

***Spillovers from Multinationals in Developing Countries: the
Mechanisms at Work***

By: Richard E. Caves

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SPILOVERS FROM MULTINATIONALS IN DEVELOPING COUNTRIES:
THE MECHANISMS AT WORK

Richard E. Caves
Harvard University

A B S T R A C T

Most research suggests that spillovers commonly benefit the productivity of LDCs' local firms from market contacts with foreign subsidiaries, but little attention has gone to where those spillovers might be large, where nonexistent. In Particular, LDC local firms can be constrained away from frontier effectiveness in at least four ways. Each constraint has different implications for the nature and extent of spillovers from foreign subsidiaries. The analysis also yields predictions how spillovers will vary with differences in the situations of subsidiaries and local competitors, and with elements of the structures of industries in which they operate. Limited empirical evidence supports the predictions and the general approach to refining our expectations about the prevalence and nature of spillovers.

Keywords: Multinational enterprise, spillovers, Managerial capability, Community based standards.

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Introduction

Early case studies of foreign direct investment identified several channels of spillover from foreign subsidiaries to local host-country enterprises. Statistical analyses, at first crude but lately based on improved data, have mostly confirmed a positive relationship between the prevalence or productivity of foreign subsidiaries and the productivity of local firms that compete with or supply them. Some negative results appear in high-quality studies, however, and other investigations suggest that spillovers' incidence varies substantially with the country and industry setting in which they (might) occur. Spillovers' contingent magnitudes, suggested in the statistical studies, direct us to a larger and more fundamental problem. A spillover's central function is to reduce the inequality of knowledge stocks possessed within the spilling and spilled-upon organizations. We are largely without either hypothesis or evidence as to what factors determine the leakage of knowledge stocks and their absorption and effective deployment in LDC firms. What knowledge-related assets get transferred to local firms, and when are foreign subsidiaries the premier source of supply?

This paper makes a start at specifying the economic behavior associated with the volumes of spillable knowledge possessed by foreign subsidiaries and the ability of potential recipient local firms to capture them, in the context of industries and firms in less-developed countries (LDCs). Spillage by definition can occur because foreign-subsidary firm *S* knows something that local firm *L* does not. Suppose that *S* and *L* compete in the same industry. Why is *L*, although a viable firm, lacking this element of knowledge? Can it access the missing knowledge from alternative sources, or is *S* clearly its best bet? Does *L* invest resources in absorbing the spillage, or is it a pure bounty? Such questions open up opportunities for modeling the context and occurrence of spillovers, so as to isolate the reasons why pre-spill discrepancies exist and predict the rational behavior of spillee *L* (and perhaps spiller *S* as well)

that determines spills' occurrence and amount. Where and when spills occur, how large they are, become questions that we might pursue empirically with some solid theoretical priors in hand.

The question why local enterprises in LDCs should lack knowledge or skills spillable from foreign subsidiaries leads directly to the role of the representative firm's organization and growth as part of the process of economic development. An economist (such as myself) with only general familiarity of the literature on development might well suppose that constraints on the LDC firm's productivity and growth stand as a major component of the study of development. S/he is in for a nasty shock. With a few exceptions noted subsequently, no systematic theory or empiricism has emerged to address this seemingly central issue. The *Handbook of Development Economics*, forty-six chapters filling four weighty volumes, has essentially nothing to say about the subject. One who seeks to understand the various mechanisms that can leave the LDC firm short of knowledge that might spill from a foreign subsidiary (or any other source, for that matter) is left to fend for him or herself.

In the first section of this paper we suggest four ways in which local enterprises can be constrained away from frontier efficiency or effectiveness. Each shortcoming has its own empirical symptoms that can be distinguished empirically. The second part considers briefly the analytics of how multinational enterprises (MNEs) decide what proprietary intangibles to transfer internationally and whether to repel or encourage productivity leakages to local firms. It then turns to predictions where these spillovers will occur, and where they will be large or small. Some limited empirical evidence is noted. The final section draws implications for public policy.

Firms' Organization and Economic Development

One fact vividly shows the importance of this missing line of inquiry: low states of national economic development are associated with a paucity of large and complex business organizations. Put the other way around, the poorer the country, the larger is the number of independent business units relative to its working population. One statistical study took as a dependent variable to be explained the

country's total employers and own-account workers as a fraction of its labor force. Call it "enterprise density." (An alternative measure added family workers to the numerator.) These ratios were obtained for a sample of thirty-four countries, ranging widely in income levels, for which reasonably comparable census-based measures of these dependent variables in the late 1960s were available. The key explanatory variables were the country's gross domestic product per capita (expressed in U.S. dollars at the current exchange rate) and its squared value. Enterprise density decreases significantly with GDP per capita, although at a declining rate; the estimated relationship bottoms out around the per-capita income levels then prevailing in Canada and Sweden, implying that the variation in enterprise density comes mostly between the poorest LDCs and the countries successfully industrializing. The study also found evidence of a lagged adjustment process in enterprise density's decline. The ratio increases with the country's growth rate in the preceding two decades, which suggests that the squeeze-out or consolidation of very small enterprises lags behind the development process (in principle, though apparently not in practice, it could be a leading component of the development process).¹

This empirical regularity suffices to demonstrate that the capacity to mobilize and run complex business organizations is a correlate of the development process. What the correlation tells us is, of course, another matter. As Lucas (1978) pointed out, entrepreneurial effort is simply one form of labor input. The lower is the value of labor time, the lower is the cost of making all the discretionary decisions associated with the management of a business enterprise. As this opportunity cost increases with development, entrepreneurial services grow more costly. They are economized by assigning each manager a larger enterprise to supervise.² Enterprise density also depends on the country's mix of

¹ See Caves and Uekusa (1976), pp. 101–106. The study was undertaken to determine whether Japan's population of small enterprises was abnormally large, as some studies of Japan's industrial development had suggested. Japan's deviation from the regression plane was indeed positive, but small.

² For evidence on the comparative statics of workers' allocation between entrepreneurship and wage labor, see Mead and Liedholm (1998). The relation between enterprise size and level of development seemingly should connect with the literature on the similarity of managerial tasks among countries, but

industries, as determined by factors of international comparative advantage other than managerial capability. Another sufficient explanation for the decline of enterprise density with development is that the poorest countries engage mainly in activities for which small-size firms happen to be efficient. Of course, they might concentrate on these sectors out of inability to manage large business enterprises that acquire and deploy substantial bodies of knowledge and tacit skills.

It seems clear that the capability to develop complex business organizations might be important for the development process. The fact certainly underlines the significance of spillovers from foreign subsidiaries and other external sources. It also shows that spillovers' role depends on exactly what constrains the indigenous development of complex enterprises. We consider some candidate explanations, treating them in isolation while recognizing that they are likely to interact.

Traditional forms of interpersonal relationships

Traditions of interpersonal relationships that resist conformance within a business hierarchy are an obvious source of limitation. Hierarchical relationships between individuals are surely unnatural in light of standards of interpersonal conduct traditional in some societies. Rank-order tournaments as a standard way to staff an effective hierarchy require acceptance of interpersonal competition, and of ways to compete interpersonally, that are hardly natural for all cultures and religions. Such constraints could limit the feasible size of the business organization, and they could promote decisions that diverge from the goal of maximizing value by responding to social norms of conduct arisen outside relationships of commerce. Ponder, for a moment, the revenge culture of the Balkans run rampant within a business hierarchy.

Institutions that are dysfunctional or inefficient tend to disappear, of course. For that reason alone, it is important to note that community-based values and interpersonal norms could be quite efficient for some forms of economic exchange while hampering the coordination of differentiated skills

no link seems to have been made (Lubatkin, Ndiaye, and Vengoff, 1997).

within the business hierarchy. Banerjee (1996) pointed out that industrialization could be promoted by norms of behavior that facilitate contracting among members of the community. Punishment of contract violations can become an obligation, and promoted even at the cost of the punisher's private interest. Reputations for cooperative or uncooperative behavior can be codified and preserved at low cost. Socially approved techniques can resolve conflicts that occur when surprises intrude upon incomplete contracts. Such patterns could strongly support the efficiency of networks of contracts among individual entrepreneurs and own-account workers, providing an effective response to Oliver Williamson's (1985) litany of woes stemming from ex ante contracting costs and ex post costs of haggling and monitoring.³ Another advantage of community-based relationships lies in minimizing transaction and information costs associated with thin LDC markets — the costs of finding the best deal when potential transaction partners are few and heterogeneous (Chen and Chen, 1997).

However, these lubricants of some types of economic transactions might prove hostile to sustaining an efficient business hierarchy. Ways of efficiently enforcing contracts that work well within a given community or group may be impossible to extend to economic relationships between members of the group and outsiders. Behavior patterns that work well among individuals in frequent face-to-face contact may falter in relationships between parties distant from one another, and outside entrepreneurs in particular may be at a disadvantage. Traditions of sharing to mitigate exogenous misfortunes can impair incentives when applied within a business organization. Banerjee suggested that such community-based forms of transaction governance appear in industries where individual firms are small, or in small-firm fringes of industries that also contain large establishments. Although they have the flavor of rural communities, he noted that they also turn up in urban areas. They probably yield the most value in static and noninnovative activities, with conventionalized personal relationships serving much better to sustain

³ For evidence that firms' repertoires of routines differ with the national culture in which it operates, see the studies discussed by Morosini, Shane, and Singh (1998). Kogut (1992) made the same point in the historical context of the industrialized countries.

efficient repetition than to make the most of innovations and promising initiatives. The weakness of such systems in responding to disturbances was illustrated in a case study of India's leather industries (Banerjee and Nihila, 1995).

Shortages of skills

Local enterprises in LDCs may suffer from a lack of human capital that yields its value in complex team activities. White-collar workers in developed-country industrial firms on average have more education and analytical skills than their blue-collar coworkers. Businesses find it worth paying for these innate and acquired assets. Such activities as coordination and supervision in their nature resist codification in by-the-book routines. They require flexible and abstract problem-solving capability, specialized bodies of skill or training, or both of these. Most LDCs have made rather modest investments in advanced general education. Some LDCs have invested more heavily in training in particular technical skills. However, the team aspect of business hierarchies suggests that skills tend to be complements rather than substitutes. Michael Kremer's O-rings production function puts this problem in its starkest form. For a valuable product to emerge, each input skill needed must be applied at least up to some threshold of competence.

A way to economize on specialized skills is to employ persons who possess bundles of several skills, although none of them at a high level. This practice not only economizes on scarce human capital overall, but also it economizes on coordinating ability by internalizing some of the coordination within the individual. The strategy is consistent with small managerial hierarchies, involving few individuals with modest levels of white-collar skills. It may be that small organizations are more tolerant of error or weak performance in team activities. The O-rings property may recede, in the sense of a reduced penalty on the value of output imposed by a shortfall in any given activity.

Shortages of knowledge

In many activities, an important problem is "knowing what it is that one does not know."

Shortages of knowledge are distinguishable in several ways from shortages of skills. We think of skills as being both encapsulated in individuals and subject to clear economic definition. Everybody knows that a firm needs a system of accounts, and also is aware what specialized training provides the capability to maintain them. Tacit and unencapsulated knowledge, however, is an “experience good.” The firm is highly uncertain about its value, short of making the investment in information. It may not even know what to ask for. Significant investment decisions (importing a proprietary technology, entering an export market) demand some stocks of knowledge that are identifiable, although likely costly and geographically distant. Other knowledge components salient to the decision the firm may not even know to ask for. Consulting and other firms of course stand ready to sell such knowledge stocks, but the pervasive inability to guarantee satisfaction to the buyer in such transactions marks them for market failures of the familiar “lemons problem.”

The growing literature on business groups in LDCs indirectly illustrates the force of the problem of economizing such tacit knowledge stocks, once they are acquired and support a repertory of routines (Nelson and Winter, 1982, ch. 5). Amsden and Hikino (1994), drawing mainly on Korea’s experience, argued that patterns of unrelated diversification prevailing in LDC business groups stem from the reuse of the capability to acquire an established technology abroad and get it into efficient operation on home-country soil. Each of Korea’s groups first established itself in some flagship industry by means of a turnkey project. They then proceeded to diversify on the basis of their fungible skills in executing technology-import projects, and these capabilities yielded sustained rents for the groups because they are too tacit to leak to other firms as directly appropriable knowledge. As a result, the groups came to possess rather similar distributions of activities among industries, although they had grown from different starting points.

Shortages of managerial capability

An important if hard-to-locate boundary separates shortages of general management and

coordinating skills from constraints on specific skills and knowledge stocks. It helps to envision the task of a top coordinator pursuing the business-strategy imperative of maintaining alignment between the opportunities and threats faced by the firm in the markets where it operates, and the mix and deployment of heterogeneous assets (with their own strengths and weaknesses) that are contractually attached to the firm. In an LDC's market context, the task includes assessing the fissures in the firm's ambient markets and devising maneuvers around them, recognizing which shortages of skills and knowledge are both important and remediable to the firm. The task is forward-looking, as the coordinator tries to identify the probability distribution of future states of nature and reduce the chance of its resource commitment decisions being blind-sided by unexpected disturbances.

Just as business-administration scholars have struggled to characterize exactly what the chief executive does, so is it difficult to say how an enterprise low on managerial coordination skills might observably differ from one afflicted by shortages of more specific skills. The most convincing evidence appears in case studies that seem to rule out shortages of skills and knowledge as binding constraints and leave managerial shortcomings as a residual yet convincing explanation. Some evidence comes from case studies of technology transfer to local firms, which demonstrate that the process involves and is constrained by a whole series of capabilities in the receiving firm that are not themselves narrowly technological. They include obtaining inputs well suited to the received technology, dealing with discrepancies in capacities between various steps of the firm's production processes, and initiating the upgrades and extensions necessary to take full advantage of the technology, once locally established (Dahlman, Ross-Larson, and Westphal, 1987). Similar evidence comes from case studies of import-substituting industrialization. With the issue of managerial capability ignored, firms engaged in import substitution might be expected to scoot down their learning curves promptly. However, the process requires explicit efforts to manage and promote the acquisition of knowledge through increased differentiation and specialization of its internal skills (Bell, Ross-Larson, and Westphal, 1984; Evenson

and Westphal, 1995).

A close study of organizational development in Indonesian banks found they had little trouble acquiring or developing the ability to offer specific new banking services, but were constrained instead by general managerial capability needed to identify what services would be valued by customers and determining what method would most effectively develop any desired capability — hiring staff from other banks, sending own staff out for training at home or abroad, etc. The process involved the diffusion of decision-making authority to middle managers (loan officers) who were in the position to learn directly of opportunities to serve customers and evaluate the information that they absorbed. The banking case is especially interesting from the viewpoint of spillovers, because most innovations are quite specific and nonappropriable. The receiving firm's task is not to acquire rights or decipher technology but to make astute managerial decisions (McKendrick, 1994).

That managerial capability specifically limits firm sizes in developing countries agrees with a pattern that is well documented in industrial countries. The compensation of chief executive officers increases sharply and regularly with the sizes of the firms that they manage, with an elasticity in the neighborhood of 0.3. An obvious explanation of this and related evidence is that the value of talent in the top coordinator increases with the volume and complexity of the activities to be coordinated, so that the managerial labor market allocates the best managers to the biggest tasks.⁴ Other factors might explain the relationship, including weaker governance by shareholders in the largest firms, but the efficient allocation of talent is surely the main force at work. A national economy less well endowed with managerial talent would likely adjust in several ways—by reducing the average sizes of firms, and by making the widest possible use of the top managerial talent available, which is arguably done by the business groups commonly found in LDCs. In sum, the circumstantial evidence that managerial

⁴ For a theoretical model of this process and its implications for LDCs, see Murphy, Shleifer, and Vishny (1991).

capability is an important constraint on the productivity and size of local business units in LDCs is quite compelling.

Foreign Subsidiaries and the Scope for Spillovers

Suppose that the preceding section correctly identifies the major constraints on local firm's productivity in LDCs. The scope for productivity spillovers from foreign subsidiaries should then depend on the incidence of these constraints, the prevalence of foreign subsidiaries in various industries, and the subsidiaries' fecundity as sources of spillable productivity benefits. All these vary from market to market in ways that might prove predictable. This section suggests some hypotheses and notes a few supportive empirical results in the research literature.

Promotion and suppression of spillovers by MNEs

The value-maximizing MNE of course pursues its own interest with regard to spillovers, thereby affecting their magnitudes. The initial decision to transfer an encapsulated technology to a host-country market is affected by any increase in the likelihood of successful copying or appropriation, where that increases with the number of locations where the technology is in use. The MNE may have reason to believe its proprietary intangibles safer at its home base, especially relative to foreign subsidiaries that are not wholly owned. Once the parent's various skills and capabilities are transplanted to the subsidiary,⁵ spillovers can either impair or enhance the subsidiary's profits, thereby warranting resource outlays either to restrict or promote them. The obvious distinction lies between horizontal spillovers to actual or potential competitors and vertical spillovers. Vertical spillovers that increase the productivity of suppliers or customers tend to affect favorably their reservation prices in transactions with the subsidiary and warrant some level of effort to promote spillovers. The subsidiary's ability to recapture this spilled benefit should depend on the market's organization. Recapture is favored if numbers of firms

⁵For a theoretical and empirical study of the general determinants of technology transfers, see Blomström, Kokko, and Zejan (1994).

are small on both sides of the market (that is, neither the subsidiary nor its local supplier or customer has many competitors). Regardless of the number of market participants, recapture is favored if the subsidiary can obtain a contractual commitment to a long-term customer-supplier relationship with the local firm. The contract then effects the recapture by conditioning the subsidiary's effort to effect or fructify the spillover on reciprocally favorable transaction terms once the spillover is complete. With large numbers, or without access to such contracts, the local firm rides free on spillovers from its (foreign-subsidary) competitors; the local firm can capture the benefit of absorbed spillovers until and unless they affect the price prevailing in the local firm's product market.⁶

Parallel considerations affect efforts that the subsidiary might make to restrict or promote transfers to local competitors. The subsidiary's profit generally decreases with the productivity and efficiency of its competitors, of course, creating a dominant interest in precluding spillovers. Free-rider effects are again present: there is no return to resources spent deterring spillovers if spillage will occur anyhow from a competing foreign subsidiary. The negative effect of spillovers on the spilling firm's profits might be reversed in particular cases. In newly developing markets, transitionally a subsidiary's profit might increase with the number of viable varieties or suppliers present. It might increase with the total size of the market, when that warrants efficient-scale collective facilities (transport, storage, etc.) that yield pecuniary externalities. These spillovers of course occur along with mutual equilibration of the market shares held by local firms and competing subsidiaries. The underlying productivity differential shrinks the local firm's shares, while spillovers enlarge them (Markusen, 1999).

Spillovers and local firms' types of shortfall

The four sources of local firms' shortfalls, suggested previously, have quite different potentials for remedy through spillovers. Business organization based on community relationships, where it proves

⁶ Another way to regard this vertical spillover theoretically is in terms of the MNE's effect of enlarging the variety of differentiated inputs available in the local markets (Rodríguez-Clare, 1996).

less productive than subsidiaries' style of market-based relationships, is probably least prone to spillovers. It is based on community and collective behavior patterns that punish individuals' deviations. No private benefit redounds to those who would shift to new ways, even if a collective shift would bring a substantial gain in value. The traditional system instead tends to be competed down in markets where it proves a less productive institution. Such cultural patterns are not immune to change, of course. They may gradually give way as individuals who are exposed to a market-based system through education, travel, and the like swell to a critical mass willing to try different ways. That process is a sort of spillover, but not one that proceeds product market by product market.

Whether spillovers alleviate skill shortages depends on the subsidiaries' effect on the net supply of skills to local firms. As demanders of skilled labor, foreign subsidiaries tend to drive up its price to local firms. On the other hand, they likely induce positive shifts in supply by providing training themselves, or by triggering the set-up of independent training institutions. The degree to which foreign subsidiaries are able to retain workers whom they have trained becomes an important factor affecting this spillover. The infeasibility of binding long-term employment contracts works to the disadvantage of subsidiaries and reduces their incentive to provide training, while it also increases the expected spillover benefit to local firms. The widespread finding that foreign subsidiaries in LDCs (though not elsewhere) pay higher wages than local firms for labor of a given quality⁷ may reflect in part an optimized effort to realize the benefit of investments in training through efficiency-wage strategies. Operationally, the size of spillover benefits from skill supplies should increase with subsidiaries' net effect on the supply of skills to local firms; the net supply increases with the training provided or engendered by the subsidiaries.

⁷Recently Aitken, Harrison, and Lipsey (1996) reported that affiliates of MNEs pay higher wages than their domestic competitors in Mexico and Venezuela; in the United States, industry average wages are positively correlated among industries with FDI, but the foreign affiliates do not pay higher wages than their domestic competitors (Feliciano and Lipsey, 1999).

and decreases with their ability to retain (or “corner”) the workforce’s augmented stock of skills.⁸

Knowledge shortages play to the classic public-good property of information and its appropriation by reverse engineering, inventing around patented technologies, and the like. Research on industrial countries suggests considerable spillage of such knowledge assets from foreign subsidiaries (Mansfield and Romeo, 1980). This evidence from industrial host countries probably misrepresents the problem as it usually affects LDC local firms. Where the relevant knowledge generally falls well short of the global frontier, the local firm suffers no lack of potential information sources (each with a price attached). The most helpful spillage from competing foreign subsidiaries may well be the local firm’s chance to observe what is feasible. That a better-quality product can be made and sold at the observed price, that locally produced goods can be profitably exported to particular foreign markets, that a foreign-designed product serves well under local conditions (even before adaptive tinkering), are important facts for the local firm contemplating the pursuit of costly information and otherwise unable to confirm its likely value. The importance of this gain was documented by Aitken, Hanson, and Harrison (1997) in their study of factors determining whether Mexican domestic plants export some of their outputs. The likelihood that a plant exports increases with the extent of exporting by foreign subsidiaries in its industry and region, although not with the export-intensity of all such plants in its region. That is, local firms’ exporting apparently responds to subsidiaries’ demonstration of its profitability, rather than to a static local comparative advantage that favors subsidiaries and local firms alike.

The responsiveness of managerial shortfalls to spillovers may depend delicately on the situations of local firms and competing foreign subsidiaries. Managerial talent like other skills can be obtained or improved from various external sources, such as established MBA programs. What a competing foreign

⁸ Empirical studies suggest diverse outcomes. For example, Gershenberg (1987) concluded that foreign subsidiaries in Kenya provide more training than local firms, although less than enterprises with government ownership, and the subsidiaries disproportionately retain the managers whom they trained. On the other hand, McKendrick (1994) reported wide dispersion through Indonesian banking of the alumni of Citibank’s training program.

subsidiary can supply *incrementally* is an exemplar of managerial talent at work in the specific context (industry, location) of the local firm's operations. For this spillover to prove substantial, the distance between the two firms must in several senses not be too great. One of these is size differences. The sizes of the two firm types must not differ too much; otherwise, the managerial tasks overlap little, and the subsidiary's lessons are either irrelevant or impossible to apply. On the other hand, if firm-size differences are insubstantial, the local firm may have little to gain from spillage due to the subsidiary. Firm-size differences may be due to fundamental differences in business strategy, as when local and subsidiary firms compete yet deploy resources in systematically different ways. Size differences between local firms and subsidiaries probably are highly correlated with productivity differences between them. In confirmation, Kokko (1994) concluded that spillovers are greatest when local firms fall short of the subsidiaries in productivity, but not too far short.⁹ A similar finding for Uruguay was reported by Kokko, Tansini, and Zejan (1996).¹⁰

To put perspective on subsidiaries' potential for spillovers of capability in general management, it is important to recall that MNEs tend to operate mainly in industries where the managerial task is most complex, in the coordination of disparate skills pursuing uncertain outcomes. This is suggested by the many studies that have found an industry's R&D-intensity and its advertising intensity (or other aspects of product differentiation) to be strong predictors of the incidence of foreign direct investment. Pugel (1981) showed this directly in a strong relationship between the prevalence of FDI in an industry and the

⁹In locally owned Mexican firms, he found that labor productivity increases significantly with the share of the industry's employment due to foreign-controlled plants, but decreases significantly with an interaction between foreign presence and the industry's ratio of value added per employee in foreign to domestic units. Kokko (1996) established a parallel difference between enclave-type industries and those with more inter-penetration between foreign and local firms.

¹⁰They calculated for each industry the average proportional gap in labor productivity between domestic and foreign plants, regardless of the gap's direction. They found that labor productivity in private, locally-owned plants increases significantly with foreign plants' share of industry output where the gap is small, while no relationship at all exists for large-gap industries.

proportion of its workforce who are managers and kindred personnel. Subsidiaries thus turn up where the managerial task is apparently the most challenging, rendering spillovers unlikely until the LDC is reasonably far along in the development process. Spillovers of general managerial capability may follow nonmonotonic pattern — low for countries far from or close to the global frontier of industrial efficiency, high for those that have reached a moderate level, low for advanced countries whose local firms' productivity levels differ only randomly from foreign subsidiaries'. It is also worth recalling the evidence that “third world multinationals” flourish in industries placing lesser demands on managerial capability, but also industries with requirements more differentiated between developed-country and LDC environments (Wells, 1983).

Other predictions

The types of shortfalls for local firms and the market structures in which local and foreign firms face one another supply most of the promising predictions about spillovers' incidence and extent.

However, a few more possible patterns present themselves:

1. Various service industries have seen a rapid expansion of FDI, prompted by some combination of proprietary assets and technologies and continuing relationships as suppliers of business services to MNEs in other industries. Services are commonly produced at the site of consumption, and may thereby generate more demonstration-type spillovers than would manufacturing activities. On the other hand, the provision of these services chiefly to multinational customers closes the local firm's window of observation.

2. Among manufacturing industries differences in market structure are likely associated with differing sensitivities of local firms' productivity to the foreign subsidiaries' combined market share. Katz (1984) argued that process and assembly industries exhibit quite different mechanisms of technology transfer and spillover. Kokko (1994) found that local firms' productivity increases significantly with the foreign share in industries with below-median royalty payments for intangible

assets or with below-median capital intensity. The slope coefficient is not significantly smaller in industries with high royalty payments or high capital intensity, but it has a much higher variance. A consistent explanation is that foreign subsidiaries regularly spill managerial capabilities to local firms in low-tech industries and assembly-type industries; in high-tech and process industries, important knowledge spills sometimes occur, but in other settings local firms either generate their productivity gains from other external sources or depend on their own capabilities.

3. Several conduits other than MNEs serve to spill knowledge to local firms in LDCs. Offshore assembly contracts are one prominent example. Offshore assembly takes place in activities in which LDCs possess cost and efficiency advantages, in the general-equilibrium sense of comparative advantage, but also suffer little or no disadvantage to industrial countries in microeconomic productivity. Local subcontractors competent in assembly work then can absorb the demonstration by their prime contractor of the harder-to-manage design and marketing activities. One wonders whether this mechanism might underlie an expansion pattern noted in Taiwanese firms: once established successfully in the local market, they tend next to expand abroad as horizontal foreign direct investors, only later (if it all) to turn to the unrelated diversification commonly seen in other LDCs' business groups (Aw and Batra, 1998).

4. Spillovers and hence productivity growth may be greater in LDCs that pursue export-promotion than where policies promote import-substitution. In general, a more efficient trade policy should achieve a higher *level* of income; that it should also generate faster steady-state *growth* is a less obvious proposition theoretically. Nonetheless, differential spillovers should provide such a mechanism (Balasubramanyam, Salisu, and Sapsford, 1996). Import-substitution regimes tend to attract truncated foreign-subsidiary plants operating at suboptimal scales and/or depending heavily on imported components. The number of competitors—foreign or local—is likely small, reducing spillovers' contagion opportunities. Export-promotion regimes beget market structures that lack these limitations, and hence are more likely to enhance the LDC's productivity growth as spillovers raise its productivity

more rapidly toward a world frontier.

Policy Implications

The preceding analysis is motivated by two central concerns. First, while productivity spillovers from foreign subsidiaries to local firms are apparently widespread, they are neither ubiquitous nor independent of the firms' ambient market structure. We need to focus on where and how they are likely to occur. Second, and more important, the study of economic development has paid little attention to the seemingly vital question of what factors retard or advance the capabilities of local firms to achieve productivity (in the sense of managerial and organizational capability) approaching the frontier found in industrial countries. Further research indicated by each concern is a requisite for effective policies to promote development.

Spillovers may provide a justification for LDC government policies to encourage inflows of foreign direct investment. The important implication of this paper is that the justification is likely conditional on the country's state of development and the structures of particular industries in which foreign subsidiaries might alight. Favorable treatment hence might be prudent for some countries but not others, or for MNEs entering some industries but not others. One cannot rule out the efficiency of conditional deals that might at the same time attract foreign subsidiaries and increase the spillage of benefits. Requirements to provide training or make local input purchases could increase the LDC's national welfare. Such policies' effectiveness depends, however, on evidence that is not yet in hand, so the finding is no open invitation to bureaucratic whim. Their success in historical practice seems rather limited (Conklin and Lecraw, 1997).

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