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GOVERNMENT POLICIES FOR INWARD
FOREIGN DIRECT INVESTMENT
IN DEVELOPING COUNTRIES:
IMPLICATIONS FOR HUMAN CAPITAL
FORMATION AND INCOME INEQUALITY

by

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Research programme on:
Global Interdependence and Income Distribution



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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

Ce Document technique examine les différentes options à la disposition des décideurs des pays en développement pour attirer l'investissement direct étranger (IDE) et influencer le comportement des firmes transnationales. Il porte plus particulièrement sur l'impact qu'ont ces firmes sur la formation de capital humain et les inégalités de revenus dans les pays d'accueil. Les travaux de recherche reconnaissent de plus en plus le rôle central que joue la formation de capital humain dans le développement. On sait moins de choses en revanche sur les relations entre IDE et formation du capital humain, ainsi que sur le type de mesures souhaitables pour accompagner ce phénomène. A l'aide d'un cadre simple d'offre et de demande sur le marché des compétences, ce document commence par passer en revue les effets des multinationales sur le capital humain. Il identifie ensuite différentes mesures relatives aux IDE ainsi que leur efficacité, et s'interroge sur l'influence de ces mesures sur l'interaction entre IDE et capital humain dans les pays en développement. Il propose enfin quelques pistes de recherche.

SUMMARY

This paper discusses policy options available to government policy makers in developing countries to attract foreign direct investment (FDI) and influence the behaviour of transnational corporations (TNCs), and it focuses on the effects these corporations have on human capital formation and income inequality in host countries. While the central role of human capital formation in development is increasingly recognised in the literature, less is known about the relationship between FDI and human capital formation and the questions whether and how policy should address this remain unanswered. This paper first reviews the effects of TNCs on human capital using a simple supply and demand framework of the market for skills. It then reviews different types of FDI policy and their effectiveness. Finally, it discusses how FDI policy may have affected the interaction between FDI and human capital formation in developing countries. The paper concludes with suggestions for further research.

I. INTRODUCTION

Making globalisation work for development and the poor is a major challenge facing many developing countries. In particular there is a debate over whether and how governments in host countries can influence and regulate foreign direct investment (FDI) in order to attract the right volume and quality of FDI (Lall, 2000; Moran, 1998) for development in their countries. Most of these governments have liberalised their FDI regime to some degree, some have started earlier and advanced further than others. However, host country governments cannot simply stand back and assume that liberalisation will be sufficient to ensure that FDI will come to their country in the right quantity, that FDI will have positive effects on the country, and that practices by TNCs will be optimal from a host country perspective. In order to attract FDI and make FDI work for development, governments need to address a series of market failures related to the market for skills and technology, and need to overcome information barriers.

While the central role of human capital formation in development is increasingly recognised in the literature, less is known about the relationship between FDI and human capital formation address this remain unanswered¹. This is unfortunate for the link between FDI and human capital formation deserves more attention. Human capital formation should not be seen as only one of the long-lasting benefits of FDI — either by developing local industry through and the questions whether and how FDI policy should linkages or by developing the skills of employees directly — but also as an increasingly important factor in attracting FDI. The main question in this paper is what are the effects of host country policies on the relationship between human capital formation and FDI?

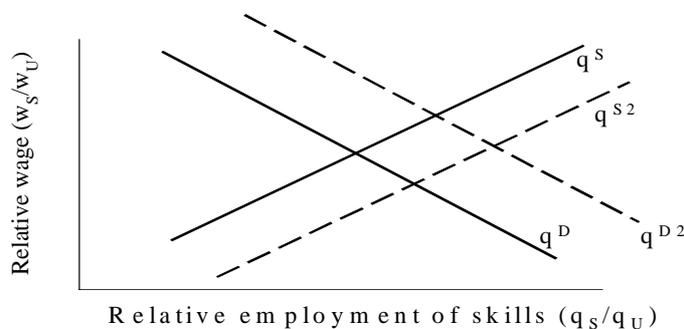
To analyse the effects of host country FDI policies on human capital formation, this paper reviews and examines relationships between two relevant areas: the effects of transnational corporations on the market for skills and FDI policy. Section II uses a supply and demand framework to analyse the effects of TNCs on human capital and skill formation. In Section III we review FDI policy, and discuss the type and effectiveness of FDI policies. Then, Section IV discusses how FDI policy may affect human capital formation. The analysis is based on individual country experiences and findings from the literature, but the evidence is too thin to be able to assume that conclusions from these sources can be generalised for all other developing countries. The paper ends with suggestions for further research.

II. TRANSNATIONAL CORPORATIONS AND THE MARKET FOR SKILLS

As this paper seeks to understand whether and how policy can affect the interaction between FDI and human capital formation, it is instructive to provide a general overview of how TNCs affect the national economy of host countries and human capital formation in particular. The literature on FDI and development is rich (Lall, 2000; Moran, 1998). This section will therefore limit the discussion to how TNCs affect human capital formation. To analyse the effects of TNCs on the market for skills, we will use a supply and demand framework², distinguishing between skilled and less-skilled workers (Section II.1). Section II.2 discusses the effects of TNCs on the demand for skills. The main focus of Section II.3 is on how TNCs affect the supply of skilled workers through general education and training. It is argued that this depends partly on the motivations of TNCs to invest abroad. The motivations of TNCs differ (Dunning, 1993): TNCs can be seeking resources (e.g. raw materials), market access (market size), efficiency (low wages) and strategic assets (e.g. skilled labour). Other determinants of the link between TNCs and human capital formation, such as host country policies and factor endowments, will be discussed in subsequent sections.

II.1. Supply and Demand Framework

It is useful to divide workers into skilled and unskilled (less-skilled) categories, based on education or occupation. The income of skilled workers relative to the income of unskilled workers is a measure of income inequality. Supply and demand equations for skilled and unskilled workers, which may depend on skill-specific wages and technology, can be transformed into *relative* supply and demand of skilled workers. The curves are shown as solid lines in Figure II.1: q^D is relative demand for skilled workers and q^S is relative supply of skills (Machin, 1996). In the remainder of the paper, we will explain how FDI policy can shift the solid curves towards positions indicated by dotted lines.

Figure II.1. Relative Supply and Demand of Skills

II.2. TNCs and the Demand for Skills

TNCs can affect the demand for skills in different ways (see Slaughter, 2002, for further analysis). First, TNCs may affect the scale of operations. This depends on whether they substitute or complement local employment. It is difficult to generalise on the TNC-*scale of employment* link as much depends on the country, industry, type of investment and time span under consideration (see, for example, OECD, 1995). Second, TNCs can employ a more skilled workforce than otherwise similar local firms, resulting in *the composition effect*³. Increased TNC activity thus tends to shift the relative demand for skills upwards?

Finally, (indirect) evidence is emerging that TNCs have accelerated *skill-biased technological change* (SBTC). Over the last 30 years SBTC within firms or sectors (hence no composition effect) has become widespread in both the developed and the developing world (Berman *et al.*, 1998; Berman and Machin, 2000), and TNCs may have transferred skill-biased technologies, making skilled workers more productive⁴. When TNCs enhance opportunities for skill-biased technical change they raise the relative demand for skills, holding other factors constant.

II.3. TNCs and the Supply of Skills

TNCs affect the supply side of skills through the general education, official training and informal on-the-job training they provide. Informal on-the-job training is likely to correlate with the skill content of the job, and hence TNCs offer more of this when they are more skill-intensive. Attracting TNCs can be beneficial to a country's human capital formation if TNCs raise workforce skills more than local firms do.

General Education

The involvement of TNCs in general education is threefold. First, there is evidence that certain TNCs provide grants and other assistance at all levels of education on a voluntary basis. This seems to be particularly true for TNCs in the extractive industries (Box 1).

Box 1. Natural Resource TNCs and “Voluntary” Investments in Human Capital

In the name of corporate social responsibility (CSR) companies decide to invest “voluntarily” in community development, including formal education and training, in addition to commercially motivated community investment needed for business operations such as infrastructure. For instance, Shell’s behaviour changed after its debacle in Nigeria and stepped up its community spending there. In 2000, it amounted to \$60 million annually (0.2 per cent of Nigerian GDP), with \$1.2 million for vocational training and \$2.5 million for secondary and tertiary scholarships.

There are other examples. Over 1998-2000, BP-Amoco expenditure on social investment rose from \$64.9 million to \$81.6 million, worth around 0.6 per cent of total sales; a quarter of this was aimed at education, but a big share was invested in the US and the UK, and only a small share in developing countries. In 2000, ExxonMobil spent \$92 million on community investment, worth around 0.3 per cent of total sales, with \$19 million spent outside the US. Rio Tinto spent \$49.5 million on communities programmes in 2000, worth over 1 per cent of value added; 77 per cent of Rio Tinto businesses “offer programmes to improve secondary school education”.

Source: Shell-Nigeria annual report; Rio Tinto social and environmental review; BP Amoco environmental and social review; ExxonMobil annual report.

Second, some TNCs are involved in setting up general education centres that are sometimes open to outsiders. Such TNCs are often strategic asset-seeking TNCs which hope to develop projects using the skills and knowledge in host countries (Box 2), and hence are likely to be more prevalent in wealthier developed countries.

Box 2. Strategic Asset-Seeking TNCs and Human Capital Formation

FDI in high-tech manufacturing operations is usually based on the availability of local capabilities such as skills, technology and R&D centres. TNCs affiliates in this sector are likely to be engaged in developing particular skill needs. The development of skills through foreign R&D in Singapore is a case in point. Part of this is directly due to efforts made by the government’s Economic Development Board. Sharp started the Sharp Design Centre in the mid-1990s after realising that Asia was becoming increasingly important in many electronics segments. Oki founded the Oki Techno Centre in Singapore in 1996 for research in multimedia for wireless communications, and STMicroelectronics, ranked high in the semi-conductor industry, has an R&D centre aimed at wireless and wireline signal processing. Ericsson’s R&D centres are located in Sweden, Finland, Germany, Hungary, Singapore and Berkeley, while Ericsson Cyberlab established a PhD programme in Singapore (costs SEK20-25 million). Philips has a Centre for Industrial Technology, with one of its two regional centres located in Singapore. The Penang Skills Development Centre is an example of a state/enterprise training centre in Malaysia (see Box 6).

Source: Sigurdson (2000).

Third, business schools (i.e. Harvard, MIT, London Business School, Stockholm School of Economics, etc.) have become international companies (TNCs) by setting up campuses abroad, especially in developing countries. Host country governments increasingly allow business education to be supplied by foreign companies inside their countries. The growing internationalisation of business education can help the spread of best practice techniques and internationally recognised standards⁵ in business education.

There seems to be no systematic evidence on how TNCs affect general education, and especially on how TNCs compare to domestic firms in this regard. It is therefore difficult to argue that TNCs have a different effect than domestic firms on human capital formation through general education.

Official Training

The involvement of TNCs in firm-specific and general vocational *training* is another way TNCs can affect the supply of skills. While this is not the case for general education, there is evidence that TNCs provide more training than their local counterparts. Using a sample of firms in Colombia, Mexico, Indonesia, Malaysia and Chinese Taipei — ranging from 500 to 56 000+ firms in single years in the early 1990s — Tan and Batra (1995) found that firms are more likely to offer worker training when they are large, employ a highly-educated workforce (except Indonesia), invest in R&D (except Indonesia), are export oriented (except Malaysia) and use quality control. All these characteristics are associated with foreign ownership (Dunning, 1993). Foreign ownership was also associated with increased training in Malaysia and Chinese Taipei⁶.

UNCTAD (1994) provides further evidence on the extent and nature of TNC training practices. TNCs spend more on training in their foreign affiliates than do local firms (Table II.1), but the differential varies according to size, industry, entry strategy and motivation for the investment. Evidence from Malaysia shows that training was aimed mainly at managerial and professional staff (45 per cent of staff received training) and less at sales employees (16 per cent) and production workers (2 per cent). While TNCs can train production workers on the job, professional employees get more formal training and are sent to international training courses using the TNCs international networks (Box 3). Workers in electrical, machinery and chemical industries receive more training than those in other industries, partly because these industries use complex technologies which require skilled and trained workers to implement them.

Table II.1. **TNCs and Training Practices: Illustrative Examples**

Study	Data used	Training practices of TNCs
Tan and Batra (1995)	Sample of manufacturing firms in Malaysia (2 200) and Chinese Taipei (56 000+)	Controlling for R&D, exports, firm size, and education, foreign owned firms train more in Chinese Taipei and Malaysia (especially unskilled workers).
Gerschenberg (1987, Table 1)	Sample of 72 managers in 41 firms	TNCs offer more training only when host country governments hold part of the equity.
Iyanda and Bello (1979)	Sample of 14 Lagos/Nigeria-based firms	Training expenses per employee were five times higher in TNCs compared to indigenous firms, and were aimed relatively more at white-collar and relatively less at blue-collar workers.

Using Dunning's (1993) breakdown of the motivation for FDI, we can see that different motivations may potentially determine the extent to which TNCs engage in training activities. *Natural resource* investments are usually capital intensive requiring a handful of skilled workers (sometimes expatriates) to use complex extraction methods. This may involve specific training for a few employees. *Efficiency seeking* manufacturing TNCs (Box 3) offer only limited training because such TNCs are often motivated by the availability of low-skill, low-wage labour. Finally, training plays an important role in *strategic asset-seeking* TNCs (discussed in Box 2). These often try to invent and implement new leading-edge technologies. Both activities require well-educated workers, whose skills can be augmented by specific training.

Box 3. Efficiency Seeking TNCs and Human Capital

FDI in the garment industry is based on the exploitation of one static advantage — low cost labour. As soon as wages rise, the garments industry will relocate, as it did first in the 1960s to the East Asian newly industrialised countries, and later since the 1980s to other countries in Asia, Latin America and parts of Africa. Most of the industry's technology is embodied in the equipment, and training is low as workers can be trained elementary skills in a few weeks. Only those countries that used finance generated to develop local skills and capabilities were able to diversify into other activities. TNC activities alone are unlikely to take the industry in many countries such as Costa Rica, Morocco and the Dominican Republic into a high enough segment to survive rising wages and the phase-out of incentives, as will happen under the Multi-Fibre Agreement. The search for cheaper locations (notably China) has not ended. Costa Rica has begun to target more long-lasting sources of competitiveness and human capital formation, such as high-tech manufacturing.

Source: UNCTAD (2000).

Finally, market-seeking investments involve limited training of local people to exploit the firm-specific advantage. Such TNCs are often replicas of their parents (horizontal TNCs) and may devote training efforts to specific technological or marketing approaches skills (Box 4). Other examples include market-seeking investments attracted by privatisation of state-utilities in East European countries, and now also in Latin America and Africa. The experience of Eastern Europe suggests that, while a relatively skilled workforce (especially in technical subjects) was available, substantial training was needed to improve market-orientation skills (UNCTAD, 1994). Further research is necessary to assess clearly the relationship between FDI motivation and training, and how it may be affected by other factors.

Box 4. Market-Seeking Investment and Training: the Case of Unilever

Unilever, with 255 000 employees worldwide, intends to stay in countries in which it invests for the longer run, partly because the nature of its products (food, home, and personal care) requires the company to be where the people are. Unilever wants to invest in people and finds that “the willingness of our employees to embrace new ideas and learn continuously are the foundations on which Unilever’s continuing success is built”.

For instance, all Elais (Unilever in Greece) employees have received regular training in total quality management since 1991. It achieved the ISO 9001 quality standard certification in 1994, and won an EFQM European Quality Award in 1999 for its pursuit of quality.

Unilever’s international training college in the UK runs 21 courses open to managers worldwide. They cover enterprise skills, advanced marketing, managing integrated supply chains and strategic IT, and were attended by 3 000 Unilever employees in 1999.

Training by Unilever in Poland is representative for operations worldwide. Training is provided to all levels: 1.5 average days for 9 senior managers, 10.8 days for 281 managers and 5 days for 2 728 factory and administrative workers. Total expenditure amounted to \$783 000. Over 100 employees received training overseas.

Source: Unilever Social Review, 2000.

III. HOST COUNTRY FDI POLICIES AND HUMAN CAPITAL FORMATION

There is a tremendous debate in policy circles over the impact of FDI on economic development. The perceived positive effects are higher growth, transfer of technology, skill upgrading, and influx of capital. The perceived negatives include rising income inequality, environmental degradation and profit repatriation. Despite this debate, on balance, an increasing number of governments want to attract FDI because they perceive that the potential positive effects of FDI generally outweigh its negative effects and will help to obtain their development objectives such as growth and poverty reduction.

There is theoretical justification for policy makers to intervene in the process of FDI and development. Lall (1996, 2000) and Moran (1998) provide a general framework for understanding FDI and FDI policy. Both stress the importance of host country policy to overcome information-related market failures with regard to FDI. These include: failures in the international investment process (limited promotion to attract FDI seems justifiable); failures in the development of technologies and skills (effective co-ordination bodies seem required); and failure to capture possible economy-wide benefits associated with TNCs, which are not incorporated in the incentives faced by private actors (linkage promotion seems justifiable).

Section III.1 provides an overview of the type of policies used to attract FDI and that can make FDI work for development. However, a theoretical justification for FDI policy does not imply that all policies are effective in achieving predefined objectives. Section III.2 discusses the effectiveness of FDI policy in attracting FDI.

III.1. Overview of Host Country Policies Towards FDI

What type of FDI policies do host countries use? Some governments just state that they allow foreign direct investment in certain sectors, others actively promote FDI, and still others go further and promote linkages between TNCs and local firms. In order to formulate the right policies to attract FDI, we need to understand what motivates TNCs to locate in a foreign location. There are several potential frameworks available, but perhaps the most apt is Dunning's OLI paradigm (Dunning, 1993). TNCs locating in a foreign location must possess an ownership (O) advantage (e.g. superior technology), the foreign location must have a locational (L) advantage (e.g. available skills) and TNCs must have reasons to internalise (I) operations rather than outsource and license foreign firms.

While location advantages often refer to such static concepts as access to natural resources, much attention has also been focused on the importance of host country policies and institutions that *create* locational advantages (skills, infrastructure, local supply services, etc.). Such policies become increasingly important in a world where country options are increasingly constrained by liberalised FDI regimes, international agreements, and increased competition within and across countries for “footloose” FDI. Some governments (perhaps too few) have realised that appropriate policies to *attract* FDI are not sufficient for generating economic development and have begun to design further policies to “make FDI work for development”.

Table III.1 contains a three by three matrix, which classifies the myriad of policies and factors affecting FDI. The factors in the first row relate to *FDI attraction*. Factors in the second row of the matrix relate to *FDI upgrading*, by which we mean upskilling of existing operations (e.g. by improving inputs, or attracting new skill-intensive operations). Upgrading policies can be of crucial importance for determining whether TNCs decide to simply exploit only the static comparative advantage (e.g. low-wage workers, tax-havens, natural resources) of operations in their affiliates, or whether they decide to upgrade skills, raise productivity and improve the quality of products of their affiliates. The final row of the matrix discusses *linkages* between TNCs and local firms and lists key policy areas and other factors determining the response of local firms to the presence of TNCs. Factors in this row affect whether and to what extent local firms benefit from foreign firms, i.e. from spillovers.

Successful strategies are likely to follow an integrated approach, containing policies relating to attraction, upgrading and promoting linkages. The relative mix of policies depends on pre-existing conditions, the objectives of the FDI strategy, and the type of investment that fits into the strategy.

The three columns show three different types of policies and factors indicating the degree to which host country actions relate to FDI. Specific FDI policies (firm-specific targeting, incentives, etc.) are mentioned in the first column, more general macro-economic policies in the second column, and international economic developments and agreements, which can be influenced to a far lesser degree by host country actions, are shown in the third column. This paper deals with different types of policies in the first and second columns.

Table III.1. Policies and Factors Affecting Inward Foreign Direct Investment

	Economic policies largely under domestic control		Other policies and factors
	Industrial policies	Macro-economic policies	
Affecting Potential foreign investors ('determinants')	<ul style="list-style-type: none"> - Financial and fiscal incentives - Efficient administrative FDI promotion - Kick-starting agglomeration and clustering - Export promotion zones (EPZs) 	<ul style="list-style-type: none"> - Infrastructure; workforce skills - Macro-economic performance and prospects - Privatisation opportunities - Financial market development - Liberal trade regime 	<ul style="list-style-type: none"> - Access to large and wealthy markets - Availability of natural resources - Geographical and cultural barriers - International, regional and bilateral treaties, including BITs and WTO - Risk insurance (MIGA, ECGD, OPIC) and political risk ratings - Corruption and conflict - Home country financial conditions and other measures
Affecting established foreign investors ('upgrading')	<ul style="list-style-type: none"> - Tax/subsidy system - Performance requirements - Research institutions and R&D promotion - Training policy 	<ul style="list-style-type: none"> - Labour market policy - Trade policies, export promotion and infrastructure - Competition policy - Development of financial market 	<ul style="list-style-type: none"> - Regional and international investment treaties - Global economic integration - Civil society
Affecting the Response of Domestic firms ('linkages')	<ul style="list-style-type: none"> - Encouragement of linkages with TNCs - Encouraging technological capabilities (R&D) - Encouraging human resources (training) - Supply side management 	<ul style="list-style-type: none"> - Education and skill generation - Labour mobility - Competition policy - Export promotion 	<ul style="list-style-type: none"> - Global economic integration

Note: The table is meant to be indicative and not comprehensive.

Source: Te Velde (2001a).

III.2. Effects of Policy on Attracting FDI

We will now discuss the main effects of the major host country policies in the first row of Table III.1. Of course, this abstracts from many other factors important to attract FDI (market size, natural resources, etc.), and from the effects the policies have on upgrading and linkage creation.

FDI Promotion

Some countries (Ireland, Singapore, Malaysia, Costa Rica, etc.) have actively tried to attract high-tech and skill-intensive electronic TNCs by creating strong and flexible investment promotion agencies to that effect. Some of these (Ireland's IDA, Singapore's EDB) use specific promotion (phone calls, mailings, visits to headquarters, on-site visits, etc.) to attract asset-seeking TNCs.

There is some evidence that FDI promotion policy works. Wells and Wint (1990) show that developing countries with a promotional body in the US attracted 30 per cent more FDI than countries without one. However, this does not mean that all investment promotion agencies are effective in their FDI attraction strategies as much depends on the organisational structure of the investment promotion agencies, the method of implementation, and the financial resources available. TNCs prefer real one-stop services to lengthy entry procedures involving many agencies.

Fiscal and Financial Incentives

Throughout the 1990s, many countries have actively sought to attract FDI by offering fiscal and financial incentives, leading to fierce competition. This has been particularly visible in the case of the automobile industry where governments in developed and developing countries have offered grants to attract TNCs (Box 5). While grants can be *effective* in attracting FDI (once fundamentals of the project are satisfactory), there is no guarantee that they will be. Hanson (2000) mentions that when one Brazilian state announced it could not afford the subsidy it had promised, Ford decided to locate in another state. This indicates that while fiscal incentives could have been effective at state level, one can have doubts about their effectiveness on the national level since, at any rate, Ford "appeared to have concluded that they needed to increase production capacity in Brazil". Further, it should be borne in mind that even if such incentives were effective in attracting TNCs, this does not imply that they are the most efficient use of public resources (Box 5).

Some governments have linked grants to the skill intensity of TNC affiliates. In Ireland, IDA grants were initially aimed at covering part of capital costs, and were later linked to employment objectives to mitigate a capital bias in times of unemployment. At present, grants operate within the limits set by the European Union and reward TNCs that are skilled-labour intensive. Honohan (1998) showed that the wage-elasticity of demand for labour in high-tech manufacturing (sectors targeted by IDA) is low (-0.55), and later work by Fitz Gerald and Kearney (2000) showed that the elasticity of substitution between skilled and unskilled labour for the economy as a whole is also low. This evidence implies that a reduction in the capital costs (e.g. grants) may not lead to a large increase in employment of (skilled) workers, suggesting that there are limits to the effectiveness of financial grants in the area of human capital formation in countries with low elasticities of substitution. In addition, it should be noted that less wealthy countries cannot easily provide fiscal grants, even if they were effective.

There is contrasting evidence for whether or not fiscal incentives *attract* more TNCs to developing countries. Reviewing a number of studies, Hines (1996) finds that taxation significantly influences FDI, corporate borrowing, transfer pricing, dividend and royalty payments, R&D activity, exports, bribe payments and location choices. By contrast, in a much cited study of determinants of US FDI abroad for 42 countries in manufacturing and in electronics in particular, Wheeler and Mody (1992) found that tax incentives were not a significant factor, but this finding may be due to a different model specification.

At first sight, Ireland appears to be a case where low taxes and grants have been important in attracting FDI (see Ruane and Gorg, 1999, on the important role of taxes). However, there were no signs that TNCs relocated *en masse* after corporate taxes were raised from zero to 10 per cent in 1990, suggesting that, by then, TNCs had other reasons to be in Ireland than zero taxes alone. Some have suggested that consistently and relatively low corporate taxes are much more important than a specific level (permanent tax holidays). Tax holidays can be confusing and, like grants, are short-run incentives.

Box 5. Financial Incentives in the Automobile Industry

Various authors have noted fierce competition for FDI in the automobile industry. This has led to substantial subsidies: \$150 million for a Toyota plant in the US (1995, \$50 000 per job), \$484 million for a Ford plant in Portugal (1991, \$254 000 per job), \$150 million for a BMW plant in the US (1992, \$79 000 per job), US\$300 million for a Mercedes plant in the US (1995, \$200 000 per job). In Brazil, combined fiscal and financial incentives amounted to \$97 million-\$169 million in 1995 for a VW plant (\$54 000, \$94 000 per job), to \$133 000 per job for a Renault plant in 1996 and \$340 000 per job for a Mercedes plant in the same year.

Are financial incentives worth it? Many have examined this question and, using different approaches, they seem to indicate that they are not. One approach is to examine spillovers econometrically. A study estimated that spillover effects in UK manufacturing were £2 440 (2000 prices) per job, and applied this estimate to two cases of subsidies to automobile plants in the US. The study argued that in both cases subsidy costs exceeded spillover benefits (even if the plants would operate for another 20 years). While this study shows that subsidies are inefficient based on estimates of intra-industry spillovers, some questions and caveats remain: "Do inter-industry spillovers exist? What is the value of job creation? What is the effect on R&D development? What exactly is the strategic alternative? etc."

Qualitative accounts can take into consideration some of these factors, but lack "hard evidence". One study gave a detailed account of the bidding wars for FDI between sub-national governments in Brazil. Sub-national governments have attracted FDI away from the São Paulo area to relatively underdeveloped areas by using grants. But the authors argue that "Apart from the direct jobs created at huge costs for the local economy, there is little evidence or guarantee that, once established, the plants will bring further direct investment in terms of suppliers, that they will rely on local component part companies, or that they will develop R&D facilities in the area leading to the genesis of technological spillovers." The study suggested that the bidding wars among Brazilian states were pure waste from a national perspective. The evidence is partly suggestive, because it is impossible to assess what would have been the foregone benefits if the TNCs had located elsewhere.

Source: Hanson (2000); Haskel *et al.* (2001); Rodriguez-Pose and Arbix (2001).

However, in other cases, the tax system does appear to have influenced the type of TNCs that host countries attract, although it is difficult to isolate the precise effects since FDI policies and other policies often change simultaneously. Singapore's Pioneer Industries Ordinance of 1959, one of many tax incentives, reduced corporation tax for a fixed period of time provided that firms, both foreign and domestic, developed "new" products. This policy appears to have been successful, since the share of manufacturing output by firms with pioneer status increased from 7 per cent in 1961 to 51.1 per cent in 1971 and 69 per cent in 1996. The Ordinance was part of an industrial strategy which focused on attracting employment generating TNCs in the 1960s and early 1970s. After wages rose and labour was upgraded, the focus shifted to targeting capital intensive projects in the 1980s, and knowledge intensive sectors in the 1990s. To tackle the skill shortages, firms are encouraged to recruit foreign workers. The EDB's regionalisation programme incites firms to set up skill intensive regional headquarters in Singapore, with labour and land intensive production processes transferred abroad (Yeung, 2001).

Hence, while grants and taxes may be effective in attracting FDI in specific cases, it is impossible to suggest that the grants/tax system can always be geared towards attracting FDI.

Trade Facilitation

There are also trade policies that can help to attract competitive and innovative TNCs, especially in the manufacturing industry. Facilitating trade (i.e. through lowering tariff and non-tariff barriers, infrastructure, customs and other business procedures, export processing zones) is likely to attract trade intensive and globally competitive TNC affiliates (Morisset, 2000). However, whether such TNC affiliates will be below or above the average level of skills in the host country will depend on TNC strategies and the host country level of development. EPZs, for example, tend to attract efficiency-seeking investors in low-skill operations, which tend to raise national employment. This alone should raise human capital to some extent, but not as much as critics would like (Box 6).

Domestic Education Policy

Human capital (measured by education enrolment rates) is correlated with FDI in developing countries (Noorbakhsh *et al.*, 2001), implying that countries with more human capital are associated with more FDI. This association has become stronger over time. TNCs are able to locate complex and skill-intensive affiliates only in countries that have a well-educated workforce. Policies aimed at raising educational attainment enhance human capital (and also growth) when educational attainment is appropriate (often technical and numerate subjects) for expanding sectors. There are a number of policies and institutions to achieve this, including offering specialised courses as happened in the Intel/Costa Rican case (Spar, 1998), or consistent skill upgrading as in Ireland (Fitz Gerald, 2000). While TNCs cannot replace the entire system for basic education, they can develop particular engineering skills once basic skills are available.

Box 6. Export Processing Zones and Human Capital Development

Many countries have established Export Processing Zones (EPZs) as a policy tool to attract FDI that would otherwise not materialise. EPZs are often defined as fenced-in industrial zones offering free trade conditions, a liberal regulatory framework and other incentives for firms exporting a minimum share of output. By 1997, there were over 27 million people employed (e.g. 18 million in China, 1 million in Mexico, 47 000 in Costa Rica, 166 000 in Guatemala, 50 000 in El Salvador, 61 000 in Honduras, 200 000 in Malaysia and 460 000 in the Philippines; these numbers can amount up to 20% of total employment in a country) in some 850 EPZs worldwide. About half of these are in North America and Europe, a quarter in Asia, a sixth in the Caribbean and Central and South America and the rest in the Middle East and Africa.

EPZs are usually found in countries with abundant labour supply. Activities inside EPZs are confined to low-tech, export and labour intensive manufacturing activities such as garments, textiles, food, and assembly operations in the electronics sector. For instance, between 65 and 100 per cent of workers in Central American EPZs are employed in the textile and garments sector, of which between 65 and 95 per cent are female workers involved in low to semi-skilled repetitive functions with little training. There are fears that workers in EPZs are faced with low labour standards. In a sample of 31 countries, EPZs in seven countries (Bangladesh, Kenya, Malaysia, Mauritius, Namibia, Pakistan and Senegal) appear to have exemptions from the national labour laws in some form. While cheap labour can be seen as a determinant of FDI, wages in EPZs are nonetheless usually higher (compulsory in Bangladesh) than those outside EPZs, but exceptions exist (Costa Rica, Panama and Mexico). Working hours can be long.

While EPZs raise the level of employment, only a few countries (Malaysia, Singapore, Costa Rica) have succeeded in using EPZs as a first step up the ladder towards higher value-added manufacturing and to promote broader economic development. Most countries with EPZs may have recorded high manufacturing export growth rates but have also struggled to attract high-skilled manufacturing FDI (e.g. Mauritius, Tunisia, Indonesia and the Dominican Republic). EPZs do not guarantee this and policy interventions are required to upgrade or target FDI that is more conducive to human capital development. EPZs have been most successful in countries that already had minimum basic conditions (infrastructure, stability, some trade liberalisation, etc.) in place, and where EPZs are well managed with few administrative burdens, streamlined customs procedures, appropriate locations, and reliable infrastructure and utilities, and where EPZs target specific industries.

Source: ILO (1998); Madani (1999); Radelet (1999); UNCTAD (1999).

To be effective in attracting FDI, it is important to provide *quality* education that is appropriate for the needs of firms. Good quality and appropriate in this context means developing capabilities to absorb technical knowledge, which implies providing education in technical subjects, especially in engineering (Lall, 2001). Technical knowledge is important for much of (manufacturing) FDI. Table III.2 shows that while tertiary enrolments in Latin America are keeping up reasonably well with the Asian Tigers (Korea, Singapore, Hong Kong and Chinese Taipei), technical enrolment rates are not. The Asian Tigers have attracted a lot of skill-intensive manufacturing FDI.

Table III.2. **Tertiary and Technical Enrolment Rates as Percentage of Population**

	Tertiary enrolments		Technical tertiary enrolments (natural science, maths, computing, engineering)	
	1995	Percentage point changes 1980-95	1995	Percentage point changes 1980-95
Developing Countries	0.82	0.46	0.16	0.08
Sub-Saharan Africa	0.28	0.21	0.04	0.03
MENA	1.26	0.70	0.22	0.11
Latin America	1.64	0.34	0.30	0.05
Asia 4 Tigers	4.00	2.39	1.34	0.68
Asia 4 new Tigers	1.61	0.65	0.28	0.12
China	0.60	0.48	0.13	0.08

Source: Lall (2001, tables 5.3-5.4)

Performance Requirements

Little is known about the effects of regulations on training or employment programmes when TNCs enter a country. Some governments have used “localisation” programmes, requiring TNCs to use local staff at various levels in the company. However, there is little evidence that employment of more local managers outweighs the loss of human capital formation in the form of on-the-job-training provided by expatriates. It seems that expatriates are particularly useful in the start-up phase when new technologies are transferred. More generally, there is little evidence to indicate whether the imposition or abolishment of performance related measures by host-country governments are affective in attracting FDI. However, there is some evidence suggesting a possible link between protection of FDI and R&D and increased FDI (Maskus, 2000, and Blonigen and Davies, 2000).

Infrastructure

Investment in infrastructure can be used to attract FDI. Wheeler and Mody (1992) found that “infrastructure quality clearly dominates for developing countries” as an attractor of US FDI, while specialised support services were the key determinant in developed countries (which presumably already have an adequate infrastructure).

Technology Policy and Supplier Development

The availability of good research institutes is also likely to attract TNCs (Box 2). More generally, technology policy can lead to good suppliers which can represent a substantial advantage for TNCs (see, for example, the role of support services in Wheeler and Mody, 1992).

IV. HOW DO FDI POLICIES AFFECT HUMAN CAPITAL FORMATION?

As we discussed previously, different types of TNCs may have different effects on human capital formation in terms of contributing to education, to formal, informal and on-the-job training, or to the employment of a relatively more skilled and educated workforce. Section III classified FDI policies into FDI attraction, FDI upgrading and TNC linkage promotion, showing that certain types of FDI policy are considered effective in attracting TNCs. This section concentrates on what types of FDI policy affect the link between FDI and human capital formation. The main issues centre on the following questions:

- How to attract TNCs beneficial to human capital formation (FDI attraction, section IV.1)?
- How to induce TNCs to do more for human capital formation than they would otherwise have done (FDI upgrading, section IV.2)?
- How to ensure maximum benefits from TNCs for human resource development in local industry (TNC linkage promotion, section IV.3)?

IV.1. Human Capital Formation and Policy to Attract TNCs

We previously discussed the evidence demonstrating the effectiveness of FDI attraction strategies, arguing that limited FDI promotion may help to attract particular types of TNCs. Successful FDI policy that targets TNCs which are more skill intensive or train more than their local counterparts can be used to enhance human capital formation.

For example, persistent and aggressive *firm-specific promotion* in addition to the availability of a relatively well educated workforce helped to attract an Intel plant to Costa Rica (Spar, 1998). Attracting skill intensive FDI (Intel plants, etc.) will help to raise the relative employment of skills (composition and possibly technique effect), and hence human capital formation. This can be shown as an outward movement of the relative demand curve, towards q^{D2} in Figure II.1⁷.

On the other hand, the role of *fiscal and financial incentives* in attracting skill intensive FDI and increasing the contribution to human capital formation is not clear. This depends on the effectiveness of such incentives in general (which is doubtful) and, in the case of incentives linked to skill intensity, also on the elasticity of substitution between skilled and unskilled workers, which varies from case to case.

Trade facilitation can attract different forms of FDI. To the extent that EPZs are used as a tool of trade policy it is likely that this will not lead to a significant increase in the relative demand for skills, although it may raise employment and hence human capital formation (Box 6).

The provision of a *good quality and appropriately educated and trainable workforce* will raise the relative supply of skills (the relative supply curve moves outward to q^{S2} in Figure II.1). This can attract skill intensive FDI, especially when combined with FDI policy, and hence raise the relative demand for skills as well.

IV.2. Human Capital Formation and FDI Policy once TNCs are Inside the Country

We have seen that FDI policy affects the attraction of FDI, with implications for human capital formation. But what about the effects of FDI policy once TNCs have already invested in the host country? Can a low-income country design policies that avoid a low-income low-skill trap? Can such a country design the right technology and training policies and institutional framework in which TNCs have sufficient incentives to upgrade towards more skill-intensive production processes?

Upgrading to Higher Value-Added Production Processes

The low-income low-skill trap is a major problem for many developing countries. To some extent this is inherent in TNC-based development strategies because efficiency-seeking TNCs want to exploit low-labour costs and have few incentives to upgrade, while strategic asset-seeking investments look for skilled labour and want to develop this further. New trade theory allows for the possibility of uneven development — or multiple equilibria — after “opening” depending on initial income levels of the host country or *ad hoc* factors creating path dependency. For example, high-income countries may end up specialising in skill-intensive sectors (with more learning-by-doing) and low-income countries in simple (assembly) sectors (Grossman and Helpman, 1991).

Wood and Ridao-Cano (1999) have shown that trade (exports to GDP) has acted to raise inequality in education by raising secondary and tertiary enrolment rates more in high-skill, high-income countries than in other countries. There is no such evidence on the effects of FDI, but could FDI have had similar effects? If so, it would call for strategic FDI policy interventions affecting the dynamic pattern of comparative advantage. In particular, it would be helpful for a host country to have an initial advantage, for instance in the levels of skills, before engaging in trade and FDI liberalisation.

The process of upgrading to different production processes can be difficult and would probably imply targeting different types of TNCs depending on the initial level of development of the host country. Many poorer developing countries struggle to diversify from attracting natural-resources TNCs into manufacturing industries. More developed countries have struggled to upgrade a simple manufacturing base towards a more complex manufacturing base. While EPZs have raised the level of manufacturing employment in many countries, few countries have succeeded in using EPZs as a first step up the ladder towards higher value-added manufacturing and to promote broader

economic development (Box 6). Singapore is one country (beside Malaysia and Costa Rica) which has upgraded relatively easily, moving from light industry and heavy industry to skill-intensive manufacturing and service sectors. But Singapore may be unique given that it is a city-state with one level of government and an unchallenged political party in power. It can, therefore, develop new institutions and implement new policies relatively easily.

Upgrading Existing Operations

Upgrading also means raising the value added and productivity of existing operations, not only attracting new and different firms. UNCTAD (2000) argues that policy matters: the extent to which TNCs upgrade their technology and skill base depends on the interaction of host-country government policies (macro, trade and FDI policies), TNC strategies, local factor markets and institutions, and the type or industry of TNCs. Trade and domestic (technology and training) policies may both matter in order to create an environment supportive of innovation and skill upgrading.

Trade Policy

Moran (1998) finds that exposure to *foreign competition* matters. Firms that are part of a global competitive network, which forces them to remain competitive, appear to have more incentives to invest in training and education and will employ more skilled workers, and are also more likely to introduce the latest technology. But it is unclear exactly what type of foreign exposure is helpful in attracting export intensive affiliates, and what policies can achieve this⁸. Governments may also try to improve the *domestic* incentive structure supporting innovation and skill upgrading within TNCs and other firms, in addition to finding the right external policies.

Technology Policy

Technology policy as part of the FDI and industrial strategy can be seen as a complement to education and training policy. The question is how to design an incentive structure to promote the use of new technologies. Often this consists of liberalising capital goods imports, fiscal incentives and R&D subsidies⁹. Unfortunately, advanced technology policy is more suitable for richer than poorer countries. For instance, the Singapore EDB has a cluster development fund to develop clusters of industries (electronics, petrochemicals, etc.) and plans R&D centres to attract asset-seeking TNCs (Box 2). For poorer countries, technology policy involves building effective support services in the area of technology and training.

Governments can also encourage technological activity in TNC affiliates by abolishing performance restrictions. Blomström *et al.* (2000, Chapter 13) find that in a sample of 32 developing and developed countries the presence of fewer performance requirements raised the payments of royalties and licence fees to US parents in 1982, and hence the abolition of TRIMs may encourage technology inflows. The promotion of technological activity in TNC affiliates is likely to raise human capital and the demand for skills since many recent technologies (IT) have been skill-biased.

However, there is no consistent evidence that restrictions on equity shares (minority stakes) are encouraging technology inflows (see, for example, Blomström and Sjöholm, 1999). On the one hand, local participation may enhance technology transfer but, on the other hand, requiring joint ventures with local owners may lead to less upgrading in affiliates as parents could keep secret their (in) tangible assets.

Training policy. Governments may also want to address failures in the market for skills to encourage training in TNCs and other firms. There is a large theoretical and empirical literature regarding who should pay — government, employers or employees — for different types of training and education, based on the idea that private actors alone could not capture all the benefits of these investments¹⁰. Looking at the empirical evidence, Acemoglu and Pischke (1998) argued that firms *do* invest in general training as labour market imperfections and compressed wage structures ensure that employees do not capture all benefits from training, and firms capture some by raising productivity more than wages. For a panel of UK industries, Dearden *et al.* (2000) find that the effects of training on productivity are twice as high as on wages.

There are various examples of incentives and public-private partnerships to encourage training within firms, including the use of subsidies and tax breaks for TNC training expenditure, tax levies dedicated to support training, sharing the costs of training instructors, equipment or locations. Governments have also supported co-operation between public research institutions and TNCs. Rich governments can support new R&D centres as part of a cluster strategy, acting as a magnet for asset-seeking TNCs.

The Skill Development Fund (SDF) in Singapore (Lall, 1996) is an example of how TNCs (and other firms) can be engaged in more training. The Productivity and Standards Board (PSB), responsible for the SDF, imposes a 1 per cent levy (it was 4 per cent before the economic crisis in 1986) on the payroll of employers for every worker earning less than a pre-determined amount. This levy is distributed to firms that send their low-earning employees to approved training courses¹¹. This has had a significant impact on skill upgrading in Singapore (an estimated 10 per cent of the workforce has been to approved training courses). However, training provided by TNCs is often aimed at the higher end of the workforce.

Some developing countries are actively attempting to engage the private sector in the provision and planning of training. Malaysia is one such example. It has seen significant government initiatives for providing training, aimed at encouraging the role of the private sector and reducing the role of the government in training activities. The following initiatives were introduced in Malaysia in the 1990s:

- Promoting private sector participation in human resource planning through membership in institutions such as the National Vocational Training Council.
- Promoting the role of the private sector in the provision of training through tax deduction on training expenses in approved institutions; the establishment of a Human Resource Development Fund (HRDF) with private sector steering imposing a levy of 1 per cent of employees' wages which employers can partly reclaim for training budgets; as well as through a liberalisation of regulation of private sector training.

- Promoting the sharing of public and private sector training resources, through exchange of trainers or allowing the use of public training facilities.

The private sector in Malaysia is playing an increasingly important role in (the planning of) training. As in Singapore, TNCs have set up training centres, sometimes jointly with government agencies. The performance of the HRDF has also been impressive, helping more than 5 per cent of the workforce in the first three years, but schemes for explicitly sharing private and public sector resources for training were considered less successful (Kiong, 1997).

This example raises a more general point: governments are increasingly trying to modify a supply driven education and training system into a demand driven system. This involves identifying skill needs, for instance by identifying growth sectors. In this way, skill creation can be made more appropriate for private sector needs (see also Box 7). Various countries use tri-sector partnerships, involving employees as well as government and businesses, to address skill needs and training policies and systems (ILO, 2001). Both Ireland and Singapore have a relatively good record of co-operation between unions and employers.

Box 7. The Malaysian Penang Skills Development Centre (PSDC)

The Malaysian Penang Skills Development Centre (PSDC) is sometimes considered best practice in public-private partnerships in training. The PSDC was set-up in 1989 in response to a growing shortage of skilled labour in the skill-intensive operations of TNCs in the free trade zones and industrial estates. It was initially financed by the public sector (grants, training materials, equipment and trainers) and the private sector (donations, loan of equipment, furniture, private training facilities) pooling their resources; it is now self-financed, offering courses at competitive rates and has been officially accredited to offer technical and managerial skill training and higher education. The centre is in a unique position to obtain immediate feedback from the private sector about course content and future training needs. Unlike some public training centres, however, the PSDC has no social objective.

IV.3. Human Capital Formation and Promoting TNC Linkages

There are various relationships between TNC linkage creation and human capital formation in local firms. On the one hand, a minimum level of technical and human resource capabilities enables local firms to create linkages with TNCs. Various types of direct and indirect linkages between TNCs and local firms exist¹². Linkages can lead to technology transfer and other benefits which can raise the efficiency and scale of local suppliers. In some cases, local suppliers have become global exporters, significantly contributing to long-term human capital formation (see Moran, 1998, for Thailand, and Te Velde, 2001a, for Ireland). On the other hand, local firms can learn more from the presence of TNCs (or other firms) when the absorptive capacity is higher and the economic distance between firms is smaller (Blomström *et al.*, 2000), and hence when technical and human resource capabilities are well developed.

Recognising the importance of linkage creation and the learning process in local firms for human capital formation, the question is how governments can raise the absorptive capacity in local firms or shrink economic distances between firms. The answer to this may include measures to raise technical capabilities through general education and training, encouraging R&D, strengthening specific support services and institutions, enhancing information and knowledge flows from TNCs and promoting linkages with TNCs through institutions.

Cohen and Levinthal (1989) argue that investment in R&D raises the absorptive capacity of firms, and hence governments should examine how to raise R&D expenditures. Teece (1977) found that a skilled workforce is more open to the introduction of new techniques and facilitates the transfer of complex technology to TNC affiliates. Ensuring that skills learned in TNCs are general and transferable could lead to new and more productive local companies ("spin-offs") during and after the operations of TNCs. Such policies would include raising labour mobility. However, such policies could also reduce the incentive for firms to provide workers with transferable skills. It is important to find an optimal balance between incentives for training and measures to encourage worker mobility.

Governments (Ireland, Singapore, Chinese Taipei, China, etc.) have set up linkage programmes to speed up the development of direct linkages between TNCs and local firms. TNCs appear to have lower local linkages than local firms, although part of this can be explained by the length of time that they are present in the local market (Ruane and Gorg, 1998), as well as the level of host country development and TNC strategies.

Table IV.1. FDI Policy and Human Capital Formation
Summary

FDI policy	Effect on human capital formation
To attract TNCs (Sections III and IV):	
Firm-specific targeting	Targeting skill-intensive TNCs raises the demand for skills (Singapore, Ireland, Costa Rica).
Trade facilitation (imports of capital goods, export orientation, trade agreements, etc.)	Facilitating trade enables the upgrading of existing affiliates (e.g. high-tech electronics, automobile, see Moran, 1998) and the attraction of efficiency seeking affiliates (e.g. EPZs, see Box 6).
Fiscal incentives linked to technology status	Pioneer status encouraged location of innovative firms (see Singapore).
Financial incentives	Grants linked to skill-intensity affect the employment of more skilled workers depending on the elasticity of substitution between skilled and unskilled workers (see Ireland case in text).
Supply of appropriate and good quality labour	This attracts FDI (Noorbakhsh <i>et al.</i> , 2001), providing a good basis to attract asset-seeking TNCs. The effect of training is more positive when basic skills exist (Tan and Batra, 1995).
Specific and general infrastructure policies	A good infrastructure attracts FDI inflows (Wheeler and Mody, 1992) and industrial parks may also help to persuade investors.
Promotion of technology and innovative capacity (R&D policy) through establishing joint TNC - public sector research institutes affiliates	Technology centres create locational advantages useful to attract asset-seeking TNCs (see Box 2).
To upgrade existing TNC operations and their suppliers (Section IV.3):	
Payroll tax, with revenues hypothecated for training	Many countries use a 1 per cent payroll tax to send employees to officially approved training courses (see SDF Singapore and HRDF Malaysia in text).
Tax deduction for training expenses	Weak and anecdotal evidence, for example, in Malaysia.
Public-private partnerships	Partnerships may stimulate more training (Box 2) or make training more relevant to business sector needs, see PSDC-Malaysia (Box 7). Tri-sector partnerships between employers, employees and businesses may also help (ILO, 2001).
Promotion of technological activity within TNC affiliates through abolition of certain restrictions	Fewer TRIMs lead to more technology payments by US affiliates, Blomström <i>et al.</i> (2000, Table 13.2), but TRIMs may reduce local sourcing and employment.
Promotion of TNC linkages	Spillover effects can help the development of local firms, see, for example, Ireland and Singapore in Te Velde (2001a).
Raising local capabilities	Reduced costs of technology transfer from TNCs through skill enhancement (Teece, 1977).

V. CONCLUSIONS

Most developing country governments have liberalised their FDI regime to some degree, some have started earlier and advanced further than others. However, host country governments cannot simply stand back and assume that liberalisation will be sufficient to ensure that FDI will come to their country in the right quantity, that FDI will have positive effects on the country, and that practices by TNCs will be optimal from a host country perspective. In order to attract FDI and make FDI work for development, governments need to address a series of market failures related to the market for skills and technology, and need to overcome information barriers.

This paper considered how FDI policies influence the interaction between FDI and human capital formation. Table IV.1 provides a summary of the interactions between FDI policy and human capital formation. To raise the contribution of TNCs to human capital formation, the first priority for a government seems to be to provide good quality and appropriate basic education, which can later be extended to tertiary education in numerate and engineering skills. There is no quick fix; long-run planning is required, which involves predicting future skill needs. Effectively and consistently executed education policies increase the likelihood that TNCs will come to the country and will have more incentives to train and upgrade dynamically. To speed up the process of upgrading TNC operations, governments have used various other policies and measures to: target certain types of TNCs; build effective institutions; impose tax levies linked to training; engage the private sector in education and training planning; and design an effective technology policy where R&D centres interact with TNCs, etc.

Improving business conditions favourable to export intensive TNCs also seems important. These include fundamentals, such as general education and a good infrastructure, but also streamlined entry procedures, a liberal trade regime, reduced transaction costs, and as little corruption and conflict as possible. Once TNCs are involved in doing simple operations, measures can be taken to attract more complex and skilled operations — e.g. moving from natural resource FDI to manufacturing FDI, or upgrading existing firms — to avoid a low-skill, low-income trap.

The discussions and framework used in this paper have implications for income inequality. Many FDI policies that maximise human capital formation aspects tend to raise income inequality, simply because they raise the relative demand for skills. It is possible that countries may need to go through a phase of rapid (FDI-based) technological growth that is often associated with rising income inequality¹³, other domestic policies address redistribution questions. However, certain policies appear to be helpful in attracting and upgrading FDI as well as in reducing income inequality, usually by investing in human capital. One such policy is a tax levy on the payroll of firms

based on the number of unskilled employees the firms have, and then using these tax revenues to train unskilled workers. Perhaps we should examine more closely countries that have introduced this tax effectively and efficiently.

Much of the evidence cited in this paper was based on the experience of a handful of countries. It remains to be seen whether conclusions reached can be generalised. Additional research is needed to confirm these lessons, and to determine exactly how they can be customised to help create appropriate policies and institutions for specific cases. Specific research is needed on the impact of particular FDI policies. First, at an international level, we need research on whether FDI causes international specialisation in skills, similar to what Wood and Riddo-Cano (1999) showed for the effects of trade.

Second, the formulation of successful FDI policy requires detailed empirical studies to examine the impact of TNC activity on human capital formation at country level. Does FDI cause skill upgrading within sectors (Blonigen and Slaughter, 2001), or does FDI help to expand skill-intensive sectors (Te Velde, 2001c)? An analysis of the elasticity of substitution between skilled and unskilled workers is also needed to predict the effects of fiscal and financial incentives. What is the impact of TNCs on the provision of good quality and appropriate education, compared to local firms? Such empirical work would help to determine what type of policy is effective and efficient for achieving the objective of human capital formation in specific country settings.

Finally, we need a better description and comparison of countries' policy and institutional environments affecting the operations of TNCs. Do countries with well-developed FDI policies and institutions achieve more favourable results for human capital formation than countries where such policies and institutions are absent? Is the method of implementation instrumental to success? Which policies have helped to encourage the upgrading of low-skill activities in EPZs to activities more conducive to human capital development? Who benefits from training? These are questions that require specific country-case studies.

NOTES

1. The term “human capital” is used in this paper to denote workforce skills, which depend on formal education, formal training, on-the-job training and experience gained by learning and doing. We do not include health aspects, although it should be borne in mind that in many developing countries poor health (for example, due to HIV/AIDS) imparts on the ability to work.
2. The framework has direct implications for income inequality.
3. This effect is not entirely predetermined. Predictions based on traditional trade theory (Heckscher-Ohlin model) would suggest that FDI in developing countries with abundant low-skilled workers is located in low-skill sectors such as garments and simple assembly operations. Such predictions differ from those based on new trade models such as in Feenstra and Hanson (1997) or Markusen and Venables (1997), where TNCs are assumed to be more skill intensive than local firms. Most evidence shows that TNCs are more skill intensive than local firms within sectors (see, for example, Te Velde, 2001*b*; and Te Velde and Morrissey, 2001).
4. Te Velde (2001*b*) shows that TNCs have been behind the spread of skill-biased micro-electronic technologies in Britain, and similar evidence is emerging for certain developing countries.
5. The supplement of the *Financial Times* (21 January 2002) on *Business Education* indicated that several quality control bodies have been formed in recent years where international business schools can seek accreditation. Accreditation guarantees a minimum of quality.
6. The proportion of female workers significantly and negatively affected training in Colombia and Indonesia. This may reflect the fact that female workers can be found in simple assembly operations. Unionisation, on the other hand, led to more training in Colombia, Mexico, Malaysia and Chinese Taipei. In theory, the effects that unions can have vary, depending on whether unions bargain for higher wages or more training.
7. The framework used in this section can also be used to derive implications for income inequality.
8. While many firms in Korea and Hong-Kong have managed to remain competitive through external exposure, specific external policies differ, with Korea adopting an interventionist approach and Hong-Kong a laissez-faire one. Similarly, in some countries extensive export competition and promotion have been combined with controls on imports, while in others both exports and imports have been largely free of restrictions.
9. R&D subsidies are still permissible under new GATT/WTO rules.

10. Most theoretical models predict that training is sub-optimally low and some form of government subsidies and regulation is required to solve this market failure. Pigou argued that government subsidies were necessary for on-the-job training and schooling since firms do not have sufficient incentives to invest in worker skills because trained workers can decide to work for other firms that can use these skills. Of course this does not imply that government involvement will materialise. Becker (1975) distinguished between training for firm-specific skills (raising the productivity of workers only for the current employers), and for general skills, useful for all firms. Becker argued that while firms can recoup investment in firm-specific training, workers have incentives to pay for general training, but that credit constraints with employees imply that they are not able to pay for general training.
11. Other countries introduced a similar tax, although implementation differed. On Malaysia, see text. Firms in the Dominican Republic are obliged to pay 1 per cent of their payroll as a levy to a training institute (Institute of Professional Technical Training). UNCTAD (2000) argues that this policy is one of the reasons why Dominican firms are more active in training than their Costa Rican counterparts.
12. Lall (1980) defines eight different types of backward linkages via sub-contracting: informational, technical, financial, procurement, locational, managerial, pricing and other.
13. Tinbergen (1975) referred to a “race between technology and education”. At times the pace of technological innovation is faster (rising inequality), and at other times the supply of skilled labour increases more rapidly (falling inequality). For instance, the non-manual / manual relative wage in UK manufacturing changed from 1.57 in 1948 to 1.31 in 1980 and 1.53 in 1994.

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