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## *How to Investigate the Impact of Foreign Direct Investment on Development and Use the Results to Guide Policy*

**M**y mentors in graduate school were Raymond Vernon, Charles Kindleberger, and Albert Hirschman. They established their reputations by selecting the most important issues and policy dilemmas on the horizon, getting to know the actors and the settings involved as thoroughly as possible, and deriving insights from intensive investigation of (often) small numbers of cases. They then had to persuade their audience that what they had discovered was not idiosyncratic, atypical, or ephemeral.

Their contributions came at the beginning of the revolution in using regressions on large datasets as [which was to become?] the preeminent investigative technique in economics. Their own work would have had more lasting impact if they had been able to combine—as I urge here—statistical analysis with a dedication to understanding how things worked by looking into the innards of the relationships they were trying to understand.

This paper will argue that the investigation of the impact of foreign direct investment (FDI) in manufacturing on development would be much more valid, more convincing—and less prone to error—if multiple techniques of investigation were used to reinforce (or refute) each other.<sup>1</sup> In addition to statistical

I am grateful to comments from Laura Alfaro, Garrick Blalock, Marc Busch, Beata Smarzynska Javorcik, Wolfgang Keller, Cheryl Long, and Anders Olofsgard. The weaknesses that remain come despite their help.

1. The analysis in this paper is limited to foreign direct investment in manufacturing in developing countries. Foreign direct investment in extractive industries, and in infrastructure, involves distinctive corporate strategies and poses distinctive public policy challenges for host authorities. See Moran (2006, chapter 3). Foreign direct investment in services—potentially of great value for increasing the competitiveness of indigenous firms—is still in the early stages of investigation.

regressions, such techniques include industry and sector studies, business cases, management interviews, data collection through firm surveys, and cost-benefit analyses of individual projects that are carefully arrayed to avoid selection bias and ensure generalizability. This argument is, I believe, unexceptional and should not even be controversial. The value of making this assertion arises, alas, because the use of multiple contrasting methodological approaches is quite uncommon—nay, vanishingly rare—among economists in the contemporary period. The weaknesses of this self-imposed narrowness plague current policy debates even among informed practitioners.

This paper examines three topics: how to investigate the impact of manufacturing FDI on a developing country host economy, how to search for externalities and spillovers (and identify the channels and mechanisms through which spillovers take place), and how to evaluate the question of whether host governments should devote public sector resources to attracting FDI in manufacturing. In each area, the paper shows how overlapping kinds of evidence can be useful, and are often indispensable, to carry out accurate investigations, to avoid analytical miscalculations, and to design appropriate policies for developed and developing countries.

### **How to Evaluate the Impact of Manufacturing FDI on a Developing Country Host Economy**

The history of efforts to investigate the outcome from multinational manufacturing investment in developing countries begins with cost-benefit analysis of individual FDI projects, industry studies, multinational business cases, management interviews, and firm surveys. Do these approaches lead to reasonably robust general propositions about the impact of manufacturing FDI on the host economy, or are they no more than impressionistic observations—anecdotal in the pejorative sense—that have a significant probability of being overturned by one or two subsequent observations? Can the results from these kinds of investigations be useful in shaping the design of large-*N* econometric investigations that use plant-level data as well as in steering clear of mistakes that have spoiled earlier efforts?

#### *Early Assessments Using Cost-Benefit Analysis*

The earliest systematic attempts to assess the impact of manufacturing FDI on development were carried out by contemporaries of Vernon, Kindleberger, and Hirschman. The investigators used variations of cost-benefit analysis to

measure the effect of the operations of multinational corporations (MNCs) on the host economy. One of the first was conducted by Sanjaya Lall and Paul Streeten under the auspices of the UN Conference on Trade and Development.<sup>2</sup> They analyzed the contribution to the host economy of 147 foreign investor operations in six developing countries. For approximately 62 percent (ninety-two projects), the effect of foreign investment on national income was positive; for the remaining projects (fifty-five, approximately 38 percent), it was negative. The key determinant of whether the social rate of return was positive or negative was the extent of effective protection granted to the investors, across all industries and all countries in the sample. A second study, sponsored by the Organization of Economic Cooperation and Development (OECD) under the direction of Grant Reuber with data from approximately the same time period, uncovered a similar contrast in outcomes drawing on a slightly different set of comparisons.<sup>3</sup> The Reuber group investigated eighty foreign investment projects within thirty host developing countries, comparing the production costs of the subsidiaries with the production costs of the parent companies for forty-five of the projects.<sup>4</sup> Approximately one-quarter of the subsidiaries had production costs that were equal to or lower than those of the parent; the remaining three-quarters had higher production costs. The Reuber team separated their sample according to whether the output of the project was destined primarily for the domestic market or for export. For the fourteen export projects identified, more than three-quarters had production costs that were equal to or lower than those of the parent. For the thirty-one remaining projects, twenty-nine had production costs higher than those of the parent. These higher production costs were attributable to three interrelated factors: high levels of protection extended against imports, an uneconomic scale of production, and a high local cost of doing business. They concluded that even under a relatively wide range of shadow exchange rate calculations these projects resulted in a substantial real resource cost to the host countries.

These rudimentary attempts at cost-benefit analysis were given more rigor a decade later by Dennis Encarnation and Louis Wells.<sup>5</sup> They used detailed data from fifty foreign manufacturing projects submitted by prospective foreign investors to the FDI screening board of a large developing country to calculate the contribution that each would make to national income minus the costs to the national economy, at world market prices, using shadow prices for

2. Lall and Streeten (1977). The data collected from 1970 to 1973 overlap with the data used in the Reuber report (1973).

3. Reuber with others (1973).

4. Reuber with others (1973, p. 179 and appendix C).

5. Encarnation and Wells (1986).

energy, foreign exchange, labor, and domestic capital to account for the opportunity cost of the resources to the host. They found that a majority of the fifty projects (55 to 75 percent, depending upon the shadow price assumptions) would increase national income, while the remainder (25 to 45 percent) would subtract from national income even though the projects were profitable to the foreign multinationals themselves. Their data exhibited a perfect rank-order correlation between the impact of the project on the host and the amount of trade protection afforded to the investor.<sup>6</sup> When trade protection was high, projects subtracted from national income. When trade protection was low, the reverse was true. For eight export-oriented projects, all were beneficial to the host economy.

Subsequent cost-benefit appraisals show similar outcomes. Using data from Kenya during the country's import substitution period, Bernard Wasow found that of thirty-five goods produced by fourteen foreign-owned firms, only three generated benefits to the host economy that exceeded their costs.<sup>7</sup> Under the umbrella of trade protection, more than half of the goods allowed the foreign affiliates to siphon foreign exchange from the host economy, rather than to only save or earn hard currency. In the protected host market, there was a multiplication of foreign plants with excess capacity; had they been able to expand production, however, the negative impact on host welfare would have increased as well.

*Business Case Studies and Industry Analyses:  
The Discovery of Distinctive Investor Operations*

Business case studies and sectoral analyses not only corroborate these findings, but they provide a clearer understanding of how multinational companies alter their production processes and business strategies in response to international competition on the one hand or domestic protection on the other. The most detailed research comes from the three sectors in which the largest amounts of manufacturing FDI have taken place—the automotive, electronics, and petrochemical industries.

Anne Krueger provided an early model for these industry studies with a microeconomic analysis of India's import substitution policies in the automotive sector.<sup>8</sup> She showed that the Indian approach led foreign investors to build facilities much smaller and less efficient than plants designed to compete in world markets. All thirty-four facilities produced at prices above the compa-

6. Subsidized energy prices also led to project outcomes that reduced national welfare.

7. Wasow (2003).

8. Krueger (1975).

rable foreign price, ranging from 18 percent more than the foreign price to three times the foreign price.<sup>9</sup> The differential was even worse for firms engaged in domestic content generation, such as metal fabrication, chemical supply, and other components, (prices 123 percent to 309 percent higher) compared with the differential for assemblers (prices 118 percent to 197 percent higher). Her estimates suggested that twenty-seven of the thirty-four operators would not remain in business if levels of effective protection dropped below 50 percent.

Automotive industry studies from other regions, and later periods, reported results similar to those of Krueger.<sup>10</sup> Protected FDI assembly operations in Latin America, Southeast Asia, and eastern Europe had typically less than half the capacity of parent operations in developed countries. The combination of sub-scale size, the requirement to meet domestic content requirements, and trade protection generated prices 150 to 200 percent higher than prices of comparable imports—except the studies revealed that domestic output was *not comparable* with imports. To meet domestic content requirements, often with mandatory local partners, international automobile companies standardized the practice of delivering semi knocked down (SKD) or completely knocked down (CKD) kits to be welded and screwed together by hand in miniature assembly plants, without benefit of large-scale automotive production and quality-control characteristics found in all cutting-edge factories.<sup>11</sup>

Factories in protected developing country markets turned out earlier-style automobiles—called “repeat models”—with previous-generation performance characteristics. Even well-run plants were not designed to be, or to become, internationally competitive. General Motor’s (GM’s) otherwise exemplary kit-assembly joint venture in Hungary achieved a maximum output of eight vehicles per hour in contrast to the output of the its full-scale operations of ninety vehicles per hour before the prospective loss of trade protection associated with Hungary’s entry into the EU led GM to buy out its Hungarian partner and shut down the plant entirely in 1999.<sup>12</sup>

Industry executives admitted (or explained) that when host countries required them to operate with indigenous joint venture partners the parent corporation withheld the most advanced technology so as to avoid “leakage” in a horizontal direction to potential rivals.<sup>13</sup> In China, product characteristics were ten years

9. Krueger (1975, table V-1, p. 89).

10. Bale and Walters (1986); Samuels (1990); UNCTC (1991).

11. For an engineering comparison of CKD and SKD auto plants with standard full-scale assembly operations, see Ngo and Conklin (1996, appendix 3: Note on the Automobile Assembly Process of Mekong Corporation and the Viet Nam Motor Vehicle Industry).

12. Klein (1995); Kalotay (2002, pp. 1042–049).

13. Beamish (1988). Multinational investors show a marked difference in behavior between freely choosing a local partner to help penetrate a host country market and being required to form

behind the industry frontier, in Latin America, sometimes even farther back.<sup>14</sup> The investors' reluctance to deploy the latest technology to China was not merely precautionary. Audi's Chinese partner in the First Automobile Works "expropriated" the production technology after the European multinational's license expired in 1997. When host countries required them to meet explicit domestic content requirements, they subtracted from their kits the most simple fixtures and components, designating these for local procurement in the host economy.

In the electronics industry, William Cline's dissection of Brazil's policy in the informatics sector mirrors what Kreuger found in the Indian automobile sector.<sup>15</sup> Brazil's strategy of restricting computer imports and limiting foreign ownership to 30 percent allowed international companies to sell less-capable models for two to three times world prices. Cline estimated the cost to consumers to have been about \$500 million per year in the mid-1980s, not including the competitive disadvantage suffered by user-companies like Embraer (aerospace) and Petrobras (petroleum exploration and development) whose international rivals could enjoy cutting-edge products with no price penalty.

To meet import substitution goals, international computer companies, sometimes using the same knocked-down kit assembly pattern as the automotive sector, shipped previous-generation components and technologies to generate a second round of oligopoly rents from production in protected markets. Operating in Mexico with a mandatory local partner and 25 to 35 percent domestic content requirement, Hewlett-Packard (HP) charged prices 160 percent higher for locally assembled computers that were at least one technology cycle (that is, two to four years) behind those in the United States.<sup>16</sup> The HP factory was approximately one-tenth minimum efficient scale for computer assembly, which precluded the introduction of automated, computerized production lines or large-batch quality-control procedures that were being perfected in Southeast Asian export plants. The kit for the previous-generation computer brought all sophisticated inputs in from elsewhere; the domestic content requirements were filled with purchases of simple coils, wires, and packaging.

Thus, besides documenting the inefficiency of using FDI for import substitution, studies using firm-level data showed that the plants were *not miniature replicas* of what could be found along the industry frontier. The production

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a joint venture as a condition of entry. They frequently partner with a local firm to set up domestic operations but then take full control if they decide to incorporate the host site into the parent's internal sourcing network.

14. Wang (2004).

15. Cline (1987).

16. Austin (1990).

lines were physically constructed differently. The workers did not receive training in the same skills as those skills needed for large-scale automated plants. The operations in the host country did not generate the dynamic learning that was essential for infant industries to mature into competitive adulthood. In the petrochemical industry, for example, a sector known for high fixed costs and low variable costs, the competitiveness of foreign-owned facilities in the developing world was acutely dependent upon capturing all economies of scale. In a study of fifteen foreign direct investment projects in petrochemicals, Peter Gray and Ingo Walter found that, from an engineering point of view, all six boutique plants built to serve protected local markets were not only high cost but were ill designed to be used as building blocks in an infant industry strategy.<sup>17</sup> Two of the six were considered outright failures by the parent investors. The remaining four survived only with on-going protection in the host market.

These industry studies show that the MNC reaction to trade protection in developing countries was *noticeably different from what was coming to be called tariff jumping FDI* among the developed countries. Confronted by U.S. tariff and nontariff barriers, Japanese auto companies began building plants in the United States that reproduced the most advanced high-quality-control production techniques available in the Japanese home market. In protected developing country markets, in contrast, manufacturing MNCs were not able to reproduce plants with the size and sophistication similar to home country facilities.

#### *Parent-Affiliate Relationships: Fragmentation versus Integration*

At the same time, industry studies revealed that the relationship between multinational parent and subsidiary was becoming increasingly fragmented within the import substitution framework. But they also showed that the parent-subsidiary relationship was growing ever more closely integrated when the former relied on the latter to secure the firm's position in international markets. Rather than merely searching for low-wage assembly sites, MNC headquarters began to orchestrate their developing country affiliates into a coherent supply network within which latest improvements in production technology and quality-control procedures could be transmitted on a real-time basis, within days or hours.<sup>18</sup>

Volkswagen designed the facilities producing that produce the inputs for its basic vehicle platform (engines, axles, chassis, and gear boxes) in Brazil, Mexico, Argentina, and eastern Europe so that they could incorporate engineering

17. Gray and Walter (1984).

18. For a more extensive review of evidence of this intimate parent-affiliate relationship, see Moran (2001).

upgrades online within sixteen hours of each other. General Motors placed cylinder head equipment that could accept continuous changes without rebuilding the production line in its high-performance engine export plant at Szentgotthard in Hungary. Ford designated its new export assembly facility in Hermosillo as the site to teach managers worldwide quality-control techniques that rival those of the Japanese. The output of this Mexican plant achieved higher scores for reliability (according to independent tracking agencies) than those of Ford plants in the United States.<sup>19</sup>

International electronics firms synchronized production changes in their Asian supply chains with the pace of the new product introduction in the home market.<sup>20</sup> Telecommunications and semiconductor multinationals assigned high-precision manufacturing and quality-control procedures to their plants in Malaysia as soon as they appeared. “As far as assembly and testing are concerned,” observed a Texas Instruments executive, “we have more expertise here than we have in the U.S.”<sup>21</sup> Using plant-level data from the disk drive industry, David McKendrick, Richard Donner, and Stephan Haggard traced the organization of “new product transfer teams” within Seagate and Read-Rite for each new generation of magnetic platters and associated high-performance motors.<sup>22</sup> Product developers at headquarters meet with fifteen process engineers and managers brought in from wholly owned affiliates in Singapore, Malaysia, or Thailand some fifty days before launch, who are followed two weeks later by twenty-four production supervisors, to be trained on the pilot line. When the assemblers return to Southeast Asia, they are accompanied by eleven managers and engineers from headquarters to perform tests on the new production line. After the official launch, ten more U.S. supervisors oversee local operations to trouble-shoot problems until high-volume, high-reliability output is achieved with minimal downtime or rejection rates.

It became a trick question in business school literature to ask whether would-be consultants in the classroom would advise a particular host to provide a tax break to an investor who would promise to introduce the very latest techniques into the local export plant—the correct answer was “no, of course not” because it would be clearly in the self-interest of the parent to incorporate such latest techniques on its own since the parent’s competitive position in global markets depended upon highest performance from the affiliate.

19. Womack, Jones, and Roos (1991, chapter 10).

20. Borrus, Ernst, and Haggard (2000).

21. Lim and Fong (1991, p. 115).

22. McKendrick, Donner, and Haggard (2000).

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*Avoiding Selection Bias:  
From Anecdotal Observations to Robust Generalizations*

To what extent might these observations about the differential impact of manufacturing FDI on the host economy—drawn from the international automotive, electronics, and petrochemical industries—be generalizable to manufacturing FDI more broadly?

Business cases, and even industry studies, are routinely referred to as anecdotal, suggesting that generalizations based on them may be discredited with no more than a handful of additional observations and that there is a high probability that such additional observations will differ.<sup>23</sup> The fact that the automotive, electronics, and petrochemical sectors show a similar divergence between production for protected domestic markets in developing countries and production for export in competitive international markets across time periods and across geographical regions provides some confidence, however, about further observations within these industries. But might there be some kind of selection bias that renders the results from these industries different from manufacturing FDI more generally? Or does evidence from FDI in manufacturing in other sectors point in the same direction? Already, the cost-benefit analyses that recorded negative host country economic effects from FDI in protected domestic markets and positive host country economic effects from export-oriented FDI have included data from such sectors as industrial equipment, agribusiness, textiles, canned goods and juices, pharmaceuticals, chemicals, and petrochemicals, as well as automotive equipment and electrical equipment. And, dating from the period of the earliest cost-benefit investigations, solid theoretical research emerged backing the expectation that domestic content requirements and other forms of trade protection are likely to lead to a proliferation of subscale and inefficient plants.<sup>24</sup>

With regard to the quality of the relationship between parent and developing country affiliate, two separate studies by Edwin Mansfield and Anthony Romeo and Jeong-Yeon Lee and Mansfield surveyed a total of sixty-five firms from a wide range of sectors and showed systematic differences as a function of whole or shared ownership.<sup>25</sup> Parent firms deployed new technology and production processes more rapidly within wholly owned MNC supply channels than they did among joint ventures or licensees. The data showed a mean lag of three to four years before technology was transferred to joint ventures or licensees in developing countries. In Vijaya Ramachandran's sample of

23. King, Keohane, and Verba, (1994).

24. Eastman and Stykolt (1970).

25. Mansfield and Romeo (1980); Lee and Mansfield (1996).

industries in fourteen sectors, the potency of the interaction between headquarters and affiliate was significantly stronger within wholly owned networks than it was for joint venture or licensees across all sectors.<sup>26</sup> Contemporary data from China exhibited the same contrast in plant operations, notwithstanding the Chinese success in attracting extraordinary large numbers of foreign investors. Drawing on a sample of 442 multinational investors, Guoqiang Long showed that wholly owned or majority parent-owned foreign affiliates were much more likely to be using the most advanced technology available to the parent than are ventures with 50-50 ownership or majority domestic ownership.<sup>27</sup> Thirty-two percent of the wholly owned foreign affiliates and 40 percent of the majority foreign [parent?]-owned foreign affiliates used technology as advanced as in the parent firm, whereas only 23 percent of the 50-50 shared ownership firms and 6 percent of the majority Chinese-owned firms did.

Business strategy literature provides ample testimony from senior MNC managers that control over ownership is used to limit opportunistic behavior, prevent appropriation of proprietary assets, and minimize transaction costs in dealing with host country partners.<sup>28</sup> Supporting such testimony, Magnus Blomstrom, Ari Kokko, and Mario Zejan found a negative correlation between host country policies that stipulate that foreign firms provide access to the parent's patents, perform research and development onsite, or transfer skills to local personnel and ensure that technology inflows from headquarters to affiliate.<sup>29</sup> Japanese MNCs displayed a negative coefficient for intrafirm technology transfer, according to Shujiro Urata and Hiroki Kawai, when host authorities impose technology sharing requirements as a condition for international investors to set up a local affiliate.<sup>30</sup> Using Bureau of Economic Analysis benchmark survey data of U.S. multinationals from 1982, 1989, and 1994, and from the nonbenchmark year 1997, Mihir Desai, Fritz Foley, and James Hines noted that whole or majority ownership occurs most frequently when parent firms coordinated production among different offshore sites, transferred technology and other intangible property among affiliates, and managed tax planning on an international basis.<sup>31</sup> Their data suggested that lifting local ownership restric-

26. The results came from industries as diverse as metal products, chemicals, rubber, food, textiles, and medical products, as well as transport equipment and electronics. Potency was operationalized by Ramachandran (1993) as the number of parent company employees sent to a given host country to bring a given technology on line and the number of host country employees sent to the parent country for training.

27. Long (2005).

28. Gomes-Casseres (1989); Beamish and Delios (1997).

29. Blomstrom, Kokko, and Zejan (1992).

30. Urata and Kawai (2000).

31. Desai, Foley, and Hines (2002).

tions provides a clear payoff to host governments in terms of expanded trade within multinational sourcing networks: each 4 percent increase in sole ownership of affiliates was associated with 3 percent higher intrafirm trade volumes. Thus evidence showing a contrast in firm behavior, and in impact on the host economy, as a function of inward orientation toward a protected market (often with performance requirements like domestic content and joint venture mandates) and outward orientation toward international markets (typically free of performance requirements) emerges across industries, regions, and time periods. This evidence from affiliate operations is backed by consistent management testimony about the motivation for the contrasting investor behavior and is supported by theoretical models to explain the favorable and the unfavorable consequences for the host economy.

#### *An Exception in Korea or Taiwan?*

Recent reevaluation of Korean performance in high-performance electronics demonstrates that that Korea's experiences with FDI is not so much a bona fide exception as an exception that proves the rule.<sup>32</sup> In industries where technology was stable and could be replicated through licenses and for-hire foreign engineers, such as shipbuilding and steel, Korea followed a model of excluding FDI, requiring domestic production of inputs, and creating "national champion" companies through government funding. In industries in which the international technological frontier was continuously pushed outward especially computers, semiconductors, telecommunications, and high-performance consumer electronics, Korea followed a script much closer to that of Hong Kong or Singapore than conventional wisdom has suggested. Foreign multinationals built the industrial base for electronics in Korea in the decade from the mid-1960s to the mid-1970s, during which foreign-owned production accounted for one-third of the domestic market and more than half of all exports. Korean companies grew up as suppliers to the foreign investors and gradually entered export markets via original equipment manufacturer (OEM) relationships with the foreign assemblers (that is, foreign-owned affiliates). The Korean suppliers credited technology acquisition to contract manufacturing, which occurred three times more often than it did through licenses or joint venture partnerships.<sup>33</sup>

In the 1980s, nationalistic policies pushed most foreign electronics assemblers out of Korea, but the OEM channel nonetheless remained the crucible that shaped the performance of Korean-owned firms. At the turn of the decade, 50 to 60 percent of all color TVs and VCRs were still exported from Korea by

32. Hobday (1995, 2000).

33. Rhee, Ross-Larson, and Pursell (1984).

means of OEM contracts with assemblers who provided the specifications for contract manufacturing.<sup>34</sup> All three of the companies that became Korean national champions—Samsung, Lucky Goldstar, and Hyundai—grew up as contract manufacturers for multinationals and, after three decades, still relied on OEM contracts for 60 percent of their electronics exports. They expanded their own design expertise because of learning-by-doing work for foreign purchasers, not because of mandatory joint venture partnerships. They depended upon duty-free imports of inputs for their own assembly, not domestic content requirements.

The Taiwan experience shows a similar same pattern. Indigenous electronics firms began by selling components for calculators, clocks, and VCRs to the local affiliates of IBM, Hitachi, and Philips; the more successful graduated to contract manufacturing of printed circuit boards, monitors, and power supplies. All the major Taiwanese computer makers, including ACER, Tatung, and MiTAC, entered export markets as OEM suppliers to foreign multinationals, learning advanced design and own-brand marketing as they went. Not one of the three became successful because of forced joint-ownership with a multinational. All eschewed government obligations on domestic content. Thus, as discussed in the final section of this paper, the argument that developing countries need more “policy space” to impose performance requirements on FDI such as domestic content or joint venture, among others—“like Korea and Taiwan did”—is simply not well informed by the facts.<sup>35</sup>

#### *A First Look at Backward Linkages*

Sectoral studies and business cases also showed a stark contrast in the spread of backward linkages from multinational affiliates to indigenous suppliers in the host economy. With FDI oriented toward protected local markets, the smaller-sized and less advanced production techniques of the multinational affiliates not only penalized the efficiency of their own plants but also hindered local companies from becoming competitive suppliers. In the automotive sector, the multinational kit assemblers fulfilled their domestic content obligations with parts for which economies of scale were least evident. The opportunities for local firms were concentrated in stamped or molded plastics, windows, simple electrical fixtures. Domestic companies were virtually precluded from becoming cost-effective producers of transmissions, axles, and even exhaust

34. These assemblers included Sony, Panasonic, Mitsubishi, Zenith, Toshiba, Philips, Zenith, RCA, and Hitachi.

35. For the argument that more “policy space” is needed for developing countries to regulate FDI, using Korea as an alleged model, see Birdsall, Rodrik, and Subramanian (2005).

systems. In the electronics sector, local suppliers had to fabricate computer casing from fiberglass or aluminum because their operations were not large enough to support the use of newer composite materials that were becoming the norm in international markets. Transistor wiring was hand-soldered, with predictable negative consequences for reliability.

For export-oriented FDI, however, MNCs began to farm out procurement contracts in a vertical direction to low-cost local suppliers. In the automotive industry, certification as an original equipment manufacturer or replacement equipment manufacturer (REM) emerged as the principal channel for the creation of a host country auto parts industry. In the electronics industry, contract manufacturing of printed circuit boards and other subassemblies became a major source of domestic industrial growth first in Southeast Asia, including Korean and Taiwan, and later in Latin America after the trade-and-investment liberalization of the 1990s.

This contrast between FDI operations oriented toward protected local markets or exports plays an important role in the search for externalities.

### **How to Investigate for Externalities from Manufacturing FDI in the Developing Country Host Economy**

The first generation of econometric analysis, examining data from the 1980s and 1990s, failed to demonstrate the existence of externalities. Industry or sector studies, business school cases, management interviews, and firm surveys analyzed evidence from the same period and from more recent periods and showed multiple kinds and types of externalities. But what is the reality? Why has the search for externalities produced such disparate outcomes? How can investigative methods be improved to provide more thorough and rigorous identification of externalities and better understanding of when and how beneficial spillovers might occur?

*Positive externalities*, which are spillovers from the presence of foreign investors that benefit the host economy without having to be paid for, come in various forms. Executives, managers, engineers, and workers may leave foreign-owned plants after having acquired skills and expertise. Nonrelated firms may observe MNC strategies, duplicate their purchases of equipment, replicate their production or management practices, or copy their quality-control practices. Foreign investors may provide advice, designs, direct production assistance, or marketing contacts to suppliers, which the latter then deploy more broadly than simply providing cheaper or more reliable inputs to the foreigners.

It is possible to imagine in the abstract a world in which executives, managers, engineers, and workers never leave the foreign plants where they have obtained on-the-job training; in which indigenous firms do not imitate production processes or marketing techniques introduced by foreigners; in which foreign affiliates do not provide advice and assistance to help suppliers reduce costs, improve quality, or penetrate new markets; or in which those suppliers fail to improve their operations in ways that cannot be fully captured by the foreign purchasers. However, this is not a world that emerges from the testimony of participants whether they are in international corporations or indigenous companies. The evidence from the actors themselves makes a clear distinction between the spread of externalities in the vertical as opposed to the horizontal direction.

*Horizontal Externalities:  
Evidence from Industry and Business Case Studies*

In the horizontal direction, international companies report diligent efforts to avoid leakage of technology and know-how to potential rivals.<sup>36</sup> The preoccupation with maintaining whole or majority ownership, as outlined in the section above, is largely driven by a desire to prevent host country entrepreneurs from becoming competitors. The decision to internalize corporate operations across borders, as opposed to licensing technology or exporting goods and services, is motivated by a strategy to prevent erosion of market position. The evidence suggests, however, that these self-protective efforts on the part of multinationals are not perfectly successful—especially in cases when the technology and management skills needed to launch a successful business are relatively simple, stable, and can be learned on the job. Multinational corporations have a long history as incubators of senior managers in the industrial sectors or in Latin America and Southeast Asia.<sup>37</sup> Local banks and financial sector institutions in both regions are filled with alumni of Citibank and Banque Nationale de Paris (BNP).<sup>38</sup> Within six years of the beginning of FDI-led export growth in Mauritius, 50 percent of all export processing zone (EPZ) firms were indigenously owned. They were founded, managed, and staffed, in many cases, by employees who had received on-the-job training in foreign enterprises and then had left to set up their own companies.<sup>39</sup>

36. Vernon, Wells, and Rangan (1995).

37. Katz (1987).

38. McKendrick (1994).

39. Rhee, Katterbach, and White (1990, p. 39). The figure of 50 percent represents the share of all EPZ equity capital. The authors report that indigenous firms were founded by former employees of the foreign multinationals, but they do not provide exact data.

Contemporary survey data provide details about the spread of production techniques and management practices in the horizontal direction. One-quarter of the managers of Czech firms and 15 percent of the managers of Latvian firms reported that they learned about new technologies by observing foreign firms as the latter entered their industry [sector?].<sup>40</sup> Twelve percent of the Czech managers and 9 percent of the Latvian managers indicated that they discovered new marketing procedures and outlets from watching the performance of foreigners. Nonetheless, in general, the transfer of production and management skills in a horizontal direction appears to take place despite the best efforts of foreign investors to prevent it. Along this axis, the popular phrase “technology transfer” can legitimately be considered an oxymoron, as far as the wishes and efforts of the multinational corporations are concerned. In a vertical direction, however, the story is far different. The surprise in the data comes from where it is least expected, in export-oriented MNC manufacturing plants.

*Vertical Externalities: Industry and Business Case Study Evidence*

The developing country governments that imposed performance requirements such as domestic content and joint venture mandates on foreign manufacturing investors justified their actions with the fear that otherwise the foreigners would engage in little more than “screwdriver” operations that had few backward linkages into the host economy. Confirming their worst apprehensions, early export-oriented MNC plants—often set up in EPZs or free trade zones, with wholly owned subsidiaries free to procure inputs from wherever they wished—were largely self-contained operations that assembled imported components with minimal local purchases. Beginning in the first half of the 1980s, however, plant-level studies began to show growing amounts of purchases from local suppliers. These local suppliers included foreign-owned component producers from the home country, induced by the original MNCs to follow them to the host country. But they also consisted of a growing number of indigenous firms. As discussed below, the spread of backward linkages to locally owned firms varied as a function of the sophistication of the local corporate community, the business-friendly character of the local investment environment, the access of indigenous firms to duty-free imports, and the length of stay of the foreign investors in the host economy.

Using data on firms based in Singapore, Linda Lim and Pang Eng Fong traced the path of backward linkages from individual foreign electronics exporters into the host economy and documented the forms of assistance explicitly pro-

40. Figures are from the sample conducted in 2003 by Beata Smarzynska Javorcik and Mariana Spatareanu (2005).

vided to locally owned firms.<sup>41</sup> Company A, the subsidiary of a U.S. semiconductor manufacturer, bought goods and services from 200 local companies in Singapore. Six of the top ten local suppliers, by value of sales to the MNC, were component affiliates of U.S., Japanese, or European investors from the home market; the other four were indigenous Singapore firms. To ensure quality and reliability of components, the U.S. semiconductor investor provided detailed specifications and engineering help to the latter. For Company B, which was the subsidiary of a European consumer electronics manufacturer, four of the eight largest suppliers were foreign-owned, and four were indigenous. For the latter, the European purchaser provided assistance in quality-control procedures and helped automate their production lines. In both cases, the local firms became sellers to unaffiliated buyers. For Company B, the foreign affiliate introduced the Singapore producers to regional sister plants, following which the Singapore companies began to sell in international markets more generally.

In Malaysia, Rajah Rasiah's study of international telecommunications and semiconductor investors, which included two months of factory-floor residency, followed the foreigners as they assigned technicians to suppliers' plants to help set up and oversee large-volume production and testing procedures.<sup>42</sup> In some instances, the multinational firms sent engineers to participate in joint design with supplier personnel of subassemblies and components. Over time, the contract manufacturing phenomenon became *more intimate than mere shopping around for cheap inputs*. Of particular note is Rasiah's account of the development of a vertical supplier group in a separate industrial sector, machine tools.<sup>43</sup> The founders of seven of the nine leading Malaysian machine tool firms started as workers in the semiconductor and telecommunications MNCs then struck out on their own. Ten percent of the workforce in these seven companies was also drawn from the MNCs. Initially, the foreigners supplied molds and dies to their former employees for products that required simple machining and stamping. As in the case of components for telecommunications and semiconductor assembly, over time, engineers from both sides worked together to design specialized machine tool equipment for the mounting of semiconductor wafers. Duplicating what Lim and Fong discovered in Singapore, the foreigner investors opened a channel for the machine tool suppliers to export to affiliated buyers abroad. All seven machine tool firms began to sell to unrelated parties, moving from the status of "captive producer" for the multinational corporation to that of independent player in the marketplace.

41. Lim and Fong (1982).

42. Rasiah (1995).

43. Rasiah (1994).

In the automotive sector, the indigenous auto part industry in Mexico ramped up production quite rapidly after the automotive multinationals shifted from import substitution to using Mexican sites as export platforms. Wilson Peres Nuñez estimated that more than 115 local component firms surpassed the \$1 million mark in sales within five years after the foreigners began to build world-scale plants.<sup>44</sup> Indigenous Mexican firms constituted more than half of the thirty largest auto part exporters (excluding engines). U.S., Japanese, and European investors provided production audits and zero-defect procedures to help improve quality control among the suppliers. Once those suppliers qualified as OEMs or REMs, they were certified for sales throughout the industry. Arch-anun Kohpaiboon reported that, to reduce unit costs and lower defect rates in Thailand, foreign auto companies assigned technicians who “ate and slept with local workers” in the factories of their local suppliers.<sup>45</sup> By 2003, according to the Thai Automotive Industry Association, the fourteen largest U.S., Japanese, and European automotive multinationals had certified 709 host country firms for OEM status (287 foreign owned, 68 joint ventures, and 354 Thai owned), followed by 1,100 second- and third-tier suppliers.<sup>46</sup>

Contemporary business surveys provide details about deliberate coaching for suppliers across many industry sectors as part of the effort of foreign investors to acquire inputs in the host economy. The survey data of Javorcik and Spatareanu showed that 90 percent of 119 majority-owned multinational investors in the Czech Republic acquired inputs from at least one Czech supplier.<sup>47</sup> The median affiliate acquired inputs from ten local firms; an affiliate in the top quartile acquired inputs from at least thirty Czech firms. One-tenth of those surveyed acquired all of their intermediate inputs from local suppliers. This evidence provides a reminder, however, that great care must be taken to identify with rigor what constitutes genuine externalities.

In the view of Javorcik and Spatareanu, the vertical relationships between foreign affiliates and indigenous suppliers took three distinctive forms. First, the multinationals may simply identify the cheapest and most reliable host country suppliers and purchase growing amounts of inputs from them—that is, the foreigners are cherry picking from among Czech firms that are already fully equipped to produce goods and services needed by the foreigners. Second, the multinationals may provide explicit assistance to potential suppliers to help improve their performance so that it meets acceptable standards of cost and reliability. Third, the multinationals may announce certain criteria that poten-

44. Nunez (1990, chapter 6).

45. Kohpaiboon (2005).

46. Kohpaiboon (2005).

47. Javorcik and Spatareanu (2005).

tial suppliers must meet that act as a stimulus for local firms to upgrade their activities on their own. A common example of this latter phenomenon was the decision of Czech firms to obtain ISO 9000 (quality-control) certification, once foreigners stipulated this as a precondition for qualifying to bid on procurement contracts.

Statistical analysis alone would show a positive correlation between the presence of foreign investors and higher-than-average productivity among local suppliers for all three types of relationships. But the first scenario—the cherry picking scenario in which firms supplying multinationals have higher productivity than others—would not merit the externality label, whereas the second, in which the foreigner provides explicit assistance to the supplier, would qualify if the benefits are not all exclusively captured by the purchaser. One-fifth of the 119 multinationals reported that they did provide some kind of clearly defined assistance. Most frequently this assistance took the form of financing and advance payment; next was the training of employees, followed by quality-control help. Other forms of assistance included lending and leasing of equipment, production technology and organization of production lines, aid with financial planning and management strategy, and initiation to exporting. More tricky to label is the third relationship (which Javorcik and Spatareanu called a “positive productivity shock”) in which the foreign presence provides the incentive for the local firms to acquire ISO 9000 certification. Forty percent of the Czech firms that underwent the arduous ISO qualification process reported that their motivation was to gain access to the advance payments, production help, and external marketing assistance that came with being a supplier to multinational corporations. Javorcik and Spatareanu left unresolved the question of whether local firms motivated by multinationals to upgrade their capabilities might be considered a genuine externality.

The buildup of indigenous supplier networks depends upon important preconditions. The extent of backward linkages, spillovers, and possible externalities differs according to the duration of the foreign investor residence in the host country, the sophistication of the local business community, and the business climate within which indigenous firms operate. The early data from Singapore and Malaysia show much lower levels of local procurement than do data from later years. René Belderbos, Giovanni Capanelli, and Kyoji Fukao found that the proportion of local content (from both foreign-owned and indigenous suppliers) was directly related to the length of the Japanese multinationals’ operating experience in any given Asian host economy.<sup>48</sup> In their estimation, one additional year of local operating experience increases the local content

48. Belderbos, Capanelli, and Fukao (2000).

ratio by 0.6 percentage point. Ari Kokko showed that spillovers between foreign affiliates and local firms in Mexico differed depending upon the productivity difference between the two: when the local firms had much lower productivity, there were few signs of spillovers. Ari Kokko, Ruben Tansini, and Mario Zejan found the same difference among Uruguayan manufacturing investors. Nonetheless, even in relatively poorer developing countries, there is evidence that some managers and workers do move from foreign affiliates to set up parallel operations in low-skill operations like garment and toy manufacturing, as demonstrated by the Mauritius case cited above. Mauritius was not alone: within two decades of export-led growth, the proportion of EPZ firms in the Dominican Republic that were locally owned had grown to 20 percent. Local procurement, however, appears to depend directly upon the business conditions surrounding the domestic business community. International firms in Mauritius engage in more subcontracting with indigenous firms, for example, than what takes place in other Africa countries, such as in Madagascar, Senegal, or Tanzania. In addition, Mauritian firms also engage in more subcontracting with each other than is common in these other countries as well. Manju Kedia Shah suggested that both outcomes quite likely may be explained by the fact that business-operating conditions for all firms in Mauritius benefit from a higher rating than what is in other countries, including favorable tax rates and tax administration, superior access to finance, lower economic and regulatory policy uncertainty, better customs and trade regulations, and more reliable electricity and telecommunications.<sup>49</sup>

#### *Weaknesses in Early Statistical Studies*

Why did the first generation of econometric studies fail to show that FDI generated externalities for the host economy? The reason lies in the discovery that FDI in manufacturing and assembly comes in two distinct forms, both of which have far different impacts on the host economy:

—First are the plants that are fully controlled by the parent and oriented toward export markets.

—Second are those plants that are oriented toward protected domestic markets and required to meet domestic content requirements and operate with majority ownership on the part of host nationals.

This discovery helps explain why the first generation of econometric studies showed such jumbled results.

49. Shah (2006, p. 2, figure 1); Shah and others (2005, p. 29, table 3-2).

In the oft-cited study of manufacturing FDI in Venezuela, Brian Aitken and Ann Harrison asked whether foreign equity participation raised the productivity of the recipient plants and found a robust positive correlation only for small enterprises.<sup>50</sup> Searching for productivity spillovers from foreign investors to domestically owned plants in the same industry (that is, in the horizontal direction only), they found a negative correlation. They concluded that the impact of manufacturing FDI in Venezuela was neither clearly positive nor clearly negative and surmised that the net effect was quite small. This study is frequently cited to cast doubt on the benefits from foreign direct investment and to refute the contention that the presence of foreign firms generates externalities for a host economy. But the data on industrial plants comes from a period (1976 through 1989) when Venezuela followed a dedicated import substitution strategy and the Venezuelan Superintendencia de Inversiones Extranjeras imposed a heavy layer of controls of foreign firms.<sup>51</sup> Business International reported that the country's policy toward foreign ownership during this era involved "strict joint venture requirements/only foreign minority position tolerated and this on a limited basis"; host country policy toward domestic content included "general requirements for specified percentage of local content/strictly enforced requirements for fully utilizing local components and materials."<sup>52</sup> Foreign firms faced restrictions on repatriation of profits and were obliged to exchange bolívares at the official rate rather than at the free market rate. In addition, they were forbidden from exercising confidentiality and exclusive-use-of-trade-secrets in their mandatory joint ventures. Only with discretionary authorization from the Superintendencia could foreigners undertake majority-owned FDI, but how frequently majority-owned operations might be reflected in the industrial plant database is impossible to ascertain. In short, the trade-and-investment regime in Venezuela during the period of this study replicated rather faithfully those anticompetitive conditions under which several studies found foreign direct investment subtracting from host country welfare, when all inputs and outputs were valued at world market prices.<sup>53</sup> Indeed the most interesting discovery is that Aitken and Harrison uncovered any favorable impact whatsoever.

On the basis of these cost-benefit studies of FDI projects in such a highly distorted setting, one would be justified in supposing that Venezuela was quite probably experiencing a large dose of negative as well as (perhaps) some pos-

50. Aitken and Harrison, (1999).

51. Balasubramanyam, Salisu, and Sapsford (1996, appendix); Wheeler and Mody (1992, tables A-1 and A-2.)

52. Wheeler and Mody (1992, p. 76).

53. Lall and Streetan (1977); Reuber and others (1973); Encarnation and Wells (1986); Wasow (2003).

itive contributions to the host economy. But this is impossible to know because of the way the investigation is designed. What would be needed would be to separate out export-oriented FDI (if any) from import-substitution FDI, to separate out foreign investors free to source from wherever they wish (if any) from foreign investors operating with domestic content requirements, and to separate out foreign investors obliged to operate as minority shareholders from foreign investors with whole or majority ownership.

Data from FDI in Morocco might appear to offer a clearer picture of the relationship between foreign investment and development. Between 1983 and 1985, Moroccan regulations governing FDI allowed foreign manufacturing firms for the first time to take an ownership position of more than 49 percent and eased trade restrictions. Mona Haddad and Ann Harrison proposed that data from 1985 through 1989 would show the impact of FDI under conditions of trade and investment liberalization.<sup>54</sup> They found that there was no significant relationship between higher productivity growth in domestic firms and greater foreign presence in the sector, suggesting that foreign investment did not bring positive spillovers to the host economy. Firms with whole or majority foreign ownership demonstrated higher levels of total factor productivity than did their domestic counterparts, but the rate of growth of productivity was higher for the latter.<sup>55</sup> Controlling for firm size, they found that foreign investors did not exhibit higher levels of labor productivity. They concluded that the evidence did not show foreign investors making a large and dynamic contribution to the development of the Moroccan economy, which was similar to the results in the Venezuelan case. When they varied measures of relative trade protection, technology spillovers from foreign investors to domestic firms remained insignificant and generally negative.<sup>56</sup> Morocco's trade reform during this period, however, was limited to phasing out quantitative restrictions while leaving in place a complicated tariff system with nominal rates ranging from 17 to 44 percent by sector and effective rates rising for each stage of processing. Other researchers continued to place Morocco in the import-substitution category during this period.<sup>57</sup> Indeed, Haddad and Harrison attributed the higher rate of total

54. Haddad and Harrison (1993).

55. The data from Morocco showed a positive and statistically significant relationship between the extent of foreign ownership of a firm's assets and firm-level productivity: each increase by one standard deviation in the extent of foreign ownership of a given firm brought that firm 4 percent closer to best practices in the industry. This test of the Moroccan data comes from a later analysis by Harrison (1996). In the original article on Morocco, Haddad and Harrison had suggested that firms with majority foreign ownership behaved generally in the same way as did firms with minority foreign ownership.

56. Once again, Haddad and Harrison tested only for horizontal spillovers not vertical spillovers.

57. Balasubramanyam, Salisu, and Sapsford (1996).

factor productivity growth for indigenous firms to their superior ability to cope with the continuing distortions in the protected local market.

As for foreign direct investment, the data do not show how much new FDI might have flowed into Morocco in the four-year period 1985 to 1989 as a response to the new-found freedom to gain majority ownership, but the aggregate changes in the share of foreign ownership by sector were small: five percentage points in leather; four percentage points in scientific instruments; three in machinery, textiles, and apparel. Only in a nonmanufacturing category (mining of phosphates) was there a more substantial FDI inflow, with the foreign share rising by seven percentage points. Most of the FDI stock in manufacturing was left over from the previous period during which strict FDI regulations oriented production toward the protected domestic market. Genuine liberalization of the Moroccan economy did not occur until the mid-1990s, following which FDI exports of electronics and other manufactured goods rose from U.S.\$4 million to some \$633 million, with overall EPZ exports approaching \$3 billion by 2006.<sup>58</sup> It would be enlightening to undertake a reevaluation of the impact of FDI on Morocco in the contemporary period, following procedures as outlined next, which avoid mixing the distinctively different forms of inward- and outward-oriented FDI.

#### *Improving Current Econometric Methodology: Horizontal Externalities*

How can contemporary econometric investigations be strengthened to provide a more accurate assessment of whether manufacturing FDI generates externalities in the host economy? How can such research be designed to identify those channels through which externalities are created when they occur? Looking first at the impact of FDI in the horizontal direction on the performance of indigenous firms, the standard econometric methodology has been to examine the relationship between the presence of foreign firms and the total factor productivity of indigenous firms in the same sector.<sup>59</sup> Perhaps the foreign firms demonstrate superior technologies or management techniques that the local firms can then imitate; or they generate competitive pressures that push local firms to upgrade their practices; or they train managers, workers, and engineers who move from foreign-owned to locally owned plants. But a positive correlation alone cannot be taken as proof that FDI is responsible for raising the performance of local firms—it could be that the foreign firms are simply settling in sectors where standards of productivity are already high. So, the next step might be to trace how the total factor productivity of local firms

58. Economist Intelligence Unit (2007).

59. Hanson (2005).

changes when levels of FDI in the sector increase. Once again, however, a positive correlation between the two might arise because there is some external reason that causes more foreign investment to enter into the sector and total factor productivity of local firms to rise, such as changes in host country tax legislation or contract enforcement. These business-friendly reforms might simultaneously act as an inducement to foreign investment while also allowing domestic firms to operate more efficiently. To infer that the arrival of foreign investors causes domestic firm productivity to rise would be mistaken. Furthermore, as Beata Smarzynska Javorcik and Mariana Spatareanu pointed out, the arrival of foreign firms is likely to produce two contradictory impacts simultaneously in the horizontal direction—the rise in the performance of indigenous firms through the demonstration of technology and management techniques by foreign-owned firms and through the spread of foreign-trained workers, managers, and engineers, while, at the same time, damage to the performance of indigenous firms through the shrinking of their market share and the draining off of their workers, managers, and engineers.<sup>60</sup>

Econometric studies that merely try to establish a horizontal correlation between changes in total factor productivity of indigenous firms with rising numbers of foreign investors in the same industry, Javorcik and Spatareanu argued, are not going to be able to disentangle these two contrary impacts. To measure spillovers and externalities in the horizontal direction, researchers using econometric techniques will have to figure out how to control for the level of competition as well as for the movement of personnel, technology, and management practices between foreign investors and indigenous firms. This constitutes a major challenge for future research on horizontal externalities. Research on developing countries can benefit from such efforts to separate true spillovers from competitive effects using developed country FDI data.<sup>61</sup>

#### *Improving Current Econometric Methodology: Vertical Externalities*

Shifting from the horizontal to the vertical, the use of econometric techniques to investigate when foreign investors create externalities in their relations with local suppliers is fraught with similar difficulties. As discussed above, a positive correlation between a foreign investor presence and higher total factor productivity in upstream or downstream local firms might occur because the foreigners were attracted to regions or sectors in which indigenous investors

60. Javorcik and Spatareanu (2005).

61. Haskel, Pereira, and Slaughter (2002); Keller and Yeaple (2007). Wolfgang Keller and Stephen Yeaple use data on the mark-up rate among firms, for example, to control for change-in-degree-of-competition effects.

would be able to operate more efficiently. Or the positive correlation might be due to other factors that attract foreign firms and also increase the efficiency with which domestic companies can operate, so that inferring a causal connection would be unjustified.

The challenges of introducing controls that enable the researcher to separate out the foreign investor impact on indigenous firms are not insurmountable, however, as the work of Garrick Blalock and Paul Gertler reveals.<sup>62</sup> They used data on manufacturing establishments in Indonesia collected by region since 1988, of which about 70 percent have export-oriented operations. First, to deal with the possibility that multinationals might make their investments in locations that are near to the most efficient suppliers but might not make those suppliers any more efficient after entering, Blalock and Gertler included establishment fixed effects in the production function. This controls for unobserved firm-specific productivity factors such as managerial capabilities and local characteristics. As a result, only changes related to suppliers' average productivity enter the estimation. Multinationals may very well locate their plants where suppliers are most efficient, but the technique employed by Blalock and Gertler investigates whether the performance of suppliers gets even better after the foreign firms enter. Second, to deal with the possibility that multinationals might make their investments in locations that are near to suppliers whose productivity is growing or expected to grow, they included industry-year fixed effects in the production function. This controls for changes over time in factors common to all firms in the same industry such as regulation and terms of trade. It also allows them to look at the overall growth of productivity in a particular sector over a given year and then to compare the growth in productivity in that particular sector in a region that had a large inflow of FDI with that in another region in which the inflow of FDI was noticeably less. Third, to deal with the possibility that multinationals might make their investments in regions where area conditions themselves are allowing suppliers' productivity to grow, they included region-year fixed effects in the production function (they call these "island-year" fixed effects, as in the island of Java versus the island of Sumatra). This controls for changes in location-specific factors that are common to all firms in the same region and that might affect firm productivity, such as local regulation, infrastructure, and labor markets. They thereby isolated the overall productivity of the particular region (for example, Java), which enabled them to compare suppliers to a sector in that region in which FDI is growing with a sector in which FDI is stagnant during a particular time period.

62. Blalock and Gertler (forthcoming). Similar research sophistication and similar results are found in Javorcik (2004).

Marching through these three steps, Blalock and Gertler found that the productivity of Indonesian supplier firms increased when the share of output purchased by foreign investors rose. What these three steps of investigation cannot rule out, however, is that foreign investors expected that the productivity of some specific suppliers in a particular sector in a particular region would grow over time—that is, the foreign firms chose to locate their operations in a particular place because they anticipated that suppliers there would undergo some idiosyncratic positive transformation that was not part of industrywide or region-wide changes promoting greater productivity growth. To address this potential concern, they employed a simultaneity correction for the estimation of production functions that used capital investment or energy consumption as a proxy for idiosyncratic shocks.<sup>63</sup> They found that the effect of downstream FDI was statistically identical to that measured without the simultaneity correction. These steps give increasingly solid confidence that the higher productivity of local suppliers that they observed originates from the presence of FDI and not from some other unobserved factor. Their calculation of the chain of welfare effects was that rising numbers of foreign investors led to improvement in the performance of local suppliers, resulting in lower prices, increased output, higher profitability, and increased entry at the supplier level. The lower prices in the supplier market, in turn, resulted in lower prices, increased output, higher profitability, and increased competition throughout the Indonesian host economy, benefiting other final goods producers as well as consumers.

But regression analysts must always wonder whether correlation (even overlapping layers of correlation) demonstrates causation? Do foreign investors actually bring about higher levels of indigenous productivity, and if so, how and why? Here, Blalock and Gertler took the logical additional investigative step, which is unusual for econometricians, and interviewed the foreign investors and Indonesian suppliers about their relationships with each other.<sup>64</sup> Both sides affirmed that concrete transfer of technology and management did take place in the vertical direction and identified the mechanisms through which this transfer occurred. An American MNC described a step-by-step program to find and qualify indigenous suppliers. Affiliate engineers would first visit the target factories to survey their operations and suggest modification. Next, the MNC would send sample output from a selected domestic factory for appraisal at home in the United States. If the product passed inspection, the American investor would send managers from the would-be local supplier to overseas training classes to learn the parent's systems for inventory control, quality con-

63. Olley and Pakes (1996).

64. Blalock and Gertler (2005).

trol, and cost accounting. This would be followed by small-scale orders from the MNC, building to regular purchases in large quantities as the supplier established a record of delivering on time and within specification. The managers of an affiliate from a Japanese MNC reported a similar certification process, adding that their usual procedure was to introduce qualified suppliers to sister affiliates of their industrial group within Indonesia and abroad.<sup>65</sup> Since other members of the Japanese MNC corporate network did the same, the Japanese managers in Indonesia became acquainted with Malaysian and Thai suppliers from whom they procured inputs for Indonesian operations. This strategy reduced search costs for the network and enabled suppliers to achieve economies of scale. Many candidates, the Japanese managers noted, did not survive the certification ordeal. From the perspective of Indonesian suppliers, Indonesia firms identified visits from engineers, efficiency specialists, and product design experts as channels for assistance. Not all MNCs provided usable advice, however, and one Indonesian firm broke off a relationship with an American buyer who demanded cost reductions but offered no technical support for achieving them.

These interviews provide a real-life picture of the diffusion of technology and management techniques between foreigners and local firms that is reflected in the econometric analysis and support the supposition that there is a link between the presence of foreign investors and the improvement in supplier productivity. But the number of observations was very small, and the collection methods do not pretend to offer a representative sample of foreign and local firms. A well-structured randomized survey would yield better, more valuable results, accompanied by details about the characteristics of the respondents that would allow other tests to determine when diffusion was more or less likely and larger or smaller. The combination of econometric analysis and sophisticated survey techniques offers great promise for future research, an observation given added resonance from looking at export externalities.

#### *Improving Current Econometric Methodology: Export Externalities*

The study by Brian Aitken, Gordon Hanson, and Ann Harrison provides a particularly valuable example in which multiple investigative techniques lead to greater value added. Using panel data on 2,104 Mexican manufacturing plants from the period 1986 to 1990, which followed the country's liberalization of trade and investment in 1985, they investigated whether there were spillovers from multinational corporations to domestic firms that led the latter to export.<sup>66</sup> Their task was particularly challenging since the more intuitive

65. Lim and Fong (1982); Rasiah (1994, 1995).

66. Aitken, Hanson, and Harrison (1997).

hypothesis is that firms are especially likely to export from wherever the overall concentration of export activity is larger—because the accumulation of exporters may allow construction of specialized transportation infrastructure, perhaps, or because access to information about the tastes of foreign purchasers may be more widespread, or because there may be some other local comparative advantage that benefits all exporters. For each location, therefore, they independently measured the overall concentration of economic activity, the concentration of export activity in general, and the concentration of MNC export activity. By controlling for the overall concentration of activity in a region, they eliminated the impact of unobserved fixed factors that might affect the export behavior of all firms. By treating local export activity and local MNC activity as endogenous variables, moreover, they controlled for the existence of region-industry-specific shocks that might make all of the firms in a particular region and industry more likely to export. In the end, after taking into account other factors that affect the decision to export (as might be the case for Mexican states with port facilities, or Mexican states located near the U.S. border, or Mexican states located near the capital city), they found that the probability of doing “more-than-expected” exporting is positively correlated with the local concentration of MNC activity but uncorrelated with the local concentration of overall export activity.

Despite this careful, powerful demonstration that the presence of MNCs leads to exports on the part of local firms, the demonstration-processes, learning-procedures, or other mechanisms—the concrete spillovers they feature in the title of their article—by which the foreign investors engender higher levels of exports remain totally opaque.

—Is the stimulus to local exporters direct or indirect? Do the MNCs themselves provide coaching in external marketing, an introduction to specific foreign buyers, or information about overseas demand? Or, alternatively, does MNC behavior simply demonstrate (without coaching) the processes through which penetration of foreign markets can be achieved, processes which can be copied and imitated by local companies?

—Is the transfer of export-related skills and knowledge horizontal or vertical? What is the relative likelihood of Mexican seafood-packing exporters growing up alongside U.S. and Japanese seafood-packing exporters (horizontal spillovers) in comparison with Mexican auto parts companies transforming themselves from suppliers to U.S. and Japanese auto plants in Mexico into OEM exporters to the international automotive industry (vertical spillovers)?

—Do the FDI-stimulated local exporters experience larger returns to scale, acquire new learning-by-doing skills, or gain reputational effects as they enter international markets, or not?<sup>67</sup>

Industry studies, business cases, management interviews, and firm surveys could provide answers at the same time as they boost confidence about the inference of causation. For researchers, to move in this direction, the leading economics journals would have to begin to accept—indeed reward—research that combines multiple kinds of investigation.

*Improving Current Econometric Methodology:  
Labor Market Externalities*

The investigation of possible labor market externalities similarly demonstrates that the introduction of ever greater statistical controls (that is, ever more narrow constrictions) on large plant-level datasets is valuable and often indispensable but with diminishing returns in comparison with what the simultaneous use of other investigative techniques might impart. How do wages paid by foreign investors to workers compare with wages paid by local firms? What accounts for the differences? Are there spillovers from labor payment practices of MNCs to labor payment practices of indigenous firms? Survey data collected by the International Labor Organization regularly show that wages paid by foreign firms are higher than those provided by domestic companies. Responses to World Bank questionnaires suggest that international companies offer permanent contracts (at higher rates than those received by temporary hires) to a larger share of their workers than do local firms. But, as in the case of productivity comparisons, the higher compensation paid by foreigners might arise solely because multinationals are located in higher-wage sectors, because they are attracted to higher-wage regions of the host country, or because the foreign-owned plants are larger or newer than the average plant.

To investigate the determinants of payments to labor, Robert Lipsey and Fredrik Sjöholm availed themselves of the same detailed information from the Indonesia Central Statistical Office as did Blalock and Gertler.<sup>68</sup> Drawing on

67. In addition to Lim and Fong (1982), Rasiah (1994, 1995) and Hobday (1995, 2000), Blalock and Gertler (2004) found strong evidence that firms experience an increase in productivity of 2 to 5 percent following the initiation of exporting. The timing of the increase points to learning from exporting rather than self-selection of higher performing firms into export markets. In interviews, the foreign investors indicated that they help their suppliers export precisely because exporting keeps the suppliers current with best practice and also because exporting expands and smoothes suppliers' demand so they can justify investment in the latest capital equipment. For the contrary view, see Clerides, Lach, and Tybout (1998); Bernard and Jensen (1999); Delgado, Fariñas, and Ruano (2002).

68. Lipsey and Sjöholm (2004a, 2004b).

18,652 plant observations from 1996, they found that foreigners paid 33 percent more for blue-collar workers and 70 percent more for white-collar workers than domestic companies did. The information for each of the plant observations included industry details, type of ownership, value added, energy consumption, and geographical location, as well as separate labor characteristics for white-collar and blue-collar employees, by number of employees of each, gender, distribution by level of education, and wages.

First, introducing controls for region and industry sectors, the premium paid by foreign-owned firms remained at 25 percent for blue-collar workers and 50 percent for white-collar workers. Next, adding controls for plant size, energy inputs per worker, other inputs per worker, and the proportion of workers that was female, the wage premium of the foreign firm remained at 12 percent for blue-collar and 22 percent for white-collar workers. Their analysis thus suggested that approximately one-third of the premium paid by foreigners was explained by region and sector and one-third by plant size and use of other inputs. But their data indicated that multinational investors were paying wages to their blue-collar and white-collar workforce above and beyond what might be due to superior productivity arising from greater scale of production and more inputs per worker, and the origin of this final one-third of the wage premium was not unaccounted for.

Turning to labor market spillovers, their analysis of the data showed that the higher wages paid by foreign firms did lead to payment of higher wages in domestically owned plants. Holding labor force quality constant, they found a positive spillover within broad industry groups at the national level and a smaller, but still positive and significant, spillover within narrower industry groups and at the province level. These results introduce a puzzle quite at variance with popular discourse: rather than engaging in “exploitation” of workers, why do foreign investors pay more than they “have to” in developing country markets, and what are the dynamics that makes this wage premium turn up among local firms as well? Labor market literature introduces a complicating reverse-causality hypothesis that higher MNC wages might derive from team-spirit, pride, or enhanced dedication, in which higher pay generates higher productivity instead of the opposite. Could this be the explanation?

Further investigation of this puzzle would be especially helpful, given the common allegation that multinational firms use their power to drive down worker wages and generate a race to the bottom among all firms in the host economy. A well-structured survey of the determinants of human resource practices within foreign affiliates and their host country counterparts could be a particularly valuable complement to the econometric analysis. The initiative

to use survey data as a complement to econometric investigation would probably have to originate among senior scholars since such an approach would be too risky for pretenure academics to do.

### **How to Assess the Need for Public Sector Support— including Subsidies and Incentives—to Attract FDI**

A key question faced by every developing country is whether host authorities should expend public funds to attract manufacturing FDI, by offering special support, providing subsidies, bestowing incentives. Economists are rightly skeptical about the desirability of showering multinational corporations with tax breaks and other subsidies. But standard economist reasoning follows an unimaginative script—not inaccurate, but unimaginative—that short-circuits any analysis of where the real problems lie and what practical policy responses might be available. The decision tree is simple: does FDI generate externalities? If not, do not subsidize FDI. If so, subsidize FDI up to the social value of the externalities. As shown next, what is needed is more thorough investigation of what are the obstacles—including market failures—that impede flows of FDI that are potentially laden with externalities and the most appropriate methods to overcome those obstacles.

Once again, it is useful to begin—Albert Hirschman-like—by looking closely at a complicated real-life case study to investigate what generalizable insights of use might emerge to analysts and policymakers alike. The most thoroughly researched case study of the challenges of attracting manufacturing FDI—and of the role of public expenditures as part of the host country investment promotion strategy—is the effort of Costa Rica to persuade Intel to build a semiconductor plant in Belen County, Heredia.<sup>69</sup> This case from 1996 is held up as a model by the Foreign Investment Advisory Service (FIAS) of the World Bank and is used as a training tool by other multilateral agencies.<sup>70</sup> Close examination of this experience offers insights both more subtle and more useful for general-purpose design of investment promotion policies, however, than conventional treatment indicates.

Before approaching potential semiconductor investors, Costa Rico had undertaken micro- and macroeconomic reforms in the 1980s that offered investors low inflation, a realistic exchange rate, sensible fiscal policy, and a reasonable business environment. Unusual in Central America, the country had a long his-

69. Spar (1998).

70. Multilateral Investment Guarantee Agency (2006).

tory of political stability, with well-respected legal and regulatory institutions. Drawing on these favorable traits, Costa Rica had managed to attract FDI in the garment and footwear sectors. As domestic wage rates rose, Costa Rican authorities feared competition from cheaper production sites and turned their attention to trying to diversify the FDI base with more sophisticated manufacturing operations. With backing from the U.S. Agency for International Development, the government reorganized its investment promotion agency CINDE (la Coalición Costarricense de Iniciativas de Desarrollo) in 1992 and staffed it with well-trained and well-compensated professionals who were able to decipher the concerns of the semiconductor, biotech, and other advanced sectors as well as prepare customized investment feasibility studies. CINDE identified Intel, which was looking for a site to build a new semiconductor plant, as the country's preeminent target. But when CINDE approached Intel with carefully crafted proposals, the agency discovered that Costa Rica was not even on Intel's long list of possible sites, let alone the short list (which included Indonesia, Thailand, Brazil, Chile, and Mexico). It took two years of what Debra Spar characterized as "assiduous" campaigning to obtain the first invitation to visit Intel headquarters.<sup>71</sup> CINDE persisted, and with a high-intensity effort—the republic's president was asked to order ministries to make special expenditures from their budgets to support Intel's proposed operations—secured the largest foreign investment (\$300 million) in the history of Central America. The final item that Costa Rica agreed to, to get Intel's signature on the investment contract, was the provision of twelve years of tax holidays for the multinational's operations.

The conventional lesson that this case is used to illustrate is that markets do not supply relevant and timely information on their own, that multinational searches are costly and incomplete, and that would-be hosts have to take active steps (the term of art is proactive steps) to "market the country." FIAS uses this case study to urge host countries to keep the websites of investment promotion agencies up to date, with current economic and legislative materials and real-time contacts to key ministries, agencies, and presidential assistants. While this is sensible advice, the Intel case study provides more profound insight into the challenges facing would-be host governments. What kind of information is most crucial to help a multinational investor decide to commit massive resources to a plant in a new locale that will play a central role in the company's global strategy (in the case of Intel, 22 to 25 percent of its output)? And when can high-level host leaders, including perhaps the president, weigh in and deploy

71. Spar (1998).

their clout in allocating domestic resources most effectively? Is providing tax breaks and subsidies to the new investor the answer?

The Intel case shows that improving the functioning of information markets on even the most rudimentary level—to position the country on Intel’s horizon—is not easy and requires prior expenditure of public funds for a well-staffed investment promotion agency. But a closer look at the details reveals, as common sense would suggest, that the doubts and hesitations that a multinational investor faces when considering a new investment derive from more than a paucity of general information, such as economic statistics, relative wage information, or legislative texts. The doubts and hesitations derive from paucity of information of a particular kind: a multinational investor like Intel (especially the first investor in a given sector) cannot know for sure whether this might be a profitable investment site—indeed, cannot even reduce most of the uncertainty involved in site selection—without “test driving” it. The challenge for the would-be host is to overcome the anxieties of a risk-averse investor who, having to make an irreversible commitment to a plant upon which headquarters will depend for the success of its international competitive position, will not know until the company tries out the proposed facility whether the MNC will—in George Akerloff’s famous phrase—be “stuck with a lemon”?<sup>72</sup>

When uncertainty about quality hinders market functioning, as Akerloff points out, outcomes can be improved when the seller takes measures to reassure the buyer about the reliability of his purchase. This is most straightforward when there is asymmetric information (the used car dealer knows which used cars are okay and which are not), and the reassurance can take the form of some guarantee (such as a warranty or a promise to fix or replace). For a host country like Costa Rica trying to attract an investor like Intel, however, the obstacle to market functioning is not information asymmetry, strictly speaking, since the host government itself does not know for sure that the local economy will be a suitable site for semiconductor assembly. The best the host can do is to try to reassure the party considering a new plant in a novel sector by taking steps to reduce the most significant sources of risk and uncertainty. Intel executives told CINDE that their principal concerns were obstacles that might reduce the corporation’s lead time over rivals.<sup>73</sup> The first obstacle was the possibility of power shortages or electrical failures. The second obstacle was potential bottlenecks in service at the national airport. The third obstacle was possible shortages of workers trained appropriately for the new semiconductor plant.

72. Akerloff (1970). For investments as irreversible commitments, see Dixit and Pindyck (1994).

73. Spar (1998).

Here is where CINDE deployed presidential power to direct the state utility to dedicate a new substation in the electrical grid to supply the Intel plant, to instruct the Ministry of Transportation to speed construction of a new air cargo terminal for Intel's use, and to create a special cooperative program between Intel's manpower experts, the national vocational training institutes, and the Ministry of Education. The provision of tax breaks was more pro forma. Once Costa Rica addressed the multinational's principal concerns, Intel negotiators notified CINDE that their country had gained a place on the company's short list. All other finalists, the Intel negotiators then pointed out, had agreed to a tax holiday for the first eight years of operation and a 50 percent exemption for the next four. Costa Rica assented to the same conditions without fanfare.

The structure of Costa Rica's negotiations with Intel is not unusual.<sup>74</sup> Multinational investors frequently demand public expenditures to reduce the most questionable aspects of project feasibility—measures to ensure the reliability of infrastructure and the availability of skilled manpower are often high on the list. Rather than advising against public sector intervention in the abstract, FIAS and other multilateral agencies typically urge that the host try to provide support in a form that benefits investors in the economy more generally, not just the MNC in question. In the Intel case, CINDE argued that air cargo and electrical capacity were fungible, that the new facilities would not subtract from what was available to other firms, and that the services were being offered to Intel at commercial rates (a subject of some domestic debate). With regard to manpower training, the Ministry of Education managed to ensure that the new cooperative training program would turn out workers with skills that could be used throughout the information technology and electronics sector. As for the tax breaks, other business cases reveal that the standard MNC negotiating technique is to line up several approximately equivalent production sites for headquarters's scrutiny and then require the host authorities at the sites to bid against each other, with packages of locational subsidies acting—in the words of one veteran negotiator—as a tie breaker.<sup>75</sup>

74. Hausmann and Rodrik (2003). In an earlier work, I posed the hypothesis that the market failure in attracting FDI in a novel sector sprang from appropriability problems: the first mover takes all the risks but (if successful) does not enjoy a period of market exclusivity long enough to compensate for this exposure. This is the market failure that is proposed by Ricardo Hausmann and Dani Rodrik (2006). The Costa Rica case does not support this interpretation, however, because of the following: senior Intel executive testimony pointed to the parent's uncertainty about efficient, reliable production as the binding constraint, not fear of follow-the-leader behavior by others; other semiconductor investors did not rush into Costa Rica after the Intel plant proved successful. As noted *infra*, the Intel decision to invest did have a demonstration effect on other multinational investors but not on investors whose entry would reduce the profitability of Intel. For my earlier hypothesis, see Moran (1998).

75. Uytendaele (1992, 1993).

How is the expenditure of public funds to attract multinational investors related to confirmation that externalities will justify such expenditure? Here again the Intel case study throws a snag into standard economic reasoning, which is obvious as soon as it is pointed out. Once Intel built its plant, backward linkages and externalities began to appear. Two years after Intel's arrival, a survey of eighty indigenous Intel suppliers in 2000 (thirty-seven suppliers of services, forty-three of goods) indicated that 35 percent of the former and 17 percent of the latter received training from Intel.<sup>76</sup> The largest local suppliers concentrated on metalwork, plastic injecting molding, packaging, and engineering services. More important for upgrading the FDI base, Intel's choice of Costa Rica had a large demonstration effect on other multinationals. Within three years of the Intel investment, the country tripled its stock of FDI to \$1.3 billion with an annual export level of more than \$3 billion. Of sixty-one multinationals with operations in Costa Rica, 72 percent said that the Intel investment played an important "signaling role" in their own decision to invest (thirty-six in electronics, thirteen in medical devices, three in business services, and nine in other sectors).<sup>77</sup> The electronics sector became the largest export cluster in the country, with 55 companies (forty-two foreign, thirteen indigenous) employing some 12,000 workers with exports of \$1.65 billion.<sup>78</sup> Management interviews indicated that success with clean rooms in the electronics industry attracted the interest of medical companies: for example, Baxter Healthcare preceded Intel; Abbot Laboratories (now Hospira) and Boston Scientific came afterward. The quality of the workforce played the same role with business services: Proctor & Gamble made Costa Rica the center for "shared services back office," followed by Western Union's technical support center and Sykes' call center for hire. Overall, by 2006, Costa Rican FDI exports of manufactured products and business services exceeded \$5 billion.

More than access to capital, FDI provided access to the international industry frontier in increasingly sophisticated activities. Costa Rica became a model of "dynamic comparative advantage," in which a host economy whose leading industries initially were composed of coffee and bananas moved (because of FDI) to low-skilled, labor-intensive exports like garments and footwear then upgraded foreign investor operations to a broad spectrum of medium- to higher-skilled endeavors. The catch was that during the period when the decision was made to refurbish CINDE and launch the drive to attract Intel the prospect of spillovers and demonstration effects was largely wishful thinking, according

76. Larrain, López-Calva, and Rodríguez-Clare (2001).

77. Larrain, López-Calva, and Rodríguez-Clare (2001).

78. Multilateral Investment Guarantee Agency (2006).

to CINDE officials.<sup>79</sup> Only the likelihood of above-average wage rates for Intel employees appeared to be a sure thing (2,900 workers with a premium of approximately 50 percent more than other manufacturing jobs), and estimates of other positive benefits were purely hypothetical.

The idea that host authorities are going to know with much certainty when externalities will be delivered from FDI operations, or be able to calibrate how much to subsidize their provision, is farfetched. Perhaps the most reasonable fashion to deal with the quandary of not knowing what the payoff from incentives will be is to direct investment promotion efforts toward FDI sectors that common sense suggests might be relatively externality-laden—sectors that are higher skill intensive and higher value added promise more local research and development or have demonstrated records of extensive local procurement in other developing countries, for example. Moreover, as suggested above, the host will be well advised to provide incentives in forms that are most likely to benefit investors more broadly than the specific MNC in question, such as upgrading worker skills and improving infrastructure reliability across-the-board.

### **Implications for Developed and Developing Country Policies**

The implications of the preceding analysis are rather simple and straightforward. The puzzle is why they are missing from the learned body of economic literature on foreign direct investment and development.<sup>80</sup> The inability to find one single “universal” relationship between manufacturing FDI and host country development represents not an investigative failure but an important discovery, crucial for both analytical and policy conclusions.

Manufacturing FDI is most likely to make a positive contribution to national income under reasonably competitive conditions. The willingness of a multinational firm to place an affiliate along the frontier of best practices in the industry, and keep it there with continuous improvements and updates, depends upon the ability of the parent to control that affiliate with minimal risk of technology leakage or external interference in operations. Manufacturing FDI in a distorted economic environment—in particular in a host economy using trade protection to substitute local production for imports and imposing domestic content, joint venture, or other technology-shifting requirements on multina-

79. Alonso (2001).

80. Or, worse, they are turned on their head into a complaint: “Policy making has come to ignore the ambiguous and inconclusive academic literature”; see Lipsey (2006).

tional investors—is likely to result in inefficient plants that subtract from national income. Developing countries should note, therefore, that their interests are not served by weakening the Agreement on Trade-Related Investment Measures (TRIMS Agreement) within the World Trade Organization, which had banned the imposition of domestic content or trade-balance mandates on FDI, or by restoring the host country practice of levying performance requirements on manufacturing multinationals. For this reason, the allegedly prodevelopment agenda advanced at the Hong Kong Trade Ministerial in 2005, which afforded developing countries greater leeway to place domestic content requirements upon foreign investors and to maintain them until 2020, represents a dramatic step backward.<sup>81</sup> Developing countries would advance their own development agenda more effectively, in fact, if they tightened the TRIMS Agreement—to bring joint venture requirements under multilateral discipline—rather than loosening it.

Contrary to the prescription of Nancy Birdsall, Dani Rodrik, and Arvind Subramanian, regulation of manufacturing FDI—leaving aside the complicated issue of intellectual property rights—is not a sphere where developing countries need more policy space.<sup>82</sup> In the roster of areas in which host country policies toward multinational corporations (not just manufacturing multinationals) might be given more or less freedom to maneuver, imposition of performance requirements is a prime candidate for less, rather than more, policy space.<sup>83</sup> The analysis in the first section of this paper is particularly important for least developed countries. Contradicting the justification given for the attack on the TRIMS Agreement in Hong Kong, the counterproductive impact of performance requirements holds for poorer developing countries as well as for more advanced developing countries. There is no evidence that least developed economies gain from placing greater restraints on manufacturing investors or from undergoing longer, slower periods of transition for liberalization of trade and investment. To be sure, to help poorer countries take full advantage of trade-and-investment liberalization, the developed world may want to redou-

81. WTO (2005).

82. Birdsall, Rodrik, and Subramanian (2005).

83. The TRIMS Agreement is one of three areas in which developing countries would actually benefit from *less* policy space: to impose performance requirements on foreign investors; to participate in bribery, corrupt payments, and nontransparency; and, as indicated *infra*, to award tax breaks and locational incentives to attract foreign investors. In three other areas, they would benefit from *greater* policy space: to avoid multilateral trade sanctions to enforce labor standards; to establish health, safety, and environmental regulations without paying compensation to foreign investors; and to engage in international arbitration procedures that emphasize conciliation with investors during cross-border financial crises (rather than mere commercial contract enforcement). See Moran (forthcoming).

ble both the provision of aid for trade and the provision of aid for investment (including aid for investment promotion and aid for regulatory and institutional reforms). But the observation that the liberalization of trade and investment does not produce maximum benefits in a vacuum does not imply that least developed countries are served by placing greater restrictions on multinational investors than are middle-income developing countries.

Despite rich country rhetoric about wanting to assist the development of poor countries through encouragement of FDI, it is a scandal to find that eighteen of the nineteen official political risk insurance agencies within the OECD—including those in the United Kingdom, Canada, France, Germany, Japan, and the United States—provide coverage for multinational manufacturing projects that rely upon trade restraints to survive.<sup>84</sup> Worst of these is the U.S. Overseas Private Investment Corporation, which insures foreign investors against the threat that the host authorities may remove anticompetitive barriers that they have used to confer high profits upon the policy holder and pays the claim when the host reneges on its promise of on-going protection by liberalizing the economy.<sup>85</sup> Nor have the developed countries exercised their responsibility to require that the Multilateral Investment Guarantee Agency of the World Bank group—or the multilateral financial agencies like the Inter-American Development Bank, the Asian Development Bank, and the European Bank for Reconstruction and Development—screen out welfare-reducing import substitution projects from their FDI guarantee portfolios. As long as manufacturing FDI projects show a positive commercial rate of return they are eligible for official guarantees even if the broader economic impact on the host economy is negative.

Designing policies to best capture externalities is likely to remain vexing. From an analytic point of view, identifying and measuring externalities—in both horizontal and vertical directions—will always be difficult, although earlier sections of this paper show that great strides are already being taken, and new multidisciplinary breakthroughs are within grasp. From a host policy point of view, the unfortunate truth is that attracting foreign direct investment in the hope of securing externalities costs money. The evidence introduced above suggests that would-be hosts are unlikely to have the luxury of basing policy on the pristine principle: improve the overall business climate and MNCs will show up. Just to improve the functioning of information markets alone, the annual budget for CINDE is \$11 million; for the Dominican Republic's investment promotion agency (IPA), \$9 million; for the IPA in Mauritius, \$3 million. The

84. Center for Global Development (2007).

85. O'Sullivan (2005). See Memorandum of Determinations by OPIC, "Expropriation Claim of Joseph Companies Incorporated of Minneapolis: Jamaica—Contract of Insurance No. E197," 1999 ([www.investmentclaims.com/decisions/JosephCompanies-OPIC-Jamaica-Aug1999.pdf](http://www.investmentclaims.com/decisions/JosephCompanies-OPIC-Jamaica-Aug1999.pdf)).

bigger ticket expenditures associated with meeting infrastructure and human resource needs of international firms require much more. The combination of marketing the country and securing specific commitments from MNCs to fill ready-made industrial parks and export zones with new plants, moreover, requires up-front outlays that must be expended well before the generation of externalities is anything more than a gleam in the eye of host authorities.

Complicating the task for would-be hosts is the fact that the allocation of public dollars to promote investment, in a world of scarce resources, requires targeting—more effort is needed to attract FDI in software development, less in garments; more is needed to attract FDI in frozen shrimp, less in bananas; more to attract FDI in call centers, less in tourism, or vice versa—and subjects the allocators to the political and economic challenges of picking winners and losers among sectors and even firms. Contemporary advice to host authorities exhibits a distinctly schizophrenic quality, switching back and forth abruptly from the interventionist urgings of Joseph Stiglitz, Ricardo Hausmann, and Dani Rodrik to the industrial policy skepticisms of Marcus Noland and Howard Pack.<sup>86</sup> As suggested above, host country authorities may have no more than common sense to guide them in trying to keep the allocation of public expenditures as free from political contamination as possible and aimed at sectors where spillovers appear most likely to emerge, without discrimination between foreign-owned and indigenous-owned recipients.<sup>87</sup>

With regard to tax breaks and direct subsidies, the predicament for developing countries springs from prisoner dilemma dynamics, not from the failure of host authorities to comprehend the misgivings of economists. The host that refuses to provide generous locational incentives is undermined by others who will. Complicating any solution is the unpleasant detection of growing competition between developed country and developing country plant sites. Conventional wisdom held that multinational corporations do not compare rich country and poor country locales in deciding where to set up operations. But contemporary research is showing otherwise: Mexico, Thailand, and Slovakia compete with Ireland, Canada, and North Carolina.<sup>88</sup> John Mutti has uncovered a particularly high elasticity for alternative sites for internationally traded goods—tax breaks that reduce the cost of capital by 1 percent raise MNC production in the manufacturing sector of the host by approximately 3 percent.

86. Noland and Pack (2003). Compare World Bank (2006); UNCTAD (2005).

87. The effort to attract FDI in new sectors must also be ready for surprises. As Hausmann and Rodrik (2006) pointed out, both salmon farming and fresh grape exports were unexpected successes that market forces in Chile alone might have overlooked.

88. Mutti (2003); Altshuler, Grubert, and Newlong (1998).

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“Just Say No” is not a realistic approach for controlling giveaways to multinational corporations. What is needed (as previously indicated in the roster of areas where developing country policy space needs to be narrowed) is an international agreement to cap and roll back locational incentives. To be effective, alas, subnational as well as national authorities—from Alabama to Minas Gerais—will have to be brought under the new disciplines, an undertaking that will be formidable indeed.

## *Comment*

**Laura Alfaro:** Ted Moran has written an engaging paper that asks three important questions: How to investigate the impact of manufacturing foreign direct investment (FDI) on a developing country host economy? How to search for externalities and spillovers (and identify the channels and mechanisms through which spillovers take place)? How to evaluate the question of whether host governments should devote public sector resources to attracting FDI in manufacturing? Many readers will find Moran's overview of the evolution of the literature on the effects of manufacturing FDI to be a further, valuable contribution of this paper.

Moran believes that it is important that researchers who attempt to answer the questions he poses use, in addition to statistical regressions, multiple forms of evidence and other techniques including industry or sectoral studies, business cases, interviews, firm surveys, and cost-benefit analyses of individual projects. I could not agree more. I will use my comments to expand further on the need of an integrated approach, as Moran calls for, to study the effects of FDI on host countries: the need for macrolevel work to uncover the role of local conditions and absorptive capacities and the role of theory in not only guiding empirical work but also illuminating policy implications, for example, such as those that relate to what is and is not an externality. I also offer some observations on data issues and requirements that call for even more integrated work and some thoughts on why so little work seems to use different methodologies.

Why have researchers paid so much attention to the role of FDI in the development of host countries? There is widespread belief in both policy and academic circles that FDI can have valuable positive effects beyond the capital financing it might bring and the jobs it might create. Because FDI embodies technology and know-how as well as foreign capital, host economies can potentially benefit through knowledge spillovers (such as accelerated diffusion of new technologies, introduction of new products and processes, employee training, and access to international production networks) as well as through

backward and forward linkages between foreign and domestic firms. Such arguments have led governments in developed and developing countries alike to devise and offer incentives that encourage FDI. Yet, empirical evidence at the microlevel remains ambiguous generally, although consistently more pessimistic for developing countries. Holger Görg and David Greenaway reviewed the microevidence on externalities from foreign-owned to domestically owned firms while paying particular attention to panel studies and concluded that the effects were mostly negative.<sup>1</sup>

Why did FDI fail to generate positive externalities in panel studies? According to Moran, the first generation of cost-benefit analyses, industry studies, and multinational business cases provided an important explanation: the extent of a competitive environment (on the basis of import substitution-type policies). Indeed, the work by Vudayagi Balasubramanayam, Muhammed Salisu, and David Sapsford found FDI flows to be associated with faster growth in countries that pursued outward-oriented trade policies.<sup>2</sup> Many of the panel studies were conducted in countries (for example, in Colombia, India, Morocco, and Venezuela) that were pursuing inward-oriented policies. An important paper in this literature is the work by Brian Aitken and Ann Harrison, who found that the overall effect of foreign investment in Venezuela was small.<sup>3</sup> The fact that Venezuela, during the period of study from 1976 to 1989 was characterized by inward-oriented policies leads Moran to conclude that “manufacturing FDI is most likely to make a positive contribution to national income under reasonably competitive conditions.”

But are reasonable competitive conditions enough of an answer? For this, the macroliterature on the effects of FDI and growth offers important insights. At the macrolevel, we find evidence not of an exogenous positive effect of FDI on economic growth but of positive effects conditional on local conditions and policies, notably, the policy environment, human capital, local financial markets, sector characteristics, and market structure.<sup>4</sup> I would argue that it is important to consider the findings of the macrolevel studies when answering the important questions raised by Moran. First, firm-level panel studies tend to cover specific and quite different types of countries (transition, developing, emerging, and industrialized), and in addition, different periods under study

1. Görg and Greenaway (2004).

2. Balasubramanayam, Salisu, and Sapsford (1996).

3. Aitken and Harrison (1999).

4. For the policy environment, see Balasubramanayam, Salisu, and Sapsford (1996); human capital, Borensztein, De Gregorio, and Lee (1998); local financial markets, Alfaro and others (2004); sector characteristics, Alfaro and Charlton (2007); market structure, Alfaro and others (2006).

make it difficult to understand the role of country-specific conditions. Because they generally span multiple countries and longer periods of time, macrolevel studies tend to afford an understanding of the role of local conditions in enabling positive benefits of FDI to materialize. Furthermore, as Robert Lipsey noted, one of the main reasons to examine productivity spillovers from foreign-owned to domestically owned firms is to understand the contribution of FDI to host country economic growth.<sup>5</sup> If higher productivity is achieved by foreign firms at the expense of lower productivity in domestic firms, there might not be any spillovers. But there might still be growth effects attributable to the operation of the foreign firms that can be analyzed in terms of the impact of FDI on a country's output or growth. Issues related to, for example, data, methodology, and determining causality notwithstanding, these studies have by virtue of their scope and duration produced evidence that suggests a relationship between local conditions and whether the benefits of FDI materialize.

But is even this enough? Can positive effects of FDI be educed by the right local conditions or, more generally, by the right economic environment? Through what mechanisms does FDI contribute to a country's development efforts? Many empirical studies have looked for the presence of externalities without trying to understand the mechanisms through which they might occur. Their focus has been on revealing indirect evidence of externalities by looking for associations between the increased presence of multinational corporations (MNCs) in a country or sector and productivity improvements in local firms or upstream sectors, for example. We need to investigate mechanisms to establish the robustness of these findings and devise appropriate policy interventions to maximize FDI externalities.

Papers by Beata Javorcik and Garrick Blalock and Paul Gertler explored the transfer of positive externalities from FDI to local firms in upstream industries (suppliers) and made an important contribution to the literature in this respect.<sup>6</sup> Moran shares these authors' belief that foreign firms have an incentive to minimize technology leaks to competitors while transferring knowledge that will improve the productivity of their local suppliers, in which case spillovers generated by FDI are more likely to be vertical rather than horizontal.

An obvious follow-up question is whether all vertical (supply) relations imply positive FDI spillovers? Here again, important information can be derived from an integrated approach that considers conducting surveys of multinationals. The cherry-picking behavior of many foreign firms with respect to local firms that can already supply goods is not associated with potential positive exter-

5. Lipsey (2002).

6. Javorcik (2004); Blalock and Gertler (2003).

nalities.<sup>7</sup> Foreign firms seem also to help some suppliers improve their performance, which again implies an externality only if these benefits are not fully internalized by the firm. Surveys administered to suppliers and MNCs in Costa Rica revealed few cases in which a positive technology transfer from an MNC to suppliers had clearly occurred.<sup>8</sup> The interviews also revealed that MNCs often lack technical knowledge about the production processes of the inputs they use. When they do have such knowledge, it tends to be about production processes for sophisticated inputs that, because they are unlikely to be supplied by local firms, are usually sourced from highly specialized international suppliers. Instead of examples of knowledge spillovers through technology transfers, the interviews revealed many instances in which local firms had decided to upgrade the quality of their production processes in order to become suppliers to MNCs.

A related question is whether MNCs' interactions with domestic suppliers always have the potential to develop into positive linkages. To answer that question, an integrated approach that links theory and evidence is needed. Theoretical work by Andrés Rodríguez-Clare suggested that under certain conditions (such as benefits of specialization, increasing returns, and transportation costs) increased demand for specialized inputs would lead to the local production of new types of these inputs thereby generating positive externalities for other domestic firms that use those inputs.<sup>9</sup> According to this view of linkages, MNCs could even generate a negative backward linkage effect. If, for example, MNCs were to behave as enclaves, importing all their inputs and restricting their local activities to hiring labor, demand for inputs might decrease as the MNCs increase in importance relative to domestic firms, leading to a reduction in input variety and specialization.

As discussed in Laura Alfaro and Andrés Rodríguez-Clare, it is important to consider the different key assumptions of the model and how the violation of these assumptions might affect the potential for multinationals to create linkages.<sup>10</sup> One important assumption is nontradability of the intermediate goods used by domestic firms. Were goods perfectly tradable (that is, were there no transportation costs), it would not make sense to talk about a firm introducing a good to a developing country: given demand, all existing goods would be automatically available everywhere. First, only demand for nontradable inputs generates meaningful linkages. Ideally, researchers would take into account only purchases of nontradable inputs, but data constraints make this impossible in most cases. Second, only demand for intermediate goods that exhibit

7. Javorcik and Spatareanu (2005).

8. See Alfaro and Rodríguez-Clare (2004).

9. Rodríguez-Clare (1996).

10. Alfaro and Rodríguez-Clare (2004).

increasing returns (as opposed to constant returns to scale, for example) entails linkages. One could thus imagine a situation in which domestic firms use mostly inputs with increasing returns and multinationals use mostly inputs with constant returns, in which case the conclusion of a positive linkage effect by multinationals would be incorrect. Here again, researchers might face important data constraints. Third, demand for inputs with a low elasticity of substitution generates linkages with a stronger effect on productivity than does demand for inputs that have good substitutes. A final concern is that skilled workers seem to be hired in greater numbers by multinationals than by domestic firms. Positive linkage effects by multinationals might be less likely in the face of greater competition between MNCs and domestic firms for scarce skilled labor.

Is this mechanism valid? The traditional interpretation of the finding frequently reported in the empirical literature, that is, that the share of inputs bought domestically by MNCs is lower than the share for local firms, has been that MNCs generate fewer linkages than do domestic firms.<sup>11</sup> Theory, however, suggests that the share of inputs bought domestically is not a valid indicator of the linkages that MNCs can generate. The appropriate measure of linkages 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 share of inputs sourced domestically times intensity (inputs per worker). Most likely, MNCs have a lower share (as they are more likely to import inputs), but foreign firms are also likely to have higher intensity coefficients (as they are more likely to use more advanced, roundabout technologies).

Do foreign and domestic firms exhibit differences in the linkage coefficient? Using plant-level data for Brazil (1997–2000), Venezuela (1995–2000), Mexico (1993–2000), and Chile (1987–99), Alfaro and Rodríguez-Clare found, consistent with earlier evidence, that the share of inputs sourced domestically was lower for foreign firms in all countries but also that the intensity coefficient for foreign firms was higher in all countries.<sup>12</sup> Overall, the linkage coefficient in Brazil, Chile, and Venezuela was higher for foreign firms. In Mexico, we could not reject the hypothesis that foreign and domestic firms have similar linkage potential. Another important result was that entering foreign firms tended to have a lower linkage coefficient but that the linkage tended to increase over time, highlighting the importance of the duration of study (as well as the timing, such that studies closer to the liberalization periods are more likely to produce negative results).

11. Barry and Bradley (1997); Görg and Ruane (2001).

12. Alfaro and Rodríguez-Clare (2004).

In contrast to what has sometimes been implied in the empirical literature on FDI externalities, a positive backward linkage effect does not necessarily imply a positive externality from MNCs to suppliers.<sup>13</sup> In fact, such a positive linkage effect should lead to a positive externality from MNCs to other firms *in the same industry* (that is, a positive horizontal externality). That the empirical literature finds precisely the opposite, a negative or zero horizontal externality and a positive vertical externality is puzzling.

Why is it that we do not observe a positive externality from MNCs to other firms in the same industry? Quality of data, measurement errors in productivity, and endogeneity issues in the presence of multinationals are all possible answers. But another possible answer to this puzzle is that there might be some negative horizontal externality that offsets the positive effect MNCs might otherwise have on other firms in the same industry, consequent to increases in the variety (or even quality) of domestic inputs, which have been precipitated by, for example, the competition effect occasioned by the entry of MNCs (as argued by Aitken and Harrison) or MNCs' pirating of the best workers from domestic firms.<sup>14</sup>

An important challenge for the literature, according to Moran, is to control for competition effects. Data availability imposes a significant restriction on efforts to address this issue through econometric work, particularly in developing countries. This leads to the issue of the availability of data for tackling important questions behind FDI. 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. Such data that are available are rarely available for very long periods (or similar periods across countries), and some of the datasets do not have all the information one would want. 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 some biases into the productivity measures.<sup>15</sup> Again, the solution to these issues is to employ an integrated approach: different methodologies, different techniques, and talking to firms.

So why then is an integrated approach so seldom used? This seems to be driven in part by journal biases, but there are also important issues in some of the nonstatistical work: potential sample biases, generalizability of results, and so forth. Surveys are expensive and difficult to administer. Because few developing countries have good census data, it is difficult to judge whether surveys are representative of samples. Interviewed business managers might convey a

13. Alfaro and Rodriguez-Clare (2004).

14. Aitken and Harrison (1999).

15. For a discussion of poor measurement of inputs and outputs, see Tybout (2001)

(positively) biased perception of the role of the multinational corporation (by overestimating positive effects to the host country, particularly if they think doing so might bring subsidies), and they are not always willing to disclose data and information about their firms. Business cases are difficult and time consuming to write: researchers need to develop important skills seldom taught in graduate schools, and they need to learn or intuit how to strike the right balance between documenting the general picture and recording essential details. In my view, the new round of empirical analysis has dealt with some of these issues, and we now see consistent evidence with previous work. So I think we might now see a widespread adoption of an integrated approach.

What are the policy implications of the integrated approach? FDI can play an important role in economic growth, most likely through suppliers, but local conditions matter and can limit the extent to which FDI benefits materialize. It is not clear that incentives to MNCs 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 we might also seek to improve domestic conditions, which should have the dual effect of attracting foreign investment (according to Alfaro, Kalemli-Ozcan, and Volosovych) and enabling host economies to maximize the benefits of such foreign investment.<sup>16</sup>

16. Alfaro, Kalemli-Ozcan, and Volosovych (2006).

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