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FDI AND HUMAN CAPITAL: A RESEARCH AGENDA

by

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PREFACE

This paper is one of five presented at a meeting on FDI, human capital and education in developing countries held in Paris in mid-December 2001. They examine the links between FDI and human capital development, notably the interaction between the host country's policies affecting multinational enterprises (MNEs), its educational and training system, and the education and training activities of MNEs. The five papers are: 1) by Ethan Kapstein situating this issue in the broader context of current debates on globalisation, growth and poverty; 2) by Matthew Slaughter looking at the implications of FDI for skill demand and supply; 3) by Dirk Willem te Velde examining the interaction between FDI promotion policy and human capital; 4) by Bryan Ritchie reviewing the relationship between domestic policy, FDI and human capital in East Asia; and 5) by Magnus Blomström and Ari Kokko reviewing the literature on human capital spillovers for the purposes of defining a new research agenda.

Over the last ten years, globalisation has become a contentious issue. Much of the debate has focused on the role of capital inflows and FDI. There is substantial evidence that short-term capital flows, and portfolio capital in particular, increase the susceptibility of developing countries to financial crises, while FDI appears to be more stable and less subject to reversal and rapid outflows. Over the last decade an increasing number of emerging market economies have opened their countries to FDI, and have made attracting FDI an integral component of their development strategies. In Latin America alone, for example, net FDI flows climbed from $18 billion in 1990 to more than $85 billion in 1999.

At the same time, the composition of FDI has changed. The majority of FDI from OECD countries to developing countries now goes into services, rather than manufacturing and natural resource production. This change of composition has been accompanied by a change in purpose. As a result, FDI is now more likely to finance a large initial surge in capital goods imports, bringing advanced technology, know-how and organisational techniques. Is, however, FDI causing a race to the bottom as countries compete to attract investors, or to a race to the top as governments recognise the need for an educated workforce? Is it contributing to greater income inequality by increasing the demand for skilled labour, or to an increase in opportunities for workers at all income levels?

The possibility that FDI is contributing to widening wage and income inequalities has revealed an important but relatively unexplored link with human capital and human capital policy, education and training. In this context, and building upon research that the OECD Development Centre has done on globalisation, the Centre's meeting was organised to examine the links between FDI and human capital development. It

particularly examined the three-way interaction between the host country's incentives to attract FDI and its policies affecting MNEs, its educational and training system, and the MNEs education and training activities.

The general conclusion that can be drawn from these papers is that MNEs can and do generate substantial human capital spillovers in developing countries and that appropriate policies can maximise these. For instance, training policies are essential to creating positive synergies with MNEs but must be seen as not FDI-specific — they are necessary for the competitiveness of all enterprises. At this point very little is known about the training activities that MNEs are actually engaged in, and to what extent local employees and managers of MNEs subsequently work in domestic firms, or start new firms themselves.

Further research is needed on the relationship between human capital and FDI, that could be extremely fruitful for both policy makers and MNEs. In particular, we need to know more about the transmission mechanisms and the ways in which policies can support them. These five Technical Papers, each of them written by eminent specialists, provide a sound basis for further work which can enhance development potential in very practical ways.

Jorge Braga de Macedo
President
OECD Development Centre
29 July 2002

Technical Paper No. 191, *Virtuous Circles? Human Capital Formation, Economic Development and the Multinational Enterprise*, by Ethan B. Kapstein, August 2002.
Technical Paper No. 192, *Skill Upgrading in Developing Countries: Has Inward Foreign Direct Investment Played a Role?*, by Matthew J. Slaughter, August 2002.
Technical Paper No. 193, *Government Policies for Inward Foreign Direct Investment in Developing Countries: Implications for Human Capital Formation and Income Inequality*, by Dirk Willem te Velde, August 2002.
Technical Paper No. 194, *Foreign Direct Investment and Intellectual Capital Formation in Southeast Asia*, by Bryan K. Ritchie, August 2002.
Technical Paper No. 195, *FDI and Human Capital: A Research Agenda,* by Magnus Blomström and Ari Kokko, August 2002.

RÉSUMÉ

Après un panorama des travaux existants, ce Document technique met en évidence un potentiel « d'effets de retombée » significatifs des IDE dans les pays récepteurs. Sont toutefois identifiées un certain nombre de contraintes : le stock de capital humain, l'intérêt des entreprises locales pour les transferts de compétences et l'environnement concurrentiel. Les auteurs proposent de comparer les conditions et les effets entre les régions, en particulier entre l'Asie de l'Est et l'Amérique latine, celle-ci ayant bénéficié de transferts bien plus conséquents que celle-là. Ils suggèrent en outre qu'une analyse des types d'IDE qui se dirigent vers telle ou telle région ou pays pourrait fournir des pistes d'appréciation pour évaluer le potentiel de maximisation de l'accumulation locale de compétences. Enfin, des études complémentaires sont nécessaires pour identifier la nature des compétences délivrées par les IDE et la manière dont les établissements de formation, par exemple les écoles de commerce, peuvent compléter les apports des entreprises dans les pays récepteurs d'IDE.

SUMMARY

After a review of the literature, this paper concludes that there is potential for significant “spillover effects” from FDI into host countries. However, it identifies 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. The authors 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. They 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.

I. 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 neo-classical models that explain growth through the accumulation of labour, 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. With regard to 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 recognised in the neo-classical growth models (Solow, 1956 and 1957), but the determinants of the level of technology were not discussed in detail, and 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 endogenising 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 labour and physical capital[1]. Taking this into account, an economy may experience positive long-run growth instead of the neo-classical steady state where per capita incomes remain unchanged.

Depending on the economy's starting point, technical progress and growth can be based on the creation of entirely new knowledge or on the 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 labour 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 of the proprietary technology that constitutes the parent's firm-specific advantage and allows it to compete successfully in an environment where local firms 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 *internalise* 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 increase productivity in local firms.

In many cases, the external effects operate through forward and backward linkages as MNCs provide training and technical assistance to their local suppliers, subcontractors and customers. The labour market is another important channel for spillovers, as almost all MNCs train locally hired operatives and managers, and these may subsequently take employment in local firms or establish entirely new companies. This way, multinational corporations may be a particularly valuable source of new technology — they not only introduce new ideas but also strengthen the human capital base needed to adapt these ideas to the local market. It is therefore not surprising that attitudes towards FDI have changed considerably over the last couple of decades, and that many countries have liberalised 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. While FDI inflows create a potential for spillovers of knowledge to the local labour force, at the same time 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 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 local labour 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 II summarises some of the aggregate evidence of technology and productivity spillovers from FDI; Section III focuses more closely on the effects of FDI on human capital development in host countries, both through linkages and various kinds of training; Section IV presents some ideas for further research; and Section V summarises and concludes the paper.

II. 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 analysed 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. Including spillovers 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 were to spur local firms to use existing resources more efficiently. They also proposed that the presence of foreign MNCs may lead to higher rates of technology transfer and diffusion. More specifically, the case studies showed that these companies 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;

— 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 standardisation to their local suppliers and distribution channels;

— 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 these 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 really are and if the

results can be generalised. For instance, many analyses of the linkages between MNCs and their local suppliers and subcontractors have documented learning and technology transfers that could become 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 occurring, but it is reasonable to assume that they are positively related to the extent of linkages. Similarly, there is much written on the relation between MNC entry and presence and the 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 labour training in foreign affiliates of MNCs. However, although these studies provide much detailed information about the various channels for spillovers, they say little about their overall significance.

Statistical studies of spillovers, by contrast, may reveal the overall impact of foreign MNC presence on the productivity of local firms, but these studies are generally not able to say much about how the effects come about. They 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 MNC 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 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 modernise "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 (1999*b*) 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 these kinds of inter-industry links, but rather focus on intra-industry effects. To the extent that FDI affects industries other than the one where the foreign investor operates, it is obvious that there is a risk that its 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 labour 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 FDI 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, Chinese Taipei 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 1965-82. Their answer is affirmative: foreign presence seems to have a significant positive impact on the rates growth rates 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 1985-89, 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 take place if MNC affiliates systematically locate in the more productive sectors. In addition, they are 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. While Cantwell's analysis differs notably from the other studies discussed in this section in that he does not focus on productivity but rather on changes in the market shares of foreign and local firms, his conclusions are still interesting here. 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 from these studies on the presence of spillovers seem to be mixed[3]. However other, recent studies suggest that there is a systematic pattern where various host industry and host country characteristics influence the incidence of spillovers. For instance, while 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 labour 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 and 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 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 materialise. Conversely, when foreign affiliates and local firms are in more direct competition with each other, spillovers are more likely to occur.

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 local 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) suggests 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 analyses the effects of competition in Mexican manufacturing. The earlier studies 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 MNCs 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, a 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. These hypotheses have been supported by analyses of the operations of foreign and domestic firms in Mexican manufacturing in a simultaneous framework (Kokko, 1996). The labour productivity of foreign and local firms 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 (1999*a*) 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 if a certain threshold of human capital, well developed infrastructure facilities, and a stable economic climate is attained in the host country. 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 realised 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.

III. 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 realised 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. The 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 in three steps how FDI affects human capital development in the host country. 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].

III.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 MNCs 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 labour, 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 programmes are run jointly by international chambers of commerce (of which MNCs are prominent members) and the Thai government. In Malaysia, several skill development centres 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 internationalisation of tertiary education, in particular management education. To facilitate the contacts and co-ordination 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 programmes is perhaps the main explanation for numerous cross-regional alliances involving leading Western business schools.

III.2. Training of MNC Employees

Most MNCs provide some training for their employees, although the amount and type of training may vary depending on the 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 for 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 programmes.

However, the evidence on spillovers from the MNC affiliates' training of local employees is far from conclusive, and comes mainly from developing country studies. As the public education systems — and, hence, the knowledge base — in developing countries tend to be relatively weaker, it is also possible that spillovers from training are relatively more important there. However, there is scattered evidence of spillover effects in the industrialised countries as well, especially regarding management skills. It is possible, for instance, that the inter-firm mobility of managers has contributed to the spread of specific management practices from Japan to the US 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 emphasised 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 local public firms. Gershenberg's observation on the relatively large training expenditures by 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 so can 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 given the common finding that MNCs pay their employees more than local firms, even taking skill levels into account. In fact, it is

not unreasonable to hypothesise that one of the reasons behind the higher wages in MNCs is the fear of a “brain drain” to local firms is.

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) emphasise 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 Southeast 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 contexts. Another possible explanation for the relative abundance of studies discussing management skills is that much training focuses on management. Summarising 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 for local employees in foreign affiliates of MNCs, although fewer detailed studies have been done on this. UNCTAD (1999) notes several cases where leading MNCs — Daimler-Benz and Nestlé, for example — provide extensive vocational training for their employees in affiliates abroad. Behrman and Wallender (1976) also recognise spillovers of both managerial and technical skills. In particular, they note that several of the MNC affiliates’ sub-contractors had been established by former employees in the host country. In addition, Hill (1982) identifies similar cases in the Philippine appliance and motor cycle industries, but argues that they were not significant. Nevertheless, twelve out of 20 assembler firms used 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 training programmes and their training expenditures were significantly (several times) higher than those for local firms in 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) suggests that technical training may be particularly important for greenfield investments. In this case, all workers reportedly received 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 programmes may spill over to local industry, and to what extent the skills themselves are firm-specific.

III.3. FDI and Human Capital Development in Service Industries

While training in manufacturing sectors often aims to facilitate the introduction of new technologies embodied in machinery and equipment, training in service sectors is more directly focused on strengthening the skills and know-how of employees. This means that training and human capital development are 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 often need to invest more in training, and the gap between affiliate and parent company wages tends, therefore, to be smaller in services 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, significant investments are also made in simpler service industries, such as hotels and restaurants. For instance, the local and international management training that is provided by MacDonalds and Pepsi-Cola's ambitious business and management programmes has received much attention. Table III.1 summarises 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 so have established well functioning international training programmes. Another likely reason is the high staff turnover in the hotel sector, which necessitates continuous training to familiarise new employees with the hotels' practices and standards.

Table III.1. **Training Activities in Foreign Affiliates of Service MNCs in Latin America**

Item	Advertising	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.

It is likely that in recent years the training needs in several important service industries have increased notably. For instance, after the Asian financial crisis, many countries that formerly limited foreign ownership in banking and finance have liberalised their regulations 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, rapid technological progress in telecommunications and IT has revealed weaknesses in domestic skills and encouraged many countries to remove various investment and entry barriers in order to attract investment by the major MNCs in these industries. However, neither of these fields has been studied in sufficient detail to allow any conclusions about total investments in training and education, nor is there much evidence on spillovers to local firms.

IV. 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 realised 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, our knowledge of these effects is still sketchy in many areas, and further research is needed to provide a more accurate and detailed picture of the relationship between FDI and human capital that could serve as 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.

First, 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 analyses at least four different elements of the equation. 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.

IV.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. While overall statistics seem to indicate a relatively high level of education in both regions, 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 study these in detail, or do a less detailed study of three or four 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 behaviour of the MNCs. The US, Sweden and possibly other home countries of multinationals could provide data for such a study.

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

If data were 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 which 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 so far focusing on the human capital aspect of the issue. It would be instructive to see to what extent an explicit focus on human capital development would affect the results from the earlier studies.

IV.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, providing 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 MNC Affiliates

Most wage comparisons between MNC affiliates and local firms show that MNCs tend to pay a wage premium, even when formal education and other labour characteristics are accounted for: MNC affiliates often employ a larger share of skilled workers than 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 outside training have employees received over their lifetime? Depending on the extent to which MNC affiliates demonstrate practices and organisational 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 globalised environment with liberalised international capital flows, but often with only limited success. The Asian financial crisis clearly demonstrated some of the shortcomings in the sector. After the crisis, many countries 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 very valuable. Similarly, the high rates of technical progress in IT and telecommunications during the past decade have revealed the weaknesses in many formerly protected industries, and encouraged a wave of liberalisation and FDI. The consequences, both in terms of human capital development and spillovers to the host economy, have neither been researched nor documented, so in-depth studies in this area would be very useful.

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 obtain much valuable information about the diffusion of managerial knowledge from MNCs to local firms. Jorge Katz (1987) did something related to this

(although he only asked about 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) provide similar evidence for the dissemination of management skills in the Philippine insurance industry.

e) MNCs and the International Diffusion of Business Schools

The top business schools in the world today, like Harvard, Wharton, Chicago, INSEAD, and (of course) the Stockholm School of Economics, are global. They not only receive students from all around the world, they also provide courses in many countries. This development is very closely related to the internationalisation 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 these schools in the different countries? What type of courses do they provide? Are the courses firm-specific or more general? Which role have MNCs played in this development, and how?

V. 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 labour force. At the same time, the host country's level of human capital determines how much FDI the country can attract and whether local firms will be able to absorb the potential spillover benefits. Hence, host economies with relatively high levels of human capital might be able to attract many technology intensive foreign MNCs that could contribute significantly to the further development of local labour skills. On the other hand, 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.

NOTES

1. For some early contributions on knowledge and economic growth see, for example, Romer (1986 and 1990), Lucas (1988) and Grossman and Helpman (1991).

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.

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

4. In addition, it might be interesting to focus on linkages between MNCs and local firms. However, this year's World Investment Report (UNCTAD, 2001) focuses 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.

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