MACROECONOMIC DRIVERS OF CAPITAL FLOWS: A REVIEW OF INTERNATIONAL LITERATURE

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Abstract

The increasing investment gap in developing countries has renewed interest in understanding drivers of capital flows and how these countries can attract more investment. To contribute towards this understanding, this paper reviews the theoretical and empirical literature on macroeconomic drivers of capital flows. While other reviews have covered capital flows at an aggregate level, this paper focuses on the sub-inflows — foreign direct investment (FDI), portfolio equity, and portfolio debt — disentangling differences in their drivers in empirical work. The empirical literature reviewed in this paper reveals that risk, global liquidity, and commodity prices are push factors that matter most for FDI and portfolio equity and, in addition, economic growth in source countries matters for portfolio debt. Fewer pull factors appear to drive portfolio flows (both equity and debt) whereas more are relevant for FDI. Interest rate differentials, which feature prominently in the theoretical literature, have been found to be an important driver of overall capital flows but evidence at the sub-component levels has been weak. Drivers can also vary due to models used, countries and regions studied, and time periods covered in empirical work.

Keywords: Capital flows, Institutions, Foreign direct investment, Portfolio debt, Portfolio equity.

1. Introduction

This paper reviews the theoretical and applied work on what determines capital flows at the sub-component level. The investment gap for developing countries has widened in

recent years, stalling advancement towards achieving the Sustainable Development Goals (SDGs). Several factors have been cited for this, including the covid-19 pandemic, geopolitical fragmentation, disruptions in supply chains affecting food and energy prices, and high public debt (UNCTAD, 2023). Understanding factors that underlie the movement of capital flows is crucial for policy makers who seek to attract investments in sufficient amounts.

Theory has provided the foundation for analysis largely at the aggregate level of capital flows, while the empirical evidence has extended to examining drivers for different types of capital flows. In early periods, open economy neoclassical framework provided theoretical grounds for the importance of the marginal productivity of capital as it was postulated that capital flows from rich to poor countries that have a higher marginal productivity of capital. The classical approach presented two main theories—one that capital movements respond to absolute interest rate differentials and the other that they respond to changes in interest rate differentials. From the 1960s, to the 1980s, the Mundell-Fleming model emerged and became a dominant framework for open economy macroeconomics, which linked various levels of capital mobility with changes in the domestic interest rate given variations in monetary policy or fiscal policy, output, and the extent of exchange rate flexibility. According to portfolio theory, investors would favor a portfolio that has lower risk over one that has higher risk for the same level of return, and this would drive investor decisions on capital flows.

Partly motivated by experiences with sharp oil price surges in 1973-74 and 1979-80 that resulted in current account imbalances that past models weren't adequately explaining, the intertemporal approach to the current account made a case for a forward-looking approach to policy analysis and decision making. Later, new open economy macroeconomics' (NOEM) incorporated the intertemporal approach with imperfect markets and nominal rigidities into a dynamic general equilibrium framework. NOEM aimed at overcoming the limitations of past models—such as the Mundell-Fleming model that assume that monetary policy and the flexibility of exchange rates would shield economies from shocks; traditional sticky price Keynesian models; and flexible price intertemporal models. This is because the latter models did not accommodate frictions that are present in many economies and generally in international finance. The analysis of capital flows was further codified in a push-pull framework that acknowledges the relevance of various external (push) and domestic (macroeconomic and/or institutional) factors. Recent theories incorporate the role of capital market frictions as drivers of capital flows, largely within a push-pull framework, aiming to capture factors that traditional models did not explain adequately.

The cross-country/or panel data empirical literature has principally analyzed capital flows drivers in a push-pull framework that incorporates variables that are motivated by various theoretical models. Push factors sway investors to move financial flows from other economies — usually more developed economies — to recipient countries. Pull factors are conditions in recipient economies that help attract capital flows. Developments during the global financial crisis (GFC) and various global shocks in recent years, such as significant capital flow reversals during 2014-2015 that were associated with the "taper tantrum", the effects of Covid-19, and more recently geopolitical fragmentation, have triggered investigation into what's driving capital flows in recent decades. While noting that there is vast literature on institutional factors and capital market frictions as drivers of capital flows, for whom investigation to their importance was motivated by the Lucas (1990) critique,

this paper concentrates on macroeconomic drivers and digs dipper into findings on the different types of capital inflows.

In the coming sections of this paper, section 2 reviews the theoretical literature of capital flow drivers. Section 3 presents the empirical literature while unbundling findings for three types of capital flows: foreign direct investment (FDI), portfolio equity, and portfolio debt, and section 4 concludes.

2. Research hypothesis and methodology

The paper reviews the theoretical and empirical literature on the drivers of capital flows, focusing on three types of these flows: FDI, portfolio equity and portfolio debt. The main research question of this literature review is what are the determinants of capital flows? Particularly, the empirical literature review focuses on the following hypothesis: i) FDI, portfolio equity and portfolio debt inflows are driven by push and pull factors; ii) the push and pull factors vary by type of capital flow.

This review concentrates on those theories that form the foundation of the understanding of macroeconomic drivers of capital flows in economics. It covers earlier theories and recent ones. Theories have largely focused on capital flows in the aggregate, while the empirical literature has delved into drivers both at the aggregate and by type of capital inflow—FDI, portfolio flows, and others. Drivers can vary by their type, for example, institutional drivers such as law and order and corruption compared to macroeconomic drivers such as economic activity and trade openness. Findings from empirical analysis can depend on whether the focus is at the country or cross-country level, which entails applying different strands of econometric techniques, such as time series or cross-sectional econometrics in the case of country level studies versus panel data econometric techniques in cross-country studies.

Given the vast empirical literature on capital flow drivers, this study narrows its focus for comprehensiveness. This review distills findings from the empirical literature on capital flow drivers, focusing on i) FDI, portfolio equity and portfolio debt flows, ii) capital inflows rather than outflows; iii) cross-country flows; and iv) macroeconomic drivers. Other studies, such as Koepke (2015) and Guichard (2017), have focused on literature at the aggregate level of capital flows.

3. Capital flow drivers: Insights from theory

Various theories have contributed towards the understanding what pushes and pulls capital flows between economies. This section reviews the main theories.

3.1 The Classical Approach to Capital Flows

In the classical approach, short-term movements in capital respond to either absolute interest rate differentials (which is a continuous flow) or changes in interest rate differentials (which is a shift in the stock of flows) between countries. In studies utilizing the "flow" framework (including Rhomberg (1960, 1964) and Black (1968)), financial asset flows occur when interest rate differences exceed cross-country differences in risk as short-term capital flows help finance a continuous balance of payments deficit. However, the emergence of capital flows that were speculative during the gold standard in the 1920s

and the balance of payments crisis during the world depression in the 1930s raised concerns over using short-term capital flows for the adjustment process (Schultz, 1979). In contrast, Bell (1962) found private capital movements to not be very sensitive to interest rate differentials and suggested that existing tax advantages at the time also drove capital movements. However, it was recognized that there was still a great deal that was unknown about what's driving capital flows at the time. Overall, interest rate differentials were a key factor in the classical approach but there was also a realization that there could be other factors that drove capital flows. Economic dislocations in the period between the two World Wars, including the sharp decline of economic integration, rise in preferential trade agreements, default of foreign debt, rise in exchange controls, were not explicable using the classical approach.

3.2 The Neoclassical Approach to Capital Flows

Neoclassical theory suggests a flow of capital from North (advanced) to South (developing) countries that have a higher marginal productivity of capital. The development of the neoclassical model is associated with Ramsey (1928), Swan (1956), Solow (1956), Cass (1965) and Koopmans (1965). The model assumes allocative efficiency of capital where capital recipients (poor countries) have a higher marginal productivity of capital compared to lenders of capital. Chenery and Strout (1966) further elaborated the neoclassical view to indicate that South (poor) countries can borrow from North (rich) countries to help ease constraints they face such as a lack of savings and skills. The flow of capital from the developed to developing countries contributes to income convergence between the countries at different levels of economic development. The marginal productivity of capital occupied a key role in determining the flow of capital in the neoclassical framework.

3.3 The Neoclassical Critique

Lucas (1990) critiqued the neoclassical premise on capital flows. Using an example of the US and India, he provided evidence that capital flows from North to South countries are very low compared to neoclassical predictions. Applying a Cobb-Douglas framework of constant returns to technology on U.S. and India data, Lucas found the marginal product of capital in India to be about 58 times the marginal product of capital in the U.S, which should result in capital flowing from North countries to South nations such as India. Under the neoclassical framework, one would not expect any investment to occur in the wealthy nations. However, this was not observed in practice. This has been termed the Lucas paradox, where there are insufficient capital flows from developed to developing countries despite poor countries having higher output per additional unit of capital and lower levels of capital per worker.

3.4 The Allocation Puzzle

Gourinchas and Jeanne (2013) showed that capital distribution across developing countries flows in a direction that is different to neoclassical expectations. In what they called the "allocation puzzle", Gourinchas and Jeanne (2013) showed that capital flows less to countries that invest and grow more. In their example, Korea who had an average annual investment rate of 34 percent and average total factor productivity growth of 4.1 percent per year from 1980 to 2000, obtained substantially low net capital inflows. In comparison, Madagascar, for whom total factor productivity fell by 1.5 percent a year and whose

average annual investment rate was short of 3 percent, received capital flows that are 7 percent of GDP on average each year. Essentially, capital flows from North to South countries are not just low—as illustrated by Lucas (1990), however, their allotment across developing countries is not correlated with theoretical expectations. To Gourinchas and Jeanne (2013), the allocation puzzle relates to the nature of accumulation of international reserves with the puzzle lying at the nexus between growth, saving, and international reserves.

3.5 The Mundell-Fleming Model

The Mundell-Fleming (Mundell (1963) and Fleming (1962) model augmented the Keynesian IS-LM framework and presented a relationship between the domestic interest rate, output, and the economy's exchange rate in an IS-ML-BP framework. The framework links various levels of capital mobility with changes in the domestic interest rate due to changes in monetary policy or changes in fiscal policy, output, and the extent of flexibility of the exchange rate. The Mundell-Fleming model has been used to argue that having a fixed exchange rate, open capital markets, and an independent monetary policy concurrently is not viable, which is also known as the Mundell-Fleming trilemma or "the holy trinity" (Rose 1996). The Mundell-Fleming model has been criticized for assuming that normal monetary policy and exchange rate flexibility shield economies from shocks and thus the model does not accommodate real world frictions and imperfections. While the Mundell-Fleming model was important in open economy macroeconomics between the early 1960s until 1980, it increasingly got displaced in the early 1980s given theoretical advances and economic events at that time. The Mundell-Fleming approach has also received criticism for ignoring intertemporal choice and intertemporal budget constraints and does not provide a valid benchmark to evaluate external balance and thus unable to address the possibility of exchange rate misalignment (Obstfeld and Rogoff 1995).

3.6 Portfolio Theory

Portfolio theory was initiated by Markowitz in 1952 and is based on the tenant that investors favor a portfolio that has lower risk over one that has higher risk for the same level of return, thus risk and return would drive investor decisions on capital flows. Portfolio theory comprises two main approaches: a partial equilibrium approach (portfolio selection) and a general equilibrium approach (portfolio balance).

The *portfolio selection theory:* Building on the work of Tobin (1958, 1965) and Markowitz (1959), Branson (1968) formalized the Markowitz-Tobin framework to help explain the allocation of wealth between foreign and domestic assets in a partial equilibrium framework. The model relates holdings of short-term foreign assets to a stock of wealth, domestic and foreign interest rates, and a gauge for risk (Schultz, 1979). Given the absence of data on wealth, the empirical literature tended to ignore the flow effect and instead used a linear form that relates changes in holdings of short-term foreign assets to variations in domestic and foreign interest rates and variations in risk; thus, making interest rates and risk the key determinants of capital flows. Branson's model has been used in the empirical literature (including Hodjera, 1973), with other additional variables to assess individual contents of the capital account and the net magnitude of the capital flows. Several problems with Branson's model have been documented (such as in Kauri and Porter, 1974; and Schultz, 1979). They include simultaneous-equation bias such that when

local and foreign bonds become perfect substitutes, the local interest rates equal foreign interest rates; and the model's incapacity to help assess many macroeconomic issues such as the influence of domestic monetary policy; and that the model results in the neutralization of the liquidity effects of capital flows (Schultz, 1979).

Portfolio balance: In the portfolio balance approach, capital flows are a stock adjustment responding to financial and real variables (Schultz, 1979). Contributors to this theory include Kouri and Porter (1974), Porter (1975), and Argy and Kouri (1975) who had similar models. The Kouri and Porter (1974) model included many endogenous variables, such as money supply and demand; many domestic variables including the interest rate; demand for bonds; domestic demand for foreign bonds; foreign demand for domestic bonds; and others. There were also exogenous variables such as nominal income (domestic and foreign); nominal wealth (domestic and foreign); foreign interest rate; a vector of risk factors; and others. Estimating the Kouri and Porter (1974) model proved difficult due to (i) a lack of dependable data on various asset stocks and interest rates necessary for simultaneous equation estimation; (ii) the need for a lot of institutional detail to tailor the framework to country idiosyncrasies; (iii) when assets are perfect substitutes, the individual structural equations are no longer well-defined functions (Kouri and Porter, 1974).

3.7 The intertemporal approach to the Current Account

The intertemporal approach argued for basing policy analysis in forward looking decision rules and was partly motivated by the current account imbalances that ensued after sharp oil price increases in 1973-74 and 1979-80 (Obstfeld and Rogoff, 1995). The approach came out in the heels of the Lucas (1990) critique and was associated with the works of Buiter (1981), Obstfeld (1982), Sachs (1981), and Svensson and Razin (1983). It recognizes that private savings and choices regarding investment, and sometimes government choices, can be the outcome of forward-looking decisions given expectations about the growth of productivity in the future, government spending requirements, real interest rates, and others (Obstfeld and Rogoff, 1995). In the intertemporal approach, net capital flows involve interchanges of assets in return for goods and services where countries with high yields receive net capital inflows to help finance domestic investment until the yield equates the world rate of return. In the intertemporal approach, gross capital flows result from the desire towards international risk-sharing by allocating capital to projects with higher risk and return.

However, some weaknesses of the intertemporal approach include that it has elements of the first welfare theorem such that liberalizing the capital market and allowing uninhibited movement of capital flows would always be economically efficient given that price signals would guide private agents to optimally trade off the costs and benefits of the financial flows (Korinek, 2020). This view implied that the liberalization of capital markets and a free movement of capital flows is an ideal policy objective. However, financial crisis in the 1990s made it difficult to apply the theory in conditions with capital market imperfections (Calvo, 1998; Krugman, 1999). During the 1990s financial crisis, countries that had borrowed in foreign currency and whose economies slowed down and their exchange rates depreciated experienced a rise in the domestic currency value of their economies' foreign currency liabilities at the same time when the value of assets declined. This led to adverse balance sheet effects and a worsening of financial market conditions, which spilled over, in a cycle, to a further deterioration in economic growth, currency depreciation, and further financial market deterioration (Korinek, 2020). This is the

financial accelerator effect, where endogenous credit market developments amplify shocks to the macroeconomy where, as a recession begins, there is usually a flight to quality where borrowers that have high agency costs would acquire a lower portion of credit and thus comprise a larger share of the fall in economic activity (Bernanke, Gertler, and Gilchrist, 1998).

3.8 The Push-Pull Framework

The past models in international finance described above and experiences with capital flows during the 1980s to the early 1990s motivated the development of the push-pull approach for the analysis of the determinants of capital flows. Papers by Calvo, Leiderman, and Reinhart (1993) and Fernandez-Arias (1994) were the basis of the push and pull context for analyzing the determinants of capital flows. Their work found push factors to be more important as drivers of capital flows compared to domestic factors. Fernandez-Arias's (1994) work has formed the basis of most of the analysis using the push-pull framework. Fernandez-Arias's work sought to analyze factors that drove the surge in capital flows to middle-income economies after 1989. Fernandez-Arias (1994) developed a push-pull analytical framework of international portfolio allocation to help determine if the capital flows were being pushed by non-favorable factors in advanced economies or pulled by favorable factors in developing countries. The framework helped determine that push factors were driving these flows, specifically, the fall in international interest rates were pushing capital flows and the findings did not give support for pull factors. This foundational work became popular in recent decades for analyzing the effect of macroeconomic and institutional conditions on capital flows.

3.9 New Open Economy Models with Capital Flows

New open economy macroeconomics (NOEM) attempts to overcome limitations of past models—such as the Mundell-Fleming model where standard monetary policy and exchange rate flexibility are assumed to insulate economies from shocks, traditional sticky price Keynesian models, and flexible price intertemporal models—which did not accommodate frictions that are present in many economies and generally in international finance. The NOEM is associated with Obstfeld and Rogoff (1995) who developed a model on international policy transmission with elements of the intertemporal approach together with short-run nominal price rigidities and explicit micro-foundations of aggregate supply, while Svensson and van Wijnbergen (1989) is generally noted as an important precursor to this work. The NOEM literature brought imperfect markets and nominal rigidities within a dynamic general equilibrium framework.

On capital flows, the NOEM literature predicts the association between capital flows and aggregate demand/output to be negative where a rise in capital flows results in currency appreciation, then a reduction in net exports and aggregate demand; and given sticky prices, lower aggregate demand leads to lower incomes. In that framework, capital flows would be expansionary only if the policy interest rate is reduced enough. In contrast, Blanchard, Ostry, Ghosh, and Chamon (2015) remark that policy makers note the opposite effect where capital flows lead to unsustainable credit growth and a rise in output and incomes that would need to be offset by increasing the policy interest rate. When extending the assets included in the Mindell-Fleming model to incorporate bonds and other assets, they find that the association between capital flows and output is contingent on the nature of

capital flows where bond inflows result in exchange rate appreciation and with an economic tightening effect whereas non-bond flows also result in exchange rate appreciation but reduce borrowing costs and are expansionary. This gives prominence to the need to analyze capital flows by financial flow aggregate. The differences in the relationship—whether expansionary or contractionary—are important for determining the appropriate policy response.

4. Capital Flow Drivers: Insights from the Empirical Evidence

The following insights can be learned from the empirical literature. Findings on the significance and sign of effects of drivers and various measures of capital inflows are summarized on Table 1.

Differences in model specification: In cross-country/panel data analysis, various types of models have been used to study the determinants of capital flows. They include panel fixed and random effects that have been used by Adam and Filippaios (2007), Ali, Fiess, and MacDonald (2010), Asiedu (2002), Hardy, Kalemli-Özcan, and Servén (2018), Baek (2006), Buchanan, Le, and Rishi (2012), Caporale, Spagnolo, and Nicola (2022), Dutta and Roy (2011), Hannan (2017), Hashimoto and Wacker (2012). They also include generalized method of moments (GMM) used by Asiedu, Jin, and Nandwa (2009), Busse and Hefeker (2007), Mercado and Park (2011), Moez and Mansour (2021), Naudé and Krugell (2007), and Okada (2013). They also include two stage least squares and instrumental variables utilized by Akhtaruzzaman (2019), Alfaro and Volosovych (2008). Model specification can affect results, for example, Hashimoto and Wacker (2012) found the role of financial openness to change depending on the model. They found financial openness to be important and positive with a random effects model but not significant with a fixed effects model. This is likely because random effects estimation contains omitted variable bias whereas the fixed effects model corrects for it. Selecting an appropriate model for the data on hand is critical for acquiring accurate results. The variables included in the model can also be a factor. Mercado and Park (2011) found the relationship between economic activity and portfolio flows to depend on model specification, where controlling for export unit value and the type of export (high-tech exports) and number of patents made economic activity an important determinant of portfolio flows.

Differences across countries and regions studied: Baek (2006) found world economic growth to matter in the regression including all 9 emerging countries in Asia and Latin America in the sample but was not significant in the samples for Latin American and for Asia countries. Adam and Filippaios (2007) found GDP per capita to matter and positively impact both OECD and non-OECD countries while trade openness was found to matter and positively impact only for OECD countries and was not significant for non-OECD countries. Addison and Heshmati (2003) found inflation to have both a positive and negative relationship with FDI. The positive relationship was found for Latin America and the authors noted that this is likely because Latin American countries were used to operating under high inflation and thus have indexed contracts. The negative relationship was found for Europe and Central Asia, Western Europe, and Middle East and North Africa. Alfaro and Volosovych (2008) found economic activity, measured with GDP per capita, to be positively or negatively associated with capital inflows depending on the model used. A positive relationship was found using first stage regression with a

probability value for Hansen overidentification test while insignificant relationships were found using two-stage least squares and OLS.

Differences across periods/economic episodes: Studies have found the importance of various factors to vary across periods, including during crisis versus normal times. For example, Milesi-Ferretti and Tille (2011) found the importance of economic activity as a driver of capital flows to be dependent on the stage of the crisis; being important and with a negative effect during the period of capital flow collapse and not important during the recovery phase. They also found that the effect on capital flows varied between advanced and emerging economies where emerging economies experienced a temporary although sharp decline in capital inflows with countries that relied on bank flows hardest hit during the GFC. Moez and Mansour (2021) found that the VIX was not important in explaining total capital flows during the pre-GFC crisis but became important and had a negative relationship with capital flows in the post-crisis period. The VIX was, however important for portfolio flows both in the pre-crisis and post-crisis periods. No importance of the VIX was found for FDI in both the pre-crisis and post-crisis periods. Similarly, Moez and Mansour (2021) found interest rate differentials and growth differentials to be important for total capital flows in the post-crisis period and not in the pre-crisis period while these variables were found to not be important for FDI over both periods. They also found differences in the importance of financial openness pre-crisis and post-crisis with importance found for portfolio flows only in the post-crisis period and for total capital flows and FDI in the pre-crisis period.

Differences across types of capital flows: Risk, global liquidity, and commodity prices are push factors that have been found to matter most for FDI and portfolio equity while, in addition, economic growth in source countries also matters for portfolio debt. Fewer pull factors appear to matter for portfolio flows (both equity and debt) whereas more matter for FDI. Interest rate differentials, which feature prominently in the theoretical literature, have been an important driver of overall capital flows but evidence at the disaggregated level is weak. There can be differences in the way factors drive capital flows; for example, commodity prices positively drive portfolio equity but negatively drive portfolio debt, while the VIX negatively drives portfolio equity but positively drives portfolio debt. Further insights at the factor level are provided below.

4.1 Push (global) Factors

The prominent push factors that have been studied in the literature include interest rate differentials, risk, global liquidity, economic growth in advanced countries, and commodity prices. The main findings on the importance of these variables are summarized below.

Interest rate differentials: interest rate differentials feature prominently in the theoretical literature, including a foundation in the classical approach to capital flows and have been found to be an important driver of overall capital flows, but evidence at the subcomponent level is weak. Ahmed and Zlate (2014) ascertained interest rate differentials as important, positively impacting net and gross capital flows, with a similar finding for net and gross portfolio inflows (both equity and debt). Their findings also show that there has been greater sensitivity of capital inflows to the interest rate differential since the 2007/08 global financial crisis (GFC). Using FE on quarterly data over 2010 to 2015, Clark, Converse, Coulibaly, and Kamin (2016) found the interest differential to not help attract

capital inflows. Caporale, Spagnolo, and Nicola (2022) found interest rate differentials not a significant determinant of equity and bond inflows. Other measures of the monetary policy stance that have been used in the literature are the US short-term interest rate and long-term bond rates. Using a PANIC approach on quarterly data over 1993 to 2009, Byrne and Fiess (2016) found the US short-run rate to important and positively related with portfolio bond inflows and a significant and negative relationship with portfolio equity inflows. Their results on the importance of US long-term rates on portfolio inflows were insignificant. Other work has focused on the consequence of unconventional monetary policy during and following the GFC in advanced economies on capital flows. For example, Lim and Mohapatra (2016) found an important impact of quantitative easing on portfolio flows. They further found heterogeneity of effect among different types of capital flows where portfolio flows were more sensitive than FDI to QE effects. Some studies have not found interest differentials to matter for FDI, portfolio equity, and portfolio debt (Hannan (2017), Mercado and Park (2011), and Moez and Mansour (2021)).

Risk/uncertainty: Risk is an important variable in various theories including portfolio theory and NOEM, and empirical analysis has found its importance to vary depending on the type of capital flow. Ahmed and Zlate (2014) found the Volatility index (VIX), which proxies perceived risk or risk aversion, to be important in explaining and is negatively related with both portfolio equity and debt inflows. Byrne and Fiess (2016) established that the relationship is important and negative for portfolio equity while it is important and positive for portfolio debt. In a study on overall capital inflows, Clark et al (2016) found the VIX to not be relevant in explaining total net capital inflows. Caporale, Spagnolo, and Nicola (2022) found risk to be important and positively drive portfolio equity but not important in driving portfolio debt. In a study of the volatility of FDI with annual data over 1990 to 2011, Opperman and Adjasi (2017) found the VIX unhelpful in explaining the volatility of FDI, portfolio equity, and portfolio debt. Studies have also shown that portfolio debt is a riskier type of capital inflow with greater risk for amplifying financial crisis (Calvo, Izquierdo and Mejía (2004) and Levy Yeyati (2006)) and creates large unfavorable externalities because they contribute to large settlements and exchange rate depreciations during financial crisis (Korinek, 2018).

Global liquidity: Often measured as the yearly growth in the global money supply—an important determinant in the portfolio balance theoretical framework—results on the role of global liquidity on capital flows have varied and are few. Opperman and Adjasi (2017) ascertained global liquidity to be important in driving the volatility of capital to SSA countries. While this study focused on volatility, the finding indicates that global liquidity can have an impact on the movement of capital flows and especially since its analysis is on SSA countries that are also the subject of this study. Forbes and Warnock (2012) found global liquidity not relevant in explaining capital inflows to developing economies.

Economic growth in advanced economies: In an OLS estimation, Ahmed and Zlate (2014) established an important and positive association between the growth differential and portfolio inflows, but the relationship was not significant in the FE estimations. A positive relationship implies that higher GDP in developing economies relative to that in advanced economies helps attract capital flows to developing economies. The relationship was detected and positive for total net capital inflows in both the OLS and FE estimation. Byrne and Fiess (2016) found advanced economy GDP growth important and positively affecting total portfolio inflows.

Commodity prices: The relationship between commodity prices and capital inflows largely emanates from the empirical literature, including Reinhart and Reinhart (2009) who found commodity prices a draw for these flows. Byrne and Fiess (2016) also observed the strong relation between commodity prices and total capital flows. The relationship was found to be positive for portfolio equity and negative for portfolio debt. Hannan (2017) found commodity prices to be important and negatively drive FDI, although their contribution to the movement of flows was found to be low. This is in line with the finding by Juvenal and Petrella (2024) that the impact of commodity prices on capital flows is mute. Hannan (2017) finds that commodity prices are not an important driver of portfolio equity and debt.

Table 1. Summary of Recent Panel Literature on the Macroeconomic Drivers of Capital Flows

Variable	Significance	Sign	Author/s
A. Foreign direct investment as the dependent variable			
Push factors			
Interest rate differentials	No		Hannan (2017); Moez and Mansour (2021)
Risk (VIX)	Yes	+	Hannan (2017)
	No		Avdjiev, Hardy, Kalemli-Özcan, and Servén (2018); Moez, Mansour (2021); Opperman and Adjasi (2017)*
Global liquidity	Yes	+	Hannan (2017); Opperman and Adjasi (2017)
Economic growth in source economies/or growth differential	No		Hannan (2017); Moez and Mansour (2021)
Commodity prices	Yes	-	Hannan (2017)
Pull factors			
Economic activity	Yes	+	Adam and Filippaios (2007), Addison, Heshmati (2003), Ali, Fiess, MacDonald (2010); Asiedu, Jin, Nandwa (2009); Ashurov, Othman, Rosman, Haron (2020); Busse, Hefeker (2007); Dutta, Roy (2011); Filippaios, Papanastassiou, Pearce (2003); Gastanaga, Nugent, Pashamova (1998); Globerman, Shapiro (2002); Hannan (2017); Mercado, Park (2011); Hashimoto, Wacker (2012); Naudé and Krugell (2007)
	Yes	-	Buchanan, Le, and Rishi (2012); Filippaios, Papanastassiou, and Pearce (2003)
	No		Ali, Fiess, and MacDonald (2010); Asiedu (2002); Avdjiev, Hardy, Kalemli-Özcan, and Servén (2018); Opperman and Adjasi (2017)
Trade openness	Yes	+	Adam, Filippaios (2007), Addison, Heshmati (2003); Ali, Fiess, MacDonald (2010); Asiedu (2002), Asiedu, Jin, Nandwa (2009); Ashurov, Othman, Rosman, Haron (2020); Buchanan, Le, and Rishi (2012); Dutta, Roy (2011); Filippaios, Papanastassiou, Pearce (2003)
	Yes	-	Filippaios, Papanastassiou, and Pearce (2003)

* The dependent variable used by Opperman and Adjasi (2017) is FDI volatility.

	No		Busse and Hefeker (2007)
Financial openness	Yes	+	Gastanaga, Nugent, and Pashamova (1998); Hashimoto and Wacker (2012); Moez and Mansour (2021); Opperman and Adjasi (2017)
	Yes	-	Okada (2013)
	No		Hannan (2017)
Inflation	Yes	+	Addison, Heshmati (2003); Asiedu, Jin, Nandwa (2009)
	Yes	-	Addison and Heshmati (2003); Busse and Hefeker (2007); Naudé and Krugell (2007)
	No		Ali, Fiess, and MacDonald (2010), Asiedu (2002); Dutta and Roy (2011)
Exchange rate	Yes	-	Dutta and Roy (2011)
Public debt	No		Ashurov, Othman, Rosman, and Haron (2020)
B. Total capital inflows as the dependent variable			
Push factors			
Interest rate differentials	Yes	+	Moez and Mansour (2021)
	No		Moez and Mansour (2021)
Risk	Yes	-	Avdjiev, Hardy, Kalemli-Özcan, and Servén (2018); Moez and Mansour (2021)
	No		Moez and Mansour (2021)
Economic growth in source countries/or growth differential	Yes	+	Moez and Mansour (2021)
	No		Milesi-Ferretti and Tille (2011)
Pull factors			
Economic activity	Yes	+	Akhtaruzzaman (2019), Alfaro and Volosovych (2008); Avdjiev, Hardy, Kalemli-Özcan, and Servén (2018)
	Yes	-	Milesi-Ferretti and Tille (2011)
	No		Alfaro, Volosovych (2008); Milesi-Ferretti, Tille (2011)
Trade openness	Yes	+	Akhtaruzzaman (2019);
Financial openness	Yes	+	Akhtaruzzaman (2019); Moez and Mansour (2021)
Inflation	Yes	+	Akhtaruzzaman (2019)
Exchange rate	No		Opperman and Adjasi (2017)
C. Total portfolio flows as the dependent variable			
Push factors			
Interest rate differentials	Yes	+	Ahmed and Zlate (2014)
	No		Moez and Mansour (2021)
Risk	Yes	-	Ahmed and Zlate (2014); Moez and Mansour (2021)
Economic growth/or growth differential	Yes	+	Baek (2006)
	No		Ahmed and Zlate (2014), Baek (2006); Moez and Mansour (2021)
Pull factors			
Economic activity	Yes	+	Mercado and Park (2011); Hashimoto and Wacker (2012)
	No		Baek (2006); Mercado and Park (2011)
Financial openness	Yes	+	Moez and Mansour (2021)
	No		Hashimoto, Wacker (2012); Moez and Mansour (2021)
Inflation	No		Baek (2006)

D. Portfolio equity as the dependent variable			
Push factors			
Interest rate differentials	No		Caporale, Spagnolo, and Nicola (2022); Hannan (2017)
Risk (VIX)	Yes	-	Byrne and Fiess (2016)
	Yes	+	Caporale, Spagnolo, and Nicola (2022)
	No		Avdjiev, Hardy, Kalemli-Özcan, and Servén (2018); Hannan (2017); Opperman and Adjasi (2017)†
Global liquidity	Yes	+	Opperman and Adjasi (2017)
	No		Hannan (2017)
Economic growth in source economies/or growth differential	No		Caporale, Spagnolo, and Nicola (2022); Hannan (2017)
Commodity prices	Yes	+	Byrne and Fiess (2016)
	No		Hannan (2017)
Pull factors			
Economic activity	Yes	-	Opperman and Adjasi (2017)
	No		Avdjiev, Hardy, Kalemli-Özcan, and Servén (2018), Cerutti, Claessens, and Puy (2019); Hannan (2017);
Trade openness	Yes	-	Hannan (2017)
	No		Cerutti, Claessens, and Puy (2019); Opperman and Adjasi (2017)
Financial openness	No		Hannan (2017); Opperman and Adjasi (2017)
Public debt	No		Cerutti, Claessens, and Puy (2019)
E. Portfolio debt as the dependent variable			
Push factors			
Interest rate differ.	No		Caporale, Spagnolo, and Nicola (2022); Hannan (2017)
Risk (VIX)	Yes	+	Byrne and Fiess (2016)
		-	Hannan (2017)
	No		Avdjiev, Hardy, Kalemli-Özcan, and Servén (2018); Caporale, Spagnolo, and Nicola (2022)
Global liquidity	No		Hannan (2017)
Economic growth in source economies/ or growth differential	Yes	+	Byrne and Fiess (2016), Hannan (2017)
	No		Caporale, Spagnolo, and Nicola (2022)
Commodity prices	Yes	-	Byrne and Fiess (2016)
	No		Hannan (2017)
Pull factors			
Economic activity	No		Avdjiev, Hardy, Kalemli-Özcan, and Servén (2018), Cerutti, Claessens, and Puy (2019); Hannan (2017)
Trade openness	No		Cerutti, Claessens, and Puy (2019)
Financial openness	Yes	+	Byrne and Fiess (2016)
Public debt	Yes	+	Cerutti, Claessens, and Puy (2019)

Notes: Dependent variables are either in percent of GDP or per capita or volatility in the case of Opperman and Adjasi (2017).

† The dependent variable used by Opperman and Adjasi (2017) is portfolio equity volatility.

4.2 Pull Factors

This section delves into the macroeconomic pull drivers of capital flows that are most analyzed in the empirical literature, most of which have strong support in the theoretical literature while some are drawn from the empirical literature.

Economic activity: While the impact of capital flows on economic activity is rooted growth theory, the role of economic activity on capital flows is embedded in several theories including Neoclassical theory and NOEM. Many studies have found real GDP growth to have an important and positive relationship with FDI (Ali, Fiess, and MacDonald (2010); Asiedu, Jin, and Nandwa (2009); Busse and Hefeker (2007); Dutta and Roy (2011); Hashimoto and Wacker (2012)). There are others, however, who have found the relationship between economic activity and capital inflows to be insignificant (Asiedu (2002) and Naudé and Krugell (2007)). Differences can also occur depending on the measure of economic activity. For example, Filippaios, Papanastassiou, and Pearce (2003) found the GDP level to be important and positively drive FDI while GDP growth negatively drove FDP but was less important. Cerutti, Claessens, and Puy (2019) found the association with portfolio equity and debt to be insignificant, while Baek (2006) and Hashimoto and Wacker (2012) found it to be important and positive for total portfolio inflows. Studies using GDP per capita have ascertained it to be important and positively affect aggregate capital inflows (Alfaro and Volosovych, 2008) as well as more specifically for FDI (Adam and Filippaios, 2007 and Akhtaruzzaman, 2019). In a specification that included both the log of GDP per capita and real GDP growth, Ali, Fiess, and MacDonald (2010) found real GDP growth to be important and positive, while GDP per capita was not significant. Forbes and Warnock (2012) did not find GDP per capita to be an important driver of capital inflows. Overall, findings suggest that strong domestic economic activity helps attract capital inflows.

Trade openness: In line with open economy macroeconomics where the theoretical models discussed above fall, trade openness has been found to be an important determinant of capital flows. Most studies have, however concentrated on FDI. Alfaro and Volosovych (2008) attained a positive and relevant relationship for trade openness and many studies have found similar results (Ali, Fiess, and MacDonald (2010); Asiedu (2002); Adam and Filippaios (2007); Asiedu, Jin, and Nandwa (2009); Dutta and Roy (2011); Buchanan, Le, and Rishi (2012); and Ashurov, Othman, Rosman, and Haron (2020)). Adam and Filippaios (2007) found the relationship to be positive and important for OECD countries but insignificant for non-OECD countries. Filippaios, Papanastassiou, and Pearce (2003) found that the effect of trade openness on FDI varied between periods. A positive association was found for the period 1982-1989 but a negative association was found for the period 1982-1997. Cerutti, Claessens, and Puy (2019) established that the relationship between trade openness and portfolio equity and debt is insignificant. Hannan (2017 found trade openness to be important and positively drive FDI but negatively drive portfolio equity and portfolio debt.

Financial Openness: Akhtaruzzaman (2019) and Hashimoto and Wacker (2012) found an important and positive relationship between financial openness, which uses the Chinn and Ito (2006) index, and FDI. Byrne and Fiess (2016) found financial openness to be positive and significant for portfolio equity and debt. Gastanaga, Nugent, and Pashamova (1998) found financial openness to be important and positively associated with FDI. These findings are in line with predominant models in open economy macroeconomics. Evidence by the Bank for International Settlements (BIS, 2021), however, indicates that financial

openness is not an important driver of total capital inflows or bank related inflows in the post-GFC period. The BIS (2021) associates this finding with the fact that emerging markets have made significant structural improvements that are a pre-condition for access to international bond markets that have now blurred the distinction between advanced economies and large emerging economies as separate asset classes.

Inflation: Several studies point to an insignificant relationship between FDI and inflation (Asiedu (2002), Asiedu, Jin, and Nandwa (2009), Dutta and Roy (2011), Naudé and Krugell (2007), while those that found significance point to either a negative relationship (Akhtaruzzaman (2019), Asiedu (2006), Busse and Hefeker (2007)) or a positive relationship (Asiedu, Jin, and Nandwa (2009)). The role of inflation has been less studied on portfolio inflows, with Baek (2006) finding an insignificant role for portfolio equity and debt in sum using FE.

Exchange rate: The importance of the exchange rate for capital flows has strong support in the theoretical literature, including the Mundell-Flemming framework. Froot and Stein (1991) showed that with imperfect capital mobility, currency depreciation leads to increased foreign investment inflow. Hashimoto and Wacker (2012) ascertained a negative relationship between the devaluation of a real exchange rate and FDI. Hashimoto and Wacker (2012) found the relationship for overall portfolio inflows to be insignificant. For the exchange rate regime, Dutta and Roy (2011) found the relationship with FDI to be negative. Cerutti, Claessens, and Puy (2019) found it to be insignificant for portfolio equity and positive for portfolio debt using a two-step methodology over 2001-2015.

Public debt: The effect of public debt has been less studied. A positive and significant relationship between public debt and portfolio debt was found by Cerutti, Claessens, and Puy (2019) over a period that includes the GFC and the relationship with portfolio equity was not significant.

Private Sector Credit: There's an expectation that high private sector credit to GDP can deter capital flows. Private sector credit to GDP can proxy market size, financial depth, and can also indicate financial stability risk when its growth is fast. Forbes and Warnock (2012) found that private sector credit is notable as a driver of banking flows and an important relationship was also found by Opperman and Adjasi (2017) for the volatility of FDI for SSA countries.

Credit ratings, the price-earnings ratio, and news: These factors are combined here as they have been less studied in the empirical literature compared to those above but there's evidence of their importance for portfolio flows. Using generalized least squares (GLS) over 1988 to 1992, Chuhan, Claessens, and Mamingi (1998) found a positive association between credit ratings and portfolio equity and debt. They noted that the credit ratings are particularly important in explaining bond flows to Asia compared to Latin Ameria. Chuhan, Claessens, and Mamingi (1998) found a negative association between the price-earnings ratio and both portfolio equity and debt. Using a monthly panel of 49 advanced, emerging, and developing economies, Caporale, Spagnolo and Nicola (2022) found that news variables help explain cross-border portfolio flows where news in the US appear to play the leading role in driving bond flows into and out of the US. The effect of news variables on equity flows is, by contrast, weak. Their work also found sovereign credit default swap spreads important and a negative driver of portfolio bond flows.

5. Conclusions

This work reviewed the economic literature on the macroeconomic determinants of capital flows at the sub-flow level. While theory provides a motivation for various drivers of capital flows, their importance varies depending on many factors. A review of the empirical literature reveals that capital flow drivers can vary between types of flows. For FDI, risk, global liquidity, and commodity prices are important push factors while the role of interest rate differentials and economic growth in source countries are weak factors. Amongst pull factors, economic activity, financial openness, inflation, and the exchange rate are important determinants while there is no evidence for public debt. For portfolio equity, risk, global liquidity, and commodity prices are important push factors while there is no evidence for the role of inflation, while economic activity and trade openness are important pull factors. For portfolio debt, risk, economic growth in source economies and commodity prices are important push factors while financial openness and public debt are important pull factors and there is no evidence for the role of economic activity and trade openness.

The review finds that drivers can vary depending on models used, for example, the role of financial openness tended to change depending on the model and was found to be important and have a positive sign with a random effects model but not significant in a fixed effects model. This is likely because random effects estimation contains omitted variable bias whereas the fixed effects model corrects for it, indicating that proper model selection is important to get valuable results. There are also differences in findings across regions, where for example, trade openness was found to matter and positively impact capital flows in OECD countries and was not significant for non-OECD countries. The time period studied can also matter as drivers change over time given the nature of shocks faced by the global economy and at the country level and evolving trade and investment dynamics.

While studies on FDI are numerous, studies on the drivers of portfolio flows have been limited and this is an area for further research to better inform policies directed at these flows. Takeaways are that research should be careful with model selection and take cognizance that the relevance of various factors can change over time, necessitating a review prior to policy adjustment. Further, one cannot directly apply results from one region to the other as idiosyncrasies necessitate a tailored approach to research. As the literature of drivers of capital flows is vast, the limitations of this review include that it did not review the literature on non-macroeconomic drivers nor country level drivers. This review also did not delve into the broader literature on the management of capital flows.

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