers, whereby macroprudential regulations (which has been mainly applied to the banking sector) increase the resilience of banks to extreme risk-off states but shift the risk exposure to bond investors. The higher exposure of non-bank bond investors may in turn increase capital flow volatility.

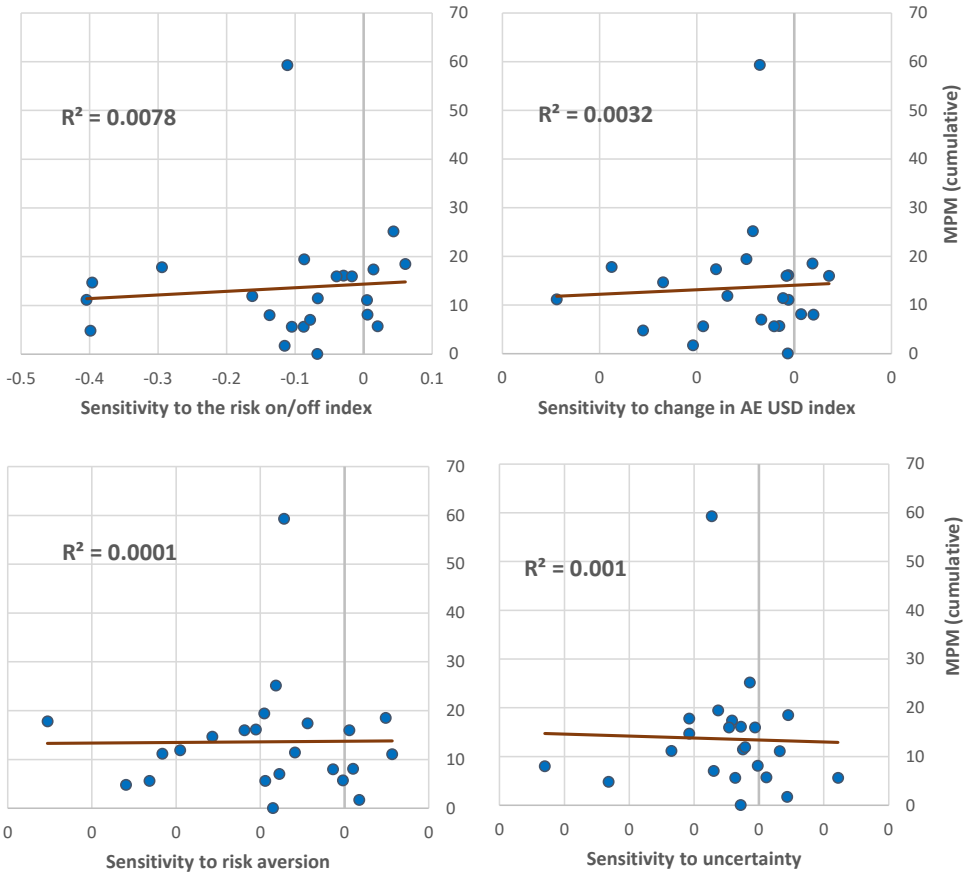
Finally, well-known limitations with macroprudential policy indices may prevent the drawing of strong policy conclusion from empirical analysis. The main limitation relates to the difficulty to capture policy intensity and stringency[15], thus often relying on dummy variables of tightening and easing actions. Another issue relates to the pooling in aggregate indices of very different policy tools: meta-analysis taking stock of the literature concluded on the considerable heterogeneity in macroprudential impact across instruments (Araujo et al., 2024[51]). As such, research has so far used either cumulative indices of dummy-based macroprudential actions or intensity-based measures looking only at a limited part of the macroprudential toolkit. Furthermore, for the purpose of the present report, the lack of data on macroprudential policy post-2021 prevents a similar analysis as the previous section, which would incorporate data for 2022 and 2023 with the latest US monetary policy cycle.

Figure 17 and Table A9 and A10 show nonetheless the results of the same exercise as in previous sections with available data.[16] Figure 17 demonstrates that macroprudential policy activity did not correlate with the sensitivity of inflows into different EMs to global shocks in cross-sectional settings for the-post GFC period. Exploiting the time series, there is limited evidence of a role for macroprudential policy in mitigating or

amplifying the sensitivity to shocks, with the exception of a significant positive impact on portfolio inflows in risk-off periods (Table A9 and A10).[17]

Figure 17. Macroprudential policy and country-specific equity inflow sensitivity to global shocks

Cross-sectional relationship between the cumulative changes in macroprudential policy (vertical axis) and the sensitivity of EM equity inflows to global shocks



Note: Cross-sectional relationship between macroprudential policy (vertical axis) and the sensitivity of EM equity inflows to global shocks (coefficients from country specific quarterly time series regressions of equity inflows on a given global shock, and controls, as described in Annex A). Macroprudential policy is the cumulative sum of a country's tightening actions – net of loosening actions since 1990, averaged in the post GFC period (2010-2021). Regressions are restricted to 2010q1-2023q4. Sample of 23 EMs.

While there is no conclusive evidence for a role for macroprudential policy in mitigating the sensitivity of portfolio inflows to global shocks, there is strong evidence of the benefits of macroprudential policy through other channels. In times of important capital inflows, there is evidence that macroprudential policy mitigates the "capital flow-credit nexus", i.e. the sensitivity of EM household and corporate credit growth to capital inflows (Carvalho, Lepers and Mercado, 2024[52]; Fendoğlu, 2017[53]), and hence limits the risk of domestic credit bubbles. In bad times such as global financial shocks or sudden stops, there is also evidence that macroprudential policy enhances the resilience of the EM domestic banking sector - and hence of credit and GDP - to shocks such as increases in global risk, capital flow sudden stops, and US monetary policy shocks (Bergant et al., 2023[33]; Coman and Lloyd, 2022[54]).[18] Finally, tighter macroprudential policy helps to regain monetary independence in face of portfolio flows (Aizenman, Chinn and Ito, 2020[55]).

The lack of evidence of direct impact on portfolio inflows may also more fundamentally reflect the fact that macroprudential policy has been primarily applied to the banking sector. As this report has shown, NBFIs and in particular investment funds, are a key driver of portfolio inflows to EMs and for global EM funds are most often domiciled abroad in AEs and international financial centres. As such, a more direct impact on cross-border portfolio flows may be expected from macroprudential policy in the source country[19] and if regulation was to be applied to NBFIs.

Policy discussions around the regulation of NBFIs and the possibility of macroprudential policy beyond banking have intensified in the last years (ESRB, 2016[56]). The FSB has dedicated in recent years several workstreams to assess and address NBFIs vulnerabilities in the following areas: resilience of money market funds and short-term funding markets, liquidity risk in open-ended funds, margining practices, as well as non-bank leverage (FSB, 2023[57]; FSB, 2021[58]). Such work was particularly strengthened following the March 2020 market turmoil.

5 Resilient capital flows: Attracting green investment

While long-term and stable capital flows are essential to help scale up development financing in EMs, capital will need to flow specifically to finance the transition to low-emission economies. According to the International Energy Agency (IEA), achieving net-zero greenhouse gas emissions by 2050 requires emerging and developing economies to invest around USD 1 trillion annually in the renewable energy sector by 2030 (IEA, 2021[59]).

The Independent High-Level Expert Group on Climate Finance estimates that around 55% of the climate financing needed can be covered by private investment, 25% by Multilateral Development Banks (MDBs), and 20% by other actors using innovative instruments for low-cost financing (Songwe, Stern and Bhattacharya, 2022[60]). For EMs with limited domestic investment, cross-border private capital flows, including FDI, bank lending, and portfolio equity and debt flows from international investors, will prove key.

FDI in renewable energy

Foreign direct investment (FDI) can help accelerate energy transitions towards carbon neutrality by providing sustainable financial and technological resources needed to support green growth. As many countries are stepping up efforts to diversify their energy supply and strengthen energy independence, mobilising foreign investment to achieve environmental policy goals might become especially challenging and, hence, understanding what factors encourage renewable energy FDI is particularly important.

Greenfield investment in renewable energy has been increasing since 2012, possibly reflecting factors such as global energy demand and other market conditions, while greenfield investment in fossil fuels shows some signs of a slowdown (Knutsson and Ibarlucea Flores, 2022[61]; OECD, forthcoming[62]). [20] The composition of investments in renewables has also shifted from predominantly solar and wind technologies to over 40% of investments in hydrogen and other emerging clean technologies in 2023 (OECD, forthcoming[62]).

In OECD countries, newly announced investments in this sector reached USD 172 billion in 2023, whereas greenfield activity in fossil fuels has decreased dramatically, from 35% of greenfield FDI in 2003 to 3% in 2023 (OECD, forthcoming[62]). Cross-border M&A activity in renewable energy, however, has lagged behind the fossil fuel sector. In 2021, renewable energy accounted for less than 1% of total cross-border M&A values, compared to 3% for fossil fuels. Despite this, fossil fuel M&A deals have been declining, while renewable energy M&A activity has remained relatively stable over time. The low share of renewable M&A deals can be attributed to the nature of renewable energy investments: as they constitute mainly newly constructed plants, especially in the case of new and emerging technologies, including solar, wind or geothermal, they consist largely of greenfield projects.

OECD research (Knutsson and Ibarlucea Flores, 2022[61]) has shown that broad investment conditions and the strength of climate policies (The FDI Qualities Policy Toolkit (OECD, 2022)) can help fostering a favourable environment for renewable energy.[21] More FDI projects into renewables go to larger markets,

picking up the greater demand of larger economies for clean energy. Foreign firms from larger countries undertake more cross-border projects in renewable energy, possibly because larger and richer economies might have more sustainable financial and technological resources to reach the competitive edge and the development and deployment of clean technologies. Interestingly, the importance of investment conditions and the strength of climate policies differs depending on the sector where mergers and acquisitions (M&A) and greenfield investors come from, suggesting that different motives might be driving the types of investors. For M&A investment, the difference in drivers is less distinct. Climate mitigation measures matter for all acquiring firms, irrespective of their sectoral origin. This finding is in line with the idea that companies that have already benefitted from the climate policies might be more attractive targets for foreign investors than businesses in a location where such policies were weaker. Moreover, this result might be partially related to the fact that many M&A originating from outside the energy sector are undertaken by financial firms seeking to maximise return on investment, so that these investors take the strength of climate policies into account.

The extent to which these factors impact investment decisions varies depending on where the investors come from: firms from outside the energy sector seem to put less weight on the climate policies when undertaking greenfield projects in renewable power, whereas energy firms put more weight on restrictions to FDI than their non-energy counterparts. Dissimilarity of the underlying motives behind investment projects, the extent of sunk costs incurred, and the investment horizon might contribute to these differences between the investor types.

Targeted policies in different areas help attract more FDI in renewable energies and other low-carbon technologies. This includes, first and foremost, national visions and strong government commitments to the low-carbon transition and to renewable energies, which are underpinned by coherent policy and strategic frameworks. Furthermore, a robust regulatory framework and conducive enabling environment for renewable energies can facilitate investment in this sector. It is also important to tailor investment promotion efforts to renewable investments. Facilitation services can help reduce administrative barriers for renewable energy investors (OECD, 2022[6]).

However, besides FDI, other sources of financing, and notably portfolio investment flows, will still be needed to meet EMs' increasing financing needs (Couto, 2023[63]).

Portfolio capital flows to green sectors: evidence from investment funds

Previous OECD research delivered to the G20 FMCBG (OECD, 2023[4]) assessed, on the basis of a dataset of the largest 37 000 mutual funds, the current state of portfolio investment in companies involved in carbon solutions in EMs (defined as companies engaged for instance as renewable energy, green transport, and buildings) . It has shown that despite the recent boom in 'sustainable' investing, only a very limited share of total equity and bond investments goes to companies involved in carbon solutions and, within this share, an even smaller proportion goes to EMs (De Crescenzio and Lepers, 2024[64]; OECD, 2023[4]). In addition, the distribution of green capital flows is particularly skewed towards few countries, and in particular the US and China.

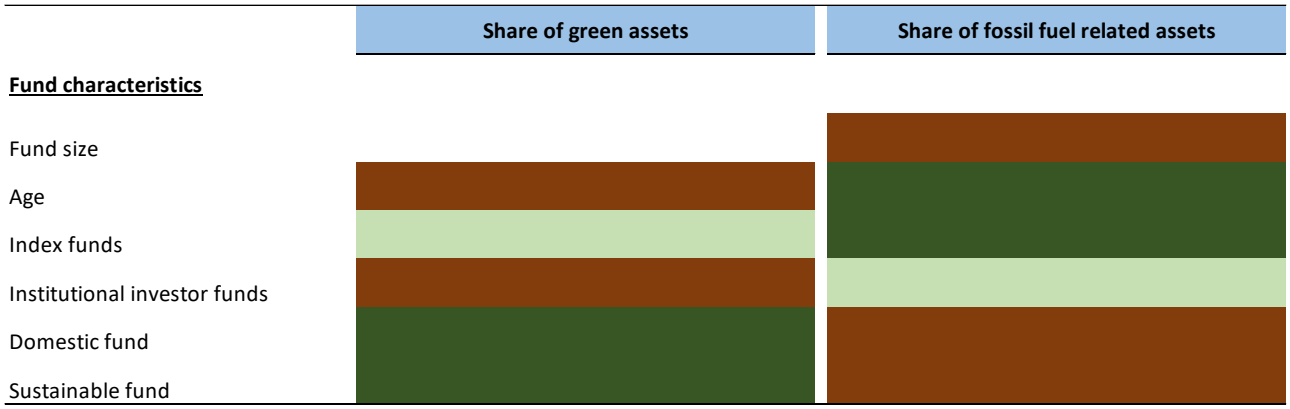
Going one step further in this analysis, fund-level and fund-country level regressions highlight several important fund and country characteristics as particularly important drivers of higher investment in green EM companies.

Funds' characteristics

Which funds are most or least likely to invest in green assets? The empirical analysis conducted over a cross-section of the 37000 largest investment funds (summarized in Table 2) highlights that:

- Age is negatively correlated with allocation of investments in green assets: newer investment funds are investing more in green assets, picking up new trends compared to older funds. Passive funds declaring tracking specific indices is weakly associated with a higher share of green assets and funds targeted at institutional investors are associated with a significantly lower share of green investments.
- Funds' EM exposure, domicile in EM, or EM mandate positively correlate with investment in green assets, highlighting that funds domiciled and investing in a single country are typically more likely to invest in green assets.
- Finally, despite potential greenwashing, sustainable labelled funds are still more likely than other funds to have a higher share of their investments in green companies.

Table 2. Drivers of green capital flows: funds' characteristics



Note: Dependent variable is the fund level share of green or fossil fuel companies assets in the portfolio. Regressions are run using OLS on funds holdings as of 2023Q1. Clustered SE at the fund level. See source for detailed description. Color coding based on statistical significance of the coefficients: dark:1% significance level, medium 5%, light 10%. Green highlights a positive coefficient while brown highlights a negative coefficient. Source: (De Crescenzio and Lepers, 2024[64])

This analysis confirms the importance of, on the one hand, the development of domestic specialised green funds in addition to the broader inclusion of green companies in global or regional equity benchmarks.

Country characteristics

The analysis also tests why do some countries receive more green investments than others? The country specific allocation of fund is determined by their mandate – global, regional, or country specific. Unlike the previous section, the analysis focuses on a sample of global EM equity funds as these funds can in theory invest in any EM[22] and highlights that:

- Inclusion of EM green companies in benchmarks enhance green investments: the country allocation in the benchmark MSCI EM equity index appears the single most important positive covariate of green investments in EMs, underscoring the importance for green companies to make their ways into benchmarks.
- Concentration of the ownership of firms (proxied by the share of listed companies where the top 3 shareholders own more than 50% of the shares), negatively affects green investments.
- Greater green allocation in EMs is linked to higher portfolio flow openness and economic freedom, capturing the rule of law, government size, regulatory efficiency, market openness.
- Climate-related factors such as exports in renewable manufacturing.

Table 3. Drivers of green capital flows: country characteristics

	Country share of green assets
Capital markets	
MSCI EM weight	
Concentration of firm ownership	
Macro variables	
Portfolio inflow restrictions	
Economic freedom index	
Green variables	
Climate vulnerability	
Sovereign ESG score	
Renewable share (% generation)	
Exports of green products (%GDP)	

Note: Dependent variable is the fund level country share of green assets in the portfolio. Poisson regressions. Clustered SE at the fund level. See source for detailed description. Color coding based on statistical significance of the coefficients: dark:1% significance level, medium 5%, light 10%. Green highlights a positive coefficient while brown highlights a negative coefficient.
Source: (De Crescenzio and Lepers, 2024[64])

The crucial role of benchmarks in driving investment in general, and also green investments, points to the importance of index inclusion of green companies. More generally, structural issues in global capital markets act as barriers for EMs, including the concentration of firm ownership and its impact on free-float levels, and biases towards large companies for inclusion in an index. This favours an uneven distribution of investment, as usually EMs are perceived as riskier investment destinations.

The absence of portfolio inflows restrictions and the level of openness and economic freedom are common drivers of investment in general and also impact green investment. The renewable energy generation of a country and the country's share in green exports have turned out to be important determinants of investment funds' asset allocation towards green. Also credible, robust and just national transition plans can serve as a structural guidance for corporates and financial investors.

Working on benchmark inclusion and maintaining openness and good investment climate, while developing green sectors domestically to ensure a pool of green competitive and investable companies are all avenues that may be on policymakers' agendas.

6 Conclusions

Take-aways on how to foster resilient capital flows

The findings presented highlight that portfolio flows continue to be influenced by several global factors, including global risk aversion, uncertainty, commodity prices, U.S. dollar fluctuations, and monetary policy changes. As these global determinants continue to play a pivotal role in shaping capital movements, enhanced macroeconomic policy co-ordination and transparent communication of monetary policy can contribute to making capital flows more resilient. In addition, geopolitical risk, has emerged as a distinct and significant driver of portfolio flows, particularly in the context of rising tensions seen in recent years.

A positive trend has been the reduced sensitivity of EMs to global shocks in the post-GFC period, signaling improved resilience overall. Nonetheless, this resilience varies across EMs, with differences largely attributed to structural policy variations. Key take-aways from the analysis include:

- Greater central bank independence is strongly linked to a reduced sensitivity of portfolio flows to global shocks. EMs with more autonomous central banks tend to absorb shocks more effectively.
- Lower government debt levels are associated with fewer portfolio outflows during periods of adverse global shocks.
- While evidence that stricter macroprudential policies reduce portfolio outflows during periods of heightened global risk is limited, such policies have strengthened banking sector resilience, supported credit availability, and contributed to a reduction in GDP volatility.

These policy conclusions suggest that a continued focus on central bank independence and fiscal discipline may offer EMs greater protection against external shocks, while macroprudential policies continue to play an important role in safeguarding broader financial stability. The role and vulnerabilities of NBFIs, and notably investment funds, in driving portfolio flows volatility, also highlighted in the analysis, render particularly relevant ongoing discussions on the regulation of investment funds.

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Annex A. Statistical annex

Capital flow definitions

This report analyses gross capital inflows understood as non-resident net purchase and sale of domestic assets. “Equity inflows” and “Debt inflows” are understood throughout as the split of portfolio inflows into debt and equity including investment fund shares. “Other inflows” are understood as “other investment inflows” in the traditional balance of payments classification and notably include bank loans, trade credit, currency and deposits.

List of Emerging Markets

Emerging markets sample based on IMF and MSCI definitions as well as data availability:

Argentina, Brazil, Bulgaria, Chile, China, Colombia, Costa Rica, Croatia, Czechia, Hungary, India, Indonesia, Malaysia, Mexico, Peru, Philippines, Poland, Romania, Russia, South Africa, Thailand, Türkiye, Vietnam

Data sources

Variables	Description	Data source
	Capital flow data	
Monthly capital flows	OECD Monthly Capital Flow dataset covers 47 countries (24 EM max), inflows/outflows, by asset class	OECD (De Crescenzio and Lepers, 2024[9])
Quarterly capital flows		IMF Balance of Payments
	Global factors	
Risk on/risk off index	composite factor analysis of risk across a range of asset classes	(Chari, Dilts Stedman and Lundblad, 2020[24])
Risk aversion index	distinguishes the risk aversion and the uncertainty component of investors unlike the more traditional VIX index	(Bekaert, Engstrom and Xu, 2022[19])
Uncertainty index	distinguishes the risk aversion and the uncertainty component of investors unlike the more traditional VIX index	(Bekaert, Engstrom and Xu, 2022[19])
USD cycle	quarterly change in the USD dollar index against AE currencies	FRED
Geopolitical risk	Global and country specific news-based indices of geopolitical risk	(Caldara and Iacoviello, 2022[30])
	Policy variables	
Central bank independence	See source for detailed index construction.	(Romelli, 2022[37])
Government debt to GDP	General government debt to GDP. Yearly from the IMF, quarterly from World Bank depending on country availability	IMF (Mbaye, Moreno Badia and Chae, 2018[65]) and World Bank
Macroprudential policy	Cumulative sum since Jan 1990 of tightening actions – net of loosening actions. Also: level of loan to value cap to calculate macroprudential intensity.	IMF (Alam et al., 2024[66])
Central bank transparency	See source for detailed index construction.	(Dincer and Eichengreen, 2014[38])

Variables	Description	Data source
	Capital flow data	
Inflation targeting	Dummy variable from survey.	AREAER
Capital account restrictiveness	See source for detailed index construction.	(Fernández et al., 2015[67])
Capital control changes	See source for detailed index construction.	OECD based on (Lepers and Mehigan, 2019[49])
	Control variables	
Interest rate differential	Differential between local policy rate and the shadow Fed Fund rate	BIS and FRED based on (Wu and Xia, 2016[68])
Terms of trade		IMF based on (Gruss and Kebhaj, 2019[69])
Quarterly GDP growth		OECD
Sovereign ratings	Long term FX sovereign rating	Fitch
Country index weights	Country weights in MSCI EM or the JP Morgan EMBI for equity and debt inflows respectively	MSCI, JP Morgan

Empirical Model

The report estimates different variants of a traditional push/pull model of capital flow drivers:

$$Y_{ct} = \alpha + \beta_L Y_{ct-1} + \beta_G X_t^{Global} + \beta_D X_{ct}^{Domestic} + \delta_c + \epsilon_{ct} (1)$$

where Y_{ct} represents different type of gross capital inflows divided by nominal quarterly GDP for each country c at time t (quarter and alternatively month).

Domestic (pull) factors $X_{ct}^{Domestic}$ include in quarterly regressions the lagged interest rate differential between country *c* and the US shadow rate, the lagged quarterly change in a country's terms of trade, lagged quarterly GDP growth, and the change in sovereign rating. When equity or debt inflows are the dependent variable, the change in the country weight in indices (the MSCI EM or the JP Morgan EMBI respectively) is added to the regression.

Global (push) factors X_t^{Global} includes alternatively 1) the risk aversion and uncertainty indices of (Bekaert, Engstrom and Xu, 2022[19]) which distinguish the risk aversion and the uncertainty component of investors unlike the more traditional VIX index, 2) the quarterly change in the USD dollar index against AE currencies – the AE index is preferred to the EM index to avoid endogeneity as also used in (Obstfeld and Zhou, 2023[26]), 3) the risk on/off index of (Chari, Dilts Stedman and Lundblad, 2020[24]) which provides a more composite factor analysis of risk across a range of asset classes.

The model also include a lagged DV $\beta_L Y_{ct-1}$ to control for capital flows persistence (Burger, Warnock and Warnock, 2022[70])[23], and country fixed effects δ_c. It is estimated with panel OLS regressions with country clustered standard errors. Alternatively, Figure 11 estimates Equation 1 in time-series country specific regressions. The resulting country-specific coefficients β_G are also used in cross sectional analysis in Figure 13, 14 and 17.

In Equation (2), an interaction term between a given measure of global risk and country structural factors: $X_t^{Global} * X_{ct-1}^{Structural}$ is added to the regressions.

$$Y_{ct} = \alpha + \beta_L Y_{ct-1} + \beta_G X_t^{Global} + \boldsymbol{\beta_I X_t^{Global} * X_{ct-1}^{Structural}} + \beta_D X_{ct}^{Domestic} + \delta_c + \epsilon_{ct} (2)$$

In subsequent regressions, the same variables are used in a panel quantile regression framework of (Machado and Santos Silva, 2019[71]) as in (Chari, Dilts Stedman and Lundblad, 2022[36]):

$$Y_{ct} = \beta_L^{(q)} Y_{ct-1} + \beta_G^{(q)} X_t^{Global} + \beta_D^{(q)} X_{ct}^{Domestic} + \delta_c^{(q)} + \epsilon_{ct} \quad (3)$$

$$Y_{ct} = \beta_L^{(q)} Y_{ct-1} + \beta_G^{(q)} X_t^{Global} + \beta_1^{(q)} \boldsymbol{X_t^{Global}} * \boldsymbol{X_{ct-1}^{Structural}} + \beta_D^{(q)} X_{ct}^{Domestic} + \delta_c^{(q)} + \epsilon_{ct} \quad (4)$$

Specifically, regressions are run for the bottom 25th percentile of the distribution (q=0.25). This quantile is chosen based on the country specific capital flow distribution of EM, with the 25th percentile corresponding to outflows in most countries (See Table A.4 below).

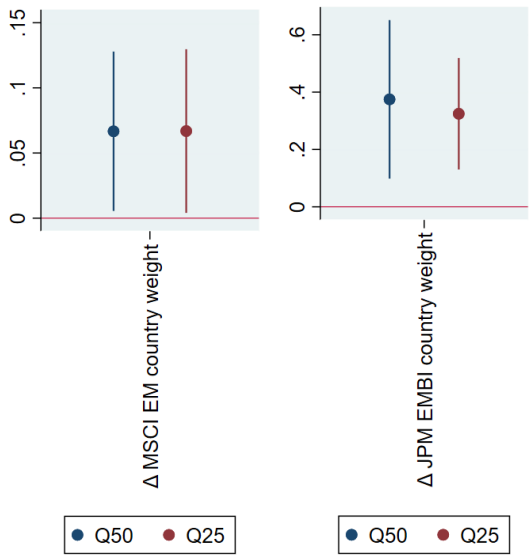
Box 3 on the role of geopolitical risk presents additional analysis using micro-level data from investment funds' portfolio, which estimates the following model (OECD, 2024[10]):

$$\text{d}.w_{ijt} = \beta_x X_{jt} + FE_{it} + FE_{ij} + \epsilon_{ijt} \quad (5)$$

where: d.w_{ijt} represents changes in a fund i's allocation to country j in month t, $\beta_x X_{jt}$ represent a vector of country time variables with the main variable of interest being country specific geopolitical risk and a set of controls (changes in country weights in relevant benchmarks, changes in country terms of trade and stock price indices, and changes in interest rate differentials), and $FE_{it} + FE_{ij}$ represent fund-country and fund-month dummies.

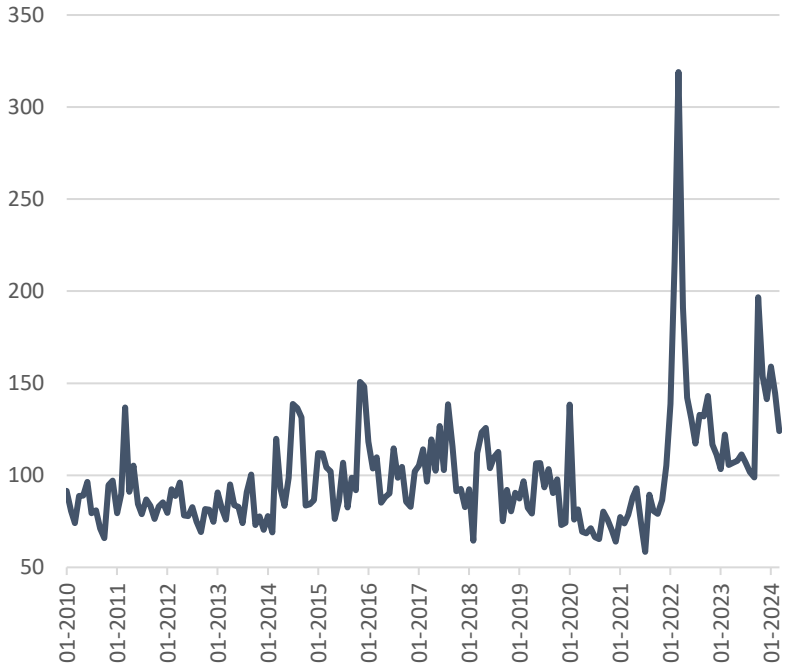
Supplementary analysis

Figure A.1. Impact of changes in index country weights on EM portfolio inflows



Note: Left hand side shows the impact of change in the MSCI EM country weight on equity inflows, while right hand side shows the impact of change in the JPM EMBI country weight on debt inflows. Quantile regressions on the 50th and bottom 25th percentile. Regressions are restricted to 2010-2023. Model and controls described above in Equation 3.

Figure A.2. Global geopolitical risk



Source: Caldara and Iacoviello (2022)

Table A.1. Pairwise correlation of different global factors in the post GFC period (levels)

	real USD EM index	real USD AE index	VIX	Risk on/off	Global fin cycle	Geopolitical risk	Fed shadow rate	Commodity prices
real USD EM index	1							
real USD AE index	0.7924	1						
VIX	0.1646	0.1733	1					
Risk on/off	-0.0038	0.006	0.2677	1				
Global fin cycle	-0.1818	-0.438	-0.3316	-0.0096	1			
Geopolitical risk	0.2826	0.2514	-0.0547	-0.003	-0.1745	1		
Fed shadow rate	0.6269	0.1283	-0.0252	0.0359	0.3564	-0.2409	1	
Commodity prices	-0.086	0.1527	0.1548	0.0573	0.0093	-0.2041	-0.2896	1

Table A.2. Pairwise correlation of different global factors in the post GFC period (monthly change)

Δ	real USD EM index	real USD AE index	Geopolitical risk	Fed shadow rate	Commodity prices
real USD EM index	1				
real USD AE index	0.6369	1			
Geopolitical risk	0.0379	-0.0292	1		
Fed shadow rate	0.1088	0.0653	-0.0339	1	
Commodity prices	-0.5577	-0.5395	0.0595	-0.0984	1

Table A.3. Global factors and portfolio inflows to GDP

a. Quarterly

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Portfolio inflows to GDP						
VIX (log)	-0.166*						
	0.09						
Uncertainty index		-0.158***					-0.013
		0.05					0.09
Risk aversion index			-0.136***				0.027
			0.04				0.07
AE US dollar index (qoq)				-0.042***			-0.022**
				0.01			0.01
Risk on/risk off index					-0.435***		-0.374***
					0.11		0.12
Commodity prices (qoq)						0.010**	0.004
						0.00	0.00
Baseline controls	Y	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y	Y

b. Monthly

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Portfolio inflows to GDP						
VIX (log)	-0.123***						
	0.02						
Uncertainty index		-0.105***					-0.070***
		0.02					0.02
Risk aversion index			-0.068***				-0.001
			0.01				0.02
AE US dollar index (qoq)				-0.032***			-0.018**
				0.01			0.01
Risk on/risk off index					-0.121***		-0.079***
					0.01		0.02
Commodity prices (qoq)						0.016***	0.003
						0.00	0.00
Baseline controls	Y	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y	Y

Note: Quarterly regressions for 23 EMs from 2010q1 to 2023q4, monthly regressions for 15 EMs from 2010m1 to 2023m4. See Equation 1 for full specification including description of controls. N=1236 (Q), 3195 (M). Clustered SE at the country level. * p<0.10, ** p<0.05, *** p<0.01.

Table A.4. Portfolio inflows to GDP distribution

	p5	p10	p25	p50	p75	p90	p95
Argentina	-0.60	-0.28	-0.23	-0.01	0.21	1.28	2.23
Brazil	-0.49	-0.37	-0.16	0.14	0.42	0.78	0.96
Bulgaria	-0.77	-0.59	-0.23	-0.06	0.08	1.75	2.56
Chile	-0.40	-0.03	0.28	0.82	1.41	2.08	2.64
China	-0.20	-0.12	0.04	0.16	0.27	0.35	0.47
Colombia	-0.28	-0.16	0.18	0.47	0.79	1.27	1.60
Costa Rica	-0.76	-0.63	-0.24	0.05	0.49	1.65	2.08
Croatia	-2.19	-1.17	-0.53	-0.04	0.54	1.91	2.62
Czechia	-1.75	-1.35	-0.27	0.30	1.15	2.37	2.82
Hungary	-2.07	-1.37	-0.73	-0.03	1.18	2.22	2.78
India	-0.43	-0.33	-0.03	0.14	0.43	0.60	0.73
Indonesia	-0.36	-0.17	0.02	0.38	0.58	0.92	1.01
Malaysia	-2.12	-1.74	-0.32	0.28	1.45	2.00	3.36
Mexico	-0.39	-0.29	-0.04	0.42	0.94	1.39	1.66
Peru	-0.50	-0.33	-0.12	0.31	0.97	1.63	1.79
Philippines	-0.73	-0.42	-0.16	0.18	0.49	0.71	0.89
Poland	-0.79	-0.57	-0.23	0.19	0.74	1.14	1.38
Romania	-0.62	-0.38	-0.02	0.50	1.16	1.61	1.80
Russian Federation	-0.58	-0.47	-0.23	-0.07	0.11	0.29	0.41
South Africa	-1.10	-0.62	-0.03	0.57	1.16	1.61	1.71
Thailand	-1.23	-1.04	-0.40	0.04	0.53	0.95	1.21
Türkiye	-0.59	-0.43	-0.16	0.31	0.68	1.13	1.43
Vietnam	-0.06	-0.03	0.05	0.15	0.25	0.40	0.70

Source: IMF and OECD calculations

Table A.5. Summary - Sensitivity of capital flows to global shocks: the role of Central Bank independence

	Panel OLS regression			Quantile regression - bottom 25 percentile		
	Portfolio inflows	Equity inflows	Debt inflows	Portfolio inflows	Equity inflows	Debt inflows
Central bank independence						
Global USD cycle						
Global risk (uncertainty)						
Global risk (aversion)						
Global risk aversion (roro)						

Note: Summary of coefficients on the sensitivity of capital inflows (% GDP) to the different global push factors conditional on the level of central bank independence. See Equation 2 and 4 for empirical specification. Estimated over the 2010q1-2023q4 period. Color coding based on statistical significance of the coefficients: dark green:1% significance level, medium green 5%, light green 10%. Green highlights a positive coefficient.

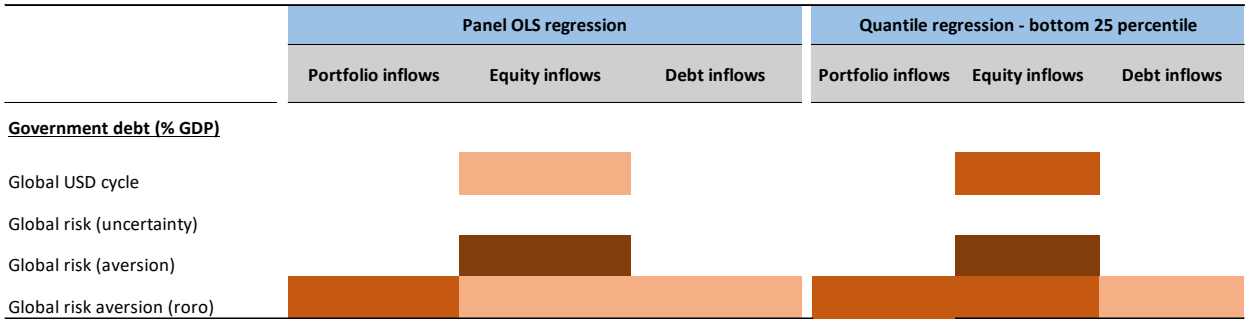
Table A.6. Sensitivity of capital flows to global shocks: the role of Central Bank independence

							OLS					
VARIABLES	port	eq	debt	port	eq	debt	port	eq	debt	port	eq	debt
Uncertainty index	-0.523***	-0.124	-0.375***									
	0.16	0.09	0.13									
interacted with CBI (t-1)	0.540**	0.124	0.354									
	0.23	0.12	0.21									
Risk aversion index				-0.351**	-0.147***	-0.210						
				0.15	0.04	0.13						
interacted with CBI (t-1)				0.320	0.151***	0.173						
				0.22	0.05	0.20						
AE US dollar index (qoq)							-0.096**	-0.034***	-0.063*			
							0.04	0.01	0.03			
interacted with CBI (t-1)							0.081*	0.036**	0.043			
							0.05	0.02	0.04			
Risk on/risk off index										-0.794**	-0.343**	-0.497*
										0.32	0.13	0.29
interacted with CBI (t-1)										0.533	0.354**	0.241
										0.42	0.16	0.38
Observations	1,236	1,236	1,180	1,236	1,236	1,180	1,236	1,236	1,180	1,236	1,236	1,180
Baseline controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

							Quantile regression (25th percentile)					
VARIABLES	port	eq	debt	port	eq	debt	port	eq	debt	port	eq	debt
Uncertainty index	-0.498**	-0.053	-0.380**									
	0.24	0.19	0.17									
interacted with CBI (t-1)	0.533*	0.020	0.366									
	0.32	0.24	0.24									
Risk aversion index				-0.488***	-0.145***	-0.294**						
				0.16	0.04	0.14						
interacted with CBI (t-1)				0.506**	0.143***	0.274						
				0.23	0.05	0.21						
AE US dollar index (qoq)							-0.105***	-0.040***	-0.061**			
							0.03	0.01	0.03			
interacted with CBI (t-1)							0.100**	0.046**	0.052			
							0.05	0.02	0.04			
Risk on/risk off index										-0.901***	-0.325***	-0.547**
										0.32	0.11	0.27
interacted with CBI (t-1)										0.795*	0.341**	0.440
										0.42	0.14	0.35
Observations	1,236	1,236	1,180	1,236	1,236	1,180	1,236	1,236	1,180	1,236	1,236	1,180
Baseline controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Note: See Equation 2 and 4 for empirical specification. Estimated over the 2010q1-2023q4 period. Color coding based on statistical significance of the coefficients: dark green:1% significance level, medium green 5%, light green 10%. Green highlights a positive coefficient.

Table A.7. Summary - Sensitivity of capital flows to global shocks: the role of government debt levels



Note: Summary of coefficients on the sensitivity of capital inflows (%GDP) to the different global push factors conditional on the level of general government debt to GDP. See Equation 2 and 4 for empirical specification. Estimated over the 2010q1-2023q4 period. Color coding based on statistical significance of the coefficients: dark:1% significance level, medium 5%, light 10%. Green highlights a positive coefficient while brown highlights a negative coefficient.

Table A.8. Sensitivity of capital flows to global shocks: the role of government debt levels

							OLS					
VARIABLES	port	eq	debt	port	eq	debt	port	eq	debt	port	eq	debt
Uncertainty index	-0.008	-0.009	-0.054									
	0.10	0.05	0.08									
interacted with general gov debt to GDP (t-1)	-0.003	-0.001	-0.002									
	0.00	0.00	0.00									
Risk aversion index				-0.104	0.010	-0.136*						
				0.08	0.02	0.08						
interacted with general gov debt to GDP (t-1)				-0.001	-0.001***	0.001						
				0.00	0.00	0.00						
AE US dollar index (qoq)							-0.013	0.002	-0.018			
							0.02	0.01	0.02			
interacted with general gov debt to GDP (t-1)							-0.001	-0.000*	-0.000			
							0.00	0.00	0.00			
Risk on/risk off index										-0.031	0.016	-0.029
										0.16	0.07	0.16
interacted with general gov debt to GDP (t-1)										-0.010**	-0.003*	-0.007*
										0.00	0.00	0.00
Observations	1,179	1,179	1,123	1,179	1,179	1,123	1,179	1,179	1,123	1,179	1,179	1,123
Baseline controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

							Quantile regression (25th percentile)					
VARIABLES	port	eq	debt	port	eq	debt	port	eq	debt	port	eq	debt
Uncertainty index	0.026	-0.043	-0.028									
	0.13	0.07	0.09									
interacted with general gov debt to GDP (t-1)	-0.004	-0.000	-0.003									
	0.00	0.00	0.00									
Risk aversion index				-0.028	0.022	-0.098						
				0.08	0.02	0.08						
interacted with general gov debt to GDP (t-1)				-0.003	-0.002***	-0.000						
				0.00	0.00	0.00						
AE US dollar index (qoq)							-0.018	0.006	-0.017			
							0.02	0.01	0.02			
interacted with general gov debt to GDP (t-1)							-0.001	-0.000**	-0.000			
							0.00	0.00	0.00			
Risk on/risk off index										-0.034	0.038	-0.023
										0.13	0.07	0.11
interacted with general gov debt to GDP (t-1)										-0.008**	-0.003**	-0.006*
										0.00	0.00	0.00
Observations	1,179	1,179	1,123	1,179	1,179	1,123	1,179	1,179	1,123	1,179	1,179	1,123
Baseline controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Note: See Equation 2 and 4 for empirical specification. Estimated over the 2010q1-2023q4 period. Color coding based on statistical significance of the coefficients: dark:1% significance level, medium 5%, light 10%. Green highlights a positive coefficient while brown highlights a negative coefficient.

Table A.9. Summary - Sensitivity of capital flows to global shocks: the role of macroprudential policy

	Panel OLS regression			Quantile regression - bottom 25 percentile		
	Portfolio inflows	Equity inflows	Debt inflows	Portfolio inflows	Equity inflows	Debt inflows
Macroprudential pol. (cum)						
Global USD cycle						
Global risk (uncertainty)						
Global risk (aversion)						
Global risk aversion (roro)						

Note: Summary of coefficients on the sensitivity of capital inflows (%GDP) to the different global push factors conditional on the cumulative net sum of macroprudential policy tightening net of loosening action since 1990. Regressions are restricted to 2010q1-2023q4. See Equation 2 and 4 for empirical specification. Color coding based on statistical significance of the coefficients: dark:1% significance level, medium 5%, light 10%. Green highlights a positive coefficient while brown highlights a negative coefficient.

Table A.10. Sensitivity of capital flows to global shocks: the role of macroprudential policy

							OLS					
VARIABLES	port	eq	debt	port	eq	debt	port	eq	debt	port	eq	debt
Uncertainty index	-0.193**	-0.011	-0.200**									
	0.08	0.02	0.07									
interacted with MPM cumul. (t-1)	0.002	-0.002	0.004									
	0.00	0.00	0.00									
Risk aversion index				-0.162***	-0.046***	-0.111**						
				0.06	0.01	0.05						
interacted with MPM cumul. (t-1)				0.001	-0.000	0.001						
				0.00	0.00	0.00						
AE US dollar index (qoq)							-0.044***	-0.010**	-0.035***			
							0.01	0.00	0.01			
interacted with MPM cumul. (t-1)							0.000	0.000	-0.000			
							0.00	0.00	0.00			
Risk on/risk off index										-0.538***	-0.149***	-0.349**
										0.13	0.05	0.13
interacted with MPM cumul. (t-1)										0.006	0.003	0.001
										0.00	0.00	0.00
Observations	1,236	1,236	1,180	1,236	1,236	1,180	1,236	1,236	1,180	1,236	1,236	1,180
Baseline controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

							Quantile regression (25th percentile)					
VARIABLES	port	eq	debt	port	eq	debt	port	eq	debt	port	eq	debt
Uncertainty index	-0.141	-0.004	-0.157**									
	0.10	0.05	0.08									
interacted with MPM cumul. (t-1)	-0.000	-0.002	0.001									
	0.00	0.00	0.00									
Risk aversion index				-0.145***	-0.043***	-0.102**						
				0.06	0.01	0.05						
interacted with MPM cumul. (t-1)				-0.001	-0.001**	-0.001						
				0.00	0.00	0.00						
AE US dollar index (qoq)							-0.040***	-0.010**	-0.028***			
							0.01	0.00	0.01			
interacted with MPM cumul. (t-1)							0.000	0.000	0.000			
							0.00	0.00	0.00			
Risk on/risk off index										-0.488***	-0.149***	-0.274***
										0.11	0.05	0.09
interacted with MPM cumul. (t-1)										0.006**	0.003	0.001
										0.00	0.00	0.00
Observations	1,236	1,236	1,180	1,236	1,236	1,180	1,236	1,236	1,180	1,236	1,236	1,180
Baseline controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Note: Regressions are restricted to 2010q1-2023q4. See Equation 2 and 4 for empirical specification. Color coding based on statistical significance of the coefficients: dark:1% significance level, medium 5%, light 10%. Green highlights a positive coefficient while brown highlights a negative coefficient.

Notes

[1] Annex A provides details on the types of flows described in each section of the report.

[2] See (Hoggarth, Jung and Reinhardt, 2016[5]) for an early summary.

[3] This report analyses gross capital inflows understood as non-resident net purchase and sale of domestic assets. "Equity inflows" and "Debt inflows" are understood throughout as the split of portfolio inflows into debt and equity including investment fund shares. "Other inflows" are understood as "other investment inflows" in the traditional balance of payments classification and notably include bank loans, trade credit, currency and deposits.

[4] What is measured by and recorded as aggregate "FDI" in the balance of payments may be quite different from such understanding of FDI as long-term commitment by MNEs. See Blanchard and Acalin for a discussion (Blanchard and Acalin, 2016[79]) Recent reforms of statistical compilation notably aim at disentangling more precisely the different components of recorded FDI. Nevertheless, Fig 2 shows that aggregate FDI with such known measurement caveats still is the least volatile class of capital.

[5] See (OECD, 2023[93]) for a description of a detailed strategy.

[6] Regression tables at quarterly and monthly frequency are provided in Table A3 a and b. It also shows results when global factors enter the regressions simultaneously instead of separately, despite their correlation. In this horse race model, the risk on/off index appears the most important factor, together with the USD cycle.

[7] The AE index is preferred to the EM index to avoid endogeneity, as also used in the paper by (Obstfeld and Zhou, 2023[26]). As explained in Obstfeld and Zhou (2023[26]), "*dollar appreciation shocks themselves are highly correlated not just with tighter U.S. monetary policies, but also with measures of U.S. domestic and international dollar funding stress that themselves reflect global investors' risk appetite*". The model in this section follows this approach by focusing on changes in the broad USD index and separately controlling for the impact of interest rate differentials between the shadow Fed fund rate and the domestic policy rate. Alternative regressions confirm that changes to- and levels of - the shadow Fed fund rate are negatively related with EM portfolio inflows.

[8] As the impact of such global financial factors on aggregate FDI, which also captures movements of a more financial nature, is not statistically significant, the same may be expected for pure greenfield investment.

[9] Results hold excluding China.

[10] Disaggregating even further by types of funds (retail vs. institutional, passive vs. active), all types of funds appear to shift their country allocation away from countries with higher geopolitical risk.

[11] Unlike the mentioned studies, the present study focuses specifically on the post-GFC period including the latest 2022/2023 monetary policy cycle, while testing the impact of several structural drivers specifically on the sensitivity of EM capital flows to global shocks.

[12] This report tests the impact of *de jure* central bank independence, using the measure of (Romelli, 2022[37]) which builds on (Garriga, 2016[80]) and (Cukierman, Webb and Neyapti, 1992[81]). What these indices measure may differ

from *de facto* independence as shown in recent work (Binder, 2021[76]) (Ioannidou et al., 2022[77]). Existing de facto measures of central bank independence such as governors' turnover (Dreher, Sturm and Haan, 2010[78]) or political pressure (Binder, 2021[76]) are not available for recent years.

[13] See Equation 2 and 4 in Annex A for model specification and controls.

[14] Research found that elevated levels of government debt raise investors' concerns about their effects on long-term growth prospects - based e.g. on expectations of either higher future tax pressure, increases in average inflation, or higher political uncertainty, and price in higher risk for firms (Croce et al., 2019[82]).

[15] This issue has been well noted in research on macroprudential policy (Eller et al., 2020[46]) but has not been addressed yet by any sufficiently large and comprehensive cross-country database on macroprudential intensity. Intensity-based datasets for large country sample thus far focus on specific tools, e.g. LTV ratios (Alam et al., 2024[66]) or reserve requirements (de Crescenzio, Lepers and Fannon, 2021[83]) (Federico, Vegh and Vuletin, 2014[86]).

[16] Such an exercise is not conducted for capital account openness as the index stops in 2019.

[17] Complementary analysis run over the full sample pre- and post-GFC, as well as using monthly frequency capital flow data, appears to highlight a more significant positive role of macroprudential policy in dampening the sensitivity of portfolio flows to global shocks. This points to the sensitivity of the results to the empirical specification.

[18] There is no such positive role in the case of capital controls (Bergant et al., 2023[33]).

[19] There is evidence that macroprudential policy on the domestic banking sector reduces both credit growth at home by domestic banks as well as their lending abroad, i.e. macroprudential policy leaks (Aiyar, Calomiris and Wieladek, 2012[87]).

[20] The remarkable increase in greenfield FDI in renewables reflects a 90% decline in the global average weighted levelised cost (i.e., the average cost in currency per energy unit) of solar PV since 2010 and a 50-60% decline in the cost of wind power (IRENA, 2023[2]). Over the last few years, investment in renewables has further been boosted by high and volatile fossil fuel prices, combined with new policy support measures across countries worldwide, driven by climate goals and energy security considerations (IEA, 2022[1]).

[21]Climate mitigation policies refer to strategies and measures to enhance and ensure human development in face of climate change. Key findings of the critical role of targeted climate mitigation policies include: 1) Feed-in Tariffs (FITs), these are positively associated with the number of FDI projects in renewable power. 2) Carbon Pricing also positively linked to the number of FDI projects. 3) Public RD&D Spending is significant for greenfield investors from outside the energy sector. 4) Fossil Fuel Support is negatively associated with the number of greenfield projects in renewable energy. 5) Countries with higher explicit barriers to foreign investment receive fewer FDI projects in renewable energy, highlighting the importance of reducing regulatory obstacles to attract green investment.

[22] Country specific and regional funds are not included in this analysis as their domestic and regional mandates constrain their geographic investment allocation and reallocation possibilities.

[23] Results hold dropping the lagged dependent variable.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