HUMAN CAPITAL AND INWARD FDI

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Abstract

After a review of the literature, we conclude that there is potential for significant "spillover effects" from FDI into host countries. However, we identify some limitations of this potential to do with the stock of human capital, the interest in local firms of promoting skills transfer and the competition environment. We suggest comparing conditions and effects between regions, particularly between East Asia and Latin America, where transfer in the former has been more consistent than in the latter. We propose further that an analysis of the type of FDI flowing to different regions and countries could provide clues to the potential for maximising the gains to local skills accumulation. Finally, studies are needed which examine the nature of skills provided by FDI, and ways in which training institutions, business schools, for example, can complement in-service training by firms in FDI host countries.

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Human Capital and Inward FDI

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1. Introduction

In recent decades, economists have begun to identify technical progress, or more generally, knowledge creation, as the major determinant of economic growth. Until the 1970s, the analysis of economic growth was typically based on neoclassical models that explain growth with the accumulation of labor, capital, and other production factors with diminishing returns to scale. In these models, the economy converges to a steady state equilibrium where the level of per capita income is determined by savings and investment, depreciation, and population growth, but where there is no permanent income growth. Any observed per capita income growth occurs because the economy is still converging towards its steady state, or because it is in transition from one steady state to another. The policies needed to achieve growth and development in the framework of these models are therefore straightforward: increases in savings and investment and reductions in the population growth rate shift the economy to a higher steady state income level. From the point of view of developing countries, however, these policies are difficult to implement. Low income and development levels are not only consequences, but also causes of low savings and high population growth rates.

The importance of technical progress was also recognized in the neoclassical growth models (Solow 1956, 1957), but the determinants of the level of technology were not discussed in detail: instead, technology was seen as an exogenous factor. Yet, it was clear that convergence in per capita income levels could not occur unless technologies converged as well. From the 1980s and onwards, growth research has therefore increasingly focused on understanding and endogenizing technical progress. Modern growth theory is largely built on models with constant or increasing returns to reproducible factors as a result of the accumulation of knowledge. Knowledge is to some extent a public good, and R&D, education, training, and other investments in knowledge creation may generate externalities

that prevent diminishing returns to scale for labor and physical capital.[1] Taking this into account, an economy may experience positive long-run growth instead of the neoclassical steady state where per capita incomes remain unchanged.

Depending on the economy's starting point, technical progress and growth can be based on creation of entirely new knowledge, or adaptation and transfer of existing foreign technology. Since it is less costly to learn to use existing technology than to generate new technology, developing countries have the potential to grow faster than developed economies for any given level of investment or R&D spending. However, this potential for convergence is conditional on the economy's level of human capital. More specifically, as noted by Van den Berg (2001:226), "it is the quality of the labor force, its accumulated experience and human capital, its education system, and so on, that determines an economy's ability to create new ideas and adapt old ones". Consequently, improvements in education and human capital are essential for absorbing and adapting foreign technology, and to generate sustainable long-run growth.

Along with international trade, the most important vehicle for international technology transfer is foreign direct investment (FDI). It is well known that multinational corporations (MNCs) undertake a major part of the world's private R&D efforts and produce, own, and control most of the world's advanced technology. When a MNC sets up a foreign affiliate, the affiliate receives some amount of the proprietary technology that constitutes the parent's firm-specific advantage and allows it to compete successfully with local firms that have superior knowledge of local markets, consumer preferences, and business practices. This leads to a geographical diffusion of technology, but not necessarily to any formal transfer of technology beyond the boundaries of the MNC: the establishment of a foreign affiliate is, almost per definition, a decision to *internalize* the use of core technology. However, MNC technology may still leak to the surrounding economy through external effects or "spillovers" that raise the level of human capital in the host country and create productivity increases in local firms.

In many cases, the effects operate through forward and backward linkages, as MNCs provide training and technical assistance to their local suppliers, subcontractors, and customers. The labor market is another important channel for spillovers, as almost all MNCs

[1] For some early contributions on knowledge and economic growth see e.g. Romer (1986 and 1990), Lucas (1988), and Grossman and Helpman (1991).

train operatives and managers who may subsequently take employment in local firms or establish entirely new companies. This way, FDI may be a particularly valuable source of new technology – it not only introduces new ideas but it also strengthens the human capital base needed to adapt these ideas to the local market. It is therefore not surprising that attitudes towards inward FDI have changed considerably over the last couple of decades, as most countries have liberalized their policies to attract all kinds of foreign investment. Numerous governments have even introduced various forms of investment incentives to encourage foreign MNCs to invest in their jurisdiction.

However, productivity and technology spillovers are not automatic consequences of FDI. Instead, FDI and human capital interact in a complex manner, where FDI inflows create a potential for spillovers of knowledge to the local labor force, at the same time as the host country's level of human capital determines how much FDI it can attract and whether local firms are able to absorb the potential spillover benefits. It is likely that that the relationship between FDI and human capital is highly non-linear, and that multiple equilibria are possible. For instance, host economies with relatively high levels of human capital may be able to attract large amounts of technology intensive foreign MNCs that contribute significantly to the further development of labor skills. At the same time, economies with weaker initial conditions are likely to experience smaller inflows of FDI, and those foreign firms that enter are likely to use simpler technologies that contribute only marginally to local learning and skill development.

The purpose of this paper is to discuss the relation between human capital development and FDI in some closer detail, and to propose some components for a research agenda on FDI and human capital. The paper is structured as follows. Section 2 summarizes some of the aggregate evidence of technology and productivity spillovers from FDI. Section 3 focuses more closely on the effects of FDI on human capital development in the host countries, both through linkages and various kinds of training, Section 4 presents some ideas for further research, and Section 5 summarizes and concludes the paper.

2. Foreign Direct Investment and Spillovers[2]

The earliest discussions of spillovers in the literature on foreign direct investment date back to the 1960s. The first author to systematically include spillovers (or external effects) among the possible consequences of FDI was MacDougall (1960), who analyzed the general welfare effects of foreign investment. Other early contributions were provided by Corden (1967), who looked at the effects of FDI on optimum tariff policy, and Caves (1971), who examined the industrial pattern and welfare effects of FDI.

The common aim of these studies was to identify the various costs and benefits of FDI. Productivity externalities were discussed together with several other indirect effects that influence the welfare assessment, such as those arising from the impact of FDI on government revenue, tax policies, terms of trade, and the balance of payments. The fact that spillovers were included in the discussion was generally motivated by empirical evidence from case studies rather than by comprehensive theoretical arguments. Yet, the early analyses made clear that multinationals may improve allocative efficiency by entering into industries with high entry barriers and reducing monopolistic distortions, and induce higher technical efficiency if the increased competitive pressure or some demonstration effect spurs local firms to more efficient use of existing resources. They also proposed that the presence may lead to increases in the rate of technology transfer and diffusion. More specifically, case studies showed that foreign MNCs may:

- contribute to efficiency by breaking supply bottlenecks (but that the effect may become less important as the technology of the host country advances);
- introduce new know-how by demonstrating new technologies and training workers who later take employment in local firms;

[2] Since FDI is essentially technology driven, we concentrate on the transfer and diffusion of technology, broadly speaking, from foreign multinationals to their host countries. One could, of course, also include a discussion of the long-term balance-of-payment effects of FDI, since foreign investment does not only appear as a one-time effect on the host country's capital account, but results in long-term effects on both the current and capital accounts of the host country. The initial investment is often financed with a combination of equity capital and international loans. In addition, the operations of the MNC affiliate often generate flows of imports and exports. A discussion of the net impact of these transactions on the host country external accounts could be relevant, but unfortunately, very few studies have tried to measure it.

- either break down monopolies and stimulate competition and efficiency or create a more monopolistic industry structure, depending on the strength and responses of the local firms;
- transfer techniques for inventory and quality control and standardization to their local suppliers and distribution channels; and,
- force local firms to increase their managerial efforts, or to adopt some of the marketing techniques used by MNCs, either on the local market or internationally.

Although this diverse list gives some clues about the broad range of various spillover effects, it says little about how common or how important they are in general. Similar complaints can be made about the evidence on spillovers gauged from the numerous case studies discussing various aspects of FDI in different countries and industries. These studies often contain valuable ”circumstantial evidence” of spillovers (see Blomström, et al., 2000 for a survey), but often fail to show how significant the spillover effects are and if the results can be generalized. For instance, many analyses of the linkages between MNCs and their local suppliers and subcontractors have documented learning and technology transfers that may make up a basis for productivity spillovers or market access spillovers. However, these studies seldom reveal whether the MNCs are able to extract all the benefits that the new technologies or information generate among their supplier firms. Hence, there is no clear proof of spillovers, but it is reasonable to assume that spillovers are positively related to the extent of linkages. Similarly, there is much written on the relation between MNC entry and presence and market structure in host countries, and this is closely related to the possible effects of FDI on competition in the local markets. There are also case studies of demonstration effects, technology diffusion, and labor training in foreign MNCs. However, although these studies provide much detailed information about the various channels for spillovers, they say little about the overall significance of such spillovers.

The statistical studies of spillovers, by contrast, may reveal the overall impact of foreign presence on the productivity of local firms, but they are generally not able to say much about how the effects come about. These studies typically estimate production functions for locally owned firms, and include the foreign share of the industry as one of the explanatory variables. They then test whether foreign presence has a significant positive impact on local productivity (or productivity growth) once other firm and industry characteristics have been accounted for. Although the data used in these analyses are often limited to few variables, aggregated to industry level rather than plant level, and in several cases of a cross-section rather than time-

series or panel character, they do provide some important evidence on the presence and pattern of spillover effects.

Almost all of the statistical analyses of spillovers have focused on intra-industry effects, but there are a few exceptions. One of them is Katz (1969), who notes that the inflow of foreign capital into the Argentine manufacturing sector in the 1950s had a significant impact on the technologies used by local firms. He asserts that the technical progress did not only take place in the MNCs' own industries, but also in other sectors, because the foreign affiliates forced domestic firms to modernize "by imposing on them minimum standards of quality, delivery dates, prices, etc. in their supplies of parts and raw materials" (Katz, 1969, p. 154). Also Aitken and Harrison (1991) include some discussion about inter-industry effect in Venezuelan manufacturing, and argue that forward linkages generally brought positive spillover effects, but that backward linkages appeared to be less beneficial because of the foreign firms' high import propensities (although there were differences between industrial sectors). Moreover, Sjöholm (1999b) identifies a geographical dimension of positive inter-industry spillovers in Indonesian manufacturing. His results suggest that the presence of foreign multinational companies may raise the productivity of locally owned firms in other industries, presumably through various linkages, but only if they are located in close proximity of the foreign multinationals. Kugler (2001), which is the most comprehensive study of the sectoral diffusion of spillovers from FDI, finds that the greatest impact of MNCs in Colombian manufacturing is across rather than within the subsidiaries' own industries. However, the evidence discussed below will rarely touch upon this kind of inter-industry links, but rather focus on intra-industry effects. To the extent that FDI affects other industries than that where the foreign investor operates, it is obvious that there is a risk that effects – negative as well as positive – are underestimated.

The earliest statistical analyses of intra-industry spillovers include studies for Australia by Caves (1974), for Canada by Globerman (1979), and for Mexico by Blomström and Persson (1983). These authors examine the existence of spillovers by testing whether foreign presence has any impact on labor productivity in local firms in a production function framework. Foreign presence is simply included among other firm and industry characteristics as an explanatory variable in a multiple regression. All three studies conclude that spillovers are significant at this aggregate level, although they cannot say anything about how spillovers take place.

Some more recent studies also claim that inward investment has made an important and significant contribution to economic growth in the recipient countries. For instance, Driffield (2001), Liu et al. (2000) and Pain (2001) all find statistically significant spillovers in the UK, as do Chuang and Lin (1999), Dimelis and Louri (2002), and Lipsey and Sjöholm (2001) in their studies of Greece, Taiwan, and Indonesia, respectively. Similar results are reported in Blomström and Wolff (1994), who also try to determine the size of these effects by asking whether the spillovers in the Mexican manufacturing sector were large enough to help Mexican firms converge toward US productivity levels during the period 1965-1982. Their answer is affirmative: foreign presence seems to have a significant positive impact on the rates of growth of local productivity. Similar conclusions are reached by Nadiri (1991) in a study of the impact of US direct investment in plant and equipment on the manufacturing sectors in France, Germany, Japan, and the UK between 1968 and 1988. Increases in the capital stock owned by US multinationals seem to stimulate new domestic investment in plant and equipment, and it appears that there is also a positive impact of FDI on the growth of total factor productivity in the host countries' manufacturing sectors.

On the other hand, there are several studies that find negative effects of the presence of multinationals on domestic firms. For instance, Haddad and Harrison (1991 and 1993), in a test of the spillover hypothesis for Moroccan manufacturing during the period 1985-1989, conclude that spillovers do not take place in all industrial sectors. Like Blomström (1986), they find that foreign presence lowers the average dispersion of a sector's productivity, but they also observe that the effect is more significant in sectors with simpler technology. This is interpreted to mean that foreign presence forces local firms to become more productive in sectors where best practice technology lies within their capability, but that there are no significant transfers of modern technology. Furthermore, they find no significant effects of foreign presence on the rate of productivity growth of local firms, and interpret this as additional support to the conclusion that technology spillovers do not occur.

Aitken and Harrison (1991 and 1999) use plant-level data for Venezuelan manufacturing between 1976 and 1989 to test the impact of foreign presence on total factor productivity growth. They conclude that domestic firms exhibited higher productivity in sectors with a larger foreign share, but argue that it may be wrong to conclude that spillovers have taken place if MNC affiliates systematically locate in the more productive sectors. In addition, they are also able to perform some more detailed tests of regional differences in

spillovers. Examining the geographical dispersion of foreign investment, they suggest that the positive impact of FDI accrued mainly to the domestic firms located close to the MNC affiliates. However, effects seem to vary between industries.

Also Perez (1998), in a study of UK industries and Cantwell (1989), who investigates the responses of local firms to the increase in competition caused by the entry of US multinationals into European markets between 1955 and 1975, argue that positive technology spillovers did not occur in all industries. Cantwell´s analysis differs notably from the other studies discussed in this section – he does not focus on productivity, but rather on changes in the market shares of foreign and local firms – but his conclusions are interesting. He asserts that ”the technological capacity of indigenous firms ... was the major factor in determining the success of the European corporate response” (p. 86) to the US challenge, and that the size of the national market was an additional determinant. More specifically, Cantwell suggests that the entry of US affiliates provided a highly beneficial competitive spur in the industries where local firms had some traditional technological strength, whereas local firms in other industries - especially in countries where markets were too small to allow both kinds of firms to operate at efficient scale - were forced out of business or pushed to market segments that were ignored by the foreign MNCs.

So the results on the presence of spillovers seem to be mixed[3]. However, recent studies suggest that there is a systematic pattern where various host industry and host country characteristics influence the incidence of spillovers. For instance, the foreign affiliates' levels of technology or technology imports seem to influence the amount of spillovers to local firms. The technology imports of MNC affiliates, in turn, have been shown to vary systematically with host country characteristics. These imports seem to be larger in countries and industries where the educational level of the local labor force is higher, where local competition is tougher, and where the host country imposes fewer formal requirements on the affiliates' operations (Blomström *et al.* 1994, Kokko and Blomström 1996).

Some recent studies have also addressed the apparent contradictions between the earlier statistical spillover studies, with the hypothesis that the host country's level of technical development or human capital may matter as a starting point. Kokko (1994), for instance, argues that spillovers should not be expected in all kinds of industries. In particular, foreign

[3] See Görg and Strobl (forthcoming) for a meta-analysis of the spillover literature.

MNCs may sometimes operate in "enclaves", where neither products nor technologies have much in common with those of local firms. In such circumstances, there may be little scope for learning, and spillovers may not materialize. Conversely, when foreign affiliates and local firms are in more direct competition with each other, spillovers are more likely.

Examining data for Mexican manufacturing, Kokko (1994) finds that spillovers are positively related to the host economy´s capacity to absorb them. Similar findings for the Uruguayan manufacturing sector are reported in Kokko *et al.* (1996), which also suggests that weak technological capability at the firm level may be an obstacle for spillovers. This is consistent with some recent research results from Ireland and India. Görg and Strobl (2000 and 2001) show that the presence of foreign companies in the Irish economy has a life enhancing effect on indigenous firms and plants in high tech industries, suggesting the presence of technological spillovers, but no effect on indigenous low tech firms and plants. Kathuria (1998, 2000, and 2001) suggest that the indirect gains or spillovers from FDI are not an automatic consequence of MNC presence in the Indian economy. Rather they depend to a large extent on the efforts of local firms to invest in learning and R&D activities so as to de-codify the spilled knowledge. Moreover, no evidence of spillovers to low-tech Indian companies was reported.

Another possible explanation for the divergent findings from the earlier statistical spillover tests is suggested by Kokko (1996), who analyzes the effects of competition in Mexican manufacturing. The earlier studies have tested the hypothesis that productivity spillovers are strictly proportional to foreign presence, but Kokko argues that this is not always the case. Spillovers from competition, in particular, are not determined by foreign presence alone, but rather by the simultaneous interactions between foreign and local firms. Hence, it is possible that the spillovers are larger in cases where a few foreign MNC stir up a previously protected market than in a situation where foreign affiliates hold large market shares, but refrain from competing hard with local firms. In fact, in some cases, large foreign presence may even be a sign of a weak local industry, where local firms have not been able to absorb any productivity spillovers at all and have therefore been forced to yield market shares to the foreign MNCs. Analyzing the operations of foreign and domestic firms in Mexican manufacturing in a simultaneous framework, Kokko (1996) finds support for these hypotheses. The labor productivity of foreign and local firm appears to be simultaneously determined, and competition from foreign affiliates seems to have an independent effect on the productivity of

local firms, even after accounting for the demonstration and contagion spillovers that are directly proportional to foreign presence. Sjöholm (1999a) also concludes that competition enhances the positive productivity spillovers from FDI.

While most of the studies mentioned above have focused on differences between industries in a given host country, Blomström *et al.* (1994) have examined the role of the host country's overall development level as a determinant of spillovers. The results of their comprehensive cross-country study of 101 economies suggest that spillovers are concentrated to middle-income developing countries, while there was no evidence of such effects for the poorest developing countries. Just as the analyses of individual host countries, these findings highlight the importance of local competence and competition for spillovers. Few local firms in the poorest countries are in direct competition with foreign MNCs, and few of these countries possess the technical skills needed to absorb modern MNC technologies. Similar results are reported in Balasubramanyam (1998). He concluded that FDI can be a potent instrument of development, but only in the presence of a threshold of human capital, well developed infrastructure facilities, and a stable economic climate. Thus, "FDI is a rich country good" (p. 18) and only the most advanced developing countries are able to benefit from FDI.

Thus, it seems clear from these studies that host country and host industry characteristics determine the impact of FDI, and that systematic differences between countries and industries should therefore be expected. There is strong evidence pointing to the potential for significant spillovers benefits from FDI, but also ample evidence indicating that spillovers do not occur automatically. Whether these potential spillovers will be realized or not depends on the ability and motivation of local firms to engage in investment and learning to absorb foreign knowledge and skills. Competition and education are key requirements to achieve this.

3. FDI and Human Capital Development

The transfer of technology from MNC parents to its affiliates and other host country firms is not only embodied in machinery, equipment, patent rights, and expatriate managers and technicians, but is also realized through the training of local employees. This training affects most levels of employees, from simple manufacturing operatives through supervisors to technically advanced professionals and top-level managers. While most recipients of training are employed in the MNCs' own affiliates, the beneficiaries also include employees among the MNCs' suppliers, subcontractors, and customers. Types of training range from on-the-job

training to seminars and more formal schooling to overseas education, perhaps at the parent company, depending on the skills needed. The various skills gained through the relation with the foreign MNCs may spill over directly – when the MNCs do not charge the full value of the training provided to local firms – or over time, as the employees move to other firms or set up their own businesses. This section will examine how FDI affects human capital development in the host country in three steps. We first discuss the role of MNCs in formal education, followed by a summary of the evidence regarding training of employees in MNCs, and some comments on the service sector, where human capital is arguably even more important than in manufacturing.[4]

3.1 The role of MNCs in formal education

While the role of MNCs in primary and secondary education is marginal, there is increasingly clear evidence that FDI may have a noticeable impact on tertiary education in their host countries. The most important effect is perhaps on the demand side. MNCs provide attractive employment opportunities to highly skilled graduates in natural sciences, engineering, and business sciences, which may be an incentive for gifted students to complete tertiary training, and MNCs demand skilled labor, which may encourage governments to invest in higher education.

There are also more direct links between FDI and higher education. Apart from providing scholarships and sponsoring the formal education of individual employees, in the host country or elsewhere, MNCs are also active in supporting the development of universities and related institutions in several ways. UNCTAD (1994:218) reports that the MNCs' "demand for highly trained graduates manifests itself in the form of financial support, particularly to business schools and science facilities, the provision of assistance and advice through membership of advisory boards, curriculum review committees, councils and senates". Some examples are given in UNCTAD (1999:274). In Thailand, various training programs are run jointly by international chambers of commerce (of which MNCs are prominent members) and the Thai government. In Malaysia, several skill development centers

[4] In addition, it might be interesting to focus also on linkages between MNCs and local firms. However, last year's World Investment Report (UNCTAD 2001) focused on promoting linkages, and there is little value added in repeating the analysis here. However, it would be advisable to consult the main authors of this report, to get their views on the topics for further work focusing on the relation between linkages and human capital.

have been established jointly by the government, local business, and foreign MNCs: the first of these, the Penang Skills Development Centre, has been widely lauded for its success. Moreover, MNCs have been instrumental in the internationalization of tertiary education, in particular management education. To facilitate the contacts and coordination of activities between the parent company and its foreign affiliates, many MNCs encourage local managers to obtain training in international business; in most cases, the MNCs also finance the training. The MNCs demand – and willingness to pay – for international management programs is perhaps the main explanation for numerous cross-regional alliances involving leading Western business schools.

3.2 Training of MNC employees

Most MNCs provide some training for their employees, although the amount and type vary depending on industry, mode of entry, size and time horizon of investment, type of operations, and local conditions. The level of the host country employees' general and cognitive skills is a particularly important determinant of the amount of training undertaken, since a relatively high level of education reduces the cost of further training and raises the expected benefits. Competition is another important factor. Firms that are protected from international or domestic competition are less likely to invest in costly training programs.

However, the evidence on spillovers from the MNC affiliates' training of local employees is far from complete, and comes mainly from developing country studies. Considering that knowledge is more scarce at the same time as the public education systems in developing countries are relatively weaker, it is also possible that spillovers from training are relatively more important there. However, there is scattered evidence of effects in the industrialized countries as well, and then perhaps mainly regarding management skills. It is possible, for instance, that the inter-firm mobility of managers has contributed to spread specific management practices from Japan to the United States and Europe, and, in earlier times, from the US to Europe (Caves, 1996). Moreover, casual observation suggests that the mobility of employees from MNCs in the computer and software industries contributes to spillovers, both within the industry and elsewhere.

Many of the studies undertaken in developing countries have emphasized the spillovers of management skills. For instance, Gershenberg (1987) examines MNCs and the training and spread of managerial skills in Kenya. From detailed career data for 72 top and middle level

managers in 41 manufacturing firms, he concludes that MNCs offer more training of various sorts to their managers than private local firms do, although not more than joint ventures or public firms. Gershenberg's observation about the relatively large training expenditures in MNC affiliates are echoed in several other studies as well (Siburuang and Brimble 1988; Yong 1988; Iyanda and Bello 1979). Moreover, UNCTAD (1994) reports that the MNC affiliates' training expenditures per employee often match or exceed those of the parent company's own training expenditures in the home country. Managers also move from MNCs to other firms and contribute to the diffusion of know-how. Of the managers in private local and public firms who had training from elsewhere, the majority had received it while working for MNCs - joint ventures, on the other hand, seemed to recruit mainly from public firms. Yet, mobility seemed to be lower for managers employed by MNCs than for managers in local firms. This is not surprising remembering the common finding that MNCs pay more for their labor than what local firms do, even taking skill levels into account: in fact, it is not unreasonable to hypothesize that the fear of a "brain-drain" to local firms is one of the reasons behind the higher wages in MNCs.

Other studies provide similar evidence of management training, and point more clearly to the presence of spillovers. Katz (1987) notes that managers of locally owned firms in Latin America often started their careers and were trained in MNC affiliates. Wasow and Hill (1986) emphasize the role of FDI for the dissemination of management skills in the Philippine insurance industry. Likewise, Yoshihara (1988) underlines the importance of management training in foreign companies (and overseas education) for Chinese-owned firms in South-East Asia. Judging from these studies, it appears that management skills may spill over relatively easily, perhaps because they are less firm-specific than technical skills and can more easily be used in other context. Another possible explanation for the relative abundance of studies discussing management skills is that much training focuses on management. Summarizing numerous studies of human capital development in MNCs, UNCTAD (1999: 275) notes that even in low-wage operations in developing countries – where training efforts could be expected to be the lowest – export oriented MNCs still invest significantly in training since they must meet high standards of quality and delivery, and need good skills at supervisory and managerial levels.

There is also evidence of training and capacity development in technical areas, although the number of detailed studies appears smaller. UNCTAD (1999) notes several cases where

leading MNCs – Daimler-Benz and Nestlé – provide extensive vocational training for their employees. Behrman and Wallender (1976) recognize spillovers of not only managerial but also technical skills. In particular, they note that several of the MNC affiliates' subcontractors had been established by former employees. Hill (1982) also identifies similar cases in the Philippine appliance and motor cycle industries, but argues that they were not significant. Nevertheless, 12 out of 20 assembler firms had some subcontractors that were established by former employees. Chen (1983), focusing on training of operatives in a study of technology transfer to Hong Kong, notes that the MNCs' incidence of undertaking training and their training expenditures were significantly (several times) higher than those for local firms three out of four sampled industries. Consequently, he concludes that "the major contribution of foreign firms in Hong Kong manufacturing is not so much the production of new techniques and products, but the training of workers at various levels" (p. 61).

Looking at the establishment of a Ford Motor Company plant in Mexico, Shaiken (1990) suggest that technical training may be particularly important for greenfield investments. In this case, all workers were reported to receive 700 classroom hours of training before starting work, and technical and supervisory workers were also sent for training to the US. Fleury and Humphrey (1992) and Liebau and Wahnshaffe (1992) report similar investments in technical training in connection with the introduction of new technologies or stricter quality requirements in Brazilian and Malaysian manufacturing. The question that remains unanswered by these studies is to what extent the technical skills absorbed in firm-specific training programs may spill over to local industry, and to what extent the skills themselves are firm-specific.

3.3 FDI and human capital development in service industries

While training activities in manufacturing often aim to facilitate the introduction of new technologies that are embodied in machinery and equipment, the training in service sectors is more directly focused on strengthening skills and know-how embodied in employees. This means that training and human capital development is often more important in service industries. Furthermore, many services are not tradable across international borders, which means that service MNCs to a great extent are forced to reproduce home country technologies in their foreign affiliates. As a consequence, service companies are often forced to invest

more in training, and the gap between affiliate and parent company wages tends, therefore, to be smaller than in manufacturing (UNCTAD 1994:232).

While the training needs in advanced services, such as finance and IT, can be expected to be quite large, there are also significant investments in simpler service industries, such as hotels and restaurants. For instance, the local and international management training run by MacDonalds and Pepsi-Cola's ambitious business and management programs have received much attention. Table 1 summarizes some data on training activities in selected service industries in Latin America, and shows significant amounts of staff training in a low technology industry like hotels. The high training intensity in the hotel sector can largely be explained by the operations of international hotel chains that aim to provide the same standard of services in all countries and that have also established well functioning international training programs. Another likely reason is the high staff turnover in the hotel sector, which necessitates continuous training to familiarize new employees to the practices and standards.

Table 1 Training activities in foreign affiliates of service MNCs in Latin America

Item	*Advertizing*	*Banking*	*Consulting*	*Hotels*	*Software*
Number of firms	14	16	17	10	16
Average no. of employees	142	172	245	658	138
Officer / staff ratio (%)	91	83	25	6	20
Officers training (days per year)	15	11	23	10	19
Staff training (days per year)	11	7	20	22	16
Visits per year by home office experts	10	10	18	21	18

Source: UNCTAD (1994), Table V.4.

In recent years, it is likely that the training needs in several important service industries have increased notably. For instance, many countries that formerly limited foreign ownership in banking and finance have liberalized their regulations after the Asian financial crisis, to bring in fresh capital as well as new technologies and skills. To transfer these skills will require substantial investments in human capital development. Similarly, the rapid technological progress in telecommunications and IT has revealed the weaknesses in domestic skills and encouraged many countries to remove various investment and entry barriers in order to attract investment from the major MNCs in these industries. However, neither of these fields has

been studied in sufficient detail to allow any conclusions about the total training and education investments, nor is there much evidence on spillovers to local firms.

4. Suggestions for Future Research

The previous pages have demonstrated that there is a potential for significant spillover benefits from foreign direct investment, with training and human capital development as a particularly important channel for these positive externalities. However, it has also been noted that spillovers are not automatic consequences of foreign presence. The potential spillover benefits are realized only if local firms have the ability and motivation to invest in absorbing foreign technologies and skills, that is, if their initial level of education and human capital is sufficiently high and barriers to competition are not too high. However, in many areas, our knowledge is still sketchy, and further research is needed to provide a more accurate and detailed picture of the relationship between FDI and human capital that can make up a foundation for policy and strategy conclusions for host country governments and MNCs. The following paragraphs will outline a possible agenda for future research on these issues.

Firstly, it should be noted that human capital is not only an important determinant of economic growth and a potential beneficiary of spillovers from FDI, but also a crucial factor in attracting MNCs and facilitating spillovers. To capture this complex interaction between FDI and human capital, it is necessary to formulate a research agenda that documents and analyzes at least four different pieces of the puzzle. The research should document differences in human capital in various host countries of FDI, the role of the host country's human capital resources as a determinant of FDI and MNC operations, differences in the MNCs training and educational activities in these countries, and relations between the host country's human capital base and the spillover benefits of FDI. To do this, both aggregated econometric analyses ("macro analyses") and case studies will be required. The combination will provide opportunities to assess the overall significance of various findings and to put the evidence from case studies in a broader perspective. The case studies, in turn, are needed to provide a deeper understanding of the processes involved and the channels for knowledge transfer. Below, we will outline four macro analyses and some case studies that could form a large part of a future research agenda.

4.1 Macro Studies

a. *Education and Human Capital in East Asia and Latin America*

A first study should examine the differences in human capital in East Asia and Latin America. Examining the overall statistics, the level of education seems relatively high in both regions, but the divergent growth experiences of the regions suggest that there must be some significant differences as well. In their comparison of education in Latin America and Scandinavia, Blomström and Meller (1991) found that it was the *type* of education, rather than the *level*, that differed. "While the students in the northern countries were preparing for examinations in math and science, the Latin American students were studying law and discussing literature" (p. 8). Following this line of research, this study should examine what type of education, particularly at the university level, is provided in the two regions. One could either pick one country in each region, and make detailed studies of each of them, or do a less detailed study of 3-4 countries in each region.

b. FDI Structure and Human Capital in East Asia and Latin America

A second study should examine what type of production activities multinationals locate in these East Asian and Latin American countries. Are there differences in industrial distribution between the countries, and how are these differences related to the human capital base? Do the affiliates differ in terms of skill levels (measured e.g. by the ratio of white- and blue-collar workers, wage levels, wage gaps between parents and affiliates and affiliates and local competitors)? By answering these questions it would be possible to get an idea of the importance of human capital in the host economies and the behavior of the MNCs. The US, Sweden and possibly other home countries of multinationals provide data for such a study.

c. MNCs Educational and Training Activities in East Asia and Latin America

If data are available, a study of the educational and training activities within the MNC affiliates in different countries would be highly desirable. Who receives training (top managers, middle managers, etc)? In what fields? And where (at home or abroad)? By whom (by the companies´ own instructors or by outsiders like INSEAD)?

d. Human Capital and Spillovers

The final macro study should be a cross-country study, examining the relation between human capital endowments (and development) and spillovers. Earlier cross-country studies of the effects of FDI have focused on the host country´s overall development level as a determinant of spillovers (Blomström, *et al.*, 1994 and Balasubramanyam, 1998), but there is no study focusing on the human capital aspect of the problem. To what extent would an explicit focus on human capital development affect the results from these studies?

4.2 Case Studies

a. Skill Development and FDI in Export Processing Zones

There are numerous case studies of export processing zones across the developing world, with rather mixed results regarding the effects of EPZ investment on local human capital and productivity. Most studies conclude that there is relatively little transfer of technology and few solid links to the surrounding economy, although a few analyses point to significant achievements in both areas. One reason for these mixed results may be that most analyses are snapshots, focusing on short periods of time. It would be highly valuable to make a case study with an explicit longitudinal perspective on EPZ development. While the initial investors in an EPZ are likely to focus on simple assembly operations and be very independent from the surrounding economy, the interesting question is what happens over time? As the EPZ matures, it is reasonable to expect learning and improvements in the local skill base, particularly if local governments are investing in education and training. What will this mean for the operations of incumbent EPZ firms and for new entrants? Is there any upgrading of technologies, stronger links to the local economy, and more spillovers?

b. Employment Structure in Foreign MNCs

Most wage comparisons between MNC affiliates and local firms show that MNCs tend to pay a wage premium, even when formal education and other labor characteristics are accounted for: MNC affiliates often employ a larger share of skilled workers than do local firms. However, few studies have explicitly compared the educational backgrounds and skill characteristics of employees in MNC affiliates and local firms. What kinds of education and experience do workers and managers have? How much in-house and outhouse training have employees received over their life-time? To the extent that MNC affiliates demonstrate

practices and organizational solutions that are subsequently adopted also by local firms, this kind of comparison may provide important insights e.g. regarding the demand for public education.

c. FDI and Skill Development in Banking and Telecommunications

Banking and telecommunications are probably the two industries where changes have been most dramatic during the past decade. The banking sectors in most developing countries have tried to adjust to a more globalized environment with liberalized international capital flows, but often with only limited success. The Asian crisis clearly demonstrated some of the shortcomings in the sector. After the crisis, many countries have removed restrictions on inward investment, hoping to attract both capital and skills needed for restructuring and recovery. Large amounts of training are needed to transfer these skills. Case studies of training and human capital in banking, as well studies of the effects on locally owned banks, would be highly valuable. Similarly, the high rates of technical progress in IT and telecommunications during the past decade have revealed the weaknesses in formerly many protected industries, and encouraged a wave of liberalization and FDI. The consequences, both in terms of human capital development and spillovers to the host economy, are have neither been researched nor documented, so in-depth studies are highly valuable.

d. Diffusion of Managerial Knowledge from MNCs to Local Firms

By simply interviewing the managers of (say) the 100 most successful local firms in one Asian and one Latin American country about their education and career track, it would be possible to document much valuable information about the diffusion of managerial knowledge from MNCs to local firms. Jorge Katz (1987) did something related to this (he only asked about their previous positions) and found that managers of successful locally-owned firms in Latin America often started their careers and were trained in MNC affiliates. Wasow and Hill (1986) provided similar evidence for the dissemination of management skills in the Philippines´ insurance industry.

e. MNCs and the International Diffusion of Business Schools

The top business school in the world, like Harvard, Wharton, Chicago, INSEAD, and (of course) the Stockholm School of Economics, have become global today. They not only

receive students from all around the world, but they also provide courses in many countries. This development is very closely related to the internationalization of production and management. It would therefore be interesting to pick a sample of (say) 10 top schools and examine their role in management education in East Asia and Latin America. How active are they in the different countries? What type of courses do they provide? Company tailor made courses or others? What role have MNCs played in this development? In what ways?

5. Conclusion

This paper has discussed the relations between FDI and human capital, noting that the interaction between the two is complex and highly non-linear, and that several different outcomes are possible. FDI inflows create a potential for spillovers of knowledge to the local labor force, at the same time as the host country's level of human capital determines how much FDI it can attract and whether local firms are able to absorb the potential spillover benefits. Hence, it is possible that host economies with relatively high levels of human capital may be able to attract large amounts of technology intensive foreign MNCs that contribute significantly to the further development of labor skills. At the same time, economies with weaker initial conditions are likely to experience smaller inflows of FDI, and those foreign firms that enter are likely to use simpler technologies that contribute only marginally to local learning and skill development.

However, although there is abundant circumstantial evidence regarding the various links between FDI and human capital, our knowledge is still sketchy, and further research is needed to provide a more accurate and detailed picture of the relationships involved. This paper has therefore proposed some topics for further research, with emphasis on a macro-to-micro approach, where aggregated econometric studies are complemented with more detailed case studies on individual countries and firms.

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