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***Foreign Direct Investment and Growth:
On the Role of Complementarities, the Search for Mechanisms, and the Potential for Linkages***

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Abstract

This paper examines the evolution of the literature on the relationship between foreign direct investment (FDI) and growth in host countries, particularly developing countries. It provides a broad overview, with a focus on two elements that have recently become particularly important, (1) the role of complementary local conditions conducive to reaping the benefits of FDI (which relate to *when* FDI will generate growth), and (2) the mechanisms by which FDI creates positive externalities (which relate to *how* FDI generates growth).

Key words: foreign direct investment, economic growth, spillovers, complementarities, mechanism.

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1. Introduction

Policy makers and academics often argue that developing countries should attract foreign direct investment (FDI) as a means of generating higher economic growth by providing to domestic firms both a source of direct capital financing and valuable productivity externalities.¹ Anticipating such benefits, governments of developed and developing countries alike have over the past two decades not only reduced barriers to FDI, but also offered incentives calculated to attract foreign firms and foster relationships between multinational enterprises (MNEs) and local firms (especially suppliers). In 1998, for example, 103 countries offered tax concessions to foreign companies that established production or administrative facilities within their borders (Hanson, 2001). Sixty-eight of 81 developing countries interviewed for the 2005 Census of Investment Promotion Agencies reported offering tax, fiscal, or other incentives to foreign investment (Harding and Javorcik, 2007). As a result of such incentives, along with the widespread liberalization of capital flows in recent decades, inflows of FDI have increased tremendously over the past generation (see Figure 1).

Incentives designed to attract MNEs generally take one of two forms: fiscal incentives such as tax holidays and lower taxes for foreign investors; and financial incentives such as government grants, credits at subsidized rates, government equity participation, and government insurance at preferential rates. Other incentives include subsidized dedicated infrastructure or services, contract preferences or foreign exchange privileges, and even monopoly rights. Efforts to attract FDI can be broad-based or target specific sectors. Alfaro and Charlton's (2007) analysis of specific sectors targeted by OECD countries between 1985 and 2000 revealed the most targeted sectors to include machinery, computers, telecommunications, and transportation equipment. Heavily targeted sectors in developing countries include wholesale trade and petroleum as well as transportation equipment, (Harding and Javorcik, 2007).

What benefits do proponents expect a country to reap from FDI inflows? Because it embodies technology and know-how as well as foreign capital, FDI can benefit host economies through knowledge spillovers as well as linkages between foreign and domestic firms. Potential positive effects include productivity gains, technology transfer, exposure of domestic firms to new processes, managerial skills and know-how, enhancements to employee training, development of international production networks, and broader access to markets. When new products or processes are introduced to the domestic market by foreign firms, domestic firms may benefit from the accelerated diffusion of new technology.² In some cases, this might occur simply by domestic firms observing foreign firms, or in other cases through labor turnover as domestic employees hired by foreign firms move to domestic firms. These benefits, together

¹ The academic literature on foreign direct investment is vast and has been surveyed many times. See Caves (1996), Blomström and Kokko (1998), Hanson (2001), Lipsey (2002), Alfaro and Rodríguez-Clare (2004), Barba-Navaretti and Venables (2004), Görg and Greenaway (2004), Moran (2007), Alfaro, Kalemli-Ozcan and Sayek (2009), and Harrison and Rodríguez-Clare (2009) for surveys of determinants, effects, spillover channels, and empirical findings.

² See Caves (1996), Blomström and Kokko (1998).

with direct capital financing, suggest an important role for FDI in modernizing national economies and promoting economic development.

Empirical evidence that FDI generates positive effects for host countries is, however, surprisingly ambiguous at both micro and macro levels. Hanson's (2001) survey of the literature finds only weak evidence that FDI generates positive spillovers for host countries, and Görg and Greenway's (2004) review of the micro level analysis literature on spillovers from foreign- to domestically-owned firms reports the effects to be mostly negative. Lipsey's (2002) survey of macro level empirical research finds no consistent relation between the size of inward FDI stocks or flows and GDP or growth. Even on a theoretical level, Rodríguez-Clare (1996) models that, in certain cases, FDI could harm domestic suppliers and even generate negative linkages, and Markusen and Venables (1999) mention that FDI could harm local industry.

There thus appears to be a significant lack of consensus between practitioners and the empirical literature regarding the existence of positive FDI externalities. Do the negative results impugn government policies that attract FDI? Should developing countries shun, rather than seek, FDI? Any answer to such questions must be informed by an understanding of the evolution of the literature on FDI, an overview which reveals two recent trends to be of particular importance. One is the recognition that benefits generated by FDI are not automatic, but rather are conditional on the presence of complementary policies and conditions by which such benefits are facilitated and absorbed. The other is the effort to understand the mechanisms through which FDI affects growth, in particular the linkages generated between foreign and domestic firms.

While the literature has evolved to more carefully measure the relationship between FDI and growth, limitations remain that make it difficult to derive clear policy implications. Macro-level studies typically offer a better understanding of the role of local conditions in eliciting positive benefits from FDI to materialize, but they continue to be limited by identification issues, or the very plausible possibility that growth might itself spawn more FDI. This potentially endogenous relationship implies any estimates are likely to overstate the positive impact of foreign investment on growth. Micro-level studies can avoid such identification issues, but available firm-level datasets tend to cover specific and quite different types of countries and are very rarely available in developing countries, thus making it difficult to understand the role of country specific conditions across different time periods. Furthermore, measurement issues plague measures of inputs and outputs, which can bias results.

The rest of the paper is organized as follows. Section 2 presents a broad overview of the evolution of the literature. Recent findings on complementarities between FDI and local policies and conditions are discussed in Section 3. Section 4 summarizes recent efforts to understand the mechanisms by which the benefits of FDI are channeled to host economies. Ongoing concerns are considered and concluding observations are offered in Section 5.

2. Overview of the Recent Empirical Literature

A multinational enterprise is generally defined as a firm that owns and controls production facilities or other income-generating assets in at least two countries. A foreign investor's construction of a green-field operation (i.e., a new production facility) or acquisition of at least 10 percent of a local firm's equity is regarded as a direct investment in the balance of payments statistics. The arbitrary 10 percent threshold reflects the notion that, even absent a majority stake, larger stockholders will have a strong say in a company's decisions, and participate in and influence its management. An MNE's creation, acquisition, or expansion of a foreign subsidiary thus constitutes FDI.³

One robust finding is that productivity tends to be higher for MNEs than for domestic firms in the same sector (Haddad and Harrison, 1993; Helpman, Melitz, and Yeaple, 2004; and Arnold and Javorcik, 2009).⁴ Of potentially greater importance is the possibility that MNEs have a positive impact on local firms' productivity through the knowledge spillovers occasioned by the technology and know-how that accompany the foreign capital embodied in FDI.

2.1 FDI, Growth and Productivity

First generation industry level (cross-sectional) studies, such as Caves (1974), generally found a positive correlation between foreign presence and sectoral productivity. A second generation of papers using cross-country growth regressions and other applications of econometric techniques, however, found only weak support for an exogenous positive effect of FDI on economic growth, and actually found evidence of negative externalities in developing countries (Borensztein, De Gregorio, and Lee, 1998; Alfaro, Chandra, Kalemli-Ozcan, and Sayek, 2004; and Carkovic and Levine, 2005). Paralleling the macro evidence, Aitken and Harrison's (1999) analysis of micro-level plant level data in Venezuela found the net effect of FDI on productivity to be quite small, productivity being enhanced in plants targeted for investment but lowered in domestically owned plants, and Haddad and Harrison (1993) do not find that the presence of foreign firms in Morocco generated spillovers to local firms.⁵

While the results from this second generation of papers were by and large negative, it is possible they were looking in the wrong place. These papers generally regressed local firm productivity on FDI activity within *the same* sector, meaning they were searching for horizontal spillovers at the intra-industry level. However, spillover effects could potentially result from vertical linkages generated between MNEs and their host country suppliers at the inter-industry level. One explanation for the lack of evidence of horizontal externalities is that, because multinationals have an incentive to minimize technology leakage to competitors but improve the productivity of suppliers, FDI-generated spillovers are more likely to be vertical than

³ For the remainder of the paper, the terms MNE and FDI are used interchangeably.

⁴ Javorcik (2009) points out that this productivity discrepancy holds for FDI in the form of both "greenfield" and equity purchases.

⁵ The evidence of positive spillover effects tends to be more favorable in developed countries. Haskel, Pereira, and Slaughter (2007), for example, find positive spillovers from foreign to local firms in a panel data set of firms in the United Kingdom.

horizontal.

Building on this insight, a third generation of studies that has looked for positive externalities of FDI for domestic firms in upstream industries (suppliers) reports more encouraging findings. In addition, these papers have addressed a number of methodological problems in the previous literature.⁶ Using uses panel data for Lithuania from 1996 through 2000, the results of Javorcik's (2004) widely cited paper find that the productivity of domestic firms is correlated with the presence of multinationals in downstream sectors (potential customers), but there is no evidence of positive externalities within the same industry.⁷ See Kalemli-Ozcan and Villegas-Sanchez (2010) in this volume for a complementary overview of the recent literature on FDI and growth.

2.2 FDI, Capital and Labor

FDI can, in theory, further a host country's development not only through technological improvements, but also via factor accumulation - that is, by expanding its stock of physical or human capital, or both. Foreign capital injected into a host economy can contribute to physical capital formation, employee training or skill development. But here, again, the empirical evidence shows that neither of these benefits can be presumed.

Of particular interest is the effect FDI has on local capital markets. The rationale advanced by some policy makers that foreign investment can add to scarce capital for new investment in developing countries is based on the assumption that foreign investors who establish new enterprises in local markets bring in additional capital with them. But Kindleberger (1969), Graham and Krugman (1991), and Lipsey (2002) show that, upon taking control of a domestic company, foreign investors tend to finance a significant share of their investment in the local market, rather than fully transferring capital from their host country.⁸ Increasing volatility in exchange rates, moreover, has prompted many foreign investors to hedge by borrowing from local capital markets, which can exacerbate financing constraints on domestic firms by crowding them out of domestic capital markets.

⁶ For example, these studies correct for the biases that result from the dependence of firm exit and factor inputs on productivity levels. Newer studies also control for time-invariant differences in plant productivity through fixed effects estimation and for time-variant productivity shocks likely to affect plant productivity using approaches such as the semi-parametric estimation proposed by Olley and Pakes (1996).

⁷ Similarly, Blalock and Gertler (2008), using a panel dataset of Indonesian manufacturing establishments from 1988 through 1996, find evidence not only of positive vertical externalities, but also that downstream FDI increases output and firm value-added while reducing prices and market concentration.

⁸ The industrial organization literature suggests that firms engage in FDI not because of differences in the cost of capital, but because certain assets are worth more under foreign than local control. If lower cost of capital were the only advantage a foreign firm had over domestic firms, it would still not explain why a foreign investor would take the trouble to operate a firm in a different political, legal, and cultural environment instead of simply making a portfolio investment.

This latter effect has been tested by Harrison and McMillan (2003) and Love, Harrison, and McMillan (2004). The former, a country case study that analyzed the behavior of mostly French multinationals operating in Cote d'Ivoire, a country at the time characterized by market imperfections and rationed access to credit, found that foreign investors did indeed crowd domestic enterprises out of local credit markets. On the other hand, the latter, which examined company level data across a panel of countries that varied in the strength of their credit markets, found that the amount of credit available to domestically-owned firms actually increased with foreign investment. These contrasting results point to the important role played by policy complementarities such as strong financial institutions, which are discussed at length in the following section.

With respect to human capital, if skilled labor is scarce, and since MNEs typically hire relatively skilled workers, FDI could reduce the stock of human capital for domestic firms. More positively, though, FDI could improve the national welfare if the wages paid by MNEs were higher than those paid by domestic firms. In instances where productivity of MNEs is higher than for domestic firms in the same sector, FDI might be expected to contribute to higher GDP. Were MNEs to pay market wages, they would entirely capture any increase in GDP and the national welfare would, hence, not be improved. But there is ample evidence that MNEs pay above market wages (Haddad and Harrison, 1993; Aitken, Harrison and Lipsey, 1996, Lipsey, 2002), and it is thus likely that higher productivity is to some degree shared between the firms and their workers.

However, several confounding issues make pinpointing any precise wage premium paid by MNEs over domestic firms a difficult task: MNEs could be selectively hiring more productive workers, or MNEs could be concentrated in industries that pay higher wages. Harrison and Rodríguez-Clare (2009) survey the literature on FDI and wages and find that the “unconditional” wage gap, or the gap between wages in foreign and domestic firms with no controls for biases, is as high as 50 percent. However, after adjusting for firm and worker characteristics, they conclude that foreign firms pay a small wage premium of between five and ten percent higher than those paid by domestic firms.

Furthermore, anecdotal evidence suggests that FDI can contribute to skill-upgrading for domestic workers, as MNEs' often make substantial efforts to educate local workers and provide more training opportunities for technical workers and managers than do local firms.⁹ Such training is sometimes provided in cooperation with host country institutions, as in the case of Intel in Costa Rica contributing to local universities and Singapore's Economic Development Board collaborating with MNEs to establish and improve training centers.¹⁰ An empirical analysis of a panel of countries by te Velde and Xenogiani (2007), however, found FDI to enhance skill development (particularly secondary and tertiary enrollment) only in countries already relatively well endowed skills-wise. The finding that FDI's contribution to skill development is conditional on the *a priori* presence of a threshold of human capital is part of

⁹ See discussions in Alfaro and Rodríguez-Clare (2004) and Alfaro, Kalemli-Ozcan, and Sayek (2009).

¹⁰ See Spar (1998).

the emerging understanding of the importance of complementarities, which is discussed in detail below.

3. Complementarities

Recent literature on the link between FDI and growth has emphasized complementarities, that is, local policies and conditions prerequisite to the benefits of FDI materializing. That not all countries enjoy these “preconditions” may help to explain the ambiguity in the findings regarding the relationship between FDI and growth. Spillovers from foreign to domestic firms depend on domestic firms’ ability to respond successfully to new entrants, new technology, and new competition, which – as the hypothesis goes – is to some extent determined by local characteristics like the strength of local institutions, the level human capital and the development of domestic financial markets. Weaknesses in these areas can reduce domestic industries’ capacity to absorb new technologies and respond to the challenges and opportunities presented by foreign entrants. Studying variation in such “absorptive capacities” of countries (and industries within countries) offers a potentially appealing synthesis of the conflicting results reported in the literature.¹¹

What is the evidence of such complementarity between FDI and other policies? At the macro level, the literature presents evidence not of an exogenous positive effect of FDI on economic growth, but of positive effects conditional on the presence of local conditions and policies. Moran (2007) emphasizes the role of a competitive environment (i.e. one that embraces trade rather than pursues import substitution type policies), and, indeed, Balasubramanayam, Salisu, and Sapsford (1996) find FDI flows to be associated with faster growth in countries that pursue outward oriented trade policies. Many of the first- and second-generation panel studies on FDI and growth that found primarily orthogonal or negative relationships examined countries that were pursuing inward oriented policies (e.g., India, Morocco, and Venezuela). Aitken and Harrison’s (1999) finding that the overall effect of foreign investment in Venezuela was small was based on data collected during the years 1976-1989, a period characterized by inward oriented policies. Moran (2007) concludes that “manufacturing FDI is more likely to make a positive contribution to a national income under reasonable competitive conditions.”

The presence of reasonable competitive conditions is but one of many complementarities found in the literature. Others include human capital (Borensztein, De Gregorio, and Lee, 1998), local financial markets (Alfaro, Chanda, Kalemli-Ozcan, and Sayek, 2004, 2010, and Alfaro, Kalemli-Ozcan, and Sayek, 2009), and market structure (Alfaro, Chanda, Kalemli-Ozcan, and Sayek, 2010).

¹¹ The importance of context-specificity has been discussed in related fields. Harrison and Rodríguez-Clare (2009) emphasize the relevance of complementary aspects of the policy regime, such as labor-market policies or ease of entry and exit, to the success of a trade policy. “Appropriate development policies,” observe Rodrik and Rosenzweig (2009), “typically exhibit high degrees of complementarity.”

Borensztein, De Gregorio, and Lee (1998), using a dataset of FDI flows from industrialized countries to 69 developing countries, find FDI to be an important vehicle for transferring technology and higher growth only when the host country has a minimum threshold of human capital. The authors empirically assess the effect of FDI on economic growth by running the following regression:

$$g = c_0 + c_1FDI + c_2FDI * H + c_3H + c_4Y_0 + c_5A + \varepsilon \quad (1)$$

where FDI is foreign direct investment, H the stock of human capital, Y_0 initial GDP per capita, and A a set of other control and policy variables frequently included as determinants of growth (e.g., government consumption, political instability, inflation rate, and so forth). Their results suggest that FDI is an important vehicle for transferring technology only in the presence of relatively high human capital, and that FDI is more productive than domestic investment only when the host country has a minimum threshold stock of human capital. Xu (2000), using data on U.S. MNEs, provides corroborating evidence that a country needs to reach a minimum human capital threshold to benefit from technology transfer from MNEs, and that most developing countries do not meet this threshold.

In a cross-country analysis, Alfaro, Chanda, Kalemli-Ozcan, and Sayek (2004) argue that lack of development of local financial markets can limit an economy's ability to channel the contributions of FDI to economic growth and take advantage of potential FDI spillovers. The results of the following regression:

$$GROWTH_i = \alpha + \beta_1(FDI/GDP_i) + \beta_2(FINANCE_i) + \beta_3(FDI/GDP_i * FINANCE_i) + X'_i\gamma + \varepsilon_i, \quad (2)$$

where X stands for the vector of control variables and FINANCE is a measure of the development of financial markets, suggest that FDI does not, on its own, exert a robust positive impact on growth. However, the term that interacts FDI and FINANCE turns out to be positive and highly significant providing evidence that a strong financial sector is necessary for a country to reap positive benefits from FDI.

In a later study, Alfaro, Kalemli-Ozcan, and Sayek (2009) investigate whether the effects of FDI on growth operate via capital accumulation or total factor productivity (TFP). The authors run regressions similar to (2) but change the dependent variable to measures of investment, human capital, or TFP growth. Their results suggest the interaction of FDI and financial development have no significant effect on capital accumulation – physical or human – but that it positively and significantly affects TFP growth¹².

The importance of well-functioning financial institutions to economic development has

¹² There is clearly a potential for endogeneity in such regressions, as higher growth could spawn more FDI. However, in a robustness check, Alfaro, Kalemli-Ozcan and Sayek (2009) switch the regression to make FDI the dependent variable and growth the independent variable, and they find there is no statistically significant effect.

been recognized and discussed extensively in the literature. Researchers have shown that well-functioning financial markets, by lowering the costs of conducting transactions, ensure that capital is allocated to the projects that yield the highest returns and therefore enhance growth rates.¹³ Furthermore, as McKinnon (1973) states, the development of capital markets is “necessary and sufficient” to foster the “adoption of best-practice technologies and learning by doing.” In other words, limited access to credit markets restricts entrepreneurial development. Thus, if entrepreneurship facilitates the assimilation and adoption of best technological practices made available through FDI, then the absence of well-developed financial markets limits the potential for positive FDI externalities.

Causal but indirect results found by researchers at the micro level further emphasize the complementarity of FDI and financial development. Alfaro and Charlton (2007), using data for OECD countries at the industry level, show the relation between FDI at the industry level and growth to be stronger for industries more reliant on external finance. Desai, Foley and Forbes (2008) show that in currency crises, MNE affiliates substantially increase their sales, assets and investment relative to local firms, and they find that this discrepancy owes in large part to MNE affiliates’ ability to draw upon the internal capital markets of their parent company whereas local firms face financing constraints. Thus FDI can potentially help to offset the negative shocks of crisis and volatility in host countries with weaker financial markets. Javorcik and Spatareanu (2007) find Czech firms that supply multinationals tend to be less liquidity constrained than other firms. The authors find this is due to the self selection of less liquidity-constrained firms into supplying relationships with MNEs, implying that liquidity-constrained firms are hindered from becoming MNE suppliers. This micro evidence further suggests that in the absence of well-functioning financial markets, local firms may find it difficult to access the funding necessary to initiate business relations with MNEs and reap the benefits of productivity spillovers.¹⁴

Most barriers to foreign investment today are in service, rather than goods, sectors. The considerable empirical evidence on the impact of FDI on the productivity of manufactured goods is being complemented by a nascent empirical literature that studies the effects of services liberalization on manufacturing productivity (for a more thorough discussion of FDI in service industries, see Kalemli-Ozcan and Villegas-Sanchez, 2010). Arnold, Javorcik, and Mattoo (2006) examine, in the Czech Republic, the link between services sector reforms and the productivity of manufacturing industries that rely on services inputs and find a positive relationship between services sector reform and the performance of domestic firms in downstream manufacturing sectors. Similarly, Arnold, Javorcik, Lipscom, and Mattoo (2008) attribute positive productivity effects on the manufacturing sector to service reform in India. The effects and complementarities associated with reducing barriers to services and goods remain important topics for future research.

¹³ See King and Levine (1993).

¹⁴ This idea is formalized in Alfaro, Chanda, Kalemli-Ozcan, and Sayek (2010),

4. Channels, Mechanisms and Linkages

Identifying complementarities, that is, the local conditions and policies necessary to reap the benefits of FDI, helps us to understand *when*, but not *how*, FDI generates positive spillover effects. Through what mechanisms does FDI contribute to a country's development efforts? Absent from many studies that seek to identify productivity externalities is any attempt to understand the mechanisms through which they occur. Empirical studies have by and large produced indirect evidence of externalities, examining, for example, whether the increased presence of MNEs in a country or sector translates into higher productivity in local firms in the same country or sector, or in upstream sectors, though more recent studies have attempted to find the casual mechanisms that FDI leads to technology transfer and spillovers.¹⁵ To establish the robustness of such findings and inform policy interventions that will maximize FDI externalities warrants research into mechanisms.

A first step toward understanding how FDI can generate higher TFP is to identify factors that distinguish plants targeted by FDI from domestically-owned plants. Using a propensity score combined with difference-in-difference analysis to control for non-random sampling and changes in observables/unobservables, Arnold and Javorcik (2009) find, in Indonesia, that relative to domestically-owned firms with similar characteristics, manufacturing plants that become foreign-owned invest more in fixed assets (machinery in particular), and increase both the import intensity of their inputs and export intensity of their output.¹⁶ The authors' finding that foreign-owned firms increase neither the skill nor capital intensity of their workforce, but rather implement organizational changes that improve worker performance, helps to explain the robust relationship between foreign ownership and plant TFP.

Arnold and Javorcik's (2009) insights pertain to how foreign ownership drives higher TFP at the firm level. Another exercise altogether is required to shed light on the mechanism by which FDI generates macro-level growth for a host country. One approach invokes new trade theories that emphasize firm heterogeneity, as illustrated by Melitz (2003). In his model, gains from trade are realized through reallocation of market share from less productive to more productive firms. The new heterogeneous trade models suggest a new mechanism through which trade affects productivity growth: greater competition forces less productive firms to exit, thereby increasing the market share of more productive firms. In this framework, trade gains are impeded by barriers to firm exit and expansion, making low barriers to entry a desirable complementarity.

The intuition from Melitz's trade model can be easily extended to understanding the potential gains from FDI: if FDI induces greater competition, and FDI-receiving plants are more productive, then it should increase the market share of more productive plants and raise

¹⁵ See Javorcik (2010) for a survey of the recent literature on FDI and technology transfers

¹⁶ The authors discuss the merits of combining the propensity score and difference-in-difference method, explaining that the difference between the treatment and control group proxies for the counterfactual, that is, for what would have happened had a plant targeted for FDI remained domestically owned.

aggregate productivity. As in the trade model, the potential for any such gains from FDI is, of course, conditional on a reasonably competitive environment to begin with, such as little or no barriers to entry and exit. Further investigation into the extent to which FDI reallocates market share to more productive firms, and other extensions of the heterogeneous firms model, is a promising line of future research.

Recent attempts in the literature to formalize whether and how foreign-owned firms generate meaningful linkages with domestic firms, both intra- (horizontally) and inter- (vertically) industry, constitute another promising avenue to understanding the growth-inducing mechanisms, if any, of FDI. Whether or not MNEs generate meaningful linkages, or relationships, with domestic firms (particularly suppliers) is of utmost importance in assessing the extent to which a host country benefits from FDI. If the MNE develops no such linkages, the potential for productivity spillovers, technology transfers, and other positive externalities from FDI are vastly diminished.

How should we look for such linkages? Because MNEs, as noted above, have incentives both to limit technological spillovers to competitors and to spread them among suppliers, the recent literature has emphasized identifying mechanisms that account for vertical, rather than horizontal, linkages. If true, then an important question is whether all vertical (supply) relationships have the potential to develop into linkages that generate positive spillovers. The cherry-picking behavior of many foreign firms with respect to local firms that can already supply goods (Javorcik and Spatareanu, 2005) is not associated with potential positive externalities. Similarly, that foreign firms seem also to help some suppliers improve their performance implies an externality only if these benefits are not fully internalized by the foreign firm. Surveys administered to suppliers and MNEs in Costa Rica revealed few cases of positive technology transfer from an MNE to its suppliers (see Alfaro and Rodríguez-Clare, 2004), and further revealed that MNEs often lack technical knowledge about the production processes of the inputs they use. Any knowledge they did have tended to be about production processes for sophisticated inputs sourced from highly specialized international suppliers rather than domestic firms. While these interviews provided no evidence of knowledge spillovers via technology transfer, they did reveal many instances in which local firms upgraded the quality of their production processes in order to become MNE suppliers.

The ambiguity of this survey data dictates a need for an integrated approach that links theory with empirical evidence to understand the effect of MNE activity on local suppliers. Research has consistently found that MNEs source a lower share of their inputs domestically than locally-owned firms, which has traditionally been interpreted to mean that fewer linkages are generated by MNEs than by domestic firms. Theory, however, suggests that the share of inputs bought domestically is not a valid indicator of the linkages MNEs can generate.¹⁷ A more appropriate measure, which Alfaro and Rodríguez-Clare (2004) call the

¹⁷ Barrios, Görg, and Strobl (2009) show that whether MNEs generate positive linkages depends heavily on the choice of the backward linkage measure. The authors also discuss in detail the assumptions that underlie the prior literature's traditional measure of linkages (see also Alfaro and Charlton, 2009).

“linkage coefficient,” is the ratio of the value of inputs bought domestically to the total number of workers hired by the firm, which can also be defined as the product of two terms: the share of inputs sourced domestically times intensity (inputs per worker). MNEs may have a lower domestic input share (as they are more likely to import inputs), but higher intensity coefficients (as they are more likely to use more advanced and productive technologies).

Do foreign and domestic firms exhibit differences in the “linkage coefficient?” Using plant-level data for Brazil (1997-2000), Chile (1987-1999), Mexico (1993-2000), and Venezuela (1995-2000), Alfaro and Rodríguez-Clare (2004), consistent with earlier evidence, find in all countries the share of inputs sourced domestically to be lower, but the intensity coefficient to be higher, for foreign firms. In Brazil, Chile, and Venezuela, the linkage coefficient (i.e. the product of the input share and intensity coefficients) was higher for foreign firms, but in Mexico the difference was not statistically significant. Another important result was that entrant foreign firms tended to have a lower linkage coefficient, which tended to increase over time, highlighting the importance of the study’s duration (as well as timing: studies closer to FDI liberalization efforts being more likely to produce negative results).

The evidence from Javorcik and Spatareanu (2007) suggests a more robust financial sector increases the potential for such linkages to develop. Alfaro, Chanda, Kalemli-Ozcan, and Sayek (2010) elucidate this idea in a theoretical framework by modeling the presence of positive linkages to be dependent on the extent of the development of the local financial sector. In their model, to operate a firm in the intermediate goods sector, entrepreneurs must develop a new variety of intermediate good, a task that requires upfront capital investments. The more developed the local financial markets, the easier it is for credit-constrained entrepreneurs to start firms, and the more firms, the more varieties of intermediate goods.¹⁸ The input variety resulting from backward linkages between foreign and domestic suppliers thus occasion, through the agency of the financial markets, positive spillovers to the final good sector. Under this framework, positive externalities do not necessarily flow from MNEs to suppliers, but rather should lead to a horizontal externality from MNEs to other firms who use the same inputs *in the same industry*

Even so, empirical evidence of horizontal spillovers from FDI remains elusive. Why don’t we observe a positive externality from MNEs to other firms in the same industry? Possible answers include quality of data, measurement errors in productivity, and endogeneity issues in the presence of multinationals. But it is also possible that positive effects MNEs might otherwise have on other firms in the same industry consequent to increases in the variety (or quality) of domestic inputs might be offset by some negative horizontal externality, for example, the competition effect occasioned by the entry of MNEs (as argued by Aitken and Harrison, 1999 and shown in Alfaro, Chanda, Kalemli-Ozcan and Sayek, 2010) or the pirating by

¹⁸ Hirschman (1958) argues that linkage effects are realized when one industry can facilitate the development of another by easing conditions of production, thereby setting the pace for further rapid industrialization. He further argues that in the absence of linkages, foreign investments could have limited or even negative effects on an economy (the so-called enclave economies scenario).

MNEs of domestic firms' best workers. In any case, such ambiguity illustrates that future research should continue to strive to uncover the mechanisms that create the potential for linkages between MNEs and their suppliers, and the externalities that may accrue horizontally as a result of such linkages.

5. Concluding Comments

Data availability continues to constrain, particularly in developing countries, efforts to uncover through econometric work the relationship between FDI and growth. Firm level panel studies tend to cover specific and quite different types of countries (transition, developing, emerging, industrialized), and it is difficult to understand the role of country specific conditions across different time periods. Moreover, firm level data are available in few countries, and in very few of the developing countries in which this question might have the greatest policy relevance. Researchers are increasingly discovering new sources of fine-grained data that support relatively rich firm-level analysis, but such data are rarely available for long periods (or for similar periods across countries), and some datasets lack desired information. Because inputs and outputs are typically poorly measured and physical outputs not really observed researchers tend to use nominal variables deflated by a broad price index, which might introduce significant biases into the productivity measures.

Macro-level studies, because they generally span multiple countries and longer time periods, afford a better understanding of the role of local conditions in eliciting positive benefits from FDI to materialize. But a critical concern in the macro-level FDI growth literature is that growth might itself spawn more FDI. Alternatively, some third variable might affect a country's growth trajectory and, thereby, attractiveness to foreign capital. In such cases, the coefficients on the estimates are likely to overstate the positive impact of foreign investment. Both theoretically and empirically, it is plausible, and quite likely, that both the magnitude of FDI and efficiency of financial markets increase with higher growth rates. This is a challenging issue that is almost impossible to resolve without good instruments.

The insights from new work on the role of complementarities and formalization of mechanisms by which FDI induces growth are important steps in reconciling the ambiguous relationship between FDI and growth. Research on complementarities has shown that FDI's positive impacts are not exogenous, but rather conditional on certain local conditions. Research into the mechanisms and channels by which FDI generates positive externalities goes a step further, illustrating *how* such complementarities can act as "absorptive capacities" that facilitate the realization of benefits from FDI, whether the context be a competitive environment that ensures that market share is allocated to the most productive firms, or developed financial markets that allow credit-constrained suppliers to access capital to produce the inputs to form linkages with MNEs.

Along with the potential benefits, it is important to be aware of the potential negative effects of FDI on host countries, especially in the absence of such complementarities discussed

above. For example, in a host country with a poorly developed financial sector, the extra competition to domestic firms induced by FDI could crowd out credit-constrained local competitors and harm local production. While Desai, Foley and Forbes (2008) found that FDI can partially mitigate volatility in times of adverse shocks in countries with poor financial development, the authors note that in the longer term its effect on local firms in such countries is unclear. Furthermore, since MNEs on average hire relatively skilled labor, they could leave none for local firms if such labor is especially scarce. Such examples should not serve to vilify FDI, but rather to make more evident the importance of FDI's interaction with other policy complementarities.

What, if any, policy implications can we draw from the current state of research? FDI can play an important role in economic growth, most likely via suppliers, but local conditions can limit the extent to which the benefits of FDI materialize. It is not clear that incentives to attract MNEs are warranted. More sensible policies might involve eliminating barriers that prevent local firms from establishing adequate linkages, improving local firms' access to inputs, technology, and financing, and streamlining the procedures associated with selling inputs. But countries might also seek to improve domestic conditions, such as the development of financial markets and improvement in the rule of law, which should have the dual effect of attracting foreign investment (Alfaro, Kalemli-Ozcan, and Volosovych, 2008), and enabling host economies to maximize the benefits from it.

7. References

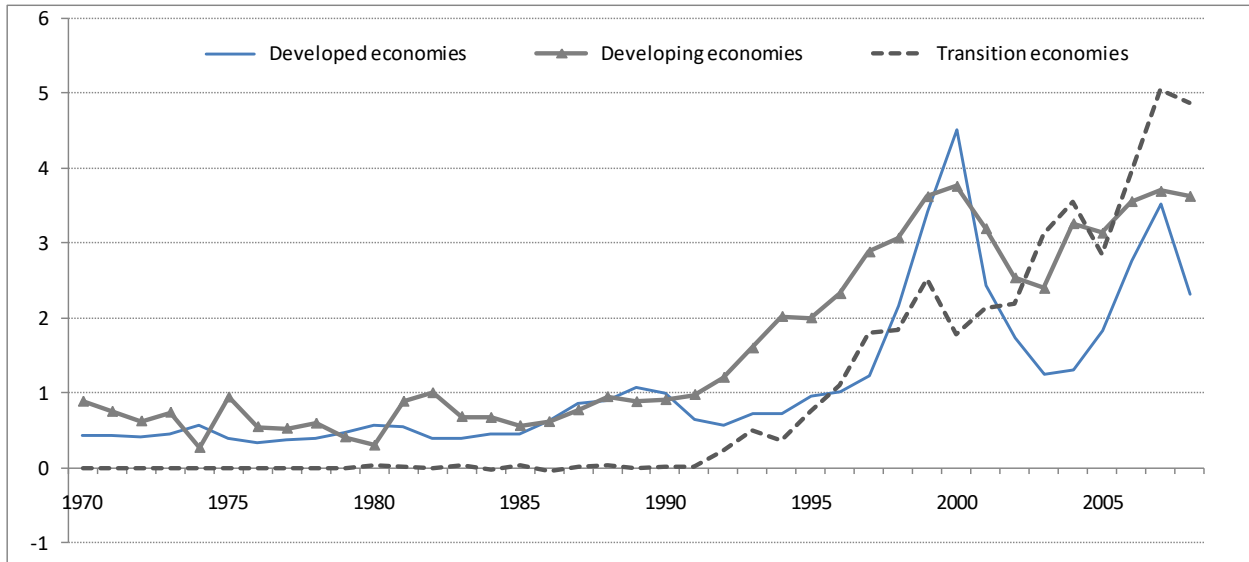
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Figure 1: FDI Inflows as a percent of Gross Domestic Product: 1970-2007



Source: UNCTAD