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FDI Flows to Low-Income Countries: Global Drivers and Growth Implications

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Abstract

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What accounts for variations in FDI flows from advanced to developing countries? How have FDI inflows explained cross-country growth experiences? In this paper we tackle both these questions empirically for a large sample of middle and low-income countries. Two key results emerge: (i) lower borrowing costs and positive real-side external factors were increasingly important drivers of FDI outflows to low-income countries in the pre-crisis period; (ii) economic fundamentals, the strength of economic reforms, and commitment to macroeconomic discipline are crucial determinants of the growth dividends of FDI. Our paper suggests that low-income countries can turn to domestic policy solutions to mitigate the adverse effects of a potential decline in FDI in the post-crisis world.

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I. INTRODUCTION

The past decade has witnessed an unprecedented increase in foreign direct investment (FDI) flows to low-income countries.² The surge in inflows has been attributed to ample global liquidity and rising commodity prices, coupled with better economic fundamentals and market-oriented reforms in many low-income countries. The pattern also reflected a growing trend toward integration of world capital markets and globalization of investments.³

The onset of the global financial crisis has changed this picture. Economic activity in all major advanced countries—the major source of FDI—contracted sharply, while the tightening of global credit conditions constrained financing capacities of multinational firms and increased risk aversion. Economic recovery in advanced countries is expected to be sluggish and global liquidity more expensive and less abundant in coming years. Competition among developing countries to attract FDI flows will also likely be fiercer than in previous years. While FDI flows from emerging markets, an increasingly important source of FDI for low-income countries, are expected to be more resilient, overall FDI flows to low-income countries could be significantly lower than in the pre-crisis period (World Bank, 2010). These developments raise important questions and policy challenges for low-income countries. Given that FDI is the dominant form of private capital inflows for low-income countries, a reversal in these flows not only would directly affect external financing needs, but also would have an impact on investment and growth (IMF, 2010).

In this paper, we ask two distinct but related questions. First, how do external factors, such as economic developments in advanced countries, affect FDI flows to low-income countries? Second, how have FDI flows contributed to economic growth in low-income countries in the pre-crisis period? In particular, what role do country-specific features and initial conditions play in explaining cross-country variations in the growth benefits of FDI? Answers to these questions provide insights into how recent and anticipated changes in economic and financial conditions in advanced countries can affect FDI prospects for low-income countries, as well as inform policy responses for sustaining growth benefits of FDI in the future.

To shed light on the first question, we empirically examine the determinants of bilateral FDI outflows from G7 countries to a large number of middle and low-income countries over the recent globalization period. While the importance of various pull factors in attracting FDI inflows is well documented, evidence on the cyclical determinants of FDI outflows from advanced to low-income countries is scant. Our findings indicate that, in contrast to middle-income countries, low international interest rates, rather than real-side external factors, were the most important drivers of FDI outflows to low-income countries. Second, and of greater significance for interpreting recent events, we find a heightened importance of advanced country economic conditions on FDI outflows to low-income countries since the mid-1990s. Finally, we

² In this paper, “low-income countries” refers to all countries, excluding India, shown on the IMF’s list of countries eligible for the Poverty Reduction and Growth Trust (PRGT) at end-December 2009.

³ FDI comprises equity investment, reinvested earnings and intra-company debt transactions. Equity investment, which is considered as FDI only if the foreign company has a minimum 10 percent share, accounts for the lion’s share of FDI flows to developing countries; with intercompany loans being higher in the extractive sector (World Bank, 2004).

provide evidence that FDI outflows to low-income countries contract during recessions in advanced countries.

On the growth impact of FDI, using standard dynamic panel growth regressions, we find that the association between FDI inflows and growth in low-income countries strengthened in the globalization period. While the empirical evidence on the growth impact of FDI is far from unanimous, this result is consistent with studies that have documented a positive impact of FDI on economic growth in developing countries (see Kose et al., 2009, for a summary of extant research). More importantly, we find that differences in economic fundamentals, the strength of economic reforms, and commitment to macroeconomic discipline are important for explaining cross-country variations in the growth benefits of FDI.

A sizeable body of literature has examined the determinants and growth implications of FDI flows. Our paper contributes to this literature in at least three major dimensions. First, unlike most existing studies which largely consider advanced and emerging market countries, we focus primarily on low-income countries. Second, we quantify the influence of interest rates and economic activity in advanced countries in driving FDI flows to low-income countries in the pre-crisis period. Finally, our paper adds to the growing literature studying a range of supporting conditions associated with structural and policy related factors (thresholds) that appear to play an important role in the relationship between growth and FDI. In particular, we provide a policy-relevant assessment of the various structural and policy characteristics that can enhance the direct and indirect growth benefits of FDI in low-income countries.

The rest of the paper is structured as follows. Section II documents pre-crisis trends in FDI flows to low-income countries. Section III presents econometric evidence on the impact of economic conditions in advanced countries to FDI outflows to low-income countries; while Section IV investigates the relationship between FDI and growth in low-income countries and the importance of threshold effects. Section VI discusses the implications of the empirical results presented in the paper; and Section VII concludes.

II. PRE-CRISIS TRENDS IN FDI FLOWS

We begin by presenting some recent trends on the magnitude and direction of FDI flows, and the country-specific characteristics that were associated with higher inflows.

While representing only a fraction of FDI flows to emerging markets and other developing countries, net FDI inflows to low-income countries more than quadrupled since 2000, growing at an average annual rate of 20 percent during 2000–2008 (Figure 1). The surge in FDI flows occurred against a particularly benign backdrop of strong global economic growth, favorable financing conditions, and strong terms of trade (Figure 2). International interest rates remained low over a sustained period, resulting in abundant global liquidity and low borrowing costs. For example, the World Bank (2010) reports that the sharp increase in global FDI flows before the financial crisis largely reflected a surge in inexpensive debt financing.⁴ The increased role of

⁴ The value of cross-border syndicated bank borrowing and international bond issuance for the purposes of carrying out mergers and acquisitions, an important mode of FDI entry in developing countries, rose almost 10-fold between 2003 and 2007. In addition, almost 30 percent of global merger and acquisition deals were carried out by high-income investment banks, hedge funds, and other private equity firms (UNCTAD, 2009).

institutional lenders in advanced countries, such as mutual and pension funds, as financial intermediaries, as well as the increased importance of securitization, also represented a “push” factor in the form of a secular change which boosted funding for FDI. At the same time, booming oil and commodity prices propelled FDI into extractive sectors.

The period also coincided with strong growth in emerging markets and rapidly expanding South-South trade and FDI linkages. Although most FDI flows to low-income countries originate from advanced countries, a number of new players emerged from middle-income countries. FDI flows from these new investors have been both seeking new markets—created by market-oriented reforms—and resources—extractive investment in mining, agriculture or new sources of cheap labor.⁵ China, in particular, emerged as an important player, with most of China’s FDI going to developing countries, mainly in Asia but also in Sub-Saharan Africa (SSA), largely in infrastructure and mining.⁶

Over the past two decades, there have been changes in the relative importance of various geographic low-income regions as FDI destinations (Figure 1). In the mid-1990s, optimistic growth prospects in the newly emerging markets of Eastern Europe and Central Asia and adoption of market-oriented reforms in Asia attracted FDI. More recently, FDI to Africa rose rapidly, but was focused in just a few countries and was targeted mainly at the extractive sector, particularly the petroleum sector (IMF, 2010). However, expressed as a share of GDP, the increase in FDI was broadly distributed across regions, particularly since 2003, including a diverse set of countries—ranging from large and landlocked to small island states, commodity dependent to more diversified service exporters. While comparable data on the sectoral composition of FDI flows in low-income countries is scarce, evidence suggests that the share of FDI in the services sector, including in tourism and banking and financial services, increased significantly in the run-up to the crisis (IMF, 2008; ECLAC, 2008).

What are the characteristics of countries that have benefited from the recent rise in FDI flows? A steady improvement in economic fundamentals and growth prospects has been a key feature of many low-income countries since the early 2000s. Second, the increase in FDI to low-income countries was driven, in part, by changes in the policy environment. Many countries liberalized their trade and investment regimes and increased participation in bilateral, regional and multilateral policy initiatives. These reform trends are reflected in the data, although there are crucial differences across countries. For example, FDI inflows in non-resource-rich countries were higher in countries with above-median values of trade liberalization, as measured by an index of trade freedom (Figure 3). Similarly, as shown in Figure 3, non-resource-rich countries, with above-median values of institutional quality—as measured by greater control of control and

⁵ It is estimated that one third to one half of total FDI inflows reported by developing countries came from other developing countries in the last decade, with a large fraction invested in low-income countries (Aykut and Goldstein, 2007). For instance, in 2008, between 20 and 30 percent of FDI to ASEAN low-income countries came from ASEAN source countries (ASEAN, 2009).

⁶ Official numbers on Chinese FDI, however, are not readily available, and estimates vary widely due to different definitions of aid and FDI. Moreover, the dividing line between trade and project financing by China’s financial institutions and direct investment by Chinese enterprises is often unclear. Foster et al. (2008) note that both bilateral trade and Chinese FDI in Africa increased about fourfold between 2001 and 2005; Davis (2009) reports that outward FDI from China nearly doubled in 2008.

economic freedom—attracted more FDI. Resource-rich countries, however, attracted high levels of FDI despite poorer institutional quality and weaker reform performance.

Overall, recent trends suggest that a confluence of global factors and favorable domestic conditions played a role in driving FDI flows to developing countries. However, global factors take on an increased importance in the wake of the current crisis given that the recent FDI flows have gone to low-income countries with a wide spectrum of domestic policies and institutional characteristics. We next turn to a formal econometric analysis of the external determinants of FDI flows to low-income countries.

III. DO EXTERNAL FACTORS DRIVE FDI FLOWS TO LOW-INCOME COUNTRIES?

What role have macroeconomic developments in advanced countries, in particular the business cycle in advanced countries, played in driving FDI flows to low-income countries in the pre-crisis period? Also, to what extent should we be concerned about the impact of the current financial crisis on prospects for FDI flows to low-income countries?

In this section, we examine the relationship between FDI outflows from advanced to developing countries, with particular emphasis on low-income countries. We focus on advanced countries because data on bilateral South-South FDI flows is scarce, and advanced countries—the major source of FDI to low-income countries—have been the hardest hit by the current crisis. We examine the differential impact of advanced country economic conditions across groups of developing countries, in particular, on low-income countries, and a sub-sample of non-fuel exporting SSA countries. We first provide a brief summary of the literature and then turn to a description of the specification and the data, before presenting the results.

A. External Determinants of FDI Flows: Channels of Transmission

The motivation of capital flows, including FDI, has long been a subject of research in economics. A considerable literature has investigated the determinants of FDI flows to developing countries. Various pull factors—related to host-country characteristics, and push factors—related to source-country economic conditions—have been identified as contributing factors. While structural and macroeconomic conditions in recipient countries have received the most attention in the literature (see Blonigen, 2005, for a survey), a large body of work has examined the relevance of external factors. An early related literature analyzed pull versus push factors in driving capital flows, particularly debt and portfolio flows in emerging market countries, emphasizing the relevance of external factors (Calvo et al., 1993; Fernandez-Arias, 1996).⁷ More recently, Albuquerque et al. (2005) find that the significance of global factors for FDI flows to developing countries has grown over the last two decades.

External factors tend to have an important cyclical component which affects FDI flows through different channels (Reinhart and Reinhart, 2008). Economic growth in advanced countries can affect FDI flows through both an income and substitution effect. During recessions, lower earnings in advanced countries can induce firms to reduce investment both at home and abroad

⁷ See Reinhart and Montiel (2001) for a survey of a literature that flourished in the 1990s.

through an income effect, resulting in procyclical FDI flows.⁸ Typical Solow-type arguments, however, suggest that a substitution effect could be at play. If firms allocate resources according to relative rates of return, a recession in advanced countries would increase the profitability and attractiveness of foreign investment, implying that FDI flows are countercyclical (Calvo et al., 2003).

Cyclical movements in interest rates in advanced countries have implications for financing FDI flows. Since a significant proportion of foreign operations of FDI are funded in international financial markets, the cost of funding is particularly sensitive to changes in international interest rates. For instance, a recent study finds that low global interest rates and the resultant fall in borrowing costs during the 2003–07 period contributed to almost 70 percent of the increase capital inflows, including FDI, into developing countries (World Bank, 2010). Countercyclical monetary policy in advanced countries during recessions contributes to lower funding costs of FDI by lowering interest rates in source countries.⁹ Moreover, beyond the direct positive implications of higher commodity prices for FDI, an underlying impetus to world commodity prices is low or negative world real interest rates (Frankel 2008). Hence, the effects of lower international interest rates work not only through the portfolio channels discussed above, but also through the commodity price channel.

A number of studies have examined the role of these factors in driving FDI flows to emerging market economies. Using aggregate FDI inflows and the U.S. business cycle as a proxy for the source country cycle, Reinhart and Reinhart (2001) and Calvo et al. (2001) find that FDI flows to developing countries (particularly in Latin America and the Caribbean) on average are higher when the U.S. economy is expanding and when monetary policy is expansionary. Levy-Yeyati et al (2007) use bilateral FDI flows from advanced OECD countries to 37 emerging markets for the 1980 to 1999 period. They find that outward FDI is countercyclical with respect to output and interest rates cycles in the United States and Europe, and mildly procyclical in Japan. Controlling for local conditions, Albuquerque et al. (2005) find that an increase in increase rates in advanced countries is significantly and negatively associated with FDI flows to developing countries.

In sum, the literature accords an important role to external factors in driving FDI flows to developing countries. However, most of the studies focus primarily on emerging market countries. While the question of North-South FDI linkages is hardly a new one—linkages between advanced and emerging markets have been studied extensively—much less attention has been paid to the growing integration of low-income countries into the global economy through enhanced FDI linkages.

⁷ The literature on commodity price determination has frequently accorded a significant role to the growth performance of major industrial countries, with recessions in industrial countries associated with weaknesses in real commodity prices (Borensztein and Reinhart, 1994). In recent years, China, India and other rapidly growing emerging market economies have become critical consumers of raw materials and energy and their demand has affected the dynamics of global commodity prices.

⁹ There is evidence that turning points in monetary policy stance either lead or are coincident with those in output, particularly in advanced countries (IMF, 2002)

B. Specification

Methodology

Our data consists of annual bilateral FDI flows from G7 countries to over 100 developing countries between 1985 and 2007, including 52 low-income countries (See Table 1 for a list of countries included in the sample). The empirical strategy is loosely based on a “gravity model,” augmented in order to examine the impact of the advanced country cycle on FDI flows to developing countries. The model has been used in a number of studies with some variations.¹⁰ Our specification is closest to that of Levy-Yeyati et al (2007), who examine the cyclical impact of FDI flows from advanced to 37 emerging market countries over the 1980 to 1999 period, focusing on how the cyclical nature of FDI flows differs according to the source. Our paper differs from theirs in that we consider a large sample of low-income countries, cover a more recent time period, and differentiate the impact by host countries. Our baseline specification is:

$$\log(FDI_{ijt}) = \alpha_1 \log(GDP_{it}) + \alpha_2 \log(GDP_{jt}) + \alpha_3 \log(TRADE_{ij,t-1}) + \alpha_4 OUTPUT_{it} + \alpha_5 RIR_{it} + u_{ij} + v_t + \varepsilon_{ijt}$$

where FDI_{ijt} is bilateral FDI in millions of US dollars flowing from G7 countries (source) to low-income and emerging market countries (host), GDP is the gross domestic product in millions of US dollars in the host (j) and source (i) economy to control for market size, $TRADE$ is the bilateral trade between the host and source country in millions of US dollars, $OUTPUT$ is a measure of economic activity in the source country, and RIR is a measure of the real interest rate in the source country.¹¹ Since a number of country-pair invariant factors such as distance, common language, common legal origin, bilateral investment treaties, etc., commonly used in gravity models are not of direct interest here, we let them be captured by country-pair fixed effects u_{ij} . We include v_t as a time trend to control for a positive FDI trend in recent years that may affect all countries in a similar fashion.

We use two measures of economic activity in source countries. Our first measure is real GDP growth in G7 countries (GROWTH). We use an additional measure to capture expansions and recessions in source countries. One commonly used measure of business cycle fluctuations is the output or growth cycle—cyclical fluctuations in economic activity around a trend.¹² Following

¹⁰The gravity model is the standard specification in empirical models of bilateral trade and, augmented versions have also been used to estimate the determinants of bilateral FDI stocks and flows (see, among others, Razin et al. 2005; Guerin and Manzochi, 2009). Di Giovanni (2005) applies a gravity model to analyze cross-border mergers and acquisitions. These models typically relate international flows to long-term fundamentals, such as economic size, the absolute and relative factor endowments across countries, the distance between markets, financial frictions, as well as trade and investment costs.

¹¹ Bilateral trade and FDI can be complements or substitutes. Insofar as both FDI and exports are means of servicing a market, they can be viewed as substitutes. On the other hand, the relationship could be complementary if FDI is export-oriented or if greater trade linkages increase familiarity with a country, hence stimulating FDI flows. Since there is a potential of reverse causality between FDI and trade, we lag the bilateral trade variable by one period.

¹² This concept has some advantages and disadvantages relative to the conventional business cycle concept, which involves determining peaks and troughs in aggregate economic activity on the basis of turning points in relevant indicators (IMF, 2002). One advantage is that it does not rely on an official chronology of dating recessions. A critique of the growth or output cycle approach, however, is that it can depend on an arbitrary distinction between

(continued)

Levy-Yeyati et al. (2007), we define the output cycle measure as the log difference between real GDP and its log-linear trend (OUTPUT GAP).

Data on gross bilateral FDI flows is taken from the OECD *International Direct Investment Statistics*. The GDP variables are from the IMF's World Economic Outlook and the bilateral trade data are from the UN COMTRADE database (see Appendix 1 for a description of variables and data sources used). The real interest rate is defined as the difference between the three-month nominal interest rate on T-bills and CPI inflation. We do not include commodity prices in the regressions since this is a global rather than country-specific variable. Moreover, given the high degree of correlation between economic activity and interest rates in advanced countries and global commodity prices, isolating the impact of commodity price changes on bilateral FDI flows could be difficult.

A potential problem with using bilateral flows, however, is that these data contain many zero entries. Dropping these observations may bias our results if, for example, such entries are more likely during recessions. To avoid these problems, we follow the literature and adopt a semi-log transformation of the form $x = \text{sign}(x)\log(1 + |x|)$.¹³ A second problem associated with zero entries is that they may be non-random and due to investment indivisibilities and fixed costs. For instance, positive FDI flows may only be observed when investment reaches a certain threshold of profitability (see Razin et al. 2008, for a discussion of these issues in bilateral FDI gravity models). In such cases of censored data, it is appropriate to use a Tobit model, which we estimate as a robustness test.

C. Results

Baseline Results

Table 2 reports the results our baseline equation estimated on the full sample of emerging and low-income countries as well as sub-samples to test for within-sample heterogeneity.¹⁴ For the entire sample, gravity determinants are significant in explaining FDI flows from the G7 to developing countries: a larger market size (as proxied by nominal GDP) in both the source and host country tends to increase FDI to developing countries (Columns 1–2). The bilateral trade variable is positive and significant, indicating complementarity between trade and FDI flows in the sample.

How do economic developments in the G7 affect FDI flows to developing countries? Real GDP growth in source countries is positively and significantly associated with FDI outflows to developing countries (Column 1). Similar results are obtained for the output cycle: the

trend and cycle, and key cyclical characteristics can depend on which detrending method is used. In our analysis, we use a log-linear trend, but the results are robust to the use of the HP-filter (available upon request).

¹³ The data on gross outflows from source countries includes negative values, which are associated with divestments, such as a multinational firm from a particular source country selling its assets in the host country, either to locals, or to multinationals from a different source country.

¹⁴ For example, we often separate the sample between fuel-exporting and non-fuel exporting countries. As noted in Section II, FDI flows to fuel-exporting low-income countries appears to behave differently from what one would expect, in particular, they appear more robust to unfavorable local conditions.

coefficient on the output gap is positive and significant, suggesting that FDI flows from G7 countries are procyclical (Column 2). Moreover, financial market conditions in source countries, as measured by the real interest rate, are negatively and significantly associated with FDI outflows. Importantly, this result holds even after controlling for the positive effects of output growth on FDI outflows.¹⁵

To investigate cross-sample heterogeneity, we divide the sample between middle-income, low-income, and non-oil exporting low-income countries in SSA (Columns 3–8). FDI flows to middle-income countries are positively and significantly associated with both domestic market size (as measured GDP in the host country) as well as the size of the source economy (Columns 3–4). In contrast, domestic market size is not a significant determinant of FDI flows in low-income countries, including in SSA (Columns 5–8), given the smaller markets in these countries. Moreover, the positive association between bilateral trade and FDI, while highly significant for the sample of middle and low-income countries, does not appear to be as important for the sub-sample of SSA countries.

Turning to economic conditions, interest rates in the source do not have a contemporaneous impact on FDI outflows to middle-income countries, but economic activity does. Higher growth in source countries is positively and significantly associated with FDI flows to middle-income countries, in line with their greater integration into the global economy. Similar results are obtained for the output cycle, although the positive coefficient on the GAP variable is not significant. In contrast, FDI to low-income countries does not appear to vary with economic activity in the G7 in the period under consideration (Columns 4–8). Financial market conditions play a more dominant role in explaining FDI flows to low-income countries: lower interest rates in the G7 tend to increase FDI outflows; this effect is economically significant. The point estimates indicate that a one-percentage point decrease in real interest rates in G7 countries is associated with a 10 percent increase in FDI flows to low-income countries. This effect is even more pronounced for the sub-sample of SSA countries.

To examine whether the impact of G7 economic conditions on FDI outflows to low-income countries is sensitive to the number of lags as well as the time-period considered, we re-estimate the baseline regressions. The results reported in Table 3 indicate that economic growth in the G7 has a contemporaneous effect on FDI flows to middle-income countries, but affects low-income countries with a lag (Columns 2–3). When the sample is restricted to the post-1993 period, the results indicate that the sensitivity of FDI outflows to low-income countries, including in SSA, to economic conditions in advanced countries increased (Columns 7–12).¹⁶ This result holds for both real growth and the output gap in advanced countries. In particular, a one-percentage point increase in advanced country growth is associated with over 30 percent increase in FDI outflows within two years (Column 9). The response of FDI to lower interest rates in the source also

¹⁵ It could be argued that due to countercyclical monetary policy, both economic activity and the interest rate cycle in advanced countries are highly correlated. Running regressions in two steps, in which we just include one of the variables, recover the residuals, and then check whether these residuals are associated with the variable excluded from the first step yields qualitatively similar results. The results are omitted here for brevity, but are available upon request.

¹⁶ This is consistent with Reinhart and Montiel (2001) who argue that financial conditions in advanced countries were particularly easy in the early 1990s.

increased in the post-1993 period, with point estimates indicating that a one percentage point decline in real interest rates in advanced countries leading to a 20–25 percent contemporaneous increase in FDI outflows (Columns 9–12).

Impact of Recessions and Expansions

How do FDI outflows to low-income countries vary with expansions and recessions in the source? We augment the baseline regressions using a measure of the growth cycle (the difference between the current and trend real growth). One potential problem with using the growth cycle is that it might not capture large recessions. In advanced countries, growth recessions are sometimes minor in size, while level recessions are usually associated with major adverse macroeconomic events. In view of this consideration, we create a dummy variable that takes on the value of one (and zero otherwise) if the fall in real growth relative to trend growth lies in the 10th percentile of the country-specific distribution (RECESSION).¹⁷ We consider the post-1993 period, which captures the 1998–99 recessions in Japan, the 2001 recession in the United States, and the 2002–2003 recessions in other G7 countries. The coefficient estimates on our recession dummies can be interpreted as the marginal effects of recessions.¹⁸

The results reported in Table 4 suggest that advanced country recessions do not have a contemporaneous effect on FDI outflows to all developing countries, including the sample of low-income countries (Columns 1, 3, and 5). However, advanced country recessions tend to have a lagged impact on FDI outflows to all countries. The negative and significant coefficient for the recession dummy is consistent with the view that FDI outflows decline disproportionately during periods of economic contraction in the North. The point estimates for the recession dummy suggest that FDI outflows to low-income countries decline on average by 25 percent in the transition from a recession to an expansion, with larger effects for middle-income countries.

The results of Table 4 could, however, mask important differences across recipient regions. To examine this possibility, in Table 5, we replicate the regressions for different regions, combining middle and low-income countries, in the post-1993 period. The results suggest that advanced country recessions have a contemporaneous significant and negative effect on FDI outflows to countries in Europe and Central Asia; all other regions are affected with a lag. Moreover, given strong linkages with the United States, the impact of recessions is highest for Latin America and the Caribbean.

¹⁷ The resulting business cycle turning points broadly match the dates in the National Bureau of Economic Research (NBER) chronologies for the United States, and the OECD official dating for other countries. The differences reflect the use by the NBER and OECD of higher frequency (monthly) data and a broader variety of indicators. Also, since the analysis in this section uses annual data, differences might arise regarding the dating of business cycles. However, the correlation between our measures and the NBER and OECD official dating is quite high.

¹⁸ Specifically, the coefficient estimates tell us the extent of changes in FDI outflows from a recession to an expansion.

D. Robustness

We next discuss the robustness of our results in various ways, by including host country characteristics, and examining alternative estimation methods.¹⁹ First, we augment our baseline regression by introducing local determinants of FDI commonly cited in the literature. Local determinants of FDI include variables that affect the anticipated profitability from investing in the host.²⁰ These are: real GDP growth, as a measure of domestic productivity growth; macroeconomic stability (proxied by public consumption relative to GDP and consumer price inflation); financial depth (measured by the ratio of credit to the private sector as a percentage of GDP) to assess the role of the domestic credit sector in attracting foreign direct investment; institutional quality (proxied by the International Country Risk Guide (ICRG) index of institutional quality) as a measure of the strength of property rights and the absence of corruption. To mitigate potential endogeneity biases, all the explanatory variables, with the exception of the institutional variable, are lagged by one period.

We find that local conditions are important in explaining FDI outflows to middle-income countries, but the results are less significant for low-income countries in the full sample period (Table 6). In particular, we find that productivity growth, macroeconomic stability (as proxied by lower government consumption to GDP), and better institutional quality are significantly associated with higher FDI outflows from advanced countries for the full sample, including the sub-sample of middle-income countries. In contrast, we find that the volume of FDI flows to low-income countries is negatively and significantly associated with institutional quality, possibly reflecting the concentration of FDI in resource-rich countries with weaker institutions. However, with the exception of the institutional variables, local conditions are not statistically significant in the post-1993 period (not reported here). Our previous results on the economic and statistical relevance of economic conditions in advanced countries in explaining FDI outflows to developing countries continue to hold for all samples and time periods.

Second, as discussed above, the bilateral FDI flows database is characterized by the large number of zero-value FDI flows. This large number of zero flows tends to reduce the variance of the sample, and could affect the estimates. Two strategies are used to address this issue. First, we assume that null values of FDI flows contain no useful information and we remove them from the sample. Second, we assume that zero entries are non-random and run a Tobit estimation. Finally, we replaced the trend with time dummies in the baseline specification. We find that our main conclusions are robust to these modifications (available upon request).

¹⁹ Second, we test the robustness of our findings to the inclusion of other variables, including a dummy for recessions or the output gap in the host country and the bilateral real exchange rate. However, our main findings remain unchanged to the inclusion of these variables.

²⁰ See, among others, Campos and Kinoshita, 2008; and Asiedu and Lien, 2004, for Africa.

IV. FDI AND GROWTH

The analysis in the previous section suggests that that FDI outflows to low-income countries contract during recessions in advanced countries and are interest-rate sensitive. What implications would the current global crisis and its aftermath have for medium-term growth prospects in low-income countries? FDI is expected to yield significant growth benefits because, in addition to augmenting investment, it has a positive impact on productivity through transfers of technology and managerial expertise. A reversal of FDI flows could, therefore, adversely affect the growth momentum achieved in low-income countries over the past decade.

In this section we empirically examine the impact of FDI on growth in middle and low-income countries in the pre-crisis period. Unlike the previous section, which examined the cyclical determinants of bilateral FDI flows from the G7 to developing countries using annual data, our sample considers net FDI inflows to developing countries using five-year averages of the underlying data. This is because our focus is on medium-run growth rather than business cycle and other short-run fluctuations. We first provide a selective literature review of the link between FDI and growth in recipient countries and the importance of initial conditions in mediating this relationship. We then examine the link in the context of a standard empirical specification, differentiating across different country groups, before turning to an analysis of the importance of country-specific features and initial conditions in driving the growth benefits of FDI.

A. FDI and Economic Growth: Selective Review of Literature

In theory, FDI is expected to confer large potential direct and indirect growth benefits for developing countries, and especially for low-income countries. The direct benefits stem from standard neoclassical arguments which suggest that FDI should flow from capital-rich economies to capital-poor economies with relatively higher rates of return to capital.²¹ These flows should complement limited domestic savings in capital-poor economies and by reducing the cost of capital, augment growth. The indirect benefits of FDI on growth relate to the productivity gains in recipient countries through transfers of technology (adoption of new production methods), skill acquisition (education or training of workers), competition (efficient use of existing resources by domestic firms), and exports (expansion of export potential of domestic firms) (Moran et al., 2005).

The empirical evidence on the growth benefits of FDI, based on cross-country evidence, has been largely inconclusive. While some of these studies conclude that there are growth benefits associated with FDI, many tend to find no effects or limited effects (results that are not robust across alternative specifications) through traditional channels such as capital accumulation for developing countries (Kose et al., 2009a). Differences in country coverage, empirical methodologies, and time periods covered by the various analyses, account in some part for the lack of unanimity in the empirical literature.²² For example, Blonigen and Wang (2005), point to the problem associated with pooling data for countries at different levels of development, noting

²¹ The fact that actual volume of such flows to developing countries is much smaller than predicted by the neoclassical growth model has been characterized as a paradox by Lucas (1990).

²² Carkovic and Levine (2005) point to the failure to fully control for simultaneity bias, country-specific effects, and/or the routine use of lagged dependent variables in growth regressions.

that pooling data for advanced and developing countries could lead to incorrect inferences, motivating in part our focus on middle and low-income countries.

Empirical research that takes a more nuanced approach, especially by accounting for the role of various initial conditions has been more successful at showing the potential links between FDI and growth.²³ Kose et al. (2009b) shows that there are certain “threshold” levels of financial and institutional development that an economy needs to attain before it can derive the growth benefits of financial flows, including FDI. Specifically, studies indicate that a country’s capacity to take advantage of FDI externalities depends on a variety of factors:

- ***Financial sector development.*** Well-developed domestic financial markets are instrumental in efficiently allocating foreign financial flows, including FDI, to competing investment projects (see Aoki et al., 2006). Deep domestic financial markets can also provide the necessary credit to local firms when they need financing to take advantage of technological spillovers associated with FDI (Alfaro et al, 2004).
- ***Institutional quality.*** Weak protection of property rights in poor countries implies that foreign financing may not be directed to long-gestation, investment-intensive, and low-initial profitability projects where such financing could be particularly useful given domestic financing constraints (Rajan and Zingales, 1998). Poor institutional quality can also limit the interaction between foreign and local firms only to hiring labor, thereby limiting the indirect benefits derived from FDI (Antras, 2003).
- ***Sectoral composition of inflows.*** Potential spillover advantages derived from FDI might differ markedly across primary, manufacturing, and services sectors (Alfaro and Charlton, 2007).²⁴ FDI in the extractive sector may have limited beneficial spillovers for growth as it often involves mega projects that scarcely employ domestically-produced intermediate goods or labor (Lim, 2001).
- ***Trade openness.*** A higher degree of trade openness and export orientation of the economy can facilitate greater transfer of know-how and managerial skills through FDI, and “crowd in” domestic investment (Balasubramanyam et al., 1996).
- ***Capital endowments.*** Technology and other productivity spillovers associated with FDI may only translate into higher growth when the host country has a minimum level of stock of human capital (Borensztein et al, 1998) or physical infrastructure (Kinda, 2007).
- ***Macroeconomic policies.*** Sound macroeconomic policies can create a general stimulus for FDI spillovers to domestic investment by raising the marginal product of new investments and creating an enabling environment for technology diffusion (Mody and Murshid, 2005).

²³ There is a large literature examining the productivity enhancing effect of FDI using firm-or sector-level data (see Haskell et al., 2007, and references therein). Studies find that FDI raises productivity growth largely through vertical spillovers, which stem from interactions between foreign firms and their local suppliers and customers.

²⁴ UNCTAD World Investment Report (2001), for instance, notes that, “[I]n the primary sector, the scope for linkages between foreign affiliates and local suppliers is often limited. The manufacturing sector has a broad variation of linkage intensive activities. [In] the services sector the scope for dividing production into discrete stages and subcontracting out large parts to independent domestic firms is also limited.”

In summary, the literature suggests that the eventual growth dividends of FDI depend upon various local conditions i.e. absorptive capacities. However the literature is disparate, with most studies focusing on just a few conditioning variables, and pooling a full range of countries from advanced, middle- and low-income to derive potential thresholds. If the level and context of growth benefits operate differently across countries, regressions that pool data for countries at very different levels of development could provide a biased picture.

B. Specification

Our empirical framework builds on standard cross-country growth regressions. We use a dynamic panel approach to investigate the relationship between FDI flows and growth. The panel consists of data from 1974–2008 for a maximum of 104 countries and the same middle and low-income counties as the estimation in the previous section. We average data over non-overlapping, five-year periods, so that, data permitting, 7 observations per country are available (1974–78, 1979–83, etc.). Thus we exploit the time-series, along with the cross-country dimension of the data. The following regression specification is considered.

$$y_{i,t} - y_{i,t-1} = \alpha y_{i,t-1} + \beta' FDI_{i,t} + \gamma' X_{i,t} + \mu_t + \eta_i + \varepsilon_{i,t}$$

where $y_{i,t}$ is the logarithm of real per capita GDP, $y_{i,t-1}$ is the level of real GDP per capita at the beginning of each five-year period to control for convergence effects, $FDI_{i,t}$ is net FDI inflows in percent of GDP, $X_{i,t}$ represents the set of relevant control variables, μ_t represent time dummies (for each non-overlapping five-year period), η_i stands for the country fixed effects, and $\varepsilon_{i,t}$ is the error term.

In assessing the impact of FDI inflows on economic growth, we control for a standard set of determinants that have been identified in the literature as being relatively robust determinants of per capita GDP growth. These include monetary and fiscal policy stances as measured by the degree of variation in consumer price inflation and the average ratio of government consumption expenditures expressed as a percent of GDP; secondary school enrollment as a proxy for human capital; trade openness (measured as the ratio of the sum of exports and imports of goods and services to GDP); financial sector development (measured as the ratio of private sector credit to GDP), population growth; and lagged average investment (measured as a percent of GDP). See Appendix 1 for a description of variables and data sources used.

One potential problem in using dynamic panel methods on cross-country data is that of reverse causality—the possibility that higher economic growth attracts more FDI—and the related problem of endogeneity—growth and FDI could be responding to some other common factors, such as the legal or the broader institutional frameworks. To tackle these problems, in the presence of unobserved country fixed effects, we use the system GMM approach of Blundell and Bond (1998), which uses suitable lagged levels and lagged first differences of the regressors as instruments.²⁵ This is, admittedly, a mechanical approach to dealing with endogeneity but it is econometrically sound, and has been widely used in a variety of different contexts (see Kose et al, 2009b; Carkovic and Levine, 2005).

²⁵ Following Roodman (2009), we include some refinements to this approach in order to limit the number of instruments.

C. Baseline Results

Table 7 presents results for different country groups and sample periods. We find that some of the standard explanatory variables have the conventional signs for the different country groups (Columns 1–3). On average, poorer countries grow faster (indicating conditional income convergence), schooling raises growth for low-income countries, and higher inflation and population growth lower growth. The effects of trade openness and financial sector development show less statistical significance.

For all developing countries in the sample, the coefficient on FDI (Column 1) is significantly positive, implying that higher FDI flows are associated with GDP growth. When we restrict the sample to low-income countries only (Column 2), FDI no longer enters the growth regressions significantly. To examine whether specific characteristics of certain countries could be driving the results, we consider a sample of non-fuel exporting countries.²⁶ The results, reported in Column 3, show that FDI is significantly and positively associated with growth in non-fuel exporting low-income countries. The point estimates indicate that a one-percentage point increase in the ratio of FDI to GDP is associated with a 0.5–0.7 percentage point increase in growth over a five-year period.

As discussed earlier, the time period covered by different empirical analyses can be an important source of variation in results. While longer time spans are presumably more appropriate for studying the impact of FDI on economic growth, FDI flows to developing countries, and especially to low-income countries, have really taken off only in the last two decades. To examine whether the choice of sample period makes a difference to our results, we consider two separate periods, 1974–1993 and 1989–2008.²⁷ Columns 5–10, present results for all developing countries and non-fuel exporting low-income countries only. The results suggest that the beneficial impact of FDI on growth is positive but significant for the 1974–1993 time period for only middle-income countries. However, the positive and significant effect of FDI on growth in all developing countries, including for the sub-sample of non-fuel exporting low-income countries (Column 10), has strengthened in the 1989–2008 period.

We test the sensitivity of our baseline results in a number of ways. First we use a different set of basic controls and redo the regressions in Table 6. We replace lagged average investment with national savings and add a proxy for infrastructure quality as a control variable. Second, we check if the results are driven by the choice of countries in our sample. We test for robustness to the exclusion of different groups of countries, including transition economies of Eastern Europe for which data in the pre-transition years is unavailable. The results are not presented here, but they were quite similar in terms of the signs and magnitudes of the FDI coefficient.

²⁶ As discussed in Section II, fuel-exporting low-income countries have received a significant amount of FDI in the past two decades. FDI in the extractive sector, however, may have limited beneficial spillovers for growth as it involves fewer vertical linkages with the rest of the economy.

²⁷ These results are robust to alternative subsamples and time periods. For instance, considering two non-overlapping periods—before 1988 and after 1988—does not change the thrust of the results (available upon request).

What do these results imply? Overall, these results indicate that FDI is positively associated with long-run growth in middle and low-income countries, particularly since the 1990s. Moreover, our results suggest that the impact of FDI on growth varies across income groups, with middle-income countries exhibiting a positive association between FDI and growth over the entire sample period as well as over different time horizons. We next turn to an examination of the role of country-specific characteristics and initial conditions in explaining the cross-country heterogeneity of the growth benefits of FDI.

D. Threshold Effects

How do macroeconomic policy, institutions and other fundamentals influence the growth dividends of FDI? In this section we provide a preliminary analysis. Following Kose et al. (2009b) we consider three sets of structural and policy-related features that appear to interact with FDI in important ways to determine the eventual growth outcomes: (i) economic fundamentals; (ii) economic reforms; and (iii) macroeconomic stability. Each of these factors has in its own right been shown to influence growth, but our interest here is in the narrower question of how they affect the growth benefits of FDI.

To examine possible factors contributing to differences across country groups, the model is estimated using various samples. Specifically, countries are separated into groups according to whether the selected indicators are “above” or “below” the median value (high/low) for each five-year period in the sample. We then run our basic regressions separately for these two groups of countries. We consider the 1989–2008 period since the significance of FDI for growth in low-income countries increased over this period.²⁸

Economic Fundamentals

We examine a range of indicators suggested by the discussion of the literature above. These include: financial sector development, trade openness, the degree of diversification of the economy (as measured by the percent of non-primary exports in total exports), the quality of infrastructure (proxied by phone diffusion), and institutional quality (proxied by the control of corruption index from the World Bank Governance Indicators). The institutional data are only available from 1996 and show strong persistence across time for each country. Hence, we use the average of the available data as a fixed institutional variable.²⁹ For all other variables, the median levels of the indicator variables that determine the high-low cutoffs are calculated separately for each five-year period.

The results are reported in Table 8 for countries with high and low levels of the indicator variables (above or below sample median). We find that the positive and significant coefficient on FDI is preserved only for countries with high levels of financial sector development. For countries with low financial development, the coefficient is much smaller and not statistically significant (Columns 1–2). This result is consistent with previous studies which find that the

²⁸ We also estimated the baseline regressions for the full sample period (available upon request). The results are qualitatively similar in terms of the importance of the various preconditions identified.

²⁹ As a robustness test, we replaced the institutional quality indicator with the ICRG variables used in the previous analysis, but the basic thrust of our results remains unchanged.

level of financial sector development constitutes an important threshold for realizing the indirect growth benefits of FDI.

Turning to the degree of diversification of the economy, we find important differences across groups of countries (Columns 3–4). Countries with more diversified economic structures (lower reliance on commodity exports) exhibit higher and statistically significant FDI coefficients. In contrast, we find no significant association in countries with exports concentrated in commodity sectors. These results highlight the importance of the export structure of an economy in conferring indirect growth benefits of FDI.

Consistent with previous studies, we find that better infrastructure and institutional quality are associated with higher growth benefits of FDI (Columns 7–10). The coefficient of FDI is statistically significant and positive for countries with above-median values of infrastructure and institutional quality. In contrast, we find no statistical significance for countries with poorer infrastructure and institutional quality.

Finally, we find no measurable difference in growth impact across countries for high or low levels of trade openness. This suggests that the trade openness variable may be a poor proxy for more open trade regimes and may not fully capture the benefits of trade liberalization.

Economic Reforms

A large literature has examined the economic benefits of reforms (see Christiansen et al., 2009, and references therein). We consider two de jure indicators of structural reforms in the areas of trade and the capital account. For trade liberalization, we use a (continuous) average tariff index constructed in Ostry et al. (2009), with missing values extrapolated using implicit weighted tariff rates. The capital account liberalization index is a subcomponent from Abiad et al. (2008) which covers restrictions on financial credits personal capital transactions of residents and financial credit to nonresident, as well as the use of multiple exchange rates.³⁰ Lagged values of both indices are considered to examine how liberalization efforts contribute to higher growth benefits of FDI.

With respect to trade liberalization, we find no measurable difference in the growth impact of FDI across countries for the 1989–2008 period. However, when the full sample period (1973–2008) is considered, we find that the positive and significant coefficient on FDI is preserved only for countries with more liberalized trade regimes (not reported here). Similarly, for capital account liberalization, no notable difference on the growth dividends of FDI is observed for the two groups of countries. As noted by Kose et al. (2008), this might reflect the fact that the existence of capital controls often does not accurately capture an economy's actual level of integration into international financial markets.

³⁰ Both indices are normalized to lie between 0 and 1.

Macroeconomic Stability

Studies suggest that stronger policy environments can strengthen the FDI-domestic investment relationship, and enhance growth. We find that the FDI impact on growth is statistically significant and positive only for countries with lower inflation (Columns 15–16).

In sum, these results suggest that FDI has a greater impact on growth in countries with (i) developed financial systems, (ii) stronger institutions, (iii) better infrastructure, and (iv) a more stable macroeconomic environment. To visually examine how the estimated thresholds look for a few key variables, Figure 4 plots the FDI coefficient estimates against different values of the relevant threshold variables. These figures were obtained by estimating regressions presented in Table 6 for different values of the relevant threshold variables. While the standard error bands often encompass zero, there is still some empirical content in these threshold measures.

Our results suggest that the threshold levels above which the effect of FDI on growth is positive corresponds to a private credit ratio of over 20 percent. This is broadly in line with the estimated credit to GDP thresholds of 13 to 48 percent found in the literature (see Kose et al, 2009b). For reference, the median level of private credit to GDP for middle and low-income countries in the sample are 39 percent and 16 percent, respectively (calculated across all period-country observations for each group). In terms of our sample, 59 percent of all countries have a private credit ratio of over 20 percent (83 percent of middle-income countries, and 35 percent of low-income countries). Similarly, for inflation, we find that the threshold level above which the effect of FDI on growth is positive corresponds to an annual inflation of 8 percent or lower.

V. DISCUSSION OF RESULTS

What accounts for variations in FDI flows from advanced to middle and low-income countries over the recent period? And how have these flows explained the varying growth experiences across these countries? In this paper, we offer some answers to both questions. We find that FDI outflows to low-income countries depend on economic conditions in advanced countries, with recessions in the G7 contracting FDI flows to countries. Low-income countries, however, are particularly sensitive to interest rate movements or changes in financing conditions in advanced countries, with the magnitude of this association increasing in the recent period. We also find that FDI is increasingly associated with growth in low-income countries during the recent globalization period.

The interest-rate sensitivity of FDI outflows to low-income countries could reflect a variety of reasons. As noted by Frankel (2008), real interest rates are an important influence on real prices of minerals and other commodities, where the bulk of FDI to low-income countries is concentrated.³¹ Financing of FDI in the extractive sector also differs from equity investment, a mode of financing FDI that is more commonly observed in non-resource rich countries. For instance, FDI in the extractive sector is more reliant on inter-company debt transactions, which

³¹ Low interest rates in advanced countries can increase the demand for storable commodities, or reduce the supply, through a variety of channels: by decreasing the incentive for extraction today rather than tomorrow; by increasing firms' desire to carry inventories; and by encouraging speculators to shift out of treasury bills, and into spot commodity contracts (Frankel, 2008).

tend to exhibit the same degree of volatility as international debt flows that are highly sensitive to international financing conditions (World Bank, 2004).³² Finally, FDI in the services sector, such as tourism and financial services, which is important for low-income countries in the Caribbean, also tends to be more sensitive to borrowing conditions in advanced countries (ECLAC, 2008).

Going forward, our empirical results suggest two key risks to the economic outlook for low-income countries coming from the behavior of FDI. First, international interest rates could rise. Currently, the global price of risk is being held down by low policy rates and quantitative easing in advanced countries and this may mitigate the effect on low-income countries in the short run. In the medium-term, as monetary easing is withdrawn, interest rates in advanced countries are expected to rise. New regulatory measures to rein in excessive risk-taking by financial intermediaries may also constrain global liquidity in the near future. As a result, there is substantial uncertainty regarding future external financing conditions, which depends, in no small measure, on fiscal risks in the G7. While the effect of a rise in interest rates on FDI should be lower than on debt and portfolio flows, parent firms could face higher capital costs with the tightening of financial regulations, and these are likely to reduce their ability to finance individual projects.

A second risk arises from the direct negative impact of recessions on FDI outflows from the G7. The current recession has been the most severe in recent history. Already, FDI to low-income countries on average fell by over 30 percent in 2009, relative to pre-crisis levels. The strength of the rebound in many advanced countries has been moderate, with prospects for a self-sustaining recovery in economic activity in advanced countries containing significant downside risks. In view of these considerations, our analysis indicates that an important medium-term risk to growth in low-income countries may stem from a sustained reduction of these flows.

What steps can developing countries take to moderate the impact of a potentially precipitous decline of flows from the G7? One possibility is to look for other source countries. To some extent, the reduction in North-South flows could be offset by a surge in South-South flows, with countries like China, South Africa, Russia and Brazil taking the lead. FDI flows from these new players, however, remain small relative to total FDI (UNCTAD, 2006). Nevertheless, South-South FDI is expected to be more resilient than flows from advanced countries, owing to the significant role of state-owned enterprises, limited reliance on international debt markets for financing, and continued efforts to gain access to energy and minerals assets (World Bank, 2010).

More importantly, our results suggest that countries can turn to domestic policy solutions as the growth dividends associated with FDI depend on propitious local conditions. First, the benefits of FDI are higher for more financially developed countries. Promoting financial development could thus assuage the painful adjustment related to the fall in FDI by increasing the growth benefits of each unit of remaining FDI. Improvements in the policies and regulatory and

³² These include the borrowing and lending of funds, including debt securities and trade credits, between parent and subsidiaries and among subsidiaries. Empirical evidence suggests that during recessions in advanced countries, investors reduce their FDI exposure in developing countries by calling back intercompany loans and increasing repatriated earnings, but the equity component generally remains more resilient (World Bank, 2004).

supervisory frameworks may significantly boost domestic financial intermediation. This strategy could ultimately benefit countries that have a strong framework for financial intermediation by increasing the efficiency of domestic financial intermediaries. It could even increase aggregate productivity by raising the return to innovation by local firms (Dabla-Norris et al., 2010).

Our results also show that other economic fundamentals increase the effect of FDI on growth and could ease the burden of the ongoing crisis. Countries with more diversified economic structures, better infrastructure, stronger institutions, and greater macroeconomic stability exhibit higher and statistically significant FDI coefficients. It follows that even in an international environment in which FDI may become scarce, countries can take steps to create the pre-conditions for deriving the growth benefits of FDI. In the expected tougher global environment, such factors are likely to play an increasingly critical role which underscores the importance of forging ahead with further reforms. Significant progress in these areas could well diminish the impact of the ongoing crisis on medium-term growth in low-income countries.

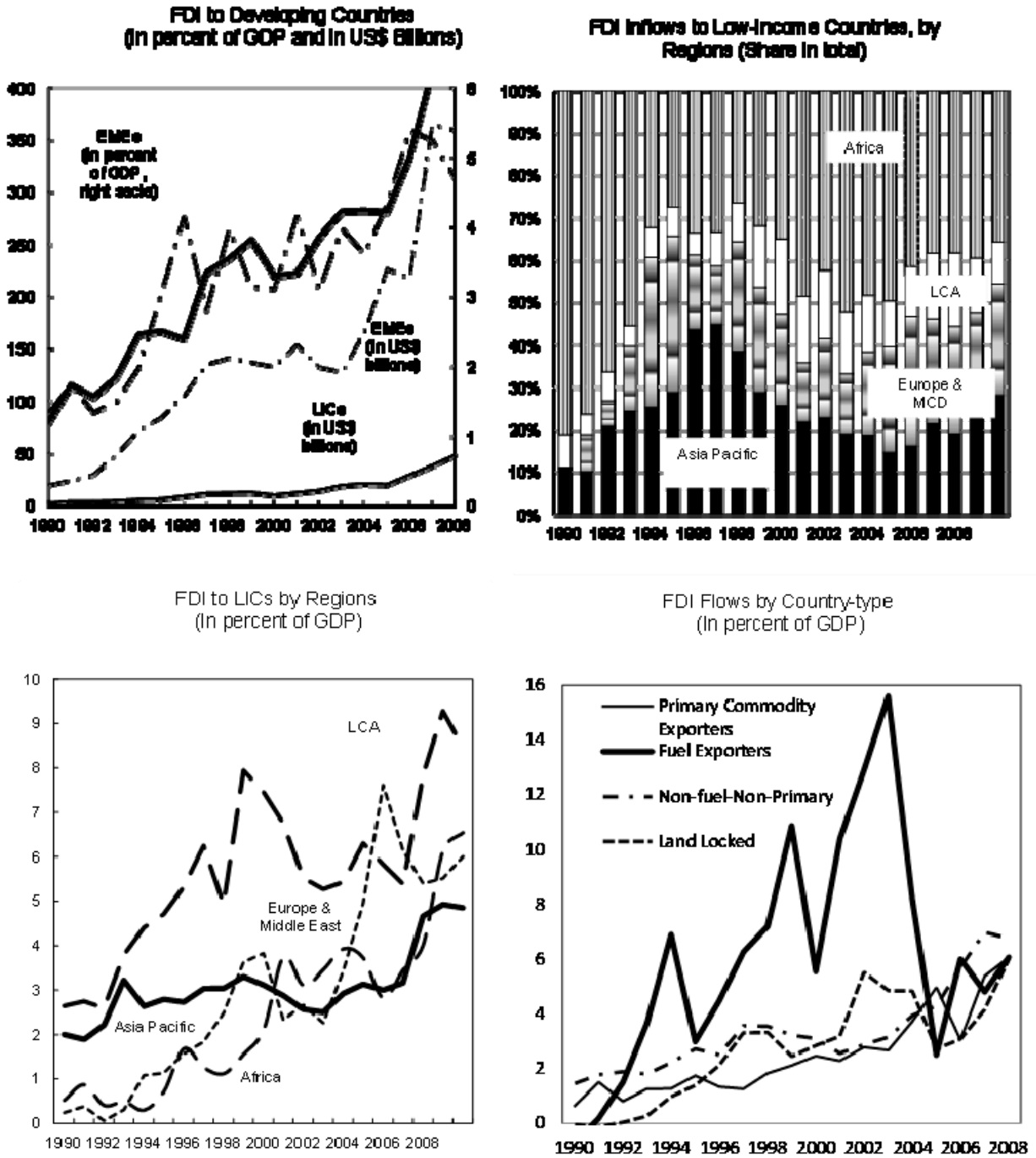
VI. CONCLUSIONS

This paper documents the relevance of global conditions for FDI to low-income countries and examines the growth implications of FDI inflows in the pre-crisis period. Using data on bilateral FDI flows from G7 countries to developing economies, we find that economic conditions in advanced countries are important factors in explaining cross-country variations in these flows in the recent period. Our results indicate that low-income countries are particularly sensitive to changes in the cost of borrowing in advanced countries. We also offer new evidence on the link between FDI inflows and growth in low-income countries. We find that growth is increasingly associated with higher FDI inflows, and we illustrate how the growth dividends of FDI depend crucially on economic fundamentals and macroeconomic stability.

Much uncertainty surrounds the speed of the recovery in advanced countries, the form of future regulatory reforms, and the future dynamics of global interest rates. Our results, however, indicate that low-income countries need not idly accept this negative shock, but can take steps to alleviate the effects of potentially painful adjustments related to a worldwide tightening in financing conditions. In particular, countries should carry-out needed reforms and policy changes, which would have the added benefit of improving the growth dividends of FDI even beyond the current crisis.

The results in this paper point to a large and unfinished research agenda. One issue is to delineate more clearly the specific channels through which financial conditions in advanced countries influence FDI outflows to low-income countries. Another important issue is to identify more definitive thresholds that drive the growth dividends of FDI. Our paper illustrates the relevance of domestic financial and institutional development and other policy factors, motivated by the existing literature. Further work is needed to more rigorously examine the economic significance of the relevant thresholds and the trade-offs between the various conditions. For instance, is there complementarity and substitutability among different threshold conditions? Pursuing these issues in detail is beyond the scope of this paper and we leave this for future work.

Figure 1. Recent Trend in FDI Flows to Low-Income Countries, 1990–2008



Sources: WEO database and IMF staff estimates.

Figure 2. Global Economic Conditions, 1980–2009

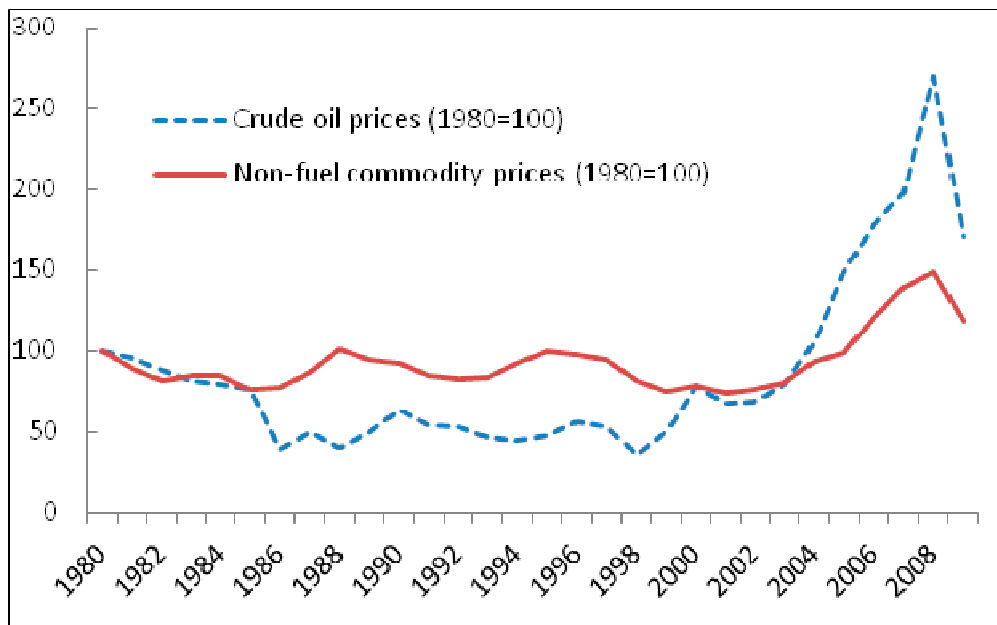
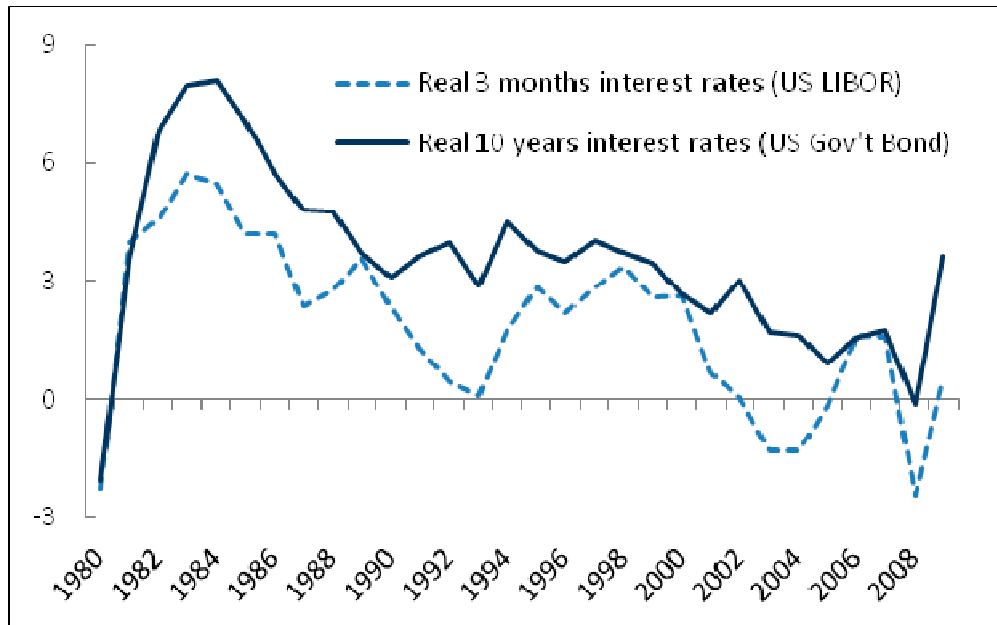
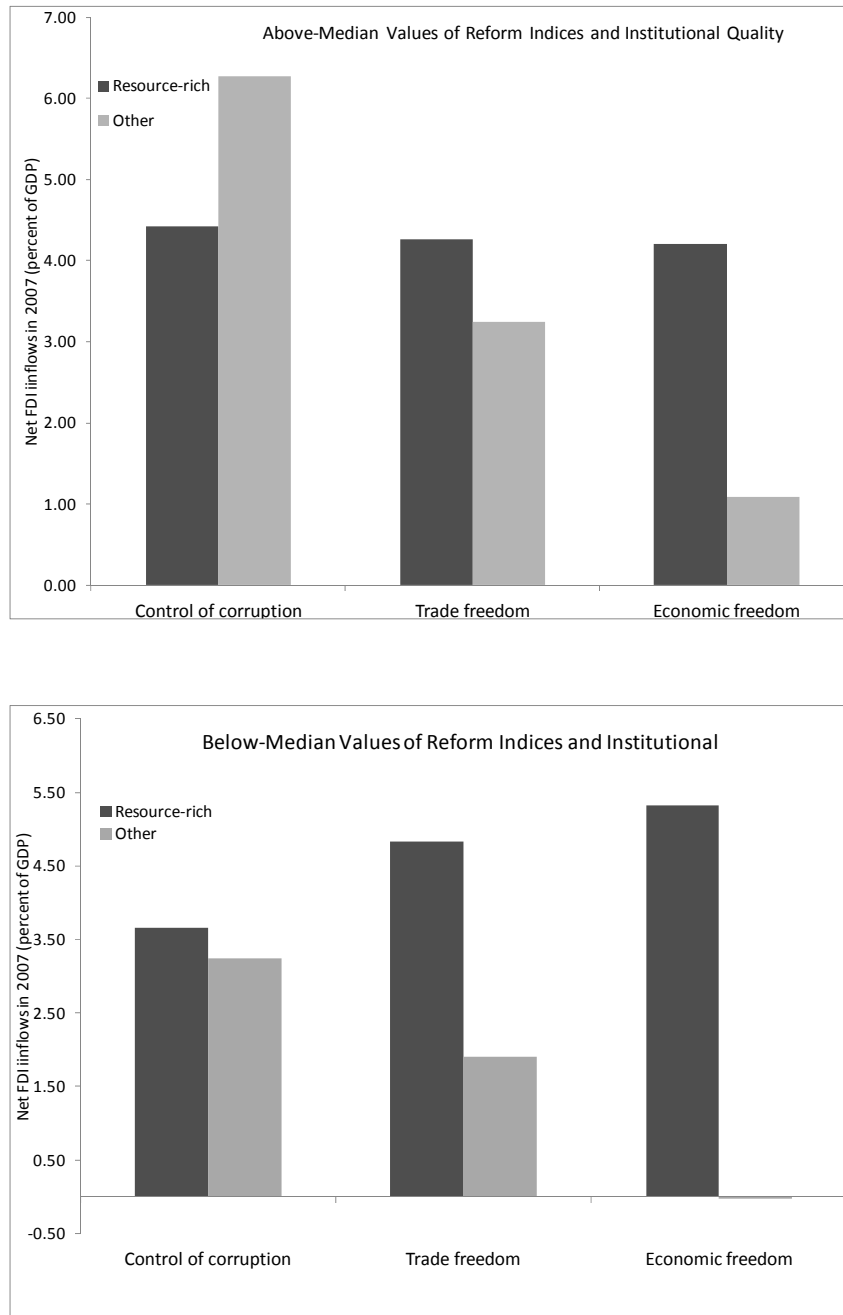
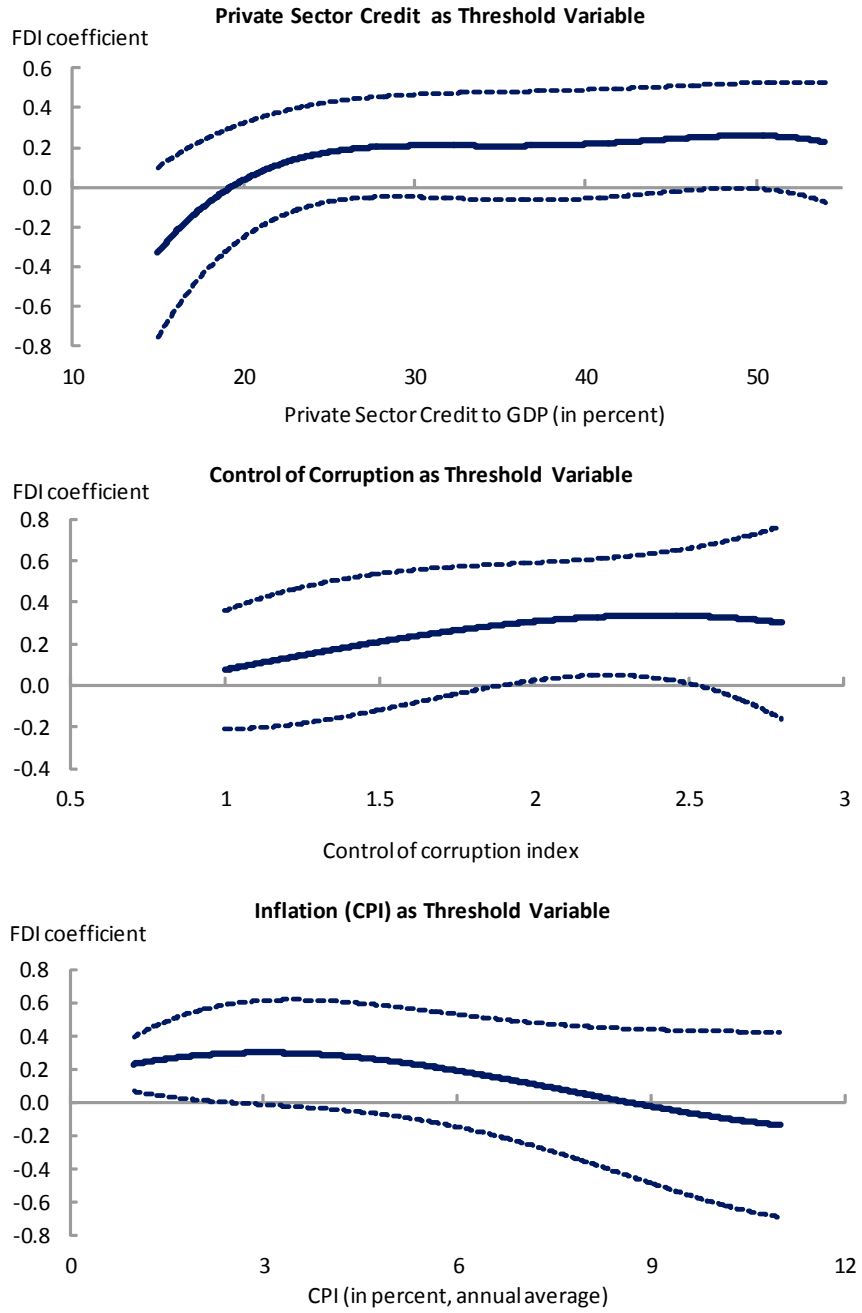


Figure 3. Above and Below Median Values of Institutional Quality and Reform Indices, and FDI to Low-Income Countries ^{1/}



^{1/} Higher values of all indices reflect better institutional quality and greater progress with reforms. Control of Corruption is from the World Bank's World Governance Indicators. The indices of trade and economic freedom are from the Heritage Foundation. The former measures the absence of tariffs and non-tariff barriers, based on the presence of quantity, price, regulatory, investment, customs restrictions as well as direct government intervention. The index of economic freedom is a composite index of the economic environment or set of policies that is most conducive to economic freedom (labor, trade, property rights, monetary, fiscal, financial, investment, etc.)

Figure 4. Threshold Analysis



Note: See Table 7 for estimation details. Dashed lines represent 95 percent confidence intervals.

Table 1. Country Coverage

Low-income Countries		Middle-income Countries	
Albania	Nepal	Algeria	Philippines
Azerbaijan	Nicaragua	Argentina	Poland
Angola	Niger	Botswana	Romania
Armenia	Nigeria	Brazil	Russian Federation
Bangladesh	Pakistan	Bulgaria	Seychelles
Benin	Papua New Guinea	Chile	South Africa
Bhutan	Rwanda	China	Suriname
Bolivia	Senegal	Colombia	Syrian Arab Republic
Burundi	Sierra Leone	Costa Rica	Swaziland
Cambodia	Sri Lanka	Croatia	Thailand
Cameroon	St. Kitts	Dominican Republic	Tunisia
Central African Republic	St. Lucia	Ecuador	Turkey
Chad	St. Vincent	Egypt, Arab Rep.	Ukraine
Congo, Rep.	Tanzania	El Salvador	Uruguay
Côte d'Ivoire	Togo	Gabon	Venezuela, RB
Dominica	Uganda	Guatemala	
Ethiopia	Vietnam	India	
Fiji	Zambia	Indonesia	
Georgia		Iran, Islamic Rep.	
Ghana		Jamaica	
Grenada		Jordan	
Guinea		Kazakhstan	
Guyana		Kuwait	
Haiti		Latvia	
Honduras		Lithuania	
Kenya		Malaysia	
Kyrgyz Republic		Maldives	
Lao PDR		Mauritius	
Lesotho		Mexico	
Madagascar		Morocco	
Malawi		Namibia	
Mali		Oman	
Mauritania		Panama	
Moldova		Paraguay	
Mongolia		Peru	
Mozambique			

Table 2. Baseline Regressions: Determinants of Bilateral FDI Flows
(Dependent Variable=log of Bilateral FDI flows; 1985–2007)

	All developing countries		Middle-income countries		Low-income countries		Non-oil exporting SSA countries	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GDP (host country)	0.6852*** (0.1358)	0.7723*** (0.1363)	1.0719*** (0.2113)	1.1847*** (0.2120)	0.1691 (0.1541)	0.2053 (0.1564)	0.1406 (0.1777)	0.1713 (0.1680)
GDP (source country)	0.9878*** (0.2429)	0.7952*** (0.2583)	0.9972*** (0.3288)	0.7453** (0.3539)	0.7607** (0.3135)	0.6295* (0.3251)	1.1045*** (0.3295)	0.9402*** (0.3374)
Bilateral trade (t-1)	0.3211*** (0.0581)	0.3059*** (0.0583)	0.5177*** (0.1029)	0.4955*** (0.1034)	0.1640*** (0.0635)	0.1598** (0.0635)	0.0663 (0.0805)	0.0667 (0.0811)
Real growth (source country)	0.1107*** (0.0260)		0.1623*** (0.0339)		0.0120 (0.0366)		-0.0209 (0.0410)	
Output gap		0.0298* (0.0160)		0.0272 (0.0203)		0.0359 (0.0240)		0.0416 (0.0268)
Real interest rate	-0.0741*** (0.0239)	-0.0750*** (0.0241)	-0.0518 (0.0331)	-0.0513 (0.0333)	-0.0951*** (0.0313)	-0.1000*** (0.0314)	-0.1994*** (0.0338)	-0.2074*** (0.0338)
Constant	90.3219*** (27.5286)	83.5978*** (28.8689)	164.6537*** (39.9931)	159.8189*** (41.6523)	4.1814 (32.5752)	-8.9022 (33.8599)	55.7974 (36.1114)	37.8529 (38.2030)
Time trend	YES	YES	YES	YES	YES	YES	YES	YES
Country-pair fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
Number of observations	5725	5725	3505	3505	2220	2220	1063	1063
R ²	0.4339	0.4325	0.3864	0.3832	0.2823	0.2832	0.3896	0.3912

Note: Robust standard errors in parentheses.

A *, **, and *** represent significance at 10, 5 and 1 percent respectively.

Table 3. Bilateral FDI Regression: Lagged Effects of Economic Conditions and Post-1993 Period
(Dependent Variable: log of Bilateral FDI Flows)

	Full Time Period			Post 1993 Sample								
	All countries	Middle-income	Low-income	Middle-income countries			Low-income countries			Non-oil exporting SSA		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
GDP (host country)	1.0513*** (0.2403)	1.0513*** (0.2403)	0.0984 (0.1786)	1.8651*** (0.3183)	2.1545*** (0.3248)	1.8333*** (0.3438)	0.8819*** (0.3064)	0.9260*** (0.3020)	0.6723** (0.3377)	0.7219 (0.4651)	0.8796* (0.4593)	0.8294 (0.5200)
GDP (source country)	0.8656** (0.3943)	0.8656** (0.3943)	1.0290** (0.4621)	0.5073 (0.4049)	0.2274 (0.4197)	0.6110 (0.4485)	0.1371 (0.4307)	0.3945 (0.4162)	0.8168 (0.5629)	0.9830 (0.6273)	1.1320* (0.6018)	1.4278* (0.7610)
Bilateral trade (t-1)	0.5307*** (0.1285)	0.5307*** (0.1285)	0.1965*** (0.0682)	0.3421*** (0.1244)	0.2786** (0.1240)	0.3990** (0.1749)	0.0618 (0.0894)	0.0735 (0.0885)	0.0994 (0.1063)	-0.0572 (0.1281)	-0.0407 (0.1263)	0.0067 (0.1600)
Real growth (source country)	0.1250*** (0.0410)	0.1250*** (0.0410)	0.0042 (0.0566)	0.3111*** (0.0672)		0.2647*** (0.0716)	0.1333** (0.0607)		0.2150*** (0.0784)	0.1013 (0.0828)		0.2208** (0.1053)
Real growth (source country) (t-1)	0.0085 (0.0388)	0.0085 (0.0388)	0.0735* (0.0404)			0.0801 (0.0567)			0.1406** (0.0580)			0.2596*** (0.0751)
Output gap					0.0823*** (0.0316)			0.1028*** (0.0321)			0.1804*** (0.0448)	
Real interest rate	0.0451 (0.0541)	0.0451 (0.0541)	-0.1136* (0.0621)	-0.0894 (0.0569)	-0.0027 (0.0534)	-0.0100 (0.0834)	-0.1887*** (0.0541)	-0.1716*** (0.0490)	-0.3039*** (0.0922)	-0.3301*** (0.0745)	-0.3237*** (0.0678)	-0.5669*** (0.1270)
Real interest rate (t-1)	-0.1134** (0.0566)	-0.1134** (0.0566)	0.0118 (0.0818)			-0.1384* (0.0738)			0.0657 (0.0881)			0.1414 (0.1157)
Constant	186.6180*** (44.5016)	186.6180*** (44.5016)	1.9871 (40.0728)	256.2635*** (50.5694)	233.8205*** (52.5098)	305.5840*** (55.6308)	54.4037 (47.7860)	27.4473 (48.3116)	47.6282 (58.2944)	112.9584* (62.3181)	78.2489 (62.4887)	149.6809** (73.2462)
Time trend	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country-pair fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Number of observations		3103	1817	2645	2645	2437	1722	1722	1434	922	922	772
R ²		0.3936	0.3063	0.3981	0.3941	0.3996	0.3577	0.3603	0.3779	0.3566	0.3701	0.3993

Note: Robust standard errors in parentheses.

A *, **, and *** represent significance at 10, 5 and 1 percent respectively.

Table 4. Bilateral FDI Regressions: Impact of Recessions
(Dependent variable: log of bilateral FDI flows, 1993–2007)

	Full sample		Middle-income Countries		Low-income countries	
	(1)	(2)	(3)	(4)	(5)	(6)
GDP (host country)	1.6463*** (0.2442)	1.6362*** (0.2675)	1.8504*** (0.3193)	1.8041*** (0.3444)	0.8601** (0.3082)	0.6524* (0.3478)
GDP (source country)	0.0923 (0.3201)	0.5884 (0.3641)	0.4176 (0.4125)	0.8104* (0.4458)	0.0385 (0.4357)	0.7196 (0.5374)
Bilateral trade (t-1)	0.1895* (0.0764)	0.2018** (0.1026)	0.3338** (0.1246)	0.3891** (0.1748)	0.0550 (0.0891)	0.0948 (0.1068)
Real growth (source country)	0.2076*** (0.0612)	0.2620*** (0.0533)	0.2610** (0.0817)	0.2961*** (0.0692)	0.0759 (0.0773)	0.1642** (0.0691)
Real interest rate	-0.1294** (0.0411)	-0.1463*** (0.0444)	-0.0863 (0.0566)	-0.0971 (0.0594)	-0.1856*** (0.0543)	-0.2263*** (0.0618)
Recession dummy	-0.2318 (0.1833)		-0.2850 (0.2740)		-0.2807 (0.1718)	
Recession dummy (t-1)		-0.3403*** (0.1220)		-0.4373** (0.1749)		-0.2540* (0.1344)
Constant	191.1085*** (39.3306)	227.6040*** (42.7576)	247.9530*** (51.1649)	285.6564*** (53.5221)	40.1965 (49.2393)	47.8790 (55.8792)
Time trend	YES	YES	YES	YES	YES	YES
Country-pair fixed effects	YES	YES	YES	YES	YES	YES
Number of observations	4367	3871	2645	2437	1722	1434
R ²	0.4528	0.4576	0.3984	0.3999	0.3585	0.3761

Note: Robust standard errors in parentheses

A *, **, and *** represent significance at 10, 5 and 1 percent respectively.

Table 5. Bilateral FDI Flows: Regional Effects of Recessions
(Dependent variable: log of bilateral FDI flows, 1985–2007)

	Asia			ECA			LAC			SSA		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
GDP (host country)	1.3546*** (0.3526)	1.3367*** (0.3533)	1.4554*** (0.3930)	0.6715 (0.4795)	0.5561 (0.4741)	0.8788 (0.5440)	2.5581*** (0.5306)	2.5581*** (0.5307)	2.2789*** (0.5444)	1.0034** (0.4554)	0.9922** (0.4558)	1.1028** (0.5317)
GDP (source country)	0.7946* (0.4809)	0.7026 (0.4849)	1.2020** (0.5619)	0.5645 (0.8131)	0.3559 (0.8154)	0.3838 (0.9443)	-0.0613 (0.6588)	-0.0587 (0.6854)	0.5054 (0.7613)	0.9721 (0.6359)	0.8691 (0.6634)	1.3784* (0.7687)
Bilateral trade (t-1)	0.0527 (0.1138)	0.0457 (0.1143)	0.0417 (0.1424)	0.8920*** (0.2481)	0.8895*** (0.2474)	0.8096*** (0.2706)	0.1367 (0.1508)	0.1371 (0.1493)	0.1056 (0.1961)	-0.0869 (0.1211)	-0.0950 (0.1215)	-0.0830 (0.1571)
Real interest rate	-0.1913*** (0.0614)	-0.1884*** (0.0612)	-0.2213*** (0.0670)	-0.2701*** (0.0928)	-0.2562*** (0.0924)	-0.3309*** (0.0982)	-0.0224 (0.0970)	-0.0224 (0.0971)	-0.0032 (0.1019)	-0.2780*** (0.0701)	-0.2747*** (0.0702)	-0.3410*** (0.0769)
Real growth (source country)	0.1373* (0.0750)	0.0844 (0.0934)	0.1633** (0.0812)	0.5022*** (0.1128)	0.3598*** (0.1229)	0.4825*** (0.1176)	0.2602** (0.1042)	0.2616** (0.1322)	0.2676** (0.1115)	0.1185 (0.0865)	0.0619 (0.1040)	0.1575 (0.0962)
Recession dummy		-0.2760 (0.2561)			-0.8168* (0.4868)			0.0071 (0.3922)			-0.2769 (0.2635)	
Recession dummy (t-1)			-0.3242* (0.1692)			-0.3185 (0.2855)			-0.7512*** (0.2805)			-0.3068* (0.1718)
Constant	208.7482*** (52.8988)	198.2182*** (53.4184)	251.3365*** (60.2691)	247.7262* (100.5788)	208.6661* (101.0600)	304.4831** (107.8385)	278.8014*** (79.4865)	279.0053*** (81.9607)	294.8533*** (86.5327)	156.8783** (61.4023)	144.8830** (63.9731)	199.9390*** (71.9706)
Time trend	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country-pair fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Number of observations	1811	1811	1574	700	700	634	1200	1200	1076	1166	1166	975
R ²	0.5077	0.5080	0.5205	0.4166	0.4202	0.4110	0.3972	0.3972	0.4009	0.4061	0.4067	0.4444

Note: Robust standard errors in parentheses

A *, **, and *** represent significance at 10, 5 and 1 percent respectively.

Table 6. Robustness Test: Role of Local Conditions
(Dependent variable: log of bilateral FDI flows, 1985–2007)

	All developing countries					Middle-income countries					Low-income countries				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
GDP (host country)	0.6123*** (0.1378)	0.8955*** (0.1832)	0.7437*** (0.1498)	0.6904*** (0.1543)	0.7726*** (0.1595)	0.9749*** (0.2167)	1.4529*** (0.2662)	1.0777*** (0.2342)	1.1030*** (0.2356)	1.1190*** (0.2455)	0.1311 (0.1564)	0.1126 (0.2046)	0.1647 (0.1061)	0.1207 (0.1695)	0.1276 (0.1829)
GDP (source country)	1.0184*** (0.2484)	1.0933*** (0.2850)	1.1616*** (0.2779)	1.1738*** (0.2781)	0.9712*** (0.2850)	1.0490*** (0.3337)	0.9479** (0.3705)	1.0785*** (0.3668)	1.1475*** (0.3652)	0.8590** (0.3658)	0.7515** (0.3256)	0.7651** (0.3882)	0.7460** (0.3246)	0.7786** (0.3726)	1.0197** (0.4172)
Bilateral trade (t-1)	0.3347*** (0.0597)	0.2949*** (0.0776)	0.3011*** (0.0707)	0.3449*** (0.0716)	0.4442*** (0.0836)	0.5317*** (0.1049)	0.5422*** (0.1282)	0.5676*** (0.1329)	0.5533*** (0.1277)	0.6715*** (0.1555)	0.1750*** (0.0665)	0.2002** (0.0797)	0.1402** (0.0601)	0.2140*** (0.0728)	0.2468*** (0.0885)
Real growth (source country)	0.1070*** (0.0266)	0.1194*** (0.0288)	0.1258*** (0.0277)	0.1193*** (0.0282)	0.1220*** (0.0303)	0.1581*** (0.0345)	0.1699*** (0.0366)	0.1688*** (0.0367)	0.1628*** (0.0367)	0.1780*** (0.0377)	0.0093 (0.0382)	0.0121 (0.0396)	0.0264 (0.0330)	0.0169 (0.0383)	-0.0020 (0.0474)
Real interest rate	-0.0739*** (0.0243)	-0.0630** (0.0272)	-0.0511* (0.0265)	-0.0659** (0.0267)	-0.0612** (0.0283)	-0.0541 (0.0335)	-0.0446 (0.0374)	-0.0497 (0.0377)	-0.0431 (0.0373)	-0.0482 (0.0372)	-0.0910*** (0.0320)	-0.0789** (0.0348)	-0.0493 (0.0302)	-0.0939*** (0.0341)	-0.0760* (0.0401)
Real growth (host country) (t-1)	0.0200** (0.0078)					0.0247** (0.0117)					0.0107 (0.0085)				
Private credit (host country) (t-1)		-0.0002 (0.0002)					-0.0069* (0.0036)					0.0001 (0.0001)			
Government consumption (host country) (t-1)			-0.0303** (0.0129)					-0.0439* (0.0231)					-0.0153 (0.0108)		
Inflation (host country) (t-1)				-0.0000 (0.0001)					-0.0001 (0.0001)					0.0000 (0.0000)	
institutional quality (host country)					0.0513* (0.0272)					0.0785** (0.0345)					-0.0810** (0.0351)
Constant	90.8649*** (27.9389)	116.7693*** (32.1341)	95.9938*** (30.9304)	101.0786** (30.7592)	82.8424** (32.4989)	166.6999*** (40.2880)	205.5872*** (44.4216)	173.6355*** (42.9885)	182.3476*** (43.0174)	140.9058*** (44.6734)	-1.4786 (33.6693)	-10.2500 (40.0763)	-24.6703 (35.0915)	-6.1149 (38.2274)	6.6057 (43.3111)
Time trend	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country-pair fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Number of observations	5556	4843	4820	4954	4657	3415	3102	3101	3128	3025	2141	1741	1719	1826	1632
R ²	0.4335	0.4401	0.4516	0.4391	0.4198	0.3841	0.3879	0.3865	0.3843	0.3680	0.2824	0.3062	0.3587	0.2985	0.2773

Note: Robust standard errors in parentheses

A *, **, and *** represent significance at 10, 5 and 1 percent respectively.

Table 7. Growth Regressions: Impact of FDI
(Dependent variable=annual growth of real per capita GDP (5-year average); 1974–2008)

	Full period (1974-2008)				1974-1993			1989-2008		
	All developing countries	LICs	Non-oil exporting LICs	MICs	All developing countries	Non-oil exporting LICs	MICs	All developing countries	Non-oil exporting LICs	MICs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
FDI	0.45 *** (0.14)	0.30 (0.27)	0.72 ** (0.30)	0.62 *** (0.15)	-0.28 (0.43)	0.46 (0.45)	0.87 ** (0.38)	0.28 *** (0.08)	0.57 ** (0.22)	0.33 * (0.12)
Trade openness	-0.001 (0.003)	0.005 (0.018)	-0.014 (0.018)	-0.002 (0.002)	-0.0004 (0.001)	0.0195 (0.04)	0.0002 (0.001)	-0.011 (0.011)	-0.019 (0.018)	-0.026 (0.019)
Government consumption expenditures	-0.004 (0.07)	-0.007 (0.07)	-0.026 (0.08)	0.091 (0.09)	-0.077 (0.13)	-0.002 (0.07)	0.294 (0.24)	-0.038 (0.09)	-0.055 (0.07)	0.110 (0.14)
CPI	-0.002 *** (0.001)	-0.001 (0.002)	-0.0012 (0.002)	-0.0002 (0.002)	0.001 (0.002)	0.000 * (0.001)	0.005 * (0.003)	-0.005 *** (0.005)	-0.0016 *** (0.001)	-0.0001 (0.002)
Private sector credit	0.04 * (0.02)	-0.08 (0.08)	0.00 (0.06)	0.01 (0.03)	0.16 ** (0.06)	0.14 (0.10)	0.01 (0.05)	0.04 (0.02)	-0.04 (0.04)	0.01 (0.02)
Average investment (t-1)	-0.08 (0.06)	-0.01 (0.07)	0.00 (0.07)	-0.10 ** (0.04)	0.04 (0.15)	-0.12 (0.16)	-0.07 (0.09)	-0.09 (0.07)	0.03 (0.06)	-0.07 (0.05)
Secondary school enrollment	0.04 (0.03)	0.10 *** (0.03)	0.05 (0.03)	0.02 (0.04)	0.06 (0.07)	0.12 (0.10)	-0.01 (0.12)	0.02 (0.03)	0.04 (0.03)	-0.07 (0.06)
Population growth	-0.87 ** (0.34)	-0.75 *** (0.28)	-0.66 ** (0.29)	-0.66 (0.95)	-0.26 (0.40)	-0.66 * (0.30)	-1.82 * (1.03)	-0.88 ** (0.44)	-0.51 *** (0.17)	-1.00 (0.71)
Initial real GDP per capita	-4.19 *** (1.42)	-4.24 *** (1.57)	-3.23 (2.24)	-4.09 *** (1.35)	-14.59 *** (2.96)	-5.98 * (2.78)	-4.80 * (2.84)	-2.80 *** (1.03)	-1.55 (1.56)	-6.02 * (1.69)
Arellano-Bond test (p-level)	0.53	0.42	0.76	0.97	0.95	0.58	0.58	0.34	0.81	0.68
Number of instruments	52	52	52	52	25	25	25	43	43	43
Number of observations	477	226	194	251	206	86	105	349	141	186
Number of countries	104	50	43	54	79	33	41	104	43	54

Note: Robust standard errors in parantheses.

1/ The equation is estimated using GMM and time dummies. A ***, **, and * represent significance at 1, 5, and 10 percent, respectively. Wald tests show that FDI coefficients are significant at 1 percent.

Table 8. Threshold Regressions
(Dependent Variable=Annual Growth of Real per Capita GDP (5-year average); 1989-2008)

Economic Fundamentals	Private sector credit ²		Trade Openness ²		Diversified exports ²		Infrastructure Quality ²		Institutional Quality ³	
	Larger	Smaller	Higher	Lower	More	Less	Higher	Lower	Higher	Lower
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
FDI	0.31 ***	0.12	0.07	0.21	0.30 ***	-0.24	0.33 *	0.17	0.24 *	-0.07
Trade openness	0.004	0.004	-0.01	0.01	-0.003	-0.02	-0.01	-0.01	-0.01	-0.07 ***
Government consumption expenditures	-0.05	0.03	0.02	-0.15	-0.03	-0.07	-0.11	0.01	-0.03	0.05
CPI	-0.003 *	0.00003	-0.003 ***	-0.002	-0.001	-0.002	-0.003 ***	-0.002 ***	-0.003 ***	-0.0004
Private sector credit	0.02	-0.25 ***	0.03	-0.02	0.02	-0.01	0.01	0.06	0.03	-0.11 ***
Average investment (t-1)	-0.06	-0.03	-0.03	0.02	-0.05	0.004	-0.08 *	0.05	-0.10	0.30 ***
Secondary school enrollment	-0.01	0.08 **	-0.03	0.08 **	-0.02	0.11	-0.01	0.03	-0.03	0.10
Population growth	-1.24 **	-0.45 **	-1.56 ***	-0.65 *	-1.41 ***	-0.44	-1.47 ***	-0.43 ***	-1.99 ***	-1.15
Log real GDP per capita (t-1)	-1.68	-1.63	-4.19 **	-2.81 *	-1.28 *	-2.62	-1.91 **	-3.89 ***	-0.15	-1.33
Arellano-Bond test (AR (2), p-level)	0.66	0.28	0.80	0.52	0.23	0.99	0.69	0.56	0.67	0.40
Number of instruments	43	43	43	43	43	43	43	43	43	43
Number of observations	189	160	162	181	156	145	173	176	146	126
Number of countries	71	66	63	67	61	58	60	58	40	39

Economic Reforms	Capital account liberalization ²		Current account liberalization ²		Macroeconomic Stability	CPI (average) ²	
	Higher	Lower	Higher	Lower		Lower	Higher
	(11)	(12)	(13)	(14)		(15)	(16)
FDI	0.11	-0.12	0.02	-0.15	FDI	0.19 *	0.15
Trade openness	-0.03 *	0.01	-0.02	0.00	Trade openness	-0.01	-0.003
Government consumption expenditures	-0.05	-0.08	-0.10	0.04	Government consumption expenditures	0.02	-0.07
CPI	-0.004 **	0.002	-0.004 **	0.00	CPI	-0.002 *	-0.001
Private sector credit	0.004	-0.01	0.05 *	-0.06 *	Private sector credit	0.01	-0.02
Average investment (t-1)	-0.11	0.08	-0.16 **	0.07	Average investment (t-1)	-0.01	-0.05
Secondary school enrollment	-0.07 **	0.14 ***	-0.03	0.08	Secondary school enrollment	-0.01	0.04
Population growth	-1.37 ***	-0.70 ***	-1.74 ***	-0.73 **	Population growth	-1.46 ***	-0.68
Log real GDP per capita (t-1)	-0.40	-3.82 ***	-0.90	-2.87 ***	Log real GDP per capita (t-1)	-1.01 **	-1.97
Arellano-Bond test (AR (2), p-level)	0.83	0.12	0.44	0.35	Arellano-Bond test (AR (2), p-level)	0.90	0.76
Number of instruments	43	43	43	43	Number of instruments	43	43
Number of observations	132	126	129	129	Number of observations	191	158
Number of countries	46	49	49	49	Number of countries	77	72

1/ The equation is estimated using GMM and time dummies. A ***, **, and * represent significance at 1, 5, and 10 percent, respectively. Wald tests show that FDI coefficients are significant at 1 percent.

2/ Countries are separated into groups according to whether selected indicators are "above" or "below" the median value for the sample in each period.

3/ Countries are separated into two groups using the average of institutional index during the whole sample period.

References

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Appendix 1. Variable Definition and Sources

Variable	Description	Source
FDI	Net FDI to GDP ratio	WEO (IMF)
GDP	GDP, USD bn	WEO (IMF)
GDP per capita	GDP per capita (constant 2000 US\$)	WDI (World Bank)
GDP per capita growth	Annual growth of real GDP per capita (constant 2000 US\$)	WDI (World Bank)
Bilateral trade	Sum of bilateral exports and imports, USD mn	COMTRADE (UN)
Trade openness	Exports and imports ratio to GDP	WEO (IMF)
Real growth	Rate of growth, gross domestic product, constant prices	WEO (IMF)
School enrollment	School enrollment, secondary (% gross)	WDI (World Bank)
Output gap	Gap between GDP and its (log-linear) trend	WEO (IMF) and IMF staff calculations
Real interest rate	Interest rates on 3-months t-bills deflated by the CPI index	WEO, IFS (IMF)
Recession	Dummy variable (see text)	IMF staff calculations
Private credit	Domestic credit to private sector to GDP	WDI (World Bank)
Population	Population growth (annual %)	WDI (World Bank)
Government	General government final consumption expenditure (% of GDP)	WDI (World Bank)
Fixed investment	Average investment to GDP	PWT
CPI	Consumer price index, annual	WEO (IMF)
Institutional quality	Simple average of three indices	ICRG
Corruption	Control of Corruption index	World Bank Governance Indicators

Notes: WEO" World Economic Outlook database; PWT: Penn World Tables (version 6.3); WDI: World Development Indicators