Foreign Direct Investment, Capital Accumulation, and Growth: The Rise of the Emerging South*

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Abstract

Using a unique dataset on bilateral FDI flows between 1990 and 2012, we analyze the heterogeneous growth effects of FDI originating from the North, the Emerging South, and the South in each country group. After controlling for the aggregation bias, sample selection bias, country heterogeneity, and endogeneity issues, and using various estimation techniques and robustness tests, we detect no long-run effects of FDI on the host country per capita GDP growth, independent of its direction. However, we find a significantly positive effect on long-run levels of GDP per capita in the sub-country groups of North-North, Emerging-North, and South-Emerging. The effects are stronger for countries with similar institutional development levels.

Keywords: Foreign direct investment, Economic growth, North-South heterogeneity, Capital accumulation

JEL Classification: F44, O47, P33

1 Introduction

Global foreign direct investment (FDI) flows increased from $54 billion in 1980 to $1.3 trillion in 2018, with a peak of $2 trillion in 2015 (UNCTAD, 2019). Reflecting this growth in global capital flows, a plethora of empirical studies have examined how capital accumulation through FDI affects economic growth. Theoretically speaking, a variety of models predicts and, in fact, guarantees a wide range of benefits that should enhance growth. Some of these benefits include enabling transfer of technology and know-how in management and production (e.g., Glass and Saggi, 1998), increasing product quality and sophistication (e.g., Lin and Lin, 2010), relaxing development bottlenecks (e.g., savings and foreign exchange gaps) (e.g., Harrison et al., 2004), increasing institutional quality (e.g., Hyun, 2006), and improving productivity (e.g., Liu et al., 2001).

However, the empirical evidence on the growth effects of FDI remains inconclusive with a long list of papers reporting negative, positive, and insignificant effects (Demena and van Bergeijk, 2017; Rojec and Knell, 2018). Furthermore, a wide range of papers reports positive effects conditional on various factors of host and home countries, such as the availability of human capital, institutional quality, and adaptive capacity. In addition to such conditioning factors, there are other reasons for differing findings, originating from a combination of data issues and a mismatch between theory and empirical application. Particularly, one common problem is the treatment of FDI as a homogeneous block, ignoring the high level of home and host country heterogeneity, sectoral orientation (e.g., manufacturing vs. agricultural), and type of FDI flows (e.g., vertical vs. horizontal or greenfield vs. mergers and acquisitions). In this paper, we contribute to the literature by addressing three issues that did not receive sufficient attention in the previous FDI-growth literature, which are the aggregation bias, selection bias, and home and host

country heterogeneity within and between the North and the South.[1]

Regarding the aggregation bias, except for a few, most previous studies are based on aggregate FDI flows with no attention to their direction or composition. As discussed later in the data section, this is far from the reality given that FDI flows are indeed a heterogeneous bunch with different structural characteristics, varieties, and sectoral orientations (Beugelsdijk et al., 2008; Amighini and Sanfilippo, 2014; Gold et al., 2017; Demena and van Bergeijk, 2017; Demir and Duan, 2018; Rojec and Knell, 2018). We also show that the traditional method of grouping countries into North and South is no longer sufficient, as Emerging South countries differ from the Rest of South in substantial ways. Furthermore, capital flows are dynamic by nature as investments and divestments occur simultaneously, which would be hidden in aggregate analysis. Our data allow us to observe simultaneous inflows and outflows of nonresident FDI from different home and host countries.

As for the selection bias and the FDI host and home country heterogeneity, these aspects of analysis are also mostly missing in the literature, despite growing evidence suggesting their importance in determining international goods and capital flows. In particular, recent studies suggest that similarities in incomes, endowments, preferences, and institutions are significant determinants of bilateral trade and investment flows (Hallak, 2006; Feenstra and Romalis, 2012; Fajgelbaum et al., 2014; Dingel, 2016). There is also growing evidence showing that such similarities determine the potential for economic spillovers between home and host countries as they affect the adoptive and absorptive capabilities of host nations (Amsden, 1984; Kaplinsky, 1990; Pack and Nelson, 1999; Amighini and Sanfilippo, 2014; Fajgelbaum et al., 2014; Acemoglu, 2015; Demir and Duan, 2018). Sirr et al. (2018), for example, find that host country conditioning factors

[1] The North is defined as high-income OECD countries and the South is defined as the rest of the world.

for positive growth effects of FDI may differ between Northern and Southern FDI. The same is true for the endogeneity of FDI flows as host countries can adopt a variety of industrial policies to cherry-pick the type of FDI they want to maximize industrial upgrading and technology transfer (e.g., Chandra, 2006). Furthermore, Beugelsdijk et al. (2008), after controlling for endogeneity and absorptive capacity, report that horizontal and vertical FDI have positive and significant growth effects only in developed but not in developing countries. They also find a stronger growth effect from horizontal FDI over vertical FDI. In other words, the evidence accumulated for the last thirty years suggests that not all FDI flows are equal.[2] Last but not least, it is well recognized now that there is a selection bias in data on trade and FDI flows as missing and zero observations are disproportionately higher among low-income countries.

In the empirical analysis, we examine the effects of bilateral FDI flows on long-run economic growth and incomes using data from 240 home and host countries between 1990 and 2012. In our identification strategy, we employ a three-dimensional home-host country framework, which helps correct for the home and host country heterogeneity. In particular, we argue that the common way of bifurcating income levels into the North and the South is no longer sufficient given the recent decoupling of the Emerging South from the North as well as the Rest of South (Dahi and Demir, 2017; Pesce, 2017). While the North consists mostly of homogeneous countries in terms of overall income and development levels, there is a high degree of heterogeneity within the global South. Particularly, the rise of the Emerging South has significantly increased the variance in income and development levels as well as in adaptive and absorptive capabilities within the global South, causing a growing divergence and requiring a more nuanced categorization of the North-South polarity. A few Southern countries, the so-called emerging markets, have

[2] For a review of the literature on FDI, growth and productivity spillovers, see Harrison and Rodrguez-Clare (2010), Demena and van Bergeijk (2017), Dimant and Tosato (2018) and Rojec and Knell (2018).

achieved fast growth rates and enjoyed a rapid structural change in their economies for the last fifty years, allowing them to transition into a mid-level of development, somewhere between the North and the Rest of South. These emerging countries are aligned closer to the North than the Rest of South in terms of incomes and development levels (Dahi and Demir, 2016). Thus, to help with the identification of the FDI-growth relationship, we split countries into three groups: the North, the Emerging South, and the Rest of South.

We should also note that FDI flows between country-pairs are not randomly distributed, which can cause a sample selection bias. In particular, our data suggest that FDI flows among developed countries (i.e the North) are better recorded, and have higher extensive and intensive margins than those between developed and developing countries or among developing countries, resulting in fewer missing and zero observations.[3] Therefore, in our estimation strategy, we apply a Heckman-style two-stage sample selection model to correct for the sample selection bias. Furthermore, the relationship between bilateral FDI flows and growth is endogenous as countries with similar incomes and development levels are more likely to invest in each other. There is also the reverse causality problem if FDI flows are directed more towards faster-growing countries. We try to address these endogeneity problems with an instrumental variable (IV) approach. Finally, there is the issue of incorrect specification of the FDI-growth nexus, which is a long-run relationship and cannot be estimated by a short-run model. Changes in capital accumulation, productivity, technological progress, human capital formation, and institutional development are occurring at a gradual pace and require an appropriate estimation strategy.

Our empirical analysis reveals four new insights. First, we find that the long-run effects of FDI are limited to the level rather than the growth rate of GDP per capita.

[3] There is also evidence showing that determinants of FDI differ significantly between developed and developing countries. See, for example, Demir and Hu (2016) and Nguyen (2019).

Independent of the direction of flows, we do not detect any growth-enhancing effect of FDI. Second, the positive long-run effect on the level of GDP per capita is limited to the North-North, Emerging (host)-North (home), and South (host)-Emerging (home) country pairs. Third, the source of FDI matters as positive effects are only observable when the origins of capital flows are from the North and the Emerging South. Fourth, we find some evidence that institutional development gaps between host and home countries affect the potential for growth spillovers. We confirm these results using a rich battery of robustness tests.

The rest of the paper is organized as follows. Section 2 offers a brief literature review, followed by Section 3, which introduces the data, empirical model, and estimation methodology. Section 4 presents the empirical results and extensions. Section 5 discusses the robustness analysis, followed by Section 6, which concludes the paper.

2 Literature Review

The workhorse of neoclassical growth theory, the Solow model, predicts that an increase in FDI does not have a permanent effect but only a short-term transitory effect through increasing capital and output per worker, mainly because of the assumption of diminishing returns and exogenous technological change. Within the endogenous growth framework, however, FDI can increase the long-run growth rate through knowledge and technology diffusion, capital accumulation, technology and knowledge transfer, structural change, better risk management and know-how, and eventually, productivity gains (Shell, 1966; Borensztein et al., 1998). Augmenting domestic savings, relaxing credit constraints, and facilitating access to international goods and capital markets are also expected to boost economic growth (Chinn and Prasad, 2003).

Despite these sound predictions, however, the existing empirical evidence yields mixed

results with some reporting positive, some negative, and others with insignificant effects.[4] One issue that has received only limited attention in this literature is that the growth effects of FDI are likely to depend on the direction of FDI flows (Beugelsdijk et al., 2008; Sirr et al., 2018). Based on the neoclassical theory, FDI flows from more advanced to less advanced economies are expected to have the highest growth effect as the North is endowed with better cutting-edge technology, know-how, and operational and management techniques. Therefore, the larger the gap between the country-pairs in endowments and capabilities, the higher is the spillover potential through technology, human capital, and knowledge diffusion, allowing for a faster catching-up process (Borensztein et al., 1998; Panagariya, 2000; Schiff and Wang, 2008). Furthermore, because the North has a wider variety of technologies available, the South has an advantage in adopting technologies more efficiently and less costly. Likewise, Krugman et al. (1995) argue that the catching-up effect is magnified when there is an opportunity for vertical specialization and value-chain fragmentation. That is, North-South exchanges are more likely to be growth-enhancing than South-South exchanges.

Another potential growth effect of FDI from the North to the South involves FDI-induced institutional change (Demir, 2016). As the Northern countries have arguably better institutional development and require stricter institutional conditions on host countries, FDI flows from the North can help improve institutional infrastructure in the South through the demonstration or conditionality effects. For instance, investors or multinational firms from the North can put pressure on the Southern policymakers to establish necessary policy measures to ensure a sound investment environment and therefore help improve the host country's institutional quality (Kwok and Tadesse, 2006).

[4] For example, De Mello (1999) and Suleiman et al. (2013) report positive effects for OECD countries and negative effects for non-OECD countries. Alfaro et al. (2004) report positive effects conditional on host countries' financial development. And yet Nair-Reichert and Weinhold (2001) find no significant effects. For a review, see Demena and van Bergeijk (2017), Rojec and Knell (2018) and Dimant and Tosato (2018).

Conversely, the new trade theory and the structuralist tradition suggest that international trade and capital flows between lower-income countries can be more beneficial for growth. In particular, South-South FDI flows can arguably have a higher potential for growth spillovers thanks to smaller gaps between the home and host country technologies and endowments, which can allow for higher complementarity, and easier and more appropriate technology adoption for host economies (Amsden, 1984, 2001; Caselli and Coleman, 2001; Durham, 2004; Girma, 2005; Li and Liu, 2005; Hallak, 2010; Aleksynska and Havrylchyk, 2013; Amighini and Sanfilippo, 2014; Bahar et al., 2014; Fajgelbaum et al., 2014; Dahi and Demir, 2017; Demir and Duan, 2018). South-South FDI flows can also facilitate easier technology adoption as they embody older but perhaps better fit technologies in terms of production techniques, scale economies, product characteristics, and consumer needs than more advanced Northern technologies (Stewart, 1982; Amsden, 1984; Kaplinsky, 1990; Pack and Nelson, 1999; Hallak, 2010). In a cross-sectional study focusing on Northern and Southern multinationals in Sub-Saharan Africa, Gold et al. (2017), for example, find stronger employment growth and technology transfer potential for firms receiving FDI from other African investors as compared to Northern FDI. And yet, they find that firms receiving FDI from OECD countries experience faster productivity growth.

Furthermore, being away from the technological frontier, the South has no choice but to follow the North in the direction of technological change, which is capital-biased and is shaped by Northern factor endowments and consumer preferences (Stewart, 1982; Kaplinsky, 1990; Acemoglu, 2002, 2015). This technological dependency can make the Northern products and production techniques biased against the Southern needs concerning consumer demand, factor endowments, and production methods. Environmental appropriateness can also condition the spillover effects in North-South vs. South-South

FDI flows. For example, the large-scale and capital-intensive production processes of the Northern investors, as opposed to the small-scale and labor-intensive production processes of the Southern investors, can have different effects in developing countries with limited resources to ensure environmental safety and protections (Atta-Ankomah, 2014).

The sectoral allocation of FDI flows also matters in determining the FDI-growth relationship. The high concentration of North-South FDI flows in primary and intermediate goods and low-productivity service sectors, for example, limits their potential spillovers (Alfaro and Charlton, 2009).[5] The structuralist literature has also long argued that North-South economic exchanges can cause uneven development because the South specializes in lower value-added primary and labor-intensive products, whereas the North specializes in higher value-added products and services. The consequences of such exchanges are the South's unsustainable dependency on the Northern technology and slower growth in the South (Dutt, 1996; Darity and Davis, 2005). In contrast, FDI flows in the manufacturing sectors are likely to allow faster growth and productivity convergence towards frontier countries (Rodrik, 2013). Supporting these views, Doytch and Uctum (2011) report a positive and significant growth effect from manufacturing FDI while a negative effect from services FDI. The quality of FDI flows is also shown to be positively correlated with the quality of the host country's institutional development, which is weaker in the South (Nunn, 2007; Alfaro et al., 2008). Supporting these arguments, Amighini and Sanfilippo (2014) show that, compared to North-South FDI flows, South-South FDI flows facilitate better diversification and quality upgrading in low-tech manufacturing industries in Africa. Furthermore, there is also evidence that the ability of host countries to conduct an activist industrial policy that chooses the right type of foreign investment for technology transfer and industrial upgrading is crucial for positive

[5] For example, according to the Business R&D and Innovation Survey conducted by the National Science Foundation in 2014, less than 20% of overseas R&D spending of the U.S. majority-owned transnational companies were in the Southern countries in 2010. For more details, see Wolfe (2014).

growth effects. Alfaro and Charlton (2007), for example, find that high-quality FDI, measured by average skill intensity and reliance on external capital, stimulates faster growth, especially in government targeted sectors. These findings provide support to the idea that sector-specific industrial policies are crucial to guide foreign investment to industries with the strongest positive spillovers.

Several studies also challenge the assumed positive institutional growth effects from the Northern FDI flows. Acemoglu et al. (2001) suggest that the long-standing colonial ties with the North have a detrimental effect on institutional quality in the South. Furthermore, Demir (2016) fails to find any positive institutional development effects from North-South FDI flows. Conversely, South-South FDI flows can help compensate for the disadvantaged position of the Southern countries because of their weaker institutional development. Cuervo-Cazurra and Genc (2008) and Demir and Hu (2016), for instance, argue that multinationals from developing countries have a comparative advantage in investing in other developing countries as they have more experience in dealing with adverse institutional and political environments.[6]

We contribute to these various strands of the literature by examining the income and growth effects of bilateral FDI flows after controlling for the aggregation bias, home and host country heterogeneity, sample selection, and the endogeneity problems. Previous studies on the FDI-growth relationship do not comprehensively tackle all these issues. Our unique bilateral FDI dataset allows us to account for home and host countries as we examine the growth effects of FDI originating from the North, the Emerging South, and the South in each country group. In the next section, we discuss our identification strategy and estimation method.

[6] South-South FDI flows, however, are not a panacea. For instance, increasing FDI flows from major emerging markets, particularly those from China, are criticized for having negative long-run effects on Southern growth. Ros (2013) and Scoones et al. (2016), for instance, show that the rise of China caused de-industrialization and a return to commodity-based production pattern in Africa and Latin America.

3 Empirical Analysis

3.1 Bilateral FDI and Economic Growth: Model Specification

We examine the association between bilateral FDI flows and host country economic growth using a linear dynamic specification. As discussed in Bond et al. (2010), this model allows for time-invariant and country-specific factors, such as colonial links or geography, to be sorted out while focusing on the effect of FDI flows. The use of a dynamic econometric specification controls for business cycle fluctuations and hysteresis effects, as well as income convergence to long-run steady-state levels.

An autoregressive-distributed lag (ADL) model in Eq. (1) is the starting point for our benchmark specification. By adding longer lags of the (log) level of real GDP per capita of country i in year t (lny_{it}) and the (log) level of FDI flows from home country j to host country i as a share of country i's GDP (both in million USD) in year t ($lnfdiy_{ijt}$), we address the likely possibility that FDI can affect growth over time. That is, by adding a lag length of p for lny_{it} and a lag length of q for $lnfdiy_{ijt}$, we have the following ADL(p, q) model:

$$lny_{it} = c_{it} + \phi_1 lny_{i,t-1} + \phi_2 lny_{i,t-2} + \cdots + \phi_p lny_{i,t-p} + \theta_1 lnfdiy_{ij,t-1} + \theta_2 lnfdiy_{ij,t-2} + \cdots + \theta_q lnfdiy_{ij,t-q} + \eta_i + \zeta_t + \epsilon_{it}, \tag{1}$$

where η_i is the country fixed effects for host country i and ζ_t is the year fixed effects. The use of country fixed effects allows us to separate time-invariant and country-specific differences in income levels across countries. ϵ_{it} is the error term with a mean of zero, conditional on c_{it}. The non-stationary process c_{it} determines the long-run growth rate of real GDP per capita. The growth dynamics in Eq. (1) is open to two alternative interpretations. That is, economies mostly operate near (or on) their steady-state long-run growth paths but are disrupted by business cycles, which are captured by the short-

run dynamics. Or, some economies are away from their steady-state growth paths during the period analyzed, and therefore short-run dynamics capture the transitional growth towards the long-run steady-state.

Next, we take the first difference of Eq. (1), which gives us a generalized growth equation:

$$\Delta lny_{it} = \Delta c_{it} + \phi_1 \Delta lny_{i,t-1} + \phi_2 \Delta lny_{i,t-2} + \cdots + \phi_p \Delta lny_{i,t-p} + \theta_1 \Delta lnfdiy_{ij,t-1} + \theta_2 \Delta lnfdiy_{ij,t-2} + \cdots + \theta_q \Delta lnfdiy_{ij,t-q} + \Delta \epsilon_{it}. \tag{2}$$

The non-stationary process Δc_{it} in Eq. (2) combines the business cycle fluctuations and the general equilibrium of long-run growth paths of a transitional growth model. Similar to the long-run growth rate in Bond et al. (2010), we further assume that Δc_{it} can be expressed in the following way:

$$\Delta c_{it} = \alpha + \beta fdiy_{ijt} + \delta_i + e_t + \nu_{it}, \tag{3}$$

where δ_i allows for time-invariant unobserved heterogeneity in growth rates; e_t reflects permanent disturbances to the (log) level of output per capita, which are distributed uniformly across all countries (i.e., year fixed effects); and ν_{it} controls for the country-specific permanent shocks (i.e., country fixed effects).

Substituting for Δc_{it} in Eq. (3), we obtain our baseline specification in Eq. (4), which is a generalized version of the autoregressive moving-average (ARMA) process of an ADL(p, q) model:

$$\Delta lny_{it} = \alpha + \beta fdiy_{ijt} + \phi_1 \Delta lny_{i,t-1} + \phi_2 \Delta lny_{i,t-2} + \cdots + \phi_p \Delta lny_{i,t-p} + \theta_1 \Delta lnfdiy_{ij,t-1} + \theta_2 \Delta lnfdiy_{ij,t-2} + \cdots + \theta_q \Delta lnfdiy_{ij,t-q} + \delta_i + e_t + \nu_{it} + \Delta \epsilon_{it}. \tag{4}$$

Thus, we can compute the long-run effect of an increase in FDI flows on the *growth*

rate of GDP per capita as $\beta/(1-\phi_1-\phi_2-\cdots-\phi_p)$. This is the cumulative growth effect. Likewise, given c_{it}, the long-run effect of an increase in FDI flows on the (log) *level* of GDP per capita is $(\theta_1+\cdots+\theta_q)/(1-\phi_1-\phi_2-\cdots-\phi_p)$. This is the cumulative level effect. We test the significance of the long-run relationship between FDI and GDP growth using the null hypothesis that there is no long-run relationship between economic growth and bilateral FDI flows. In the estimation stage, we examine the long-run effects of FDI flows using lags up to 3 years.

3.2 Data

We use a dataset on bilateral non-resident FDI flows, compiled from the United Nations Conference on Trade and Development (UNCTAD), OECD, and statistical offices of individual countries between 1990 and 2012. Approximately 18,000 country pairs are available between 240 host and home countries. In merging the data from different sources, we took the following steps to mitigate any inconsistency in the data generating process. First, we gave priority to OECD over the UNCTAD data since OECD often has more complete, standardized, and consistent observations on FDI flows. Similarly, if the host country is non-OECD but the home country is OECD then we used the home country data. Second, we gave priority to the host country over home country data when there is any inconsistency between inflows and outflows. Third, we mirrored the home country data for the full (but not partial) time series if the host country's inflow data have missing observations but the home country's outflow data are available for a longer period. In cleaning the data, we excluded the top and bottom one percentile of $fdiy_{ijt}$ in levels and growth rates to limit the effect of outliers. Due to the disaggregated nature of our dataset and unlike most previous research, our sample includes negative FDI observations, which occur when non-resident outflows exceed non-resident inflows.

To account for these negative values, we add an intercept of one to all observations.[7]

The dependent variable, economic growth (Δlny_{it}, log difference of real GDP per capita), is in constant 2005 dollars (UNCTAD, 2017). Similar to $fdiy_{ijt}$, we exclude the top and bottom one percentiles of economic growth to reduce the effects of outliers. Table 1 provides the summary statistics for variables used in the regression analysis after removing these outliers. The first three variables pertain to the FDI-growth relationship. The mean growth rate of GDP per capita for host country i (Δlny_{it}) is 2.37% with a standard deviation of 3.63%. The mean value is slightly higher than the median (2.33%) due to a few remaining outliers at the upper tail of the distribution. The middle 50 percentile of the observations (i.e., between the first and the third quartiles) are distributed between 0.61% and 4.49%. The mean value of FDI flows from home country j to host country i ($fdiy_{ijt}$) is 0.067 with a standard deviation of 0.126. The median value of $fdiy_{ijt}$ (i.e., 0.011) is substantially lower than the mean value of $fdiy_{ijt}$ (i.e., 0.67), which implies that the distribution of $fdiy_{ijt}$ is skewed to the right. In other words, a few outliers at the upper tail of the distribution drive up the mean value of bilateral FDI flows. The mean of $\Delta lnfdiy_{ijt}$ is approximately 0.13% with a standard deviation of 9.58%. The variation within $\Delta lnfdiy_{ijt}$ is high due to the extreme values of the lower and upper quantiles. In contrast, the middle 50 percentile of the observations (i.e., between the first and the third quartiles) for $\Delta lnfdiy_{ijt}$ are between -1.05% and 1.68%, which has a relatively lower variation than that of the entire distribution.

[Table 1 about here.]

The rest of the variables in Table 1 are used in the sample selection model. The average and median values for the (log) level of GDP per capita for host country i (lny_{it}) and home country j (lny_{jt}) suggest that home countries have higher incomes than host

[7] For a similar adjustment, see Borensztein et al. (1998).

countries, and are more homogeneous based on the standard deviations of different income levels. For example, the median (mean) value for lny_{jt} is 10.437 (9.981), which is higher than 9.490 (9.418) of lny_{it}.

To measure bilateral economic connections and proximity, we include $Trade_{ijt}$, which is the (log) sum of bilateral merchandise goods trade as a share of total GDPs of home and host countries (i.e., $log((Export_{ijt} + Export_{jit})/(GDP_{it} + GDP_{jt}))$ (IMF, 2019). In addition, we include three standard gravity variables to capture investment costs, including $Contiguity_{ij}$, $Colony_{ij}$, and $SameCountry_{ij}$ (Mayer and Zignago, 2011). These are three dummy variables equalling one if two countries are contiguous, have ever had a colonial link, and were/are ever the same country, respectively. We measure different levels and distances of institutional development using the International Country Risk Guide (ICRG) index. Lastly, IMR refers to the Inverse Mills Ratio, obtained from the sample selection model.

3.3 Sample Selection Bias and the Problem of Missing and Zero FDI Flows

The master dataset with untreated observations includes a large number of zero and missing observations. While this is a common issue in the international macro literature (for both trade and capital flows), if not addressed properly, it can cause a severe sample selection bias (Garrett, 2016). Particularly, we cannot determine whether zero and missing observations are truly zero or missing. Furthermore, the distribution of these missing and zero observations across country-pairs is likely to be non-random, and be correlated with the income and development levels of home and host countries. To examine these issues further, Table 2 shows the types of FDI flows from the master dataset in four different categories: missing, zero, negative, and positive FDI flows. Of the 379,186 observations from all country-pairs between 1990 and 2012, 63.37% are missing and 18.42% are zero.

In other words, around 81% of total observations in the sample are either unobservable or zero, suggesting that only a few country pairs report non-zero or non-missing FDI flows, and these are the countries that account for most of the global FDI flows. Of the non-missing and non-zero observations, around one-fourth are negative and three-fourth are positive flow values.

Next, we examine the data by income groups. Table 2 shows that for both the Northern (N_i) and the Southern (S_i) host countries, over 60% of observations are missing, and an additional 20% are zero observations. However, consistent with our expectations, the distributions of missing and zero observations are highly skewed between the North and the South. In particular, only 26.48% (4.02%) of all possible observations between North-North (NN_{ij}) country-pairs are missing (zero), which is significantly lower than any other income groups or direction of FDI flows. In fact, around 65% of NS_{ij}, SN_{ij}, and SS_{ij} FDI observations are missing in the master dataset. Furthermore, most of the observed FDI flows within NN_{ij} are positive (53%), which is in stark contrast with those in SS_{ij} flows, in which the only 12.7% of observations are positive.

[Table 2 about here.]

Therefore, it is highly likely that bilateral FDI flows in the sample are not randomly distributed, an issue that is not fully addressed in previous studies. To correct this bias, we employ the Heckman (1979) two-step sample selection model.[8] Accordingly, we first estimate a probit model to obtain the probability of participation in bilateral FDI flows. To this end, we generate an indicator variable, I_{ijt}, which is set equal to one for non-zero and non-missing bilateral FDI flows, and zero otherwise.[9] To estimate the probit model for I_{ijt}, we include several standard control variables that are expected to influence the

[8] We discuss the sample selection model further in Appendix A.

[9] In the regression analysis we replace all missing observations with zero values.

selection stage, which are: the (log) level of real GDP per capita (in constant 2005 dollars) of host and home countries, bilateral trade volume as a share of total GDPs, geographic contiguity, and colonial ties. We then generate the Inverse Mills Ratio (IMR) and include it in the second stage for the two-stage least squares (2SLS) estimation as an IV.[10] The use of IMR as an IV also allows us to account for the endogenous relationship between FDI flows and economic growth as countries with a higher rate of output growth may receive more FDI than slow-growing economies.

3.4 Heterogeneity within the Global South: the Emerging vs. the Rest

Differences in economic structures of the Northern and Southern countries are likely to influence both the type and structure of FDI flows as well as their growth effects. For example, the adaptive capabilities of host countries, such as human capital or institutional development, are shown to influence how international capital flows affect economic growth. Likewise, the type of FDI and its sectoral breakdown may be conditional on home and host country characteristics. To address these issues, previous studies usually divided countries into two groups based on their development levels, such as the North vs. the South, or developed vs. developing. However, we argue that this way of dividing countries into two groups is no longer sufficient for capturing the heterogeneity within and between country groups, especially for the South. The main cause for this is that since the 1990s, the gap among developing countries has grown further apart, with some moving up while the rest getting stuck at the lower steps of the development ladder (Dahi and Demir, 2017). In terms of export structures, for example, while less than 20% of emerging country exports were primary commodities in 2012, the same figure was 74% for the Rest of South economies. Likewise, while the emerging countries' share in

[10] Wooldridge (2010) introduces the strategy of using all exogenous variables and the IMR term as instruments.

global technology and skill intensive exports was 55% in 2012, it was only one-third of one percent for the Rest of South economies (Dahi and Demir, 2016). Similar gaps exist in growth rates, human capital, institutional development, and physical infrastructure.

Consequently, we divide the global South into two groups, the Emerging South and the Rest of South, to account for heterogeneity within the global South. The Emerging South includes more advanced and at least partially industrialized developing countries, which the World Bank and the IMF refer to as the middle-income group or the Emerging Countries group. The Rest of South includes the remaining developing countries. Thus, the North (23 countries), the Emerging South (38 countries), and the Rest of South (144 countries) are the three country groups that we use for analyzing the FDI-growth relationship. The availability of data was the main deciding factor for country selection. To be consistent, we determined a country's classification based on its standing during the full sample period and did not allow switching from one group to another.[11] Table 3 reports the mean and median values of Δlny_{it}, $fdiy_{ijt}$, and $\Delta lnfdiy_{ijt}$ for each country group. First, we divide the sample by host countries, the North (N_i), the Emerging South (E_i), and the Rest of South (S_i), and present the summary statistics in Panel A of Table 3. In terms of the number of observations, E_i accounts for a majority of FDI flows with 10,501 observations, which is evidence of the growing importance of the Emerging South in global capital flows. Additionally, both the Emerging South and the Rest of South have an average Δlny_{it} of over 3%, which is higher than the average value for the North, around 1%.

[Table 3 about here.]

Regarding annual FDI flows as a share of host country GDP (i.e., $fdiy_{ijt}$), both the mean and median values suggest that FDI inflows account for a larger portion of the

[11] In Appendix Table B1, we provide a full list of countries by income groups.

Rest of South economies compared to that of the North and the Emerging South. For instance, the median value of $fdiy_{ijt}$ for the Rest of South is 0.046, which is substantially higher than 0.003 and 0.012 for the North and the Emerging South, respectively. On the other hand, the Northern host countries enjoy a faster and steadier FDI inflow and foreign capital accumulation than the other two groups, given the significantly higher mean and median values of the growth rate of bilateral FDI flows. For instance, the median $\Delta lnfdiy_{ijt}$ value for the North is 0.012, which is higher than 0.007 and 0.009 of the Emerging South and the Rest of South, respectively. The mean $\Delta lnfdiy_{ijt}$ value for the Rest of South is even negative, which indicates that capital outflows are more common than inflows for the Rest of South host countries. One possible explanation is profit repatriation or capital flight by non-resident investors in developing countries. It is also likely that the level of profit repatriation is endogenous to the level of economic development of a host country, as the Rest of South has a limited ability to levy taxes on capital earnings of foreign investors.

In Table 3, we further divide host countries by the direction of capital flows. In particular, Panels B, C, and D provide summary statistics for Δlny_{it}, $fdiy_{ijt}$, and $\Delta lnfdiy_{ijt}$ for the North, the Emerging South, and the Rest of South host countries (i) by each direction of FDI flows from the North, the Emerging South, and the Rest of South home countries (j). In Panel B, we see that out of a total of 8,428 observations for the Northern host countries, around 45.9% (i.e., $3,867/8,428$) is from the North (NN_{ij}), 38% from the Emerging South (NE_{ij}), and 16.1% from the Rest of South (NS_{ij}). As for the Emerging Southern host countries in Panel C, out of a total 10,501 observations, around 57.1% is from the North (EN_{ij}), 28.3% from the Emerging South (EE_{ij}), and 14.6% from the Rest of South (ES_{ij}). For the Rest of Southern host countries in Panel D, out of a total 4,876 observations, around 60.4% are from the North (SN_{ij}), 26.5% from the Emerging

South (SE_{ij}), and 13.1% from the Rest of South (SS_{ij}).

As shown in Panels B and C, the mean and median values of FDI flows in levels are the highest for those from the Northern home countries. Furthermore, the intensive margins between countries with dissimilar income levels are lower. For both the Northern and Emerging Southern host countries, the lowest levels of FDI flows are those from the Rest of Southern countries. As for the Rest of Southern host countries in Panel D, the distribution of home countries among different income groups is quite even. For example, FDI flows from all three directions are very close, both in means and medians. Interestingly, however, the Rest of Southern host countries have the most volatile FDI flows, which is reflected by negative average growth rates of FDI flows and high standard deviations.[12]

Thus, the distribution of FDI flows between different country-pairs suggests that there exists significant country heterogeneity depending on the direction of international capital flows. Consequently, the homogeneity assumption for home and host countries within and between these three groups of countries no longer holds under the framework of the North, the Emerging South, and the Rest of South.[13]

4 Empirical Results

In this section, we report regression results from Eq. (4). Table 4 presents the baseline regression results using the 2SLS IV method and after correcting for cross-sectional dependency by demeaning all variables by their aggregate mean values, and including year, home and host country fixed effects.[14] We identify $\Delta lny_{i,t-1}$ and $fdiy_{ijt}$ as endogenous

[12] The standard deviations for North, Emerging South and Rest of South are 0.1, 0.123, 0.158, respectively (Appendix Table C1).

[13] Appendix C includes further summary statistics of main variables, broken down by the direction of FDI flows.

[14] The regression analysis is conducted using the *ivreg2* code in Stata 14.2.

and use their lagged values, $\Delta lny_{i,t-2}$, $fdiy_{i,t-2}$, $fdiy_{i,t-3}$, and $fdiy_{i,t-4}$, as IVs in the estimation. We also include the IMR as an additional IV, which is obtained from the first stage sample selection model. The IV estimates for the full sample in column (1) of Table 4 reveal significant and positive long-run effects of bilateral FDI flows on the level but not the slope of long-run growth paths in host countries. In particular, the coefficient estimate for $fdiy_{ijt}$ is positive but statistically insignificant. The long-run growth effect of an increase in the level of $fdiy_{ijt}$, $(0.001/(1-0.145))$, is also statistically insignificant with a p-value of 0.997. Our finding implies that FDI flows do not appear to have a permanent effect on long-run growth rates in host countries. This is consistent with previous studies at the aggregate level that reported no significant growth effects from FDI (Demena and van Bergeijk, 2017; Rojec and Knell, 2018).

[Table 4 about here.]

As for the effect of bilateral FDI flows on the (log) level of output per capita, we find a positive and significant effect. By including lags up to three for $\Delta lnfdiy_{ijt}$, we examine how a durable long-run FDI relationship with home countries can lead to a steady-state increase in the (log) level of output per capita.[15] The coefficients for $\Delta lnfdiy_{ij,t-1}$ and $\Delta lnfdiy_{ij,t-2}$ are positive and statistically significant at the 1% and 5% levels. The coefficient for $\Delta lnfdiy_{ij,t-3}$ is also positive but statistically insignificant. The significant and positive level effect (i.e. $(0.005+0.003+0.001)/(1-0.145)$) indicates that FDI flows to enhance the long-run (log) level of output per capita in host countries. The cumulative level effect of 0.012 is quite substantial and economically significant with a p-value of 0.005.

In columns (2)-(4) we divide host countries into three groups, the North, the Emerging South, and the Rest of South, to examine whether the effects of FDI flows are conditional

[15] We choose $p=1$ and $q=3$ for the ADL model since any higher lag lengths are jointly insignificant.

on the development levels of host countries. Overall, the results from the sub-samples are quite consistent with the results from the full sample, showing a significantly positive level effect but an insignificant growth effect. As shown in column (3), the long-run level effect of 0.022 for the Emerging South is almost twice larger than that for the North and the Rest of South, and is significant at the 1% level. In contrast, we find that the lowest level effect is 0.011, which is observed for the Rest of South in column (4) with a borderline statistical significance at the 10% level. These heterogeneous findings suggest that working with the full sample, or even dividing it into the traditional North-South framework, is insufficient to capture country heterogeneity, and if not properly addressed, would have caused a significant bias in the internal validity of our empirical estimation.

Next, we scrutinize the effects of FDI flows by direction and examine the stability of the estimated parameters in the presence of home and host country heterogeneity. The sub-sample analysis of FDI flows can help identify whether the source country conditions the effectiveness of FDI flows. In Table 5 we present results from repeating the regression analysis of Table 4 for each direction of FDI flows within the framework of the North, the Emerging South, and the Rest of South.

[Table 5 about here.]

Columns (1)-(3), (4)-(6), and (7)-(9) present results for the North, the Emerging South, and the Rest of South host countries. For the Northern host countries in columns (1)-(3), FDI flows from the North (NN_{ij}) have a significant and positive effect on the long-run (log) level of GDP per capita, while no such effect is detected for FDI flows from the Emerging South (NE_{ij}) or the Rest of South (NS_{ij}) home countries. This is indeed a novel finding. Two possible explanations for such a pattern are that either the investment volume is too small, or they fail to generate productivity spillovers because of the Emerging South and the Rest of South being further away from the technology

frontier. Likewise, we find no slope effects from FDI flows on the growth rate of GDP per capita in any direction. Lack of sufficient technology transfer or TFP effects may help explain the lack of growth effects from FDI. While increasing the level of capital accumulation can increase the level of output per capita, increasing the long-run growth rate would require increases in productivity.

In columns (4)-(6), we show the breakdown of FDI flows for the Emerging South host countries. Interestingly, analogous to the findings in columns (1)-(3), the only positive effect from FDI flows is for the long-run levels of GDP per capita, and only for investment flows from the Northern home countries.[16] In contrast, we do not find any significant effects for the EE_{ij} and ES_{ij} country-pairs, either for the growth or the level of output per capita. Our findings imply that Emerging South host countries benefit positively only from Northern FDI flows. Similarities in technology, know-how, managerial skills and endowments between Emerging South countries appear to be limiting positive spillover effects from FDI. Furthermore, given that the Rest of South is lagging the Emerging South in technology, productivity, and know-how, positive spillover effects are arguably much limited in scope.

Columns (7)-(9) present the breakdown of FDI flows from different home countries to the Rest of South host countries. Similar to the findings in columns (1)-(6), we detect no long-run growth effects from FDI flows, irrespective of the direction. In column (8), however, we find a positive and significant effect (at the 5% level) of FDI flows from the Emerging South on the long-run (log) level of GDP per capita of the Rest of South. In contrast, FDI flows from the North or the Rest of South yield no such significant effects. It is possible that a high level of the development gap between the Rest of South and the

[16] The p-value for the Sargan-Hansen (SH) test in column (6) is 0.02, which implies that our instruments may be over-identifying for the endogenous variables. In Appendix D, we show results after removing the fourth lag of $fdiy_{ijt}$ from the IV set. The new IV set has a p-value of 0.141 for the SH test and the new estimate does not change the main finding for the ES_{ij} country-pair.

North inhibits spillover effects from FDI. The types of FDI from the North can also be less conducive to long-run growth if they are directed more towards low productivity and primary good sectors. As for the FDI flows from the Rest of South (SS_{ij}), the insignificant association is due to having similar endowments and capabilities, which limits spillover effects as both countries are away from the technology frontier. In contrast, the Emerging South home countries occupy a mid-position between the North and the Rest of South, allowing them to have more positive effects on enhancing economic output for the Rest of South host countries.

In all regressions, we test the validity of the IV set using the exogeneity and the relevancy conditions. In particular, we check the exogeneity condition using the over-identification restrictions test of Sargan-Hansen (SH), and the relevancy condition using the under-identification test of Kleibergen-Paap (KP). The null hypothesis of the SH test is that the IV set as a group is exogenous, and it is not correlated with the endogenous variable. Hence, an IV set is said to be valid when we fail to reject the null. Similarly, the null hypothesis of KP test is that the IV set is not correlated with the endogenous variable, where the KP statistics determine the under-identification of the instrument set as a whole when more than one regressor is endogenous.[17]

To summarize, the main finding from Table 5 is that the positive long-run effects of FDI flows on the (log) level of GDP per capita are driven by the experiences of NN_{ij}, EN_{ij}, and SE_{ij} country-pairs. Our main finding has several implications for growth. First, in addition to the potential for productivity spillovers, development gaps between host and home countries may also be playing a role here, as is suggested by the Linder Hypothesis on FDI in Fajgelbaum et al. (2014). Second, the source of the investment

[17] Using the augmented Dickey-Fuller test on both the levels and first difference and with and without a trend, we find that both FDI flows and GDP per capita growth have unit roots and are integrated of order one (I(1)). However, we found no co-integrating relationship between the two, based on the Im-Pesaran-Shin heterogeneous panel co-integration test. This finding is robust for lags up to eight.

determines the effectiveness of FDI flows in increasing economic output. For instance, the positive effects are most visible when FDI flows are originated from the North and the Emerging South. One possible explanation for this pattern is that investment flows from the North and the Emerging South are often of a higher quality than the Rest of South as shown in Alfaro and Charlton (2009). Third, heterogeneity within the global South is evident as it is likely that only the Emerging Southern host countries have the necessary absorptive capacity to benefit from the Northern FDI flows. On the other hand, FDI flows from the Emerging South are also instrumental in increasing the level of incomes in the Rest of South in the long-run. This implication complements the findings in recent papers that emphasize the importance of heterogeneity within the global South (Demir and Duan, 2018).

In Table 6, we expand our benchmark specification by adding the level of host country institutional development as a control variable, which is shown to affect the degree of positive FDI spillovers (Nunn, 2007). Being a major part of foreign investors' risk assessment, the institutional environment affects the type and structure of FDI flows, and consequently their potential for increasing economic output. To measure the level of institutional development, we use the International Country Risk Guide (ICRG) composite political risk index, which consists of twelve sub-components with the composite index ranging from 0 to 100 with the higher values representing lower risk.[18]

[Table 6 about here.]

Columns (1)-(5) of Table 6 report results using the same benchmark specification as in Table 4 for the full sample, but adding the composite ICRG index ($lnInst_{it}$) and its four sub-components, bureaucratic quality, corruption, government stability, and invest-

[18] The twelve sub-components are government stability, socioeconomic conditions, investment profile, internal conflict, external conflict, corruption, military in politics, religious tensions, law and order, ethnic tensions, democratic accountability, and bureaucracy quality.

ment profile, which are consistently found as being the most important determinants of long-run economic growth and FDI. In column (1), we confirm our earlier results and find a significant effect of FDI on long-run levels of per capita incomes. We also find that institutional development has a positive and significant long-run effect on economic growth. Furthermore, in columns (2)-(5) we continue to find consistent results as before and also show that these four components of institutional development are of significant importance for long-run growth. In all sets of regressions, the instrument set passes the validity tests of under- and over-identification.

To analyze the role of institutional environments within the framework of the North, the Emerging South, and the Rest of South, we also need to consider the institutional development gaps between home and host countries. Institutional distance increases transaction cost and risk premium for FDI, and can affect the potential for spillovers from FDI. Corruption, for example, imposes extra costs on foreign investors and reduces the level of planned investment. Likewise, political risk, including government stability, bureaucratic quality, or rule of law can influence a multinational firm's decision to transfer technology, or increase its R&D spending in a host country. Institutional differences also affect adaptive capabilities by widening gaps in operating environments and know-how. South-South or North-North FDI, for example, may have a higher potential for technology transfer than North-South FDI because the gap between the home and host country endowments is smaller, allowing for higher complementarity, easier absorptive capability, and easier and more appropriate technology transfer and adoption (Amighini and Sanfilippo, 2014; Bahar et al., 2014; Demir and Duan, 2018). Therefore, compared to the capital-accumulation driven causes of growth, the assimilation and capabilities aspects may be more important for productivity and growth given that adoption of imported technologies becomes easier when the institutional distance between host and

home countries is smaller. However, it is also possible that the effect is not linear or symmetric, as investors from the Emerging South and Rest of South may find it easier to invest in the North with better institutional development than the other way around.

To examine this possibility, we incorporate an institutional development distance term, $InstDist_{ijt}$, into our benchmark specification, measured by $1/12 \sum_{k=1}^{12} (ICRG_{kit} - ICRG_{kjt})^2/V_k$, where k is each of the twelve sub-components of the ICRG index and V_k is the variance of the k^{th} order (e.g., Kogut and Singh, 1988). We add both $InstDist_{ijt}$ and its interaction with $fdiy_{ijt}$ to our benchmark specification to examine how the FDI-growth relationship is affected by different levels of institutional development gaps between host and home countries. If institutional distance makes it harder to benefit from FDI flows, we should expect a negative effect from this interaction term. The estimation results are reported in Table 7. We find that the level of institutional distance may not be a strong predictor of economic growth in host countries, as the interaction term is statistically insignificant. However, we find that the institutional distance can make the FDI-growth relationship weaker as all the interaction terms have a negative sign except in columns (3) and (8) which are in NS_{ij} and SE_{ij} directions. In other words, for most of the country pairs, FDI has a larger positive effect on host country growth when institutional differences are smaller between host and home countries.

[Table 7 about here.]

5 Robustness Analysis

In this section, we conduct a variety of robustness tests. First, we examine the sensitivity of our results to the estimation method and repeat the benchmark regressions in Tables 4 and 5 with the two-step GMM method. The GMM results, including the IV

selection, are reported in Appendix E.[19] Second, we consider the sensitivity of our results to sample selection and drop those observations below and above the 5^{th} and the 95^{th} percentiles. The re-estimated results for Tables 4 and 5 are reported in Appendix F. Third, we examine the robustness of our results to the exclusion of home country fixed effects in Tables 4 and 5 and the results are reported in Appendix G. Fourth, we check whether our baseline specification in column (1) of Table 4 is sensitive to different lags of $\Delta lnfdiy_{ijt}$. Table 8 reports the estimates from this sensitivity test. Column (1) presents the estimates when only $\Delta lnfdiy_{ij,t-1}$ is included and column (2) presents the estimates when both $\Delta lnfdiy_{ij,t-1}$ and $\Delta lnfdiy_{ij,t-2}$ are included. Fifth, we check whether our baseline specifications are sensitive to the choice of IVs. The IV set for the baseline specification includes IMR, $\Delta lny_{i,t-2}$, $fdiy_{ij,t-2}$, $fdiy_{ij,t-3}$, and $fdiy_{ij,t-4}$. Column (3) reports the estimates when the IV set is IMR, $\Delta lny_{i,t-2}$, and $fdiy_{ij,t-2}$ and column (4) reports the estimates when the IV set is IMR, $\Delta lny_{i,t-2}$, $fdiy_{ij,t-2}$, and $fdiy_{ij,t-3}$. Sixth, to control for regional heterogeneity we repeat our benchmark analysis by dropping from the sample one geographical region at a time (using World Bank regional classification) and report the results in Appendix H. Seventh, we restrict our sample period to 1996 and 2012 and report the estimates in Appendix I. 1995 corresponds to economic liberalization in many countries with the launching of WTO and may have caused a trend change in the data. Also, given the two-year lag in final reporting of FDI and trade data in the balance of payments statistics, the last two years of the sample might be biased. Eighth, we address the issue of data quality by employing the overall statistical capacity indicator from World Bank, which provides information on the statistical capacity of developing countries since 2004 and ranges between 0-100 (WB, 2021).[20] Thus, we re-estimate Ta-

[19] We used the ivreg2 command with the gmm option in Stata 14.2.

[20] Because the statistical capacity variable is available only since 2004, our sample size drops in this exercise. Additionally, given that the data is reported only for Southern countries, we assumed that statistical capacity is near-optimal for developed countries and set it equal to 100 for the Northern countries.

bles 4 and 5 after dropping the 1^{st}, 5^{th}, and 10^{th} percentiles of the sample based on the statistical capacity indicator and report the results in Appendix J. After these tests, our results remained unchanged and full results, including estimation details, are reported in the online Appendix.

[Table 8 about here.]

6 Conclusion

FDI has become a major source of capital accumulation in both developed and developing countries since the 1980s. According to UNCTAD (2019), the average share of annual FDI flows in gross fixed capital accumulation reached 9% in developed, 13% in transition, and 10% in developing economies between 2000 and 2017. Accompanying the growing international capital flows, there is an ongoing debate among economists on the FDI-growth relationship as a multitude of factors are shown to shape the relationship between the two. Difficulties with the measurement of FDI as well as the presence of estimation errors that fail to account for the heterogeneous and uneven nature of FDI flows also cause further complications in empirical research on the FDI-growth relationship. In this paper, we contribute to the literature by using a unique dataset with bilateral FDI flows as our main unit of analysis. First, we manage to tackle the home and host country heterogeneity bias by accounting for differences in development levels. In particular, we divide the sample countries into three groups by income levels, which are the North, the Emerging South, and the Rest of South. The income and institutional development levels of these three income groups are drastically different from each other. Thus, empirical estimates are biased if these differences are not addressed. Likewise, using bilateral flows and taking care of the home and host country fixed effects allow us to control for FDI heterogeneity as we simply do not know whether $1 of FDI between two Northern

economies is indeed the same as $1 between two Southern economies. Second, we separate the long-run growth effects from the long-run level effects. Third, we address the sample selection bias given a large number of missing and zero observations in the sample. Fourth, using the 2SLS IV methods, we try addressing the endogeneity problem between FDI and growth relationship.

Overall, we fail to find a significant effect of FDI on host country growth. However, we detect a positive relationship between FDI and long-run levels of GDP per capita in host countries but only in the following directions: North-North, Emerging (host)-North (home), and South (host)-Emerging (home). In the extensions, we also consider the conditional effects of FDI and incorporate institutional development gaps between home and host countries. While most of our earlier results continue to hold, we also find that FDI is less effective in stimulating long-run levels of output in countries with larger institutional development gaps but again only in certain directions: NE and SS. While this is an interesting finding, we hope further research will explore the main drivers behind it, particularly the reasons why such development gaps do not condition FDI effectiveness in any other direction. Likewise, we hope new research will further study the conditioning factors for FDI effectiveness in North, Emerging South, and the Rest of South economies.[21]

We also expect future research to disentangle various effects of heterogeneous FDI flows, conditional on their sectoral distribution in a bilateral setting. Doing so will allow us to observe the specific channels that lead to heterogeneous outcomes in enhancing economic output and long-run growth. Moreover, analyzing the relationship between the multinationals from the Emerging South or the Rest of South can help us better understand the dynamics of bilateral FDI flows and several outcome variables, such as

[21] Kayalvizhi and Thenmozhi (2018) suggest that sound governance of emerging host countries is an important factor in attracting inward FDI flows.

business cycle synchronization and income convergence.

Finally, we suggest that understanding the ways through which FDI can be harnessed as an effective and robust growth-enhancing factor remains of paramount importance for policymakers. Furthermore, our findings suggest that simply focusing on attracting FDI is probably not the most appropriate approach for a sound development policy. There are perhaps both push and pull factors at play here. On the one hand, potential spillovers will be limited unless the absorptive capabilities of host countries are improved. On the other hand, these capabilities also affect the type of FDI that developing countries attract, making it an endogenous process. Likewise, there needs to be room for an active industrial policy to maximize potential spillovers, without which there is limited incentive for any multinational to transfer technology or know-how. As shown in Chandra (2006) and Alfaro and Charlton (2007), the host countries that succeeded in harnessing foreign investment for technology transfer, industrial upgrading, and growth have followed a targeted and industry-specific approach.

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Table 1: Summary Statistics, Regression Sample

Variable	Obs	Mean	Std. Dev.	Min	Max	P25	P50	P75
Δlny_{it}	23,805	2.370	3.625	-11.877	13.216	.611	2.332	4.494
$fdiy_{ijt}$	23,805	0.067	0.126	-0.028	0.737	0.000	0.011	0.071
$\Delta lnfdiy_{ijt}$	23,805	0.128	9.576	-54.744	37.792	-1.048	0.009	1.679
lny_{it}	23,805	9.418	1.232	5.267	11.626	8.601	9.490	10.553
lny_{jt}	23,805	9.981	1.069	4.431	11.626	9.334	10.437	10.713
$Trade_{ijt}$	23,805	0.222	0.293	0	2.645	0.032	0.113	0.281
$Contiguity_{ij}$	23,805	0.071	0.257	0	1	0	0	0
$Colony_{ij}$	23,805	0.057	0.231	0	1	0	0	0
$SameCountry_{ij}$	23,805	0.029	0.168	0	1	0	0	0
$lnInst_{it}$	23,193	4.260	0.160	3.609	4.565	4.172	4.286	4.377
$InstDist_{ijt}$	22,514	1.323	0.973	0.019	7.562	.606	1.066	1.813
IMR	23,805	0.875	0.285	0	1.156	0.733	0.967	1.103

Notes: The summary statistics refer to (non-missing and non-zero) sample used in the main regression. P25, P50 and P75 refer to the first, the median, and the third quartiles, respectively. lny_{it} refers to the (log) real GDP per capita of host country i; lny_{jt} refers to the (log) real GDP per capita of home country j; and Δlny_{it} is the logarithmic difference of lny_{it}, which is the growth rate of GDP per capita of host country i at time t. $fdiy_{ijt}$ is bilateral FDI flows from home country j to host country i as a share of host country GDP; $lnfdiy_{ijt}$ is the log of $fdiy_{ijt}$; and $\Delta lnfdiy_{ijt}$ is the first difference of $lnfdiy_{ijt}$, which is the growth rate of $fdiy$. $Trade_{ijt}$ refers to the (log) sum of bilateral trade flows as a share of total GDP in home and host countries (i.e., $log(Export_{ijt} + Export_{jit})/(GDP_{it} + GDP_{jt})$; $Contiguity_{ij}$ is a dummy variable, equaling one if i and j are contiguous; $Colony_{ij}$ is a dummy variable, equaling one if i and j ever had a colonial link; and $SameCountry_{ij}$ is a dummy variable, equaling one if i and j were ever the same country. $lnInst_{it}$ refers to the log of the ICRG index of host country i and $InstDist_{ijt}$ refers to the institutional distance between host country i and home country j. IMR refers to the Inverse Mills Ratio obtained from the sample selection model.

Table 2: Zero and Missing FDI Observations by Income Group in Master Dataset

Income Group	(1) Obs.	(2) Missing	(3) Zero	(4) Negative	(5) Positive
All	379,186	63.37%	18.42%	4.12%	14.09%
N_i	122,743	60.98%	20.90%	5.38%	12.74%
S_i	256,443	64.51%	17.24%	3.51%	14.74%
NN_{ij}	11,650	26.48%	4.02%	15.76%	53.74%
NS_{ij}	111,372	65.05%	13.16%	4.39%	17.40%
SN_{ij}	111,093	64.53%	22.64%	4.31%	8.51%
SS_{ij}	145,071	64.11%	20.35%	2.84%	12.71%

Notes: The data is from the untreated master dataset including outliers for the period between 1990-2012. All refers to entire country-pairs in the master data. N_i refers to the Northern and S_i refers to the Southern host countries. NN_{ij} refers to FDI flows from the North to the North, NS_{ij} refers to FDI flows from the South to the North, SN_{ij} refers to FDI flows from the North to the South, and SS_{ij} refers to FDI flows from the South to the South. The percentage values are the shares of missing, zero, negative, and positive observations in total FDI flows in each sub-category.

Table 3: Summary Statistics: Direction of FDI Flows

		Δlny_{it}		$fdiy_{ijt}$		$\Delta lnfdiy_{ijt}$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Obs.	Mean	Median	Mean	Median	Mean	Median
Panel A							
N_i	8,428	0.983	1.525	0.042	0.003	0.368	0.012
E_i	10,501	3.045	3.375	0.065	0.012	0.237	0.007
S_i	4,876	3.315	3.231	0.113	0.046	-0.521	0.009
Panel B							
NN_{ij}	3,867	1.294	1.681	0.077	0.019	0.517	0.071
NE_{ij}	3,205	0.904	1.459	0.013	0.001	0.264	0.013
NS_{ij}	1,356	0.281	0.920	0.011	0.000	0.189	0.000
Panel C							
EN_{ij}	5,992	3.251	3.561	0.088	0.028	0.232	0.043
EE_{ij}	2,977	2.873	3.092	0.038	0.004	0.329	0.004
ES_{ij}	1,532	2.571	2.627	0.030	0.002	0.079	0.000
Panel D							
SN_{ij}	2,946	3.208	3.055	0.115	0.047	-0.395	0.016
SE_{ij}	1,293	3.511	3.533	0.110	0.040	-1.026	-0.002
SS_{ij}	637	3.412	3.334	0.107	0.048	-0.078	0.097

Notes: N, E, and S refer to the North, the Emerging South, and the Rest of South, respectively. The bilateral flows such as NE_{ij} refer to (non-missing and non-zero) FDI flows from the Emerging South (home) to the North (host). For other variable definitions, refer to Tables 1 and 2.

Table 4: Bilateral FDI and Economic Growth

	(1) $Full_i$	(2) N_i	(3) E_i	(4) S_i
$\Delta lny_{i,t-1}$	0.145***	0.262***	0.057	0.040
	(0.028)	(0.030)	(0.065)	(0.043)
$fdiy_{ijt}$	0.001	-0.971	0.273	0.413
	(0.314)	(0.641)	(0.484)	(0.632)
$\Delta lnfdiy_{ij,t-1}$	0.005***	0.005***	0.010***	0.005*
	(0.002)	(0.002)	(0.003)	(0.003)
$\Delta lnfdiy_{ij,t-2}$	0.003**	0.002	0.007**	0.005*
	(0.002)	(0.002)	(0.003)	(0.003)
$\Delta lnfdiy_{ij,t-3}$	0.001	0.003	0.004*	0.001
	(0.001)	(0.002)	(0.002)	(0.002)
Year FE	Yes	Yes	Yes	Yes
Home FE	Yes	Yes	Yes	Yes
Host FE	Yes	Yes	Yes	Yes
Observations	23,805	8,428	10,501	4,876
F-Statistics	159.454	79.004	39.231	56.411
KP test	0.000	0.000	0.000	0.000
SH test	0.645	0.501	0.576	0.751
Growth Effect	0.001	-1.317	0.289	0.430
Growth p-value	0.997	0.131	0.571	0.512
Level Effect	0.012	0.013	0.022	0.011
Level p-value	0.005	0.036	0.001	0.092

Notes: $Full_i$ refers to the full sample, and N_i, E_i, and S_i refer to the Northern, the Emerging South, and the Rest of South host countries, respectively. The estimates are from the 2SLS IV estimation. The endogenous variables are $\Delta lny_{i,t-1}$ and $fdiy_{ijt}$. The instrument set includes IMR, $\Delta lny_{i,t-2}$, $fdiy_{ij,t-2}$, $fdiy_{ij,t-3}$, and $fdiy_{ij,t-4}$. $YearFE$, $HomeFE$ and $HostFE$ are year, home and host country fixed effects. Robust standard errors are in parentheses. ***, **, and * refer to significance levels at 1%, 5%, and 10%, respectively. Kleibergen-Paap (KP) test and Sargan-Hansen (SH) test results are reported by their p-values. The growth effect is computed as $\beta/(1-\phi_1)$ and the level effect as $(\theta_1+\theta_2+\theta_3)/(1-\phi_1)$. $Growth\ p-value$ and $Level\ p-value$ refer to p-values for the significance of estimated long-run growth and level effects.

Table 5: FDI and Economic Growth by the Direction of FDI flows

	(1) NN_{ij}	(2) NE_{ij}	(3) $NSij$	(4) EN_{ij}	(5) EE_{ij}	(6) ES_{ij}	(7) SN_{ij}	(8) SE_{ij}	(9) SS_{ij}
$\Delta lny_{i,t-1}$	0.384***	0.109*	-0.069	0.198**	-0.088	-0.560*	0.140**	-0.147	-0.122
	(0.038)	(0.065)	(0.130)	(0.078)	(0.126)	(0.327)	(0.056)	(0.090)	(0.096)
$fdiy_{ijt}$	-0.132	-0.924	-1.796	-0.571	0.158	2.025	0.669	1.195	3.315
	(0.584)	(1.853)	(1.955)	(0.565)	(0.972)	(1.996)	(0.711)	(1.388)	(3.531)
$\Delta lnfdiy_{ij,t-1}$	0.004**	-0.002	0.009*	0.007**	0.015**	0.011	0.002	0.013**	0.012
	(0.002)	(0.008)	(0.006)	(0.003)	(0.007)	(0.012)	(0.003)	(0.005)	(0.012)
$\Delta lnfdiy_{ij,t-2}$	0.001	-0.007	0.003	0.006*	0.005	0.013	0.003	0.010*	0.001
	(0.002)	(0.008)	(0.008)	(0.003)	(0.009)	(0.012)	(0.003)	(0.005)	(0.010)
$\Delta lnfdiy_{ij,t-3}$	0.004**	-0.006	0.003	0.002	0.007	0.013	-0.001	0.003	0.002
	(0.002)	(0.004)	(0.009)	(0.003)	(0.007)	(0.009)	(0.002)	(0.005)	(0.009)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Home FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Host FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-Statistics	68.691	17.717	5.108	24.472	10.298	2.515	28.172	15.105	7.098
Observations	3,867	3,205	1,356	5,992	2,977	1,532	2,946	1,293	637
KP test	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000
SH test	0.448	0.188	0.760	0.643	0.115	0.020	0.133	0.337	0.237
Growth Effect	-0.214	-1.037	-1.679	-0.712	0.145	1.298	0.778	1.042	2.955
Growth p-value	0.822	0.620	0.353	0.320	0.871	0.326	0.345	0.382	0.343
Level Effect	0.015	-0.017	0.014	0.018	0.025	0.023	0.005	0.023	0.013
Level p-value	0.039	0.356	0.455	0.048	0.135	0.212	0.558	0.044	0.571

Notes: The estimates are from the 2SLS IV estimation. The endogenous variables are $\Delta lny_{i,t-1}$ and $fdiy_{ijt}$. The IV set includes IMR, $\Delta lny_{i,t-2}$, $fdiy_{ij,t-2}$, $fdiy_{ij,t-3}$, and $fdiy_{ij,t-4}$. $YearFE$, $HomeFE$ and $HostFE$ are year, home and host country fixed effects. Robust standard errors are in parentheses. ***, **, and * refer to significance levels at 1%, 5%, and 10%, respectively. Kleibergen-Paap (KP) test and Sargan-Hansen (SH) test results are reported by their p-values. The growth effect is computed as $\beta/(1-\phi_1)$ and the level effect as $(\theta_1+\theta_2+\theta_3)/(1-\phi_1)$. $Growth\ p-value$ and $Level\ p-value$ refer to p-values for the significance of estimated long-run growth and level effects. For other variable definitions, refer to Tables 1, 2, and 4.

Table 6: FDI, Economic Growth, and Institutional Development

	(1) $\sum_{k=1}^{12} ICRG_{it}^{k}$	(2) Bureaucratic Quality	(3) Corruption	(4) Government Stability	(5) Investment Profile
$\Delta lny_{i,t-1}$	0.152***	0.162***	0.164***	0.163***	0.153***
	(0.028)	(0.028)	(0.028)	(0.028)	(0.028)
$fdiy_{ijt}$	-0.037	0.001	0.002	-0.025	-0.048
	(0.336)	(0.333)	(0.333)	(0.335)	(0.334)
$\Delta lnfdiy_{ij,t-1}$	0.004**	0.004**	0.004**	0.004**	0.004**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
$\Delta lnfdiy_{ij,t-2}$	0.002	0.002	0.002	0.002	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
$\Delta lnfdiy_{ij,t-3}$	0.001	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$lnInst_{it}$	0.074***	1.061***	0.125**	0.080***	0.146***
	(0.008)	(0.163)	(0.053)	(0.019)	(0.018)
Year FE	Yes	Yes	Yes	Yes	Yes
Home FE	Yes	Yes	Yes	Yes	Yes
Host FE	Yes	Yes	Yes	Yes	Yes
F-Statistics	160.631	164.278	164.296	164.422	161.126
Observations	23,193	23,193	23,193	23,193	23,193
KP test	0.000	0.000	0.000	0.000	0.000
SH test	0.729	0.633	0.624	0.671	0.672
Growth Effect	-0.044	0.001	0.003	-0.030	-0.057
Growth p-value	0.912	0.998	0.994	0.941	0.885
Level Effect	0.009	0.009	0.009	0.009	0.009
Level p-value	0.037	0.042	0.044	0.042	0.047

Notes: $lnInst_{it}$ is the (log) ICRG institutional development index. The estimates are from the 2SLS IV estimation. The endogenous variables are $\Delta lny_{i,t-1}$ and $fdiy_{ijt}$. The instrument set includes IMR, $\Delta lny_{i,t-2}$, $fdiy_{ij,t-2}$, $fdiy_{ij,t-3}$, and $fdiy_{ij,t-4}$. Year FE, Home FE and Hos FE are year, home and host country fixed effects . Robust standard errors are in parentheses. ***, **, and * refer to significance levels at 1%, 5%, and 10%, respectively. Kleibergen-Paap (KP) test and Sargan-Hansen (SH) test results are reported by their p-values. The growth effect is computed as $\beta/(1-\phi_1)$ and the level effect as $(\theta_1+\theta_2+\theta_3)/(1-\phi_1)$. $Growth\ p-value$ and $Level\ p-value$ refer to p-values for the significance of estimated long-run growth and level effects. For other variable definitions, refer to Tables 1 and 2.

Table 7: FDI, Economic Growth and Institutional Development by the Direction of FDI flows

	(1) NN_{ij}	(2) NE_{ij}	(3) $NSij$	(4) EN_{ij}	(5) EE_{ij}	(6) ES_{ij}	(7) SN_{ij}	(8) SE_{ij}	(9) $SSij$
$\Delta lny_{i,t-1}$	0.382***	0.111*	0.006	0.189**	-0.085	-0.457*	0.185***	-0.091	-0.199*
	(0.038)	(0.064)	(0.117)	(0.078)	(0.126)	(0.260)	(0.055)	(0.083)	(0.121)
$fdiy_{ijt}$	0.059	0.732	-1.452	0.823	0.931	3.096	2.282**	1.534	1.236
	(0.304)	(1.227)	(3.305)	(0.559)	(1.033)	(2.230)	(0.940)	(1.396)	(1.797)
$InstDist_{ijt}$	-0.132	0.146**	0.034	-0.006	0.113	0.326	-0.475**	-0.053	-0.498
	(0.099)	(0.068)	(0.161)	(0.100)	(0.116)	(0.377)	(0.203)	(0.217)	(0.599)
$fdiy_{ijt}$*$InstDist_{ijt}$	-0.448	-1.516	0.749	-0.487	-0.041	-1.531	-0.503	0.075	-1.369
	(0.459)	(1.051)	(1.856)	(0.374)	(0.870)	(1.791)	(0.488)	(1.289)	(2.778)
$\Delta lnfdiy_{ij,t-1}$	0.004***	-0.002	-0.000	0.007**	0.014**	0.014	-0.001	0.008	0.027**
	(0.002)	(0.006)	(0.009)	(0.003)	(0.007)	(0.013)	(0.003)	(0.007)	(0.013)
$\Delta lnfdiy_{ij,t-2}$	0.002	-0.008	-0.002	0.006	0.004	0.013	0.001	0.006	0.012
	(0.002)	(0.007)	(0.009)	(0.003)	(0.009)	(0.013)	(0.003)	(0.006)	(0.014)
$\Delta lnfdiy_{ij,t-3}$	0.004**	-0.006	-0.001	0.002	0.006	0.013	-0.002	0.001	0.007
	(0.002)	(0.004)	(0.008)	(0.003)	(0.007)	(0.009)	(0.003)	(0.007)	(0.011)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Home FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Host FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-Statistics	51.837	18.553	5.956	24.748	10.178	3.716	32.037	23.751	8.600
Observations	3,867	3,205	1,124	5,992	2,977	1,175	2,614	1,080	480
KP test	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.000
SH test	0.597	0.282	0.380	0.261	0.134	0.041	0.324	0.456	0.292
Growth Effect	0.096	0.823	-1.461	1.015	0.858	2.124	2.799	1.406	1.031
Growth p-value	0.845	0.550	0.662	0.134	0.363	0.166	0.013	0.274	0.489
Level Effect	0.016	-0.019	-0.003	0.017	0.023	0.027	-0.002	0.014	0.038
Level p-value	0.016	0.195	0.887	0.059	0.167	0.207	0.844	0.322	0.137

Notes: $InstDist_{ijt}$ is institutional development distance. The estimates are from the 2SLS IV estimation. The endogenous variables are $\Delta lny_{i,t-1}$ and $fdiy_{ijt}$. The instrument set includes IMR, $\Delta lny_{i,t-2}$, $fdiy_{ij,t-2}$, $fdiy_{ij,t-3}$, and $fdiy_{ij,t-4}$. $YearFE$, $HomeFE$ and $HostFE$ are year, home and host country fixed effects. Robust standard errors are in parentheses. ***, **, and * refer to significance levels at 1%, 5%, and 10%, respectively. Kleibergen-Paap (KP) test and Sargan-Hansen (SH) test results are reported by their p-values. The growth effect is computed as $\beta/(1-\phi_1)$ and the level effect as $\theta_1/(1-\phi_1)$. $Growth\ p-value$ and $Level\ p-value$ refer to p-values for the significance of estimated long-run growth and level effects. For other variable definitions, refer to Tables 1, 2, and 4.

Table 8: FDI and Economic Growth: Robustness Checks

	(1)	(2)	(3)	(4)
	Lag 1	Lag 2	Different IV	Different IV
$\Delta lny_{i,t-1}$	0.213***	0.198***	0.142***	0.143***
	(0.023)	(0.026)	(0.027)	(0.027)
$fdiy_{ijt}$	0.231	0.145	0.242	0.241
	(0.285)	(0.284)	(0.323)	(0.319)
$\Delta lnfdiy_{ij,t-1}$	0.003***	0.005***	0.005***	0.005***
	(0.001)	(0.001)	(0.002)	(0.002)
$\Delta lnfdiy_{ij,t-2}$		0.002	0.002	0.003*
		(0.001)	(0.002)	(0.002)
$\Delta lnfdiy_{ij,t-3}$			0.001	0.001
			(0.001)	(0.001)
Year FE	Yes	Yes	Yes	Yes
Home FE	Yes	Yes	Yes	Yes
Host FE	Yes	Yes	Yes	Yes
F-Statistics	190.924	170.089	258.431	187.965
Observations	32,987	27,903	24,516	24,184
KP test	0.000	0.000	0.000	0.000
SH test	0.626	0.393	0.831	0.996
Growth Effect	0.293	0.181	0.282	0.282
Growth p-value	0.418	0.608	0.453	0.448
Level Effect	0.004	0.008	0.010	0.011
Level p-value	0.003	0.002	0.016	0.011

Notes: Columns (1) and (2) include lags one and two for $\Delta lnfdiy_{ijt}$. Columns (3) and (4) show the estimates for using different instruments for the IV set. Specifically, the instrument set for column (3) includes IMR, $\Delta lny_{i,t-2}$, and $fdiy_{ij,t-2}$. For column (4), the instrument set includes IMR, $\Delta lny_{i,t-2}$, $fdiy_{ij,t-2}$, and $fdiy_{ij,t-3}$. The estimates are from the 2SLS IV estimation. The endogenous variables are $\Delta lny_{i,t-1}$ and $fdiy_{ijt}$. For columns (1) and (2), the instrument set includes IMR, $\Delta lny_{i,t-2}$, $fdiy_{ij,t-2}$, $fdiy_{ij,t-3}$, and $fdiy_{ij,t-4}$. $YearFE$, $HomeFE$ and $HostFE$ are year, home and host country fixed effects. ***, **, and * refer to significance levels at 1%, 5%, and 10%, respectively. The covariance matrix in each column allows for heteroscedasticity and the MA(1) errors. Kleibergen-Paap (KP) test and Sargan-Hansen (SH) test results are reported by their p-values. The growth effect is computed as $\beta/(1-\phi_1)$ and the level effect as $(\theta_1+\theta_2+\theta_3)/(1-\phi_1)$. $Growth\ p-value$ and $Level\ p-value$ refer to p-values for the significance of estimated long-run growth and level effects. For other variable definitions, refer to Tables 1 and 2.