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Financial development and the capital flow allocation puzzle in developing Asia

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ADB Working Paper Series

**FINANCIAL DEVELOPMENT
AND THE CAPITAL FLOW
ALLOCATION PUZZLE
IN DEVELOPING ASIA**

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Abstract

Using a panel regression approach across 13 developing Asian economies from 1996Q1 to 2019Q4, this paper examines the extent of financial development as a transmission channel for mediating the “allocation puzzle” in capital flows. This puzzle pertains to why capital seems to flow to economies with lower rather than higher productivity growth. We find that while portfolio equity and debt investment flows are negatively related to total factor productivity (TFP) in developing Asia, thereby contradicting the predictions of traditional neoclassical growth models, financial development significantly mitigates this effect. This is particularly the case at earlier stages of financial development and convergence towards a frontier. For foreign direct investment, although we find that there is no direct allocation puzzle in developing Asia, financial development can hamper the stimulatory effect of TFP for highly financially developed economies given diminishing marginal returns.

Keywords: international capital flows, total factor productivity, financial development, developing Asia

JEL Classification: F20, F30, F41

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1. INTRODUCTION

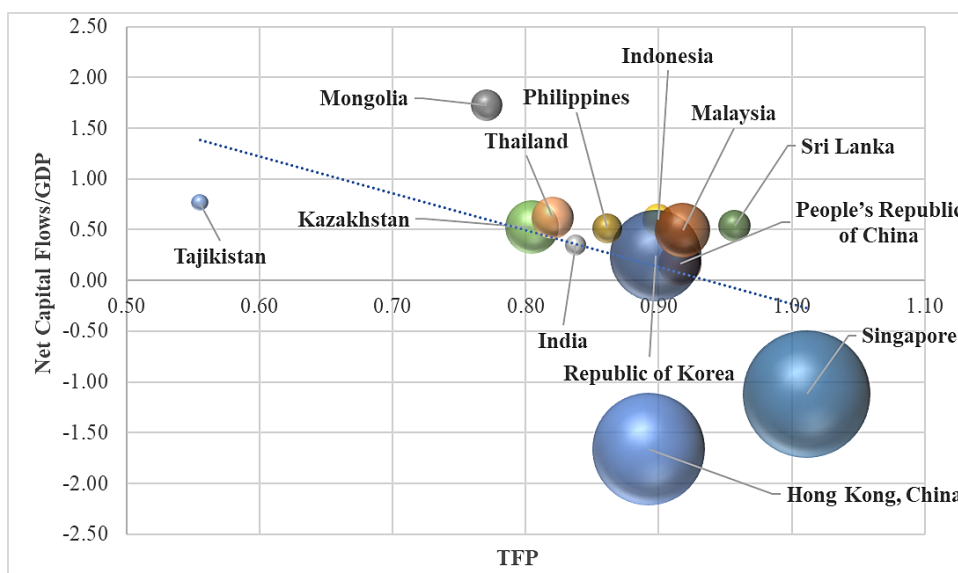
This paper examines the role of financial development across 13 developing Asian economies over the period 1996Q1 to 2019Q4 as a mechanism for understanding the allocation puzzle in capital flows, i.e., whereby foreign capital flows to economies with low rather than high productivity, against theoretical predictions of standard models. Prevailing studies suggest that capital does not appear to flow to developing economies in the magnitude predicted by the neoclassical open economy framework, while some rapidly growing economies have even experienced net capital outflows (Gourinchas and Jeanne, 2013). It has also been well documented in the literature that financial development is an important means through which capital can be allocated productively for achieving economic growth (King and Levine, 1993; Levine, 1997; Levine et al. 2000). There has been less empirical work, however, on the role of financial development in influencing the effect of productivity on capital flows. Reconciling, at least to some extent, the discrepancy between predicted capital flows based on theory and actual capital flows is important from a policy perspective. The purpose of this paper is to empirically examine whether progress by developing economies on financial development affects the relationship between productivity and capital flows such that a greater share of capital flows to developing economies can be predicted using standard models.

This paper empirically examines the role of financial development in developing Asian economies on the relationship between capital flows and productivity growth. This is rationalized on the basis that financial development has progressed strongly in developing economies over the past 25 years or so, with financial factors and financial frictions not adequately accounted for in traditional neoclassical growth models. Focusing on developing Asia, the paper contributes to the literature in two main respects: (i) We examine the prevalence of the allocation puzzle disaggregated across different categories of capital flows, namely foreign direct investment (FDI), net portfolio equity investment, and net portfolio debt investment; and (ii) We explore alternative financial development threshold levels in order to infer more refined policy implications.

By way of context, Figure 1 provides an overview of the basic relationship between net capital flows and total factor productivity (TFP) across the sample of 13 Asian economies used in the analysis. The negative observed relationship contravenes the theoretical proposition that economies with higher productivity growth should experience higher capital inflows from abroad.

Providing insights on factors affecting the allocation of capital flows across developing economies in terms of scale and direction has been a feature of some recent studies (Gourinchas and Jeanne, 2013; Prasad et al., 2007). These previous studies noted that more capital tends to flow to developing economies that are converging less on productivity relative to a frontier region. Buera and Shin (2017) highlighted that productivity growth in developing economies is closely linked with economic reforms that are implemented through underdeveloped domestic financial markets. Given financial frictions, with higher savings materializing at a faster rate than investment, this leads to net capital outflows. Other work by Bationo et al. (2023) found that the capital allocation puzzle may be due to capital being channeled to non-productive sectors of the economy, such as extractives and infrastructure. In addition, Davenport (2023) stressed the role of cross-country heterogeneity in the time path of technological convergence as a mitigating factor.

Figure 1: Net Capital Flows and Total Factor Productivity



Notes: The X-axis represents the periodic mean of total factor productivity. The Y-axis represents the periodic mean of net direct investment, net portfolio equity investment, and net portfolio debt investment. All are ratios to GDP. The size of the bubbles represents the periodic average of the real GDP per capita of the sample economies.

Source: Author's calculations.

Overall, our main findings indicate that the allocation puzzle in capital flows for developing Asia is prevalent for portfolio equity and debt investment, rather than foreign direct investment. Moreover, the allocation puzzle in portfolio investment is driven by economies with levels of financial development that are below threshold. Taking into account the interaction of productivity and financial development mitigates the extent of the puzzle for portfolio investment, whereby a positive total marginal effect of productivity on net capital inflows materializes. The paper has useful policy implications pertaining to the usefulness of standard neoclassical models for predicting capital flows in developing Asia, and the important role of financial development. The remainder of the paper is structured as follows. Section 2 describes the related literature in this field. Section 3 explains the data used in the analysis. Section 4 describes the methodology employed. Section 5 presents the estimation results and discussion. Finally, Section 6 outlines the conclusions and policy implications.

2. RELATED LITERATURE

This paper is broadly related to the literature on the drivers of capital flows to emerging and developing economies, and more specifically on the strand of the literature that examines how capital is allocated across developing economies. International capital flows to developing economies are influenced by both global (or push) and country-specific (or pull) factors and vary over time according to their types (Hannan, 2018; Koepke, 2019). Global factors such as global risk aversion, advanced economy interest rates, and financial stress can play a crucial role in driving capital flows (Byrne and Fiess, 2016). Domestic fundamentals, such as output growth, return on assets, inflation, institutional quality, trade and financial openness, and productivity, also determine the pattern and level of international capital flows (Meyer and Sinani, 2009; Koepke, 2019; Osina, 2021). Capital flow dynamics can also be affected due to financial crises and the imposition of financial protectionist type measures (e.g., Beck

et al., 2015). Our paper models the role of domestic factors, controlling for global factors with time fixed effects, with a particular interest in understanding the effect of productivity and its interaction with financial development. Our paper also relates to the strand of the literature that has explored capital flow dynamics in emerging and developing economies relative to the theoretical predictions of standard models. Neoclassical economic growth theory predicts that foreign capital flows are channeled to the fastest-growing economies, where returns are higher, while cross-country differences in per capita income are largely determined by countries' TFP (Solow, 1956). Such foreign investment supplements national domestic savings, leading to an acceleration in economic growth. TFP therefore has an important effect on capital flow dynamics, given that countries with higher productivity should attract more capital from abroad. It follows that, under the assumption of international capital mobility, capital should flow across countries such that the marginal product of capital is equalized. Lucas (1990), however, noted, that international capital does not flow from rich countries to poor countries, as expected. There is even some evidence to show that capital flows in the opposite direction, moving "uphill" from developing to developed countries (Prasad et al., 2007).

Several papers have explored mechanisms for explaining why the neoclassical growth model may not hold. On the flow of capital, these have tended to be linked to a lower actual rate of return in developing economies than would be suggested by their capital-to-labor ratios (Borio and Disyatat, 2015). Weak institutions and underdeveloped financial markets can also explain why capital could be channeled from developing to developed economies (Alfaro et al., 2008; Caballero et al., 2008). Building upon the work of Lucas (1990), Gourinchas and Jeanne (2013) noted that the intertemporal approach implies that economies with higher productivity growth should attract higher capital inflows and run higher current account deficits. The "allocation puzzle" refers to the empirical observation that developing economies with high rates of productivity tend to run current account surpluses, which is counter to theoretical predictions. Ly-Dai (2020) highlighted the role of the savings wedge as a financial friction (i.e., the difference between the rate of return on household savings and the lending rate). For a sample of 162 economies over the period 1983 to 2013, it is shown that higher productivity growth can lead to a higher savings wedge. Capital outflows can emerge where savings outstrips investment, with the implication that the neoclassical growth model holds only for the investment side of the net capital flows equation.

In related work, Ly-Dai (2019) proposed non-linearity in the relationship between international capital flows and productivity growth, decreasing where growth is low and increasing where growth is high. Accounting for this non-linearity can help to reconcile the neoclassical growth model predictions in respect of capital flows to developing economies. Other studies have inferred an inverted U-shaped relationship between growth and capital account openness (e.g., Klein, 2003). Our paper is related to this strand of the literature to the extent that it delves deeper into the drivers of capital flows and the role of financial development on mitigating non-linear effects. A paper by Buera and Shin (2017) employed a model with heterogeneous producers and underdeveloped domestic financial markets to shed light on the issue. They find that TFP rises after the implementation of large-scale economic reforms that help to reallocate resources efficiently. However, domestic financial frictions lead to a sharp rise in savings and a lagged response in investment. Therefore, while a positive relationship between TFP and savings is apparent, a much weaker relationship exists between TFP and investment, and can explain why TFP rises can be associated with net capital outflows. In other work, Davenport (2023) notes that cross-country heterogeneity in the time path convergence to a technological frontier needs to be taken into account.

The classification of capital flows has also been explored in the literature. While the trajectory of an economy's net international investment position relative to abroad also determines the pattern of international capital flows (Benhima, 2013), it has been found that the negative correlation between net capital flows and productivity is driven by official capital flows and may not apply to private capital flows (Aguar and Amador, 2011; Alfaro et al., 2014). This points to consideration needed on the accumulation of official foreign reserves and sovereign capital flows. The role of financial development and the efficiency of financial market intermediation are also important factors. These have been studied in the past in terms of their impact on capital flows and economic growth (Aghion et al., 2005; Von Hagen and Zhang, 2014). This paper builds on the prevailing literature by examining the role of financial development in affecting the impact of productivity on net capital flows. In doing so, we contribute to the empirical literature on understanding the predictions of the neoclassical growth model in respect of capital flows in developing economies, across different types of capital flows and different threshold levels of financial development. The focus is on Asian developing economies, the economic growth and productivity of which have been notable over the past 25 years, and where the level of financial development has grown strongly over this period.

3. DATA

Quarterly and annual time series data from 1996 to 2019 are obtained from various secondary sources for 13 Asian economies: the People's Republic of China (PRC); Hong Kong, China; India; Indonesia; Kazakhstan; the Republic of Korea; Malaysia; Pakistan; the Philippines; Singapore; Sri Lanka; Tajikistan; and Thailand. The selection of these Asian economies largely is driven by the availability of data. The main data sources are International Financial Statistics (IFSs) and the World Economic Outlook (WEO) of the International Monetary Fund (IMF), the World Development Indicators (WDIs) of the World Bank, and the Penn World Tables (PWTs) developed by the University of California and the Groningen Growth Development Center at the University of Groningen.

First, we obtain a quarterly series of assets and liabilities of three types of international capital flows (ICFs) comprising direct investment, portfolio equity investment, and portfolio debt investment. We also obtain the annual series, interpolate it to a quarterly average, and merge it with the original quarterly dataset. GDP data is taken from the IMF WEO, while annual TFP data at constant national prices (2017=1) is gathered from the Penn World Tables (interpolated to a quarterly average). The financial development (FD) index, from the IMF, incorporates the depth, access, and efficiency of both the financial market and institutions (interpolated to a quarterly average).¹ For the control variables, we obtain quarterly series of the consumer price index (CPI) and real effective exchange rate (REER) from the IMF's IFS database. Where the REER data is not available from the IMF's database, we use monthly and quarterly series of the REER in broad and per unit labor cost forms from the Bank of International Settlement (BIS). We obtain the trade volume (TRD) ratio to GDP, the gross domestic savings (GDS) ratio to GDP, and the total central government debt (DEBT) ratio to GDP from the annual WDI series and interpolate them to a quarterly average.

¹ Please refer to Figs A1, A2, and A3 in the Appendix for plots of capital flows, TFP, and FD for the countries in our sample.

Our core specification considers the overall measure of financial development across three dimensions of financial institutions and markets. For this purpose and to disaggregate the sample into high and low categories of financial development, we compare the periodic mean (\bar{x}_t) of financial development of each economy with the group mean (\bar{x}) of the 13 economies. The comparison of the periodic average of financial development with the group means is reported in Table 1. Hong Kong, China; the Republic of Korea; and Singapore from the high-income economies, and Malaysia and Thailand from the upper-middle-income economies have a higher level of financial development than the group mean of the full sample. The remaining seven developing economies have lower levels of financial development than the group mean. Our empirical work examines sub-panels of high financial development (High FD) and low financial development (Low FD) economies accordingly.

Table 1: Classification of Economies Based on Financial Development

Economy	Periodic Mean (\bar{x}_t)	Classification Group Mean (\bar{x}) =0.45
Hong Kong, China	0.73	High
People's Republic of China	0.49	High
India	0.42	Low
Indonesia	0.32	Low
Kazakhstan	0.27	Low
Republic of Korea	0.77	High
Malaysia	0.60	High
Mongolia	0.24	Low
Philippines	0.34	Low
Singapore	0.71	High
Sri Lanka	0.24	Low
Tajikistan	0.09	Low
Thailand	0.58	High

Source: Author's calculations using data from the International Monetary Fund (IMF).

The descriptive statistics and correlation matrix of these variables used in the analysis are presented in Tables A2 and A3 in the Appendix. In addition, a short definition, overview of measurement scales, and data sources are shown in Table A1 in the Appendix.

4. METHODOLOGY AND EMPIRICAL MODELS

The methodology employed is a fixed-effects panel regression model. In this setup, we construct panel settings of 13 cross-sections (N) and 98 quarterly time observations (T), that is, $(N \times T) = (13 \times 96)$. The analysis also classifies the panel settings of 13 cross-sections of developing economies based on their per capita GNI as of July 2022 according to the World Bank classification. Later, the developing economies, which consist of upper- and lower-middle-income economies, are subdivided into developing economies with high financial development and developing economies with low financial development. Drawing on the related literature and theoretical considerations, the first part of the analysis focuses on the impact of TFP on three types of net capital flow ratio to GDP. The baseline equation is provided in (1), while equation (2) contains both TFP and financial development, and equation (3) introduces an interaction term between TFP and financial development.

The first equation examines the empirical relationship between productivity and net capital flows using three measures of capital flows for Asian economies. Through a panel regression approach, we then test the drivers of capital flows, examining the central hypothesis that financial development matters for the effect of TFP on capital flows and therefore is a key determining factor that may help to explain the allocation puzzle. We therefore introduce financial development as an intermediation channel between TFP and capital flows, thus our main discussion focuses on the output of equation (3).

$$ICF_{i,t} = \alpha_{i,t} + \beta_1 TFP_{i,t-1} + \gamma_{i,t-1} + \delta_{i,t} + \lambda_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$ICF_{i,t} = \alpha_{i,t} + \beta_1 TFI_{i,t-1} + \beta_2 FD_{i,t-1} + \gamma_{i,t-1} + \delta_{i,t} + \lambda_{i,t} + \varepsilon_{i,t} \quad (2)$$

$$ICF_{i,t} = \alpha_{i,t} + \beta_1 TFP_{i,t-1} + \beta_2 FD_{i,t-1} + \beta_3 (TFP \times FD)_{i,t-1} + \gamma_{i,t-1} + \delta_{i,t} + \lambda_{i,t} + \varepsilon_{i,t} \quad (3)$$

where ICF represents three types of net international capital flows, namely net direct investment (DI), net portfolio equity investment (PIEQUITY), and net portfolio debt investment (PIDEBT). All are denoted in level values of ratios to GDP. TFP represents total factor productivity measured in constant national prices (2017=1). FD denotes financial development, represented by an overall index of financial institutions and markets concerning depth, access, and efficiency. $\gamma_{i,t-1}$ represents a vector of control variables with a one-period lag. $\delta_{i,t}$ represents country-fixed effects, and $\lambda_{i,t}$ denotes time-fixed effects. The controls comprise trade openness (TRD), gross domestic savings (GDS), and total central government debt (DEBT). All are represented as ratios to GDP. Other control variables are the natural logarithm of the consumer price index (LnCPI) and the natural logarithm of the real effective exchange rate at market prices (LnREER). This study uses periodic lags, assuming that TFP and financial development's direct and marginal effects may have gradual causal effects on net capital flows in these economies.

5. ESTIMATION RESULTS AND DISCUSSION

5.1 Net Direct Investment

The estimation results of equation (3) for the net direct investment (DI) ratio to GDP are reported in Table 2.² The results are presented for all 13 economies in the sample and sub-panels of economies with high and low levels of financial development. The estimation results show that, for FDI, there is a positive relationship between TFP and net direct investment ratios to GDP in developing Asian economies. These findings are consistent with the predictions of the neoclassical growth model, indicating that developing economies are attracting FDI in line with theoretical expectations. In the case of FDI, therefore, we do not find evidence of an allocation puzzle in a direct sense, with longer term foreign direct capital flows positively related to TFP. Previous studies on the allocation puzzle have tended to examine the overall net capital flows (e.g., Gourinchas and Jeanne, 2013; Ly-Dai, 2019). We also find that the TFP of developing economies with higher financial development has a stronger impact on net direct investment flows. These findings are consistent with previous empirical studies

² Please refer to Table A4 in the Appendix for the baseline results of empirical models (1), (2), and (3) with a full set of control variables for net direct investment (DI) ratios to GDP. Tables A5, and A6 contain the results for equity and debt investment, respectively. Tables A7 to A9 provide further estimation results that excludes the Asian financial crisis period, and are fully consistent with the baseline.

that found an important role for financial development in affecting that FDI flows (e.g., Asamoah et al., 2022; Von Hagen and Zhang, 2014; Alfaro et al., 2008). It should be noted, however, that for highly financially developed economies, there can be offsetting effects whereby financial development hampers the positive effect of TFP on FDI. This may be related to diminishing productivity returns to financial development, which can be notably acute in economies with highly developed financial sectors (e.g., Zhu et al., 2020; Aghion et al., 2018).

Table 2: Estimation Results for Net Direct Investment

Variables	(1)	(2)	(3)
	All (13)	High FD (6)	Low FD (7)
TFP(-1)	1.146*** (0.210)	2.492*** (0.556)	-0.487 (0.319)
FD(-1)	3.114*** (0.337)	4.944*** (0.710)	0.537 (0.795)
(TFP×FD)(-1)	-4.450*** (0.380)	-7.019*** (0.798)	0.339 (0.944)
TRD(-1)	0.120*** (0.024)	0.163*** (0.027)	-0.190*** (0.072)
GDS(-1)	0.432*** (0.137)	1.428*** (0.237)	-0.442** (0.192)
DEBT(-1)	0.008*** (0.001)	0.003 (0.002)	0.003*** (0.001)
LnCPI(-1)	-0.018 (0.053)	-0.517* (0.297)	0.531*** (0.073)
LnREER(-1)	0.140** (0.061)	0.156 (0.098)	-0.024 (0.084)
Constant	-1.780*** (0.383)	-1.059 (1.364)	-1.495** (0.606)
Observations	876	460	416
R-squared	0.409	0.641	0.512
Number of CSs	13	6	7
Country Fixed Effects	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes

Notes: Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. TFP = Total Factor Productivity Constant; FD = Financial Development; TRD = Trade Ratio to GDP; GDS = Gross Domestic Savings Ratio to GDP; DEBT; Total Central Government Debt Ratio to GDP; LnCPI = Natural Logarithm of the Consumer Price Index; LnREER = Natural Logarithm of the Real Effective Exchange Rate; CSs = Cross-Sections.

Source: Author's calculations.

5.2 Net Portfolio Equity Investment

The estimation results of equation (3) for the net portfolio equity investment (PIEQUITY) ratio to GDP are reported in Table 3.

The results show that TFP is negatively associated with net portfolio equity investment for developing economies overall and for the panel with lower financial development. This indicates that, for economies with lower than threshold levels of financial development, higher productivity leads to a reduction in net equity flows. The finding of a negative relationship between equity and TFP is consistent with the “allocation puzzle” hypothesis, as noted in the previous literature. As explained earlier, this can be due to weak institutions in developing economies and underdeveloped financial

markets (e.g., Antràs and Caballero, 2009). However, going beyond the previous empirical literature, our results show that the level of financial development matters for the effect of TFP on equity flows. In particular, we find that the interaction term of financial development and TFP is positive and significant and substantially outweighs the negative direct effect of TFP. The positive and significant coefficients of the interaction terms of TFP and financial development in developing economies, especially those with low financial development, suggest that financial development plays an important intermediating role on TFP concerning net equity investment flows. This also aligns with theoretical work that explored the role of financial development in affecting the impact of productivity on capital flows (e.g., Aghion et al., 2005). Through a process of catching up and convergence relative to a technological frontier, financial development levels matter for the positive net contribution of productivity to equity inflows.

Table 3: Estimation Results for Net Portfolio Equity Investment

Variables	(1)	(2)	(3)
	All	High FD	Low FD
TFP(-1)	-0.956*** (0.303)	-0.095 (1.139)	-0.225*** (0.057)
FD(-1)	-0.076 (0.490)	3.185** (1.446)	-0.315** (0.143)
(TFP×FD)(-1)	2.521*** (0.557)	0.988 (1.664)	0.535*** (0.170)
TRD(-1)	-0.202*** (0.033)	-0.188*** (0.047)	0.005 (0.013)
GDS(-1)	0.355* (0.188)	2.280*** (0.397)	0.019 (0.034)
DEBT(-1)	-0.004*** (0.001)	0.016*** (0.004)	-0.000 (0.000)
LnCPI(-1)	0.631*** (0.076)	2.073*** (0.498)	-0.134*** (0.013)
LnREER(-1)	-0.231*** (0.083)	-0.970*** (0.165)	0.089*** (0.015)
Constant	-1.196** (0.539)	-6.874*** (2.334)	0.278** (0.109)
Observations	861	445	416
R-squared	0.432	0.669	0.710
Number of CSs	13	6	7
Country Fixed Effects	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes

Notes: Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. TFP = Total Factor Productivity Constant; FD = Financial Development; TRD = Trade Ratio to GDP; GDS = Gross Domestic Savings Ratio to GDP; DEBT; Total Central Government Debt Ratio to GDP; LnCPI = Natural Logarithm of the Consumer Price Index; LnREER = Natural Logarithm of the Real Effective Exchange Rate; CSs = Cross-Sections.

Source: Author's calculations.

5.3 Net Portfolio Debt Investment

The estimation results of equation (3) for the net portfolio debt investment (PIDEBT) ratio to GDP are reported in Table 4. In the case of net debt inflows, which are less stable forms of capital than FDI and portfolio equity, we find a negative relationship with TFP across all economies and those with low financial development. As in the case of

net equity flows, this implies the presence of a capital allocation puzzle. However, we find a strong role of financial development in influencing the effect of TFP on net debt inflows. The positive and significant coefficients of the interaction term between TFP and financial development indicate that it is important to consider the role of financial development as a mechanism driving an overall or net positive effect of productivity on portfolio debt flows. Our findings can be interpreted as inferring a dissipation of the negative relationship between capital flows and productivity growth. This builds on the work of Klein (2003), who found an inverted U-shaped relationship between capital account openness and output growth, although this does not go on to examine the role of financial development at different thresholds. Indeed, our results imply that financial development matters the most for productivity-driven debt flows in economies with lower levels of financial development, where there is greater scope for higher marginal returns. The magnitude of the interaction term in respect of debt is notably higher than the case of equity, and suggests that financial development is particularly important for productivity-related debt inflows. As debt flows can be more volatile than equity, the intermediation role of domestic financial markets thus is important for driving capital inflows while at same time positively affecting productivity-related impacts. Previous work on the allocation has not examined alternative dynamics across types of portfolio investment, while our findings also provide insights in the case of Asia, also building on related theoretical work in the literature described earlier.

Table 4: Estimation Results for Net Portfolio Debt Investment

Variables	(1)	(2)	(3)
	All	High FD	Low FD
TFP(-1)	-1.139*** (0.141)	0.133 (0.402)	-1.141*** (0.149)
FD(-1)	-1.690*** (0.226)	-0.085 (0.513)	-1.064*** (0.372)
(TFP×FD)(-1)	3.087*** (0.255)	1.639*** (0.577)	2.008*** (0.442)
TRD(-1)	-0.181*** (0.016)	-0.219*** (0.019)	0.110*** (0.034)
GDS(-1)	-0.187** (0.092)	-0.034 (0.171)	0.347*** (0.090)
DEBT(-1)	0.000 (0.000)	0.008*** (0.001)	0.003*** (0.000)
LnCPI(-1)	0.475*** (0.036)	1.560*** (0.215)	0.209*** (0.034)
LnREER(-1)	-0.004 (0.041)	-0.280*** (0.071)	0.272*** (0.039)
Constant	-1.112*** (0.257)	-5.927*** (0.987)	-1.485*** (0.284)
Observations	876	460	416
R-squared	0.455	0.704	0.485
Number of CSs	13	6	7
Country Fixed Effects	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes

Notes: Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. TFP = Total Factor Productivity Constant; FD = Financial Development; TRD = Trade Ratio to GDP; GDS = Gross Domestic Savings Ratio to GDP; DEBT; Total Central Government Debt Ratio to GDP; LnCPI = Natural Logarithm of the Consumer Price Index; LnREER = Natural Logarithm of the Real Effective Exchange Rate; CSs = Cross-Sections.

Source: Author's calculations.

5.4 Robustness

While our findings for portfolio equity and debt investment demonstrate an important role for financial development in mitigating the allocation puzzle in capital flows to developing Asia, it is important to address potential endogeneity concerns. To this end, we have implemented two alternative approaches as robustness tests. While endogeneity is always a concern in studies of this nature, and notwithstanding the well-known difficulty in identifying truly satisfactory instruments for regression analysis involving macro and financial time series, we have estimated a 2SLS approach using trade openness as an IV for productivity, on the rationale that higher trade openness can help to drive productivity growth via technology, while the connection between trade and capital flows is more indirect (e.g., Miller and Upadhyay, 2000; Xu et al., 2008). The results using this approach are also consistent with our baseline. In addition, we have followed an estimation using two lags of the regressors as instruments (e.g., Bøler et al. (2015) and Doraszelski et al. (2018)). In particular, given that our baseline lags the regressors by one period, this 2SLS approach conditions on two lags of the explanatory variables, finding that the results are fully consistent with our baseline. Given the outcome of these two approaches, endogeneity concerns are mitigated. In addition, we have estimated the models for a sub-period that excludes the Asian crisis, finding that the results are fully consistent with our baseline.³

A further examination was carried out in order to allay concerns that our designation of high and low financial development is robust to alternative definitions, we have undertaken two additional sensitivity tests. First, recognizing that the group mean is 0.45 and India is close to but below that level at 0.42 (implying it is in the low financial development group), we re-estimated our core regression in a specification where India is placed in the high financial development group. The regression results for high and low financial development panels remain fully consistent. Second, we have examined a categorization of the threshold financial development level based on the group median rather than the group mean. These results yield results that are fully consistent with our baseline. Our categorization of high and low financial development in our baseline is justified on the basis of these additional sensitivity tests. Moreover, this type of approach has also been adopted in other papers in the literature (e.g., Beirne et al. 2021; Love and Zicchino, 2006).⁴

6. CONCLUSIONS

This paper empirically examines the role of financial development in affecting the “allocation puzzle” in net capital inflows for a sample of 13 economies in developing Asia over the period 1996 to 2019. This puzzle refers to the negative relationship between productivity growth and net capital flows in developing economies, which runs counter to predictions of the neoclassical growth model. The paper explores the puzzle in respect of alternative categories of capital flows including FDI, portfolio equity, and portfolio debt, and for high and low threshold levels of financial development.

³ The results are not included in the paper for brevity reasons, but are available from the authors upon request.

⁴ Results of additional tests undertaken in respect of the sensitivity of the financial development threshold are available from the authors upon request.

While it is found that no direct capital allocation puzzle is apparent for FDI, diminishing productivity returns to financial development for highly financially developed economies can impede FDI inflows. For portfolio equity and debt investment, our findings indicate that the negative direct effect of TFP on net capital flows is mitigated when financial development is taken into account. Interestingly, we find that, even where the level of financial development is below a threshold level, it can have significant influence on TFP in explaining capital flow dynamics more in alignment with standard economic models. This is also related to increasing productivity-related returns to financial development for economies converging towards a frontier.

Our paper implies that while FDI flows to developing Asia appear to be largely consistent with the neoclassical growth model, for equity and debt portfolio investment, an efficient financial sector is needed in order to channel and allocate capital productively. Given the important role of financial development in affecting the impact of TFP on capital flows, policymakers should be encouraged to enhance further efforts on developing domestic financial markets, for instance through well-targeted financial regulation and progress on local currency bond market development, supported by more resilient macroeconomic fundamentals. In addition, improving the efficiency of financial intermediation through regional cooperation, raising the scope for positive technology and knowledge spillovers, may be a further avenue for consideration.

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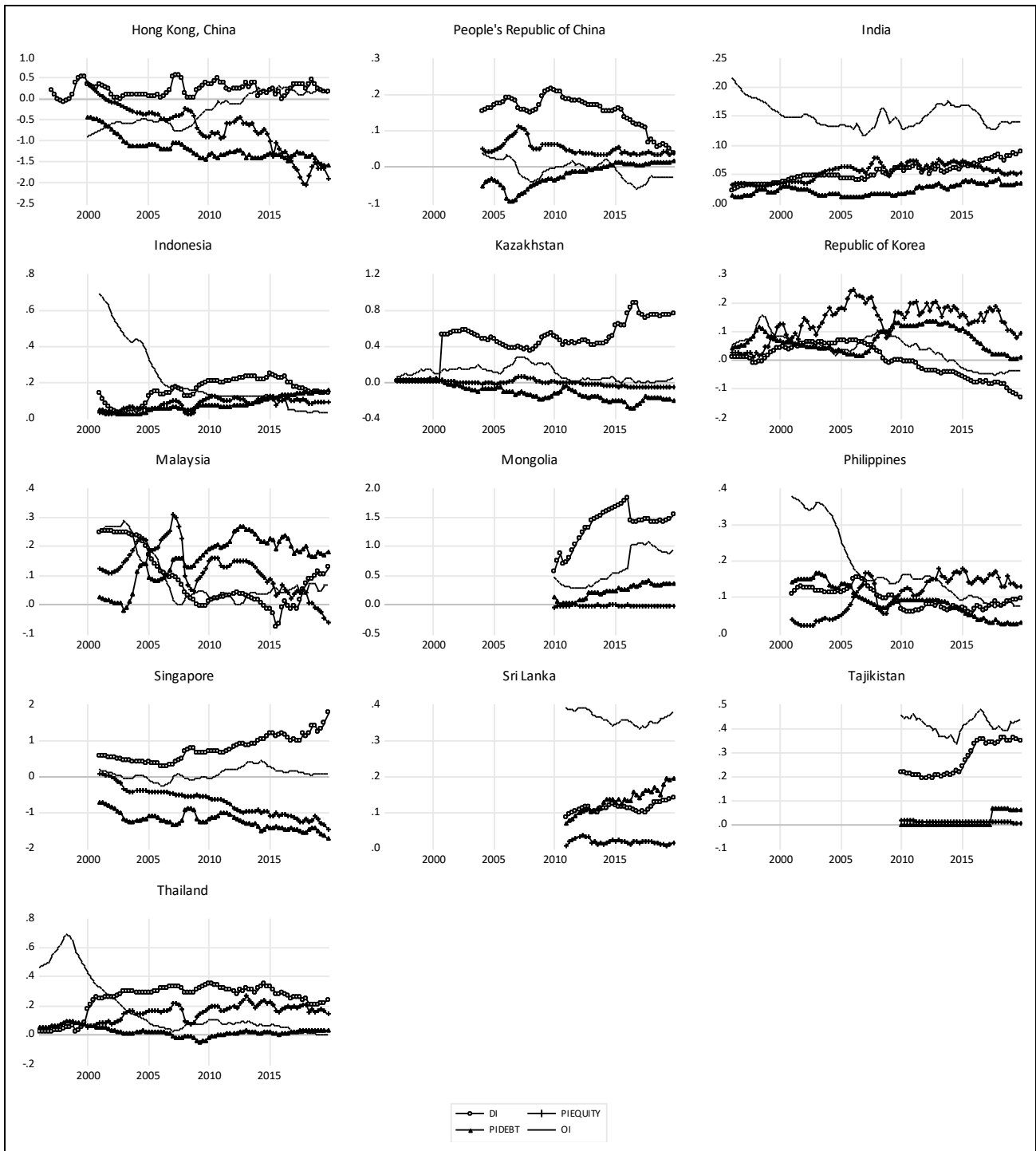
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APPENDIX

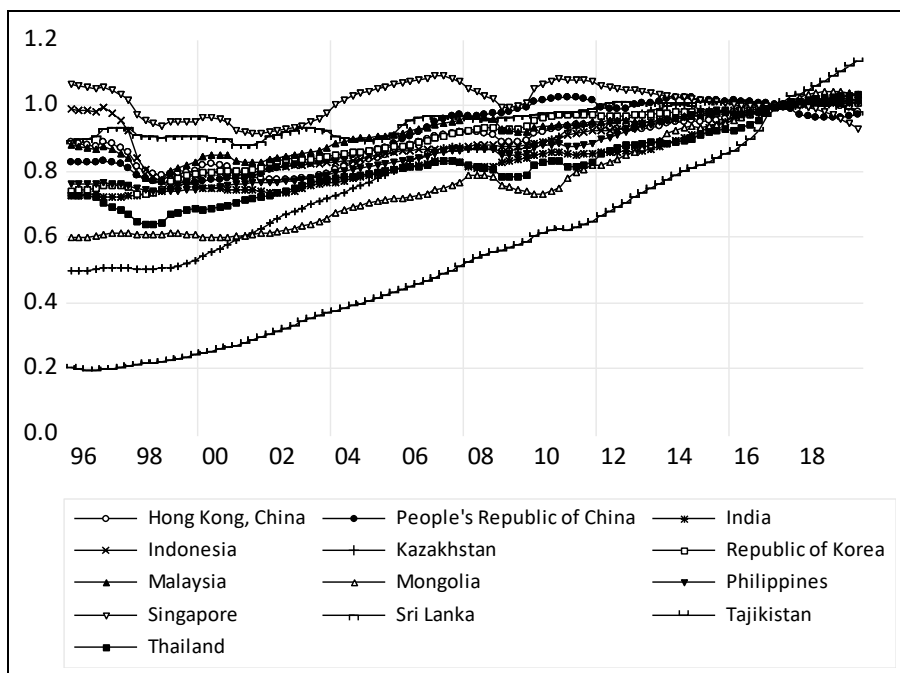
Figure A1: Graphical Representation of International Capital Flows (ICFs)



Notes: DI = Net Direct Investment; PIEQUITY = Net Portfolio Equity Investment; PIDEBT = Net Portfolio Debt Investment; OI = Net Other Investment. All are ratios to GDP.

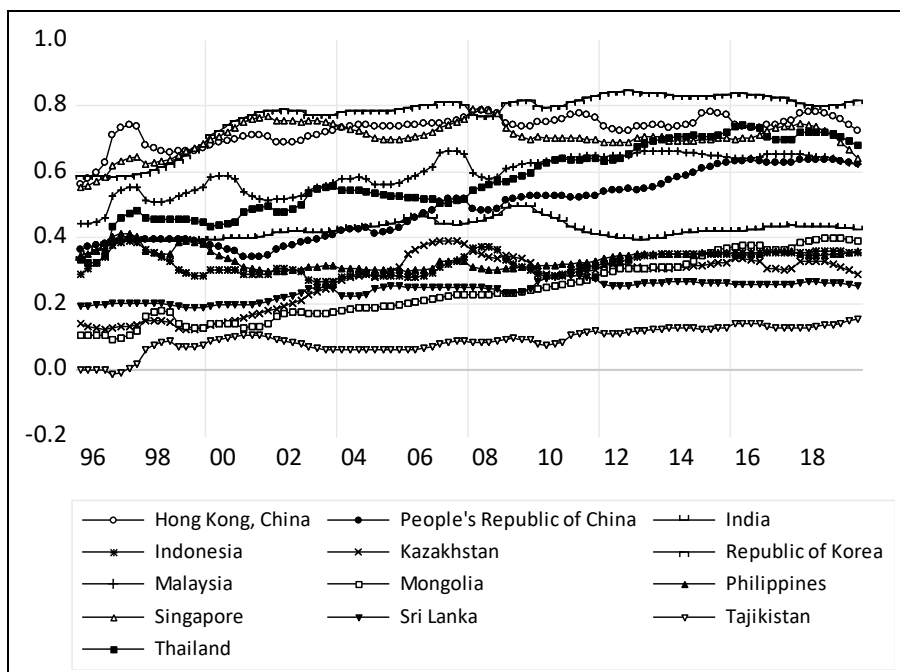
Source: Author's calculations.

Figure A2: Total Factor Productivity



Source: Author's creation.

Figure A3: Financial Development



Source: Author's creation.

Table A1: Variables, Definitions, Measurement Scale, and Data Sources

Variable Name	Code	Scale	Short Definition	Treatment	Data Source
Net Direct Investment	DI	Ratio to GDP	Net direct investments are the net inflows (liabilities minus assets) of investment to acquire a lasting management interest (10% or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments.	Interpolated and merged	IFS and WEO, IMF
Net Portfolio Equity Investment	PIEQUITY	Ratio to GDP	This is the net inflows (liabilities minus assets) of cross-border transactions and positions of equity securities other than those included in direct investment or reserve assets.	Interpolated and merged	IFS and WEO, IMF
Net Portfolio Debt Investment	PIDEBT	Ratio to GDP	This is the net inflows (liabilities minus assets) of cross-border transactions and positions of debt securities other than those included in direct investment or reserve assets.	Interpolated and merged	IFS and WEO, IMF
Total Factor Productivity	TFP	Constant (2017=100)	TFP is measured as the ratio of aggregate output to aggregate inputs. TFP growth is the growth in output that is not explained by the growth in inputs of labor and capital used in a production system. This measure of total factor productivity at constant national prices (2017=1) does not consider welfare.	Interpolated	PWT
Financial Development	FD	Index	The financial development index consists of the financial market and financial institutions. It comprises depth, access, efficiency, and stability of both the financial market and the financial institutions.	Interpolated	IMF
Trade	TRD	Ratio to GDP	This is the sum of imports and exports of goods and services measured as a share of the current gross domestic product.	Interpolated	WDI, World Bank
Gross Domestic Savings	GDS	Ratio to GDP	Gross domestic savings are calculated as GDP less total consumption expenditure.	Interpolated	WDI, World Bank
Total Central Government Debt	DEBT	Ratio to GDP	Debt is the entire stock of direct government fixed-term contractual obligations to others outstanding on a particular date.	Interpolated	WDI, World Bank
Consumer Price Index	CPI	Index	The consumer price index reflects changes in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals.	None	IFS, IMF
Real Effective Exchange Rate	REFER	Index	The REER is the real effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs. It is calculated based on the CPI.	None	IFS, IMF, ADBI Database, and CEIC
Real GDP Per Capita (Used in Figure 1)	GDPPC	Constant 2015 USD	The GDP per capita is the gross domestic product divided by the midyear population. The GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products.	Interpolated and merged	WDI, World Bank

Table A2: Descriptive Statistics

Variable	Observations	Mean	Std Dev.	Min.	Max.
DI	956	0.26	0.34	-0.13	1.83
PIEQUITY	928	-0.06	0.36	-2.03	0.40
PIDEBT	944	-0.16	0.49	-1.71	0.41
TFP	1,248	0.86	0.16	0.20	1.14
FD	1,248	0.45	0.22	-0.01	0.85
TRD	1,240	1.26	1.05	0.22	4.44
GDS	1,248	0.30	0.14	-0.31	0.56
DEBT	1,156	0.43	0.28	0.03	1.39
LnCPI	1,221	4.46	0.41	3.02	5.29
LnREER	1,160	4.59	0.15	3.73	5.09

Note: DI = Net Direct Investment; PIEQUITY = Net Portfolio Equity Investment; PIDEBT = Net Portfolio Debt Investment. All are ratios to GDP. TFP = Total Factor Productivity; FD = Financial Development; TRD = Trade Ratio to GDP; GDS = Gross Domestic Savings Ratio to GDP; DEBT; Total Central Government Debt Ratio to GDP; LnCPI = Natural Logarithm of the Consumer Price Index; LnREER = Natural Logarithm of the Real Effective Exchange Rate.

Source: Author's calculations.

Table A3: Correlation Table

	Dependent Variables				Regressors					
	DI	PIEQUITY	PIDEBT	TFP	FD	TRD	GDS	DEBT	LnCPI	LnREER
TFP	0.17	-0.27	-0.23	1.00						
FD	-0.09	-0.33	-0.47	0.34	1.00					
TRD	0.31	-0.76	-0.89	0.24	0.57	1.00				
GDS	0.23	-0.18	-0.28	0.42	0.49	0.29	1.00			
DEBT	0.33	-0.22	-0.18	0.30	-0.02	0.22	0.16	1.00		
LnCPI	0.31	-0.14	-0.03	0.70	0.02	0.03	-0.04	0.06	1.00	
LnREER	0.09	-0.22	-0.21	0.21	0.39	0.20	0.04	-0.14	0.29	1.00

Note: DI = Net Direct Investment; PIEQUITY = Net Portfolio Equity Investment; PIDEBT = Net Portfolio Debt Investment. All are ratios to GDP. TFP = Total Factor Productivity; FD = Financial Development; TRD = Trade Ratio to GDP; GDS = Gross Domestic Savings Ratio to GDP; DEBT; Total Central Government Debt Ratio to GDP; LnCPI = Natural Logarithm of the Consumer Price Index; LnREER = Natural Logarithm of the Real Effective Exchange Rate.

Source: Author's calculations.

Table A4: Baseline Regressions for the Net Direct Investment Ratio to GDP (DI)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	All (13)			High FD (6)			Low FD (7)		
TFP(-1)	-0.988*** (0.130)	-0.759*** (0.144)	1.146*** (0.210)	-2.570*** (0.206)	-2.106*** (0.209)	2.492*** (0.556)	-0.008 (0.180)	-0.401* (0.209)	-0.487 (0.319)
FD(-1)		-0.508*** (0.144)	3.114*** (0.337)		-1.135*** (0.180)	4.944*** (0.710)		0.810*** (0.230)	0.537 (0.795)
(TFP×FD)(-1)			-4.450*** (0.380)			-7.019*** (0.798)			0.339 (0.944)
TRD(-1)	0.019 (0.024)	0.010 (0.024)	0.120*** (0.024)	0.100*** (0.029)	0.079*** (0.027)	0.163*** (0.027)	-0.172*** (0.061)	-0.176*** (0.060)	-0.190*** (0.072)
GDS(-1)	0.911*** (0.143)	0.838*** (0.143)	0.432*** (0.137)	1.582*** (0.247)	0.951*** (0.254)	1.428*** (0.237)	-0.403** (0.179)	-0.468*** (0.177)	-0.442** (0.192)
DEBT(-1)	0.008*** (0.001)	0.008*** (0.001)	0.008*** (0.001)	-0.000 (0.002)	-0.002 (0.002)	0.003 (0.002)	0.003*** (0.001)	0.003*** (0.001)	0.003*** (0.001)
LnCPI(-1)	0.367*** (0.047)	0.320*** (0.049)	-0.018 (0.053)	-0.991*** (0.301)	-1.575*** (0.300)	-0.517* (0.297)	0.479*** (0.073)	0.531*** (0.073)	0.531*** (0.073)
LnREER(-1)	0.075 (0.066)	0.111* (0.066)	0.140** (0.061)	0.161 (0.103)	0.384*** (0.104)	0.156 (0.098)	-0.013 (0.084)	-0.018 (0.083)	-0.024 (0.084)
Constant	-1.482*** (0.417)	-1.455*** (0.414)	-1.780*** (0.383)	4.667*** (1.194)	6.490*** (1.170)	-1.059 (1.364)	-1.504*** (0.541)	-1.599*** (0.532)	-1.495** (0.606)
Observations	876	876	876	460	460	460	416	416	416
R-squared	0.291	0.303	0.409	0.512	0.562	0.641	0.493	0.512	0.512
Number of CSs	13	13	13	6	6	6	7	7	7
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. TFP = Total Factor Productivity; FD = Financial Development; TRD = Trade Ratio to GDP; GDS = Gross Domestic Savings Ratio to GDP; DEBT; Total Central Government Debt Ratio to GDP; LnCPI = Natural Logarithm of the Consumer Price Index; LnREER = Natural Logarithm of the Real Effective Exchange Rate; CS = Cross-Sections.

Source: Author's calculations.

Table A5: Baseline Regressions for the Net Portfolio Equity Investment Ratio to GDP (PIEQUITY)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Variables	All (13)			High FD (6)			Low FD (7)		
TFP(-1)	1.043*** (0.179)	0.130 (0.188)	-0.956*** (0.303)	2.300*** (0.374)	0.554* (0.319)	-0.095 (1.139)	-0.033 (0.033)	-0.089** (0.038)	-0.225*** (0.057)
FD(-1)		1.982*** (0.185)	-0.076 (0.490)		4.027*** (0.280)	3.185** (1.446)		0.116*** (0.042)	-0.315** (0.143)
(TFP×FD)(-1)			2.521*** (0.557)			0.988 (1.664)			0.535*** (0.170)
TRD(-1)	-0.177*** (0.032)	-0.139*** (0.030)	-0.202*** (0.033)	-0.249*** (0.052)	-0.176*** (0.041)	-0.188*** (0.047)	0.028** (0.011)	0.027** (0.011)	0.005 (0.013)
GDS(-1)	-0.178 (0.194)	0.106 (0.182)	0.355* (0.188)	-0.034 (0.453)	2.313*** (0.393)	2.280*** (0.397)	-0.013 (0.033)	-0.022 (0.032)	0.019 (0.034)
DEBT(-1)	-0.003*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	0.013*** (0.004)	0.017*** (0.003)	0.016*** (0.004)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
LnCPI(-1)	0.242*** (0.065)	0.434*** (0.063)	0.631*** (0.076)	-0.193 (0.565)	2.163*** (0.474)	2.073*** (0.498)	-0.141*** (0.013)	-0.133*** (0.013)	-0.134*** (0.013)
LnREER(-1)	-0.074 (0.089)	-0.215** (0.084)	-0.231*** (0.083)	-0.160 (0.190)	-0.993*** (0.160)	-0.970*** (0.165)	0.098*** (0.015)	0.098*** (0.015)	0.089*** (0.015)
Constant	-1.250** (0.583)	-1.429*** (0.543)	-1.196** (0.539)	-0.221 (2.223)	-7.733*** (1.829)	-6.874*** (2.334)	0.128 (0.098)	0.115 (0.097)	0.278** (0.109)
Observations	861	861	861	445	445	445	416	416	416
R-squared	0.328	0.417	0.432	0.465	0.668	0.669	0.693	0.701	0.710
Number of CSs	13	13	13	6	6	6	7	7	7
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. TFP = Total Factor Productivity; FD = Financial Development; TRD = Trade Ratio to GDP; GDS = Gross Domestic Savings Ratio to GDP; DEBT; Total Central Government Debt Ratio to GDP; LnCPI = Natural Logarithm of the Consumer Price Index; LnREER = Natural Logarithm of the Real Effective Exchange Rate; CS = Cross-Sections.

Source: Author's calculations.

Table A6: Baseline Regressions for the Net Portfolio Debt Investment Ratio to GDP (PIDEBT)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Variables	All (13)			High FD (6)			Low FD (7)		
TFP(-1)	0.552*** (0.091)	0.183* (0.097)	-1.139*** (0.141)	1.752*** (0.151)	1.207*** (0.138)	0.133 (0.402)	-0.361*** (0.088)	-0.630*** (0.101)	-1.141*** (0.149)
FD(-1)		0.823*** (0.097)	-1.690*** (0.226)		1.334*** (0.119)	-0.085 (0.513)		0.554*** (0.111)	-1.064*** (0.372)
(TFP×FD)(-1)			3.087*** (0.255)			1.639*** (0.577)			2.008*** (0.442)
TRD(-1)	-0.120*** (0.017)	-0.105*** (0.016)	-0.181*** (0.016)	-0.223*** (0.021)	-0.199*** (0.018)	-0.219*** (0.019)	0.197*** (0.030)	0.195*** (0.029)	0.110*** (0.034)
GDS(-1)	-0.587*** (0.100)	-0.468*** (0.097)	-0.187** (0.092)	-0.665*** (0.180)	0.077 (0.169)	-0.034 (0.171)	0.237*** (0.088)	0.192** (0.085)	0.347*** (0.090)
DEBT(-1)	0.001* (0.001)	0.001 (0.000)	0.000 (0.000)	0.008*** (0.002)	0.009*** (0.001)	0.008*** (0.001)	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)
LnCPI(-1)	0.164*** (0.033)	0.241*** (0.033)	0.475*** (0.036)	1.121*** (0.220)	1.807*** (0.199)	1.560*** (0.215)	0.176*** (0.036)	0.211*** (0.035)	0.209*** (0.034)
LnREER(-1)	0.074 (0.046)	0.016 (0.044)	-0.004 (0.041)	-0.071 (0.076)	-0.333*** (0.069)	-0.280*** (0.071)	0.308*** (0.041)	0.305*** (0.040)	0.272*** (0.039)
Constant	-1.294*** (0.292)	-1.337*** (0.279)	-1.112*** (0.257)	-5.546*** (0.873)	-7.690*** (0.775)	-5.927*** (0.987)	-2.034*** (0.266)	-2.099*** (0.257)	-1.485*** (0.284)
Observations	876	876	876	460	460	460	416	416	416
R-squared	0.289	0.350	0.455	0.589	0.697	0.704	0.408	0.451	0.485
Number of CSs	13	13	13	6	6	6	7	7	7
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. TFP = Total Factor Productivity; FD = Financial Development; TRD = Trade Ratio to GDP; GDS = Gross Domestic Savings Ratio to GDP; DEBT = Total Central Government Debt Ratio to GDP; LnCPI = Natural Logarithm of the Consumer Price Index; LnREER = Natural Logarithm of the Real Effective Exchange Rate; CS = Cross-Sections.

Source: Author's calculations.

Table A7: Alternative Estimation Results for 2000Q1–2019Q4 – Net Direct Investment Ratio to GDP (DI)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Variables	All (13)			High FD (6)			Low FD (7)		
TFP(-1)	-1.150*** (0.135)	-0.908*** (0.148)	0.944*** (0.226)	-2.584*** (0.208)	-2.121*** (0.215)	3.447*** (0.715)	-0.004 (0.180)	-0.395* (0.209)	-0.363 (0.328)
FD (-1)		-0.554*** (0.145)	2.951*** (0.365)		-1.056*** (0.187)	6.152*** (0.906)		0.806*** (0.230)	0.904 (0.814)
(TFP×FD) (-1)			-4.319*** (0.417)			-8.466*** (1.045)			-0.122 (0.969)
TRD (-1)	0.026 (0.024)	0.016 (0.024)	0.125*** (0.024)	0.094*** (0.029)	0.075*** (0.028)	0.183*** (0.029)	-0.170*** (0.061)	-0.173*** (0.060)	-0.168** (0.073)
GDS (-1)	1.029*** (0.144)	0.959*** (0.144)	0.543*** (0.141)	1.779*** (0.250)	1.175*** (0.262)	1.436*** (0.242)	-0.429** (0.180)	-0.494*** (0.178)	-0.504** (0.196)
DEBT (-1)	0.007*** (0.001)	0.008*** (0.001)	0.008*** (0.001)	-0.001 (0.002)	-0.002 (0.002)	0.004* (0.002)	0.003*** (0.001)	0.003*** (0.001)	0.003*** (0.001)
LnCPI(-1)	0.424*** (0.048)	0.374*** (0.049)	0.040 (0.056)	-0.587* (0.314)	-1.199*** (0.320)	-0.482 (0.306)	0.496*** (0.073)	0.548*** (0.073)	0.548*** (0.073)
LnREER(-1)	0.072 (0.065)	0.107 (0.065)	0.122** (0.061)	0.092 (0.105)	0.305*** (0.108)	0.112 (0.101)	0.042 (0.082)	0.036 (0.080)	0.038 (0.082)
Constant	-1.718*** (0.404)	-1.602*** (0.401)	-1.776*** (0.376)	3.539*** (1.296)	5.735*** (1.300)	-1.597 (1.496)	-2.061*** (0.531)	-2.138*** (0.522)	-2.174*** (0.596)
Observations	835	835	835	428	428	428	407	407	407
R-squared	0.303	0.317	0.404	0.504	0.547	0.621	0.496	0.515	0.515
Number of CSs	13	13	13	6	6	6	7	7	7
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. TFP = Total Factor Productivity; FD = Financial Development; TRD = Trade Ratio to GDP; GDS = Gross Domestic Savings Ratio to GDP; DEBT; Total Central Government Debt Ratio to GDP; LnCPI = Natural Logarithm of the Consumer Price Index; LnREER = Natural Logarithm of the Real Effective Exchange Rate; CSs = Cross-Sections.

Source: Author's calculations.

Table A8: Alternative Estimation Results for 2000Q1–2019Q4 – Net Portfolio Equity Investment Ratio to GDP (PIEQUITY)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Variables	All (13)			High FD (6)			Low FD (7)		
TFP (-1)	0.988*** (0.186)	0.129 (0.192)	-0.968*** (0.310)	2.291*** (0.375)	0.537* (0.321)	-0.304 (1.164)	-0.027 (0.033)	-0.082** (0.038)	-0.226*** (0.059)
FD (-1)		1.966*** (0.188)	-0.110 (0.500)		4.003*** (0.279)	2.915** (1.475)		0.114*** (0.042)	-0.328** (0.147)
(TFP×FD) (-1)			2.559*** (0.572)			1.279 (1.701)			0.550*** (0.175)
TRD (-1)	-0.175*** (0.033)	-0.139*** (0.031)	-0.203*** (0.034)	-0.250*** (0.052)	-0.180*** (0.042)	-0.196*** (0.047)	0.028** (0.011)	0.028** (0.011)	0.005 (0.013)
GDS (-1)	-0.142 (0.199)	0.106 (0.187)	0.352* (0.193)	-0.023 (0.452)	2.266*** (0.391)	2.226*** (0.394)	-0.021 (0.033)	-0.030 (0.033)	0.017 (0.035)
DEBT (-1)	-0.003*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	0.013*** (0.004)	0.018*** (0.003)	0.017*** (0.004)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
LnCPI(-1)	0.263*** (0.066)	0.442*** (0.064)	0.640*** (0.077)	-0.165 (0.568)	2.156*** (0.476)	2.047*** (0.498)	-0.142*** (0.013)	-0.134*** (0.013)	-0.135*** (0.013)
LnREER(-1)	-0.080 (0.090)	-0.203** (0.085)	-0.212** (0.084)	-0.172 (0.190)	-0.981*** (0.160)	-0.952*** (0.165)	0.097*** (0.015)	0.096*** (0.015)	0.087*** (0.015)
Constant	-1.122** (0.556)	-1.532*** (0.521)	-1.429*** (0.515)	-0.418 (2.341)	-8.740*** (1.937)	-7.633*** (2.435)	0.157 (0.097)	0.146 (0.096)	0.307*** (0.108)
Observations	835	835	835	428	428	428	407	407	407
R-squared	0.326	0.413	0.429	0.462	0.666	0.666	0.690	0.697	0.706
Number of CSs	13	13	13	6	6	6	7	7	7
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. TFP = Total Factor Productivity; FD = Financial Development; TRD = Trade Ratio to GDP; GDS = Gross Domestic Savings Ratio to GDP; DEBT; Total Central Government Debt Ratio to GDP; LnCPI = Natural Logarithm of the Consumer Price Index; LnREER = Natural Logarithm of the Real Effective Exchange Rate; CSs = Cross-Sections.

Source: Author's calculations.

Table A9: Alternative Estimation Results for 2000Q1–2019Q4 – Net Portfolio Debt Investment Ratio to GDP (PIDEBT)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Variables	All (13)			High FD (6)			Low FD (7)		
TFP(-1)	0.626*** (0.097)	0.242** (0.102)	-1.298*** (0.151)	1.768*** (0.155)	1.144*** (0.143)	-1.471*** (0.497)	-0.363*** (0.088)	-0.630*** (0.100)	-1.213*** (0.152)
FD(-1)		0.879*** (0.100)	-2.035*** (0.243)		1.424*** (0.124)	-1.960*** (0.630)		0.549*** (0.110)	-1.253*** (0.376)
(TFP×FD)(-1)			3.590*** (0.278)			3.975*** (0.727)			2.238*** (0.448)
TRD(-1)	-0.123*** (0.017)	-0.108*** (0.016)	-0.198*** (0.016)	-0.227*** (0.022)	-0.202*** (0.019)	-0.252*** (0.020)	0.200*** (0.030)	0.197*** (0.029)	0.102*** (0.034)
GDS(-1)	-0.644*** (0.104)	-0.533*** (0.099)	-0.187** (0.094)	-0.626*** (0.187)	0.188 (0.174)	0.066 (0.169)	0.234*** (0.088)	0.190** (0.085)	0.380*** (0.091)
DEBT(-1)	0.001* (0.001)	0.001 (0.000)	0.000 (0.000)	0.008*** (0.002)	0.009*** (0.001)	0.006*** (0.002)	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)
LnCPI(-1)	0.141*** (0.034)	0.221*** (0.034)	0.498*** (0.038)	1.176*** (0.235)	2.002*** (0.212)	1.665*** (0.213)	0.176*** (0.036)	0.211*** (0.035)	0.209*** (0.034)
LnREER(-1)	0.082* (0.047)	0.027 (0.045)	0.014 (0.041)	-0.088 (0.079)	-0.376*** (0.071)	-0.285*** (0.071)	0.315*** (0.040)	0.311*** (0.039)	0.277*** (0.038)
Constant	-1.224*** (0.290)	-1.407*** (0.277)	-1.263*** (0.251)	-6.001*** (0.969)	-8.961*** (0.863)	-5.518*** (1.041)	-2.052*** (0.260)	-2.104*** (0.251)	-1.448*** (0.275)
Observations	835	835	835	428	428	428	407	407	407
R-squared	0.292	0.359	0.478	0.588	0.703	0.727	0.419	0.461	0.501
Number of CSs	13	13	13	6	6	6	7	7	7
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. TFP = Total Factor Productivity; FD = Financial Development; TRD = Trade Ratio to GDP; GDS = Gross Domestic Savings Ratio to GDP; DEBT; Total Central Government Debt Ratio to GDP; LnCPI = Natural Logarithm of the Consumer Price Index; LnREER = Natural Logarithm of the Real Effective Exchange Rate; CSs = Cross-Sections.

Source: Author's calculations.