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The Effectiveness of Capital Flow Management Measures: Evidence from India*

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Abstract

This study empirically examines the effectiveness of capital flow management measures (CFMs) in India. Using the local projection method and monthly de jure data constructed by Binici et al. (2024), we find that CFMs are effective across all examined asset categories: portfolio, equity, debt, and FDI inflows, as well as portfolio and FDI outflows.

Keywords: Capital flow management measures (CFMs); Capital controls; India; Local projection

JEL Classification: F38; F32; G15.

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1 Introduction

The potential effects of CFMs have been rigorously examined as one of the most important topics in international economics.[1] This becomes more evident especially after the International Monetary Fund (IMF) acknowledged that CFMs can be an appropriate policy tool under certain circumstances, despite the primary principle of financial liberalization (IMF, 2012). The IMF's recognition of CFMs reflects the practical deployment of CFMs by emerging economies (e.g., Brazil, Indonesia, Taiwan, and Thailand) in response to massive capital inflows due to the unconventional monetary policies of advanced countries after the global financial crisis. This background leads to the expansion of research on the effectiveness of CFMs. Although many theoretical studies suggest that CFMs are a useful policy tool, empirical studies provide mixed results. (We review the theoretical and empirical literature in Section 2.) While some empirical studies suggest that CFMs are effective, other studies suggest that CFMs are ineffective. It is notable that quite a few empirical studies suggest that the effectiveness of CFMs depends on various factors, such as asset categories, flow directions, transitory or permanent type, countries' income levels, financial development levels, regulatory quality levels, and banking-sector structure. The empirical literature seems inconclusive on whether CFMs are effective (or not).

Regarding CFMs specific to India, previous *de jure* measures of CFMs suggest that capital account in India has remained closed persistently. For example, Table

[1]The term "capital flow management measures (CFMs)" refers to policy measures that are specifically designed to limit capital flows (IMF, 2012). The IMF tends to use the term "CFMs" rather than "capital controls." However, "CFMs" and "capital controls" are generally used interchangeably in the related literature (Erten et al., 2021). In this paper, we use the term "capital controls" to refer to the earlier literature and "CFMs" to refer to the more recent literature.

1 indicates Fernández et al. (2016)'s data of CFMs on equity, bonds, and direct investment. In Table 1, "1" indicates the existence of CFMs on a specific type of transactions in a specific asset category ("0" indicates no CFMs). Table 1 shows that CFMs are imposed on all the international transactions of equity, bonds, and direct investment between 2012 and 2019 in India.

Table 1: India's CFMs: Data from Fernández et al. (2016)

	eq_plbn	eq_siln	eq_pabr	eq_siar	bo_plbn	bo_siln	bo_pabr	bo_siar	dii	dio
2012	1	1	1	1	1	d.n.e	1	1	1	1
2013	1	1	1	1	1	1	1	1	1	1
2014	1	1	1	1	1	1	1	1	1	1
2015	1	1	1	1	1	1	1	1	1	1
2016	1	1	1	1	1	1	1	1	1	1
2017	1	1	1	1	1	1	1	1	1	1
2018	1	1	1	1	1	1	1	1	1	1
2019	1	1	1	1	1	1	1	1	1	1

Note: "d.n.e" stands for "does not exist." "eq_plbn" denotes "Purchase locally by nonresidents (equity)." "eq_siln" denotes "Sale or issue locally by nonresidents (equity)." "eq_pabr" denotes "Purchase abroad by residents (equity)." "eq_siar" denotes "Sale or issue abroad by residents (equity)." "bo_plbn" denotes "Purchase locally by nonresidents (bonds)." "bo_siln" denotes "Sale or issue locally by nonresidents (bonds)." "bo_pabr" denotes "Purchase abroad by residents (bonds)." "bo_siar" denotes "Sale or issue abroad by residents (bonds)." "dii" denotes "Direct investment inflow restrictions." "dio" denotes "Direct investment outflow restrictions."

Including Fernández et al. (2016), many of the *de jure* measures of CFMs extract information from the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER), and construct their indicators by checking whether CFMs exist in the subcategories in AREAER (e.g., Chinn and Ito, 2006a; Schindler, 2009; Quinn et al., 2011; Klein, 2012). For example, Fernández et al. (2016) construct their indicators by aggregating the score of "1" or "0" in the subcategories of CFMs in Table 1, and rank India as among the countries with the most restrictive CFMs. It is noteworthy that the above mentioned indicators do not detect a move toward capital account openness unless the government removes

all the CFMs imposed in a subcategory.

However, the government has been gradually opening the capital account in India, although the pace of liberalization has varied across time (Maslova, 2017; Patnaik and Prasad, 2020). Against this background, some previous studies questioned whether the *de jure* measures appropriately track the capital account openness in India and examined the effectiveness of CFMs by evaluating deviations from the covered interest parity (CIP) (e.g., Bi, 2016; Hutchison et al., 2012; Ma and McCauley, 2014; Aggarwal et al., 2022). In economies with open capital account and efficient financial markets, the CIP would hold. The difference between forward rate and spot rate would be equal to the interest rate differential between home and foreign currencies. The deviation from the CIP implies that arbitrage opportunities exist due to the imposition of CFMs. Therefore, the deviations form CIP have been examined to evaluate the degree of cross border market segmentation due to CFMs (e.g., Bi, 2016; Hutchison et al., 2012; Ma and McCauley, 2014; Aggarwal et al., 2022). Many studies on the *de facto* measures suggest that the capital account in India has a long-term trend of moving toward openness, although it has varied over the sample period. The approach evaluating the CIP deviations is useful for testing the effectiveness of CFMs on capital flows as a whole. However, using the CIP approach, we cannot separately examine the effectiveness of implementing specific CFMs on individual asset categories such as debt, portfolio, and FDI.[2]

To better capture the effectiveness of CFMs, some studies employ a count-based measure of policy actions rather than constructing aggregate indices from

[2]The CIP approach also has another problem because it is a *de facto* measurement of CFMs. As Quinn et al. (2011) argue, *de facto* measures may not be perfectly related to a government's policy stance (i.e., CFMs).

CFM subcategories (e.g., Ahmed and Zlate, 2014; Chen and Qian, 2016; Pandey et al., 2021; Binici et al., 2024). Compared to previous *de jure* measures, these count-based measures better capture the frequency and intensity of policy changes, making them more appropriate for examining CFM effectiveness. We therefore use the count-based, monthly-frequency CFM dataset developed by Binici et al. (2024).[3] The disaggregated *de jure* CFM measure by Binici et al. (2024) enables us to separately analyze the effectiveness of CFMs across different asset categories in India.

To the best of our knowledge, our study is the first to distinguish among asset categories and examine how changes in corresponding CFMs affect the gross inflows and outflows of each category in India.[4] We estimate the marginal effect of CFMs using the local projection (LP) method (Jordà, 2005). Specifically, we adopt the smooth local projection approach of Barnichon and Brownlees (2019), which maintains LP's robustness to misspecification while reducing estimator variability via B-spline smoothing.

We find that CFMs are effective in controlling gross inflows and outflows in all asset categories for which data are available. Specifically, CFMs on gross inflows are effective in portfolio, equity, debt, and FDI categories, while CFMs on gross outflows are effective in portfolio and FDI categories. Using alternative monthly data from Pandey et al. (2020), we confirm the robustness of our results, though

[3]Binici et al. (2024) compile monthly data of CFMs for 49 countries between 2008 and 2021 extracting information from the International Monetary Fund's Taxonomy of Capital Flow Management Measures.

[4]Gross inflows refer to net purchases of domestic assets by foreign agents (i.e., foreign purchases minus foreign sales). Gross outflows refer to net purchases of foreign assets by domestic agents (i.e., domestic purchases minus domestic sales). As noted by Forbes and Warnock (2012), the terminology of "gross inflows" and "gross outflows" can be confusing since these measures are actually net concepts.

this analysis is limited to certain categories due to data availability. Our results are consistent with previous studies suggesting that CFMs are more effective in countries with well-established control systems such as India and China (Habermeier et al., 2011; Pandey et al., 2021; Zhou and Kitano, 2025b).

2 Literature review

Theoretical Literature

While early debates on capital controls date back to the 1980s, the theoretical literature gained prominence in the 1990s, when debt crises in Latin America and subsequent currency crises in East Asia prompted economists to reconsider the desirability of international capital mobility.[5] Concerns that rapid surges in capital inflows and their sudden reversals could generate substantial adverse effects on domestic economies motivated the use of capital controls.[6] Against this background, theoretical analyses of capital controls were largely framed in the context of currency crises. A substantial body of work examined the effectiveness of capital controls as a policy instrument for crisis management, including Wyplosz (1986), Park and Sachs (1987), Auernheimer (1987), Bacchetta (1990), Dellas and Stockman (1993), and Bartolini and Drazen (1997).[7] Much of this literature focused on whether capital controls could effectively delay the onset of a crisis. Early studies, such as Wyplosz (1986) and Park and Sachs (1987), suggested that capital controls may indeed postpone crisis episodes. By contrast, Dellas and Stockman

[5]See, for example, Cooper (1998), Rodrik (1998), Stiglitz (2002), and Eichengreen and Voth (2003).

[6]For capital control episodes in the 1990s, see World Bank (2000), Chapter 5, and Ariyoshi et al. (2000).

[7]See Dooley (1996) for a comprehensive survey of the earlier literature on capital controls.

(1993) argued that capital controls could be destabilizing, as expectations of their imposition may induce speculative capital outflows. Bartolini and Drazen (1997) further showed that current capital control measures can signal a government's future fiscal stance. In particular, restrictions on capital outflows may convey adverse information to private agents and, paradoxically, trigger capital flight. Kitano (2004) analyzed capital controls as a policy response to capital inflow related challenges, namely current account deterioration, real exchange rate appreciation, and inflationary pressures, and demonstrated that such measures can not only limit inflows but also mitigate their macroeconomic consequences. Kitano (2007) further showed that capital controls may, contrary to conventional wisdom, accelerate currency crises. Under such regimes, elevated interest rates can intensify fiscal pressures, thereby precipitating crisis episodes.

This literature experienced a significant revival after the 2008 to 2009 Global Financial Crisis, as policymakers and academics reassessed the role of capital controls in ensuring financial stability. Emerging economies experienced unprecedented swings in capital flows during and after the global financial crisis. Policymakers responded to surging inflows by tightening capital controls (Ghosh et al., 2017). Whereas the IMF had traditionally opposed restrictions on capital mobility, Ostry et al. (2010) and Ostry et al. (2012) argued that such measures may be warranted under certain conditions. The IMF has since recognized that volatile capital flows can threaten macroeconomic stability and now considers capital controls a legitimate policy response for emerging markets (IMF, 2012). In light of these developments, an expanding literature has examined the macroeconomic role of capital controls. Initially, such controls were viewed as a tool to internalize the externalities that amplify financial crises and to prevent excessive borrowing.

Jeanne and Korinek (2010) and Bianchi (2011) formally establish the presence of pecuniary externalities in financial crises, thereby providing a rationale for the use of prudential capital controls.

Jeanne et al. (2012) contend that "[p]roperly designed capital controls may even be effective as a regular instrument of economic policy" (p. 110). Following this view, theoretical studies on capital controls have proliferated, with a subset analyzing their effects in the presence of nominal rigidities. Schmitt-Grohé and Uribe (2016), using a disequilibrium model with a fixed exchange rate and downward wage rigidity, find that capital controls can lower unemployment and stabilize the economy. Farhi and Werning (2014) similarly show that capital controls are effective under exchange rate pegs, particularly against country-specific risk premium shocks, and may remain optimal under flexible regimes when nominal rigidities persist.

A parallel line of research examines how capital controls interact with monetary and credit policies. Davis and Presno (2014) find that capital controls generate welfare gains under flexible exchange rates even when monetary policy is optimal. Chang et al. (2015) and Liu and Spiegel (2015) show that capital controls and sterilization complement each other in small open economies with imperfect asset substitutability. Agénor and Jia (2015) study the interaction between countercyclical capital controls and reserve requirement rules in cross-border bank borrowing. Kitano and Takaku (2017) demonstrate that stronger financial frictions between banks and foreign creditors call for more aggressive capital controls. Building on this result, Kitano and Takaku (2018a) highlight the role of capital controls as a substitute for direct credit policy in mitigating post-crisis contractions. Kitano and Takaku (2018b) compare the welfare implications of optimal capital control

policies under fixed exchange rates with those of optimal monetary policies under flexible exchange rates, showing that in the presence of a financial accelerator, the former yields higher welfare, whereas the latter is preferable in its absence.

Within the capital control literature, a strand of theoretical research compares capital controls with macroprudential policies as alternative tools for macro-financial stabilization.[8] Korinek and Sandri (2016) are the first to distinguish between macroprudential policies and capital controls, showing that both instruments can stabilize the economy and that their joint use is desirable in calibrations based on East Asian crisis countries. Building on this framework, subsequent studies emphasize that the relative effectiveness of the two policies depends on country characteristics and the nature of shocks. For instance, Matschke (2025) highlights the role of domestic financial development, while Nispi Landi (2017) shows that capital controls are more effective under external financial shocks, whereas macroprudential policies perform better under domestic technology shocks. Similarly, Kitano and Takaku (2020) and Zhou and Kitano (2025a) demonstrate that the superiority of these policies hinges on financial frictions and the origin of shocks.

Another branch of the literature studies welfare gains from international coordination in capital control policies. De Paoli and Lipinska (2013) show that unilateral capital controls can act as beggar-thy-neighbor measures, whereas coordinated implementation improves global welfare by avoiding disruptions to international risk sharing. Using a two-country model with capital accumulation, Heathcote and Perri (2016) find that, for certain parameter values, the introduction of capital

[8]While both policy instruments can contribute to macroeconomic stabilization and help mitigate financial crises, capital controls and macroprudential policies differ in their scope and implementation. As discussed by Korinek and Sandri (2016), macroprudential policies regulate the borrowing behavior of domestic agents irrespective of the source of funding, whereas capital controls target cross-border financial transactions between residents and non-residents.

controls can enhance international risk sharing. Through this channel, symmetric use of capital controls can yield welfare improvements for both countries relative to unrestricted capital mobility, implying that coordinated policies can be Pareto-improving. Extending this analysis, Kitano and Takaku (2022) demonstrate that as financial markets become more incomplete, welfare losses under the Nash equilibrium increase, while optimal global coordination mitigates these losses and generates larger welfare gains from cooperation.

Empirical Literature

Prior to the global financial crisis, empirical research on capital controls largely aimed to assess whether capital account liberalization, or the presence of restrictions, was correlated with higher economic growth. Reviewing this literature, Prasad et al. (2003) report that the majority of studies find either insignificant or mixed effects of international financial integration on growth in developing countries. Forbes (2007) proposes several explanations for these inconclusive outcomes. First, capital account openness is inherently difficult to measure with precision. Second, different categories of capital flows and controls may generate distinct effects. Third, the growth impact of liberalization may depend on structural characteristics such as institutional quality and corporate governance. Consistent with this view, Chinn and Ito (2006b) show that stronger legal and institutional frameworks enhance the gains from liberalization, Alfaro et al. (2004) find that deeper financial systems better utilize foreign direct investment, and Kose et al. (2009b) identify thresholds of financial and institutional development necessary to realize benefits from openness. Numerous other empirical studies also suggest that institutional and financial development condition the growth benefits from capital

account liberalization (e.g., Klein, 2005; Klein and Olivei, 2008).[9]

Following the global financial crisis, both policy practice and terminology evolved. Unconventional monetary policies in advanced economies generated capital inflows into emerging markets on an unprecedented scale. To counter the resulting macroeconomic pressures and financial stability concerns, many emerging economies implemented capital flow management measures (CFMs). This experience spurred extensive empirical research assessing the effectiveness of CFMs, particularly in moderating capital inflows.[10] Cross-country evidence, however, remains inconclusive. Some studies report that CFMs effectively curb inflows (e.g., Ostry et al., 2012; Ahmed and Zlate, 2014; Chantapacdepong and Shim, 2015; Bruno et al., 2017), whereas others find limited or no effectiveness (e.g., Forbes and Warnock, 2012; Forbes et al., 2015; Frost et al., 2020).[11] A number of studies emphasize that the effectiveness of CFMs depends on various factors, including asset categories, the direction and persistence of flows, countries' income and financial development levels, regulatory quality, and banking sector structure (e.g., Binici et al., 2010; Baba and Kokenyne, 2011; Dell'Erba and Reinhardt, 2015; Beirne and Friedrich, 2017; Magud et al., 2018; Nispi Landi and Schiavone, 2021; Kitano and Zhou, 2022; Zhou and Kitano, 2025b). Overall, the empirical literature remains inconclusive regarding the effectiveness of CFMs.[12]

In addition to cross-country analyses, a growing body of research focuses on

[9]For more detailed surveys of this literature, see Prasad et al. (2003), Forbes (2007), Prasad and Rajan (2008), and Kose et al. (2009a). The sequencing of capital account liberalization has also been a longstanding topic; see, for example, McKinnon (1991).

[10]For studies focusing on capital outflows, see Gkillas et al. (2016).

[11]Boero et al. (2019) find that the short run effects of capital controls can be positive for some countries, but tend to dissipate over time.

[12]Relatedly, Zhou and Kitano (2024) provide cross-country evidence that capital flow management measures affect wealth inequality, highlighting substantial heterogeneity across asset categories, income levels, and capital flow directions.

individual countries, notably China and India. Regarding China, many studies evaluate the effectiveness of CFMs by testing whether covered interest parity holds (e.g., Ma and McCauley, 2008; Cappiello and Ferrucci, 2008; Otani et al., 2011; Cheung and Herrala, 2014). Other studies employ *de jure* measures of CFMs. For example, Fu and Cao (2020) analyze the effects of CFMs on trade using the *de jure* dataset of Fernández et al. (2016). Kitano and Zhou (2022) distinguish among asset categories and investigate how CFMs targeting each category influence capital flows in China, using the dataset of Chen and Qian (2016), which quantifies changes in the intensity of China's CFMs. Turning to India, numerous studies also assess the effectiveness of CFMs by examining deviations from covered interest parity and measuring the degree of cross border market segmentation (e.g., Shah and Patnaik, 2007; Patnaik and Shah, 2012; Hutchison et al., 2012; Ma and McCauley, 2014; Bi, 2016; Aggarwal et al., 2022). Research based on *de facto* measures indicates that India's capital account has exhibited a long term trend toward openness, although the extent of liberalization has varied over time. Pandey et al. (2020) construct a *de jure* dataset for India by counting policy actions that tighten or loosen CFMs on foreign borrowing, which they then use to analyze both the motivations for policy adjustments and their effectiveness. As noted in the Introduction, and explained in detail in the next section, Binici et al. (2024) construct a *de jure* dataset for India that differs from Pandey et al. (2020) in both data sources and asset categories.

3 Data

In this study, we use the index data constructed by Binici et al. (2024). As discussed in Section 1, Binici et al. (2024) count policy actions that tighten or

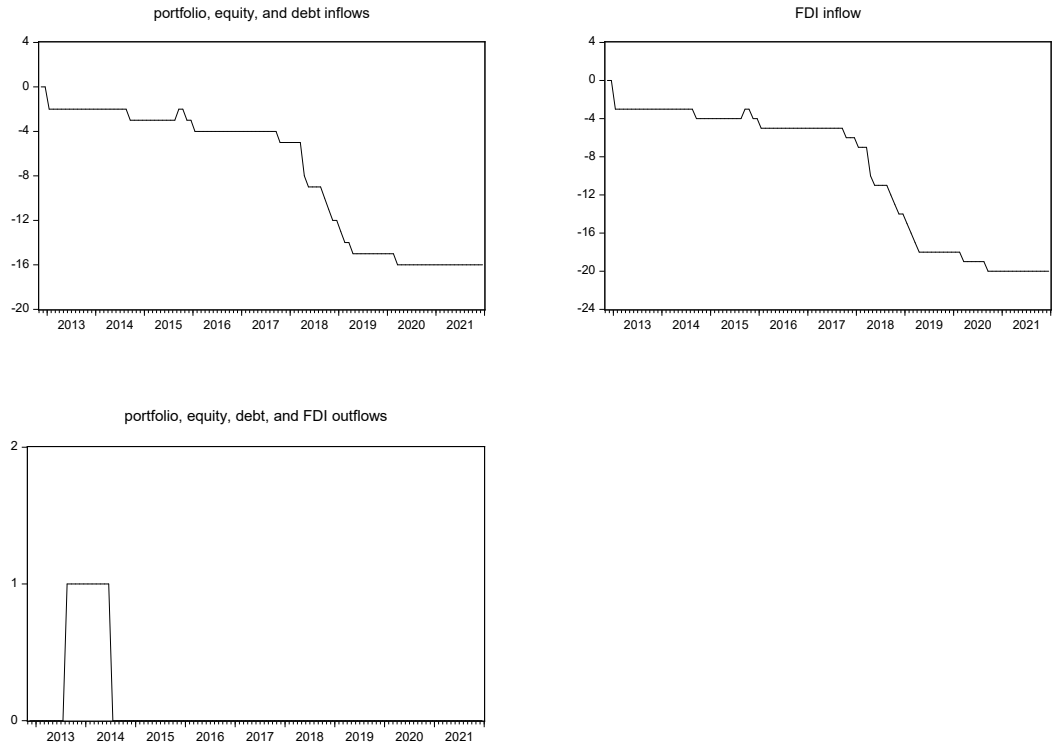
loosen CFMs at the level of individual asset subcategories, rather than simply indicating whether CFMs are imposed. This disaggregated dataset at monthly frequency enables us to examine the effectiveness of India's CFMs separately across asset categories.

Figure 1 depicts the time evolution of India's CFMs on gross portfolio, equity, and debt inflows (upper left panel) and on FDI inflows (upper right panel), based on the data from Binici et al. (2024). CFMs on equity and debt inflows are identical over our sample period from November 2012 to December 2021. Accordingly, in our empirical analysis, we use the same CFM series for equity and debt inflows as for portfolio inflows. By contrast, the time evolution of CFMs on FDI inflows differs slightly from that of portfolio, equity, and debt inflows. Toward the end of the sample period, while the cumulative level of CFMs on portfolio, equity, and debt inflows reaches -16, that on FDI inflows reaches -20, implying that CFMs on FDI inflows were loosened more frequently than those on debt and equity inflows.[13]

Correspondingly, we obtain monthly data on gross inflows from the database constructed by de Crescenzio and Lepers (2025). The inflow data are seasonally adjusted using EViews 14 integrated with JDemetra+ and the X-13 package. We compute a three month moving average of the inflow series to smooth the impulse response functions.

[13]Both indices start from zero at the beginning of our sample period.

Figure 1: Time Evolution of India's CFMs on Gross Capital Inflows and Outflows



Note: Tightening (loosening) actions increase (decrease) the cumulative CFM index on the vertical axis. Data source: Binici et al. (2024).

Figure 1 also depicts the time evolution of CFMs on gross portfolio, equity, debt, and FDI outflows (lower panel), based on the dataset constructed by Binici et al. (2024). In contrast to the inflow cases, changes in outflow CFMs were quite limited. Only one tightening and one loosening episode of CFMs on gross outflows were observed during the sample period. Specifically, CFMs on gross equity, debt, and FDI outflows were imposed in August 2013 and subsequently lifted in July 2014.

We attempt to obtain the corresponding monthly outflow data from the database compiled by de Crescenzio and Lepers (2025), following the same procedure as for

the inflow cases. However, monthly data on gross equity and debt outflows are not available in their dataset. Therefore, in Section 5, we present empirical results only for the two available cases, namely gross portfolio and FDI outflows.

As control variables in our empirical analysis of the effects of CFMs on inflows (Section 4), we use India's monthly data on the Consumer Price Index, equity market index, exchange rate against the U.S. dollar, industrial production index, and policy rate. All five control variables are obtained from the CEIC database, and their year-over-year changes are used in the analysis. In the empirical analysis of the effects of CFMs on outflows, we instead use the U.S. equity market index and the U.S. policy rate, replacing the corresponding Indian variables. This specification reflects the fact that India's gross outflows represent net purchases of foreign assets by Indian residents.

4 Empirical specification

We analyze the responses of gross inflows and outflows across different categories conditional on the implementation of the corresponding CFMs and macroeconomic control variables. In this context, we consider the following set of h-period-ahead predictive regressions:

$$CF_{t+h} = \alpha^h + \beta^h CFM_t + \sum_{i=0}^{p} \gamma_i^h \boldsymbol{w}_{t-i} + u_{t+h}^h, \tag{1}$$

where $h = 1, \cdots, 24$ and $p = 1$ or 2.

The term CF_{t+h} denotes the h-period-ahead conditional forecast of gross inflows or outflows and serves as the response variable of interest. The term CFM_t

represents the corresponding index of CFMs. For example, when CF refers to gross portfolio inflows, CFM denotes the CFMs applied to gross portfolio inflows. The index CFM_t is constructed such that a policy tightening is associated with an increase in CFM_t. Accordingly, the coefficient β^h captures the marginal effect of tightening CFMs on the corresponding gross inflows or outflows h periods ahead.

The 5×1 vector $\boldsymbol{w}_{t-i}$ contains the control variables, including the contemporaneous and i-period lagged values of India's gross inflows or outflows, the CPI inflation rate, the equity market index, the industrial production index, the policy rate, and the exchange rate against the U.S. dollar. The maximum lag length p is set to either one or two months based on the Schwarz information criterion (SC) and the Hannan–Quinn information criterion (HQ). The final term u_{t+h}^h in Eq. (1) denotes the prediction error, where $\text{var}\left(u_{t+h}^h\right) = \sigma_h^2$.

The marginal effects of CFMs are estimated using smooth local projections, a method proposed by Barnichon and Brownlees (2019) that extends the local projection framework of Jordà (2005). While standard local projection estimators tend to suffer from high variability, smooth local projections based on B-spline smoothing yield smoother impulse response functions by balancing the trade-off between estimator variance and bias.[14]

5 Empirical Results

In Section 5.1, we present our main results obtained using the dataset on India's CFMs compiled by Binici et al. (2024). In Section 5.2, we show that the key implications of our analysis remain robust when using an alternative dataset on

[14]Following Barnichon and Brownlees (2019), we select the smoothing parameters via cross-validation.

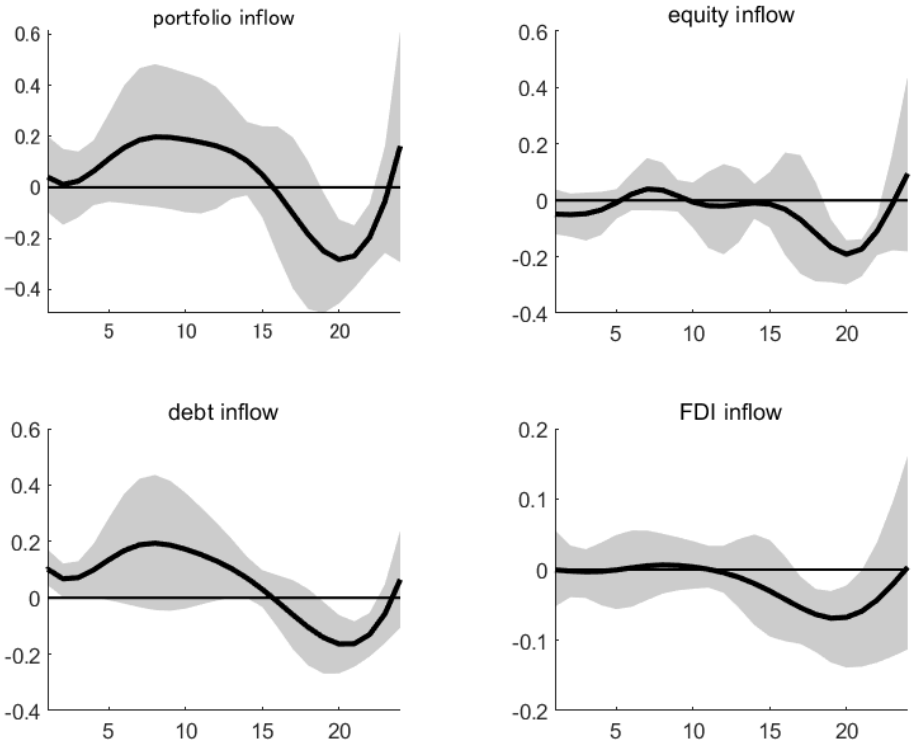
India's CFMs constructed by Pandey et al. (2020).

5.1 Main results

Figure 2 displays the impulse responses of gross portfolio, equity, debt, and FDI inflows to a tightening of the corresponding CFMs. The shaded areas indicate 90% confidence intervals. Overall, the impulse responses of the four types of gross inflows move in the expected directions following a tightening of the respective CFMs.

Specifically, portfolio inflows decline by up to USD 0.28 billion 20 months after the shock, with statistical significance at the 5% level between 19—22 months. Equity inflows fall by as much as USD 0.19 billion 20 months after the shock, with statistical significance at the 5% level between 19—22. Debt inflows decrease by up to USD 0.16 billion 20—21 months after the shock, with statistical significance at the 5% level between 19—22 months. Finally, FDI inflows contract by up to USD 0.07 billion 19—20 months after the shock, with statistical significance at the 5% level between 17—21 months.

Figure 2: Impulse Responses of Gross Inflows to a Tightening of CFMs

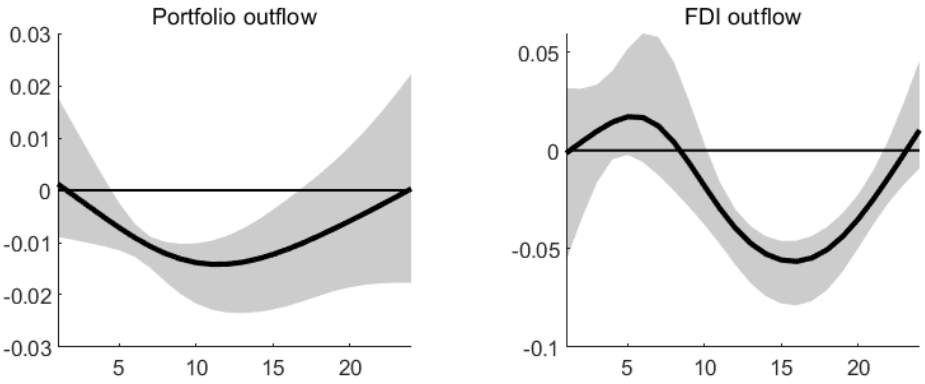


Note: The shaded are denotes the 90% confidence interval.

Figure 3 displays the impulse responses of gross portfolio and FDI outflows to a tightening of the corresponding CFMs. Both impulse responses move in the expected directions.

Specifically, portfolio outflows decline by up to USD 0.014 billion 11 months after the shock, with statistical significance at the 5% level between 5—16 months. FDI outflows decrease by up to USD 0.056 billion 16 months after the shock, with statistical significance at the 5% level between 11—21 months.

Figure 3: Impulse Responses of Gross Outflows to a Tightening of CFMs



Note: The shaded are denotes the 90% confidence interval.

5.2 Robustness

In this section, we examine the robustness of our results. The availability of monthly datasets on India's CFMs, such as that compiled by Binici et al. (2024), is quite limited. An exception is Pandey et al. (2020), who also construct a monthly dataset on CFMs for India.[15] However, the dataset of Pandey et al. (2020) focuses on foreign investments and is therefore limited to gross inflows.[16] Moreover, although their dataset contains four categories—*debt*, *derivatives*, *equity*, and *other*—the recorded policy episodes during the sample period are confined to CFMs on debt.[17] Consequently, the robustness analysis is confined to CFMs on gross debt inflows.

[15]While Binici et al. (2024) rely on the International Monetary Fund's *Taxonomy of Capital Flow Management Measures*, Pandey et al. (2020) use data collected from the websites of regulatory agencies.

[16]*Gross inflows* refer to the net of purchases and sales of domestic assets by *foreign agents*.

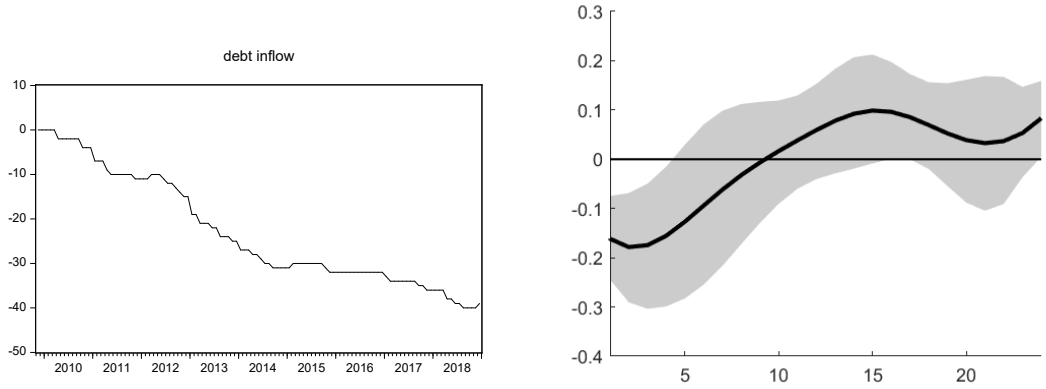
[17]The dataset of Pandey et al. (2020) covers the period up to December 2018, whereas our main sample spans November 2012—December 2021. To maintain a comparable sample size, we set the robustness sample period to November 2009—December 2018.

The left panel of Figure 4 illustrates the evolution of CFMs on gross debt inflows based on the dataset of Pandey et al. (2020). Comparing this series with the upper-left panel of Figure 1, we find that although both exhibit a long-term downward trend, there is a notable difference between the two datasets. Specifically, Binici et al. (2024) suggest that India intensively loosened CFMs on gross debt inflows in 2018, whereas Pandey et al. (2020) indicate that the intensive loosening occurred in 2013.

The right panel of Figure 4 displays the impulse response of gross debt inflows to a tightening of the corresponding CFMs, estimated using the dataset of Pandey et al. (2020). The impulse response moves in the expected direction, consistent with the main analysis.

Specifically, tightening CFMs on gross debt inflows reduces the corresponding inflows by up to USD 0.18 billion two months after the shock, with statistical significance at the 5% level between one—four months. The magnitude of this reduction (USD 0.18 billion) is very similar to that obtained using the dataset of Binici et al. (2024) in Figure 2, where the reduction amounts to USD 0.16 billion. However, the timing of the maximum reduction differs substantially across the two datasets: it occurs two months after the shock in the case of Pandey et al. (2020), whereas it occurs 20—21 months after the shock in the case of Binici et al. (2024).

Figure 4: India's CFMs on Gross Debt Inflows and the Corresponding Impulse Response to a Tightening of CFMs (based on Pandey et al. (2020))



Note: The shaded area denotes a 90% confidence interval. The sample period spans November 2009—December 2018.

6 Conclusions

Using the novel monthly dataset developed by Binici et al. (2024), we examined the effects of CFMs on gross capital flows across individual asset categories in India, employing the local projection method. This study contributes to the literature by distinguishing asset categories and analyzing how changes in CFMs within each category affect the corresponding gross inflows and outflows. Specifically, we assessed the effectiveness of CFMs on gross inflows in the portfolio, equity, debt, and FDI categories, as well as on gross outflows in the portfolio and FDI categories. Our results indicate that CFMs are effective in influencing both gross inflows and outflows across all cases examined. Although our robustness analysis is limited to a single case due to data availability, we confirm the effectiveness of CFMs on gross debt inflows.

The implications of our results are consistent with the arguments of Haber-

meier et al. (2011) regarding the effectiveness of CFMs in India. They argue that countries such as India, which have well-established control frameworks, face fewer difficulties in managing capital flows because their comprehensive systems allow for close monitoring of flows and calibrated tightening of controls when necessary.

Our analysis is subject to some limitations, particularly with respect to data availability on India's CFMs. For instance, it remains unclear why the indicators for CFMs on gross debt inflows differ substantially between Binici et al. (2024) and Pandey et al. (2020). The institutional complexity in India may partly explain these discrepancies, and further research is needed to better understand the regulatory architecture that shapes the implementation of CFMs.

Future research could extend the analysis to examine how CFMs influence broader macroeconomic outcomes, such as output growth, exchange rates, and investment. Another promising direction would be to adopt a multi-country framework to investigate cross-country heterogeneity in the effects of CFMs.

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