



FDI, Human Capital and Education in Developing Countries

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GOVERNMENT POLICIES TOWARDS INWARD FOREIGN
DIRECT INVESTMENT IN DEVELOPING COUNTRIES:
Implications for human capital formation
and income inequality

By

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Abstract:

This paper discusses host-country government policy options available to policy makers to attract foreign direct investment (FDI) and to influence the behaviour of Transnational Corporations (TNCs), with focusing on their effects on human capital formation and income inequality. This paper first reviews FDI policy, with the aim of discussing FDI policies affecting human capital formation. It introduces a simple demand and supply framework of the market for skills, which allows us to analyse the effects of TNCs on human capital and income inequality. FDI policy options are analysed within this framework in order to see *how* FDI policy may have affected human capital formation and income inequality. The paper concludes with suggestions for further research.

1. Introduction

Making globalisation work for development and the poor is a major challenge facing many developing countries. In particular there is a debate about whether and how governments can influence and regulate foreign direct investment (FDI). This paper discusses policy options available to policy makers to attract foreign direct investment and to influence Transnational Corporations (TNCs) once they are operating inside a country. There are three reasons for the focus on the interaction between FDI and human capital formation: human capital formation is often seen as one of the long-term benefits of FDI; human capital is increasingly important in attracting FDI; and human capital is an important determinant of spillovers of FDI to the local industry¹. The main question in this paper is what can host-country policy makers do to improve the impact of TNCs on human capital formation?

It is important to understand how FDI policy affects human capital formation as this is one route by which FDI can have consequences for long-term economic development. FDI policy includes a range of policies that directly or indirectly affect potential or existing foreign investors or suppliers to TNCs. An understanding of the effects of FDI policy on human capital formation also enables us to focus on the effects of FDI on the distribution of wages since the distribution of human capital is a major determinant of the distribution of wages, for instance between skilled and unskilled workers. human capital formation in the workforce can be expressed as employment quality * employment quantity and FDI (policy) can affect both terms. The main focus of this paper is employment quality.

To analyse the effects of FDI policies on human capital formation and income inequality, this paper reviews and analyses relationships between three relevant areas: FDI policy, TNC behaviour, and the market for skills. In the Section 2, we review FDI policy, with the aim of discussing how FDI policies affect human capital formation. Then, in Section 3, we introduce a simple demand and supply framework to analyse the market for skills (section 3.1). This framework allows us to analyse the effects of TNCs on human capital and, derivatively, income inequality (section 3.2). We apply FDI policy options to this framework to analyse *how* FDI policy may have affected human capital formation and income inequality in Section 4. The analysis is based on individual country experiences and findings in the literature, but the evidence is too thin to be provide assurance that conclusions from these sources can be generalised to all other countries. The paper ends with suggestions for further research.

2. Host-country FDI policies and human capital formation

An increasing number of governments want to attract FDI rise because the characteristics associated with FDI increasingly fit the government's development objectives (growth, poverty reduction, etc.). This is based on a perception that the potential positive effects of FDI (growth, technology, skill upgrading, capital) generally outweigh its negative effects (income inequality, environmental

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 (e.g. due to HIV/AIDS) imparts on the ability to work.

degradation, profit repatriation).² These development objectives, together with the ability to choose the degree of policy intervention and factor endowments, determine a country's FDI strategy. Once the strategy has been determined, there exists an array of possible FDI policies across the entire policy spectrum to influence FDI.

Lall (1996, 2000) and Moran (1998) provide a general framework for understanding FDI and FDI policy. Both stress the importance of the host-country policy to overcome information-related market failures with regard to FDI. First, policies are justified when they address information failures in the international investment process. Second, a government is justified in addressing market failures in the market for skills and technologies, and gear the development of technologies and skills towards the needs of TNCs and other expanding sectors. Third, a country may want to intervene because of possible externalities associated with TNCs, where the economy-wide benefits are not incorporated in the incentives faced by private actors.

2.1 Overview of host-country policies towards FDI

TNCs, as carriers of FDI, decide to locate in a foreign location for a number of reasons. Following 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. Locational advantages often refer to such static concepts as access to natural resources. However, 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 countries have liberalised their FDI regimes and where countries are competing for 'footloose' FDI.

At the same time, 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". This integrated approach to FDI policy appears to have been practised by the Republic of Ireland and Singapore, which have successfully attracted large sums of FDI³. Below we discuss a policy matrix, outlining possible policy options constituting successful integrated FDI policies⁴. This will frame the discussion of the interaction between FDI policy and human capital formation.

Table 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

² Notice that such objectives are unlikely to be the same for all individuals within a country. However, we assume that using some process, a government can formulate development objectives in the interest of the people it represents. In doing so it needs to make statement such as: FDI in natural resources is useful as long as they fulfil certain criteria; FDI induced growth is desirable even it were to raise income inequality, etc.

³ While successful, the specific FDI targeting may have made these countries more vulnerable to US and high-tech recessions. Both countries are also amongst the most unequal of the middle/high income countries.

⁴ This section restricts the FDI policy review to a simple classification (see Te Velde, 2001a), which provides the basis for discussing interactions between FDI policy and human capital formation.

of existing operations, e.g. by improving inputs, or attracting new skill-intensive operations. Upgrading policies can be of crucial importance 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 local firms benefit from foreign firms. Successful FDI strategies are likely to follow an integrated approach, containing FDI policies relating to FDI attraction, FDI upgrading and TNC linkage promotion. 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.

Table 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 and bargaining - Efficient administrative procedures and rules on ownership - Promotion, targeting and image building - Developing key sectors (agglomeration and clustering) - Developing export platforms (EPZs) 	<ul style="list-style-type: none"> - Availability of infrastructure and a skilled workforce and good labour relations - Sound macro-economic performance and prospects - Privatisation opportunities - Development of financial market and external debt position. - No impediments to trade of goods and services 	<ul style="list-style-type: none"> - Global and regional economic integration and transportation costs - International, regional and bilateral treaties, including BITs and WTO. - Insurance (ICSID, MIGA, ECGD, OPIC) and political risk ratings - Location near large and wealthy markets - Availability of natural resources - Historical ties and language-use - Absence of corruption and conflict - Financial conditions in home countries
Affecting established foreign investors ('upgrading')	<ul style="list-style-type: none"> - Tax/Subsidy system - Performance requirements (abolished in most cases under TRIMS) - Interaction with research institutions and other firms - Encouragement of R&D - Training of employees 	<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

Source: Te Velde (2001a)

The three columns in Table 1 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. International economic developments and agreements, which can be influenced to a far lesser degree by host-country actions, are shown in the third column.

International agreements may either constrain or facilitate the attraction of FDI. Some GATT/WTO agreements specifically aim to give more protection to foreign investors, such as the TRIMs and TRIPs agreements, and limit the scope of domestic policy towards foreign investors. Other international agreements, such as bilateral investment treaties (BITs), seem to be easier influenced by host-country decisions. Having said that, it is not clear whether countries have less effective negotiation power in multi-country negotiations, compared to bilateral negotiations where power balances may be more skewed. While the main focus in this paper is on FDI policies under the direct control of host-countries, later we will briefly discuss the effects of FDI-related international agreements on human capital formation.

To implement these FDI policies consistently and effectively, governments need to build institutions to address market failures associated with the process of FDI and development. For instance, investment promotion agencies may address information related market failures by providing potential investors with information required to make the investment. Other institutions, such as National or Sectoral Vocational Training Boards, may address market failures in the market for skills. It can take substantial effort to co-ordinate the skill needs of (potential) investors at present or in the future with the supply of skills.⁵

2.2 FDI policies and host-country human capital formation

FDI policies and TNC activity interact with human capital in many ways. In line with the classification used in Table 1, relevant FDI policies are can be grouped under three headings:

- How to attract TNCs beneficial to human capital formation (FDI attraction)?
- How to induce TNCs to do more on human capital formation than they would otherwise have done (FDI upgrading)?
- How to ensure maximum benefits from TNCs to a country's human capital stock as a whole (TNC linkage promotion)?

How to attract TNCs beneficial to human capital development?

This question relates to whether policies and institutions can attract specific *types* of TNCs particularly beneficial to human capital formation in the host country, and how this might be done. It assumes that there are certain types of TNCs, or specific activities, that are more beneficial to human capital formation in terms of contributing to education; formal, informal and on-the-job training; or employing a relatively more skilled and educated workforce. If all TNCs provide more of these than local firms, attracting any type of TNC would help *ceteris paribus*. The degree to which TNCs are beneficial to human capital formation generally depends on the

⁵ Notice that some oppose the principles behind 'Knowledge for Business' on the basis that decisions on general education should be made independent from short-term business needs.

level of development in the host-country. Some industries and types of TNCs appear to be more favourable to human capital formation than others, so this may be potentially relevant for FDI promotion policies.

How to induce TNCs to do more HRD than they would otherwise have done?

The question here is whether host-country policies and institutions can induce TNCs to contribute more to training than they would otherwise have done once they have located in the country. 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 the TNC. We will later examine *how* FDI policies have affected human capital formation.

Can a host country influence the behaviour of TNCs concerning human resource development by providing the right framework of policies, institutions and support services? If so, what external policies and domestic policies are appropriate in order to create an environment supportive of innovation and skill upgrading? 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 and to use more skilled workers. But the question remains regarding exactly what type of foreign exposure is particularly helpful in attracting export intensive affiliates, and what policies create such foreign exposure. 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.

In addition to finding the right external policies, governments may also try to improve the domestic incentive structure supporting innovation and skill upgrading within TNCs and other firms. It is unclear what type and level of education attainment is required for training programmes to be successful, whether government should dictate the use of local staff or the use of local inputs more generally, or how governments can encourage training within TNCs, or interactions between TNCs and research institutes. To answer such questions, we need to understand the skill needs of TNCs at different stages of their operations, the effectiveness of various human capital promotion policies: subsidies or tax breaks on TNC training expenditure; tax levies dedicated to support training or interactions with research institutes; and cost sharing of training instructors, equipment and locations, etc.

There is a large theoretical and empirical literature regarding who should pay - government, employers or employees - for what type of training and education, based on the idea that neither private actor could capture all the benefits of these investments⁶. Looking at the empirical evidence, Acemoglu and Pischke (1998)

⁶ 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. In the beginning of the 20th century, 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

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, while 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.

How can a government ensure maximum benefits from TNCs to the local industry?

The third type of host-country policies within the integrated policy approach tries to maximise long-lasting benefits of TNCs to the host-country development by encouraging the quantity and quality of linkages. There are many direct and indirect linkages between TNCs and other firms in the host-country. Lall (1980) defines 8 different types of backward linkages via sub-contracting: informational, technical, financial, procurement, locational, managerial, pricing and other.

Governments may try to encourage direct spillovers, by ensuring that skills learned in TNCs are general and transferable, which 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 reduce the incentive for firms to provide workers with transferable skills.

Governments have also tried to promote indirect linkages between TNCs and local firms. 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). A well-developed local supplier base acts as a 'sticky' place (created asset) and leads to 'embeddedness' of TNCs in the country.

Finally, Cohen and Levinthal (1989) found that local firms benefit more from the presence of TNCs (or other firms) when absorptive capacity is higher and the economic distance between firms is smaller. But this begs the question as to how to governments can raise the absorptive capacity in local firms, or shrink economic distances? What type of policies, institutions and support services are required so that local firms benefit from TNCs?

3. TNCs and the market for skills.

This section describes a framework within which we can analyse the effects of TNCs on human capital and income inequality. We first propose a demand and supply framework distinguishing between skilled and less-skilled workers, which is instrumental in deriving implications for human capital and income inequality. We then discuss whether TNCs are different from local firms in terms of their impact on the supply of, demand for and bargaining position of skilled and less skilled workers. This section serves as an introduction to the next section, where we will use this framework in this section to analyse the effects of FDI *policy*. The main focus is how

work for other firms that can use these skills. Of course this does not imply that government involvement materialises. 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. In contrast to Pigou, Becker argued that workers have incentives to pay for general training, while firms can recoup investment in firm-specific training, and that credit constraints mean employees are not able to finance training.

TNCs affect the quality of employment (e.g. demand for and training of skilled workers), but it is also recognised that the objective of FDI policy for some countries is to raise employment levels rather than employment quality.

3.1 Supply and demand framework.

We divide workers into skilled and unskilled (less-skilled) categories, where skills can be based on education or occupation. The income of skilled workers relative to income of unskilled workers is our measure of income inequality.⁷ Simple demand and supply equations for skilled and unskilled workers are as follows⁸

$$\begin{aligned}
 q_U^D &= a_U + b_U (w_S - w_U) &= & \text{Demand for unskilled workers} \\
 q_U^S &= c_U + d_U (w_S - w_U) &= & \text{Supply of unskilled workers} \\
 (3.1) \quad q_S^D &= a_S + b_S (w_S - w_U) &= & \text{Demand for skilled workers} \\
 q_S^S &= c_S + d_S (w_S - w_U) &= & \text{Supply of skilled workers}
 \end{aligned}$$

where q is demand for (superscript D) or supply of (superscript S) skilled workers (subscript S) or unskilled workers (subscript U); a , b , c and d are coefficients; and w is the wage of workers. We further impose homogeneity of degree zero in wages, and set $a_S - a_U = a$; $c_S - c_U = c$, so that relative demand (q^D) and supply (q^S) of skilled workers are

$$\begin{aligned}
 (3.2) \quad q^D &= a + b w \\
 q^S &= c + d w
 \end{aligned}$$

where $w = w_S - w_U$, and $b = b_S - b_U$; $d = d_S - d_U$. Suppose individual supply and demand curves in (3.1) are upward respectively downward sloping ($b_S < 0$; $b_U > 0$; $d_S > 0$; $d_U < 0$) then relative supply and demand curves are also upward and downward sloping ($b < 0$; $d > 0$). The curves are shown as solid lines (q^D and q^S) in Chart 1 (see also 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.⁹

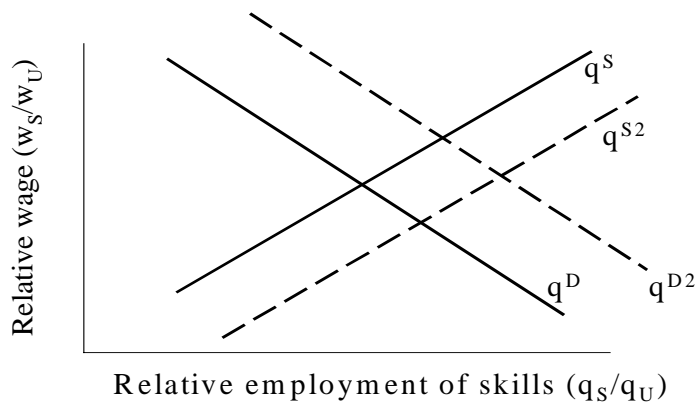
⁷ We concentrate on income from labour, and do not include other income such as capital income or unemployment benefits. Gini coefficients based on income surveys have the advantage that they often include other types of incomes. However, the main disadvantage is that Gini coefficients are statistical descriptions which cannot directly be linked to economic interpretations.

⁸ Variables are in logs. Gregg and Manning (1997) argue that the reservation wage of (or demand for) one type of workers depends on the wage of (demand for) the other type.

⁹ Taking model (3.1) – (3.2) in addition to $a > c$, we can assume for now that there exists an equilibrium between supply and demand ($q^D = q^S$). The equilibrium relative wage (\bar{w}) and relative employment (\bar{q}) of skilled workers are

$$\bar{w} = \frac{a - c}{d - b}, \quad \bar{q} = \frac{ad - bc}{d - b}$$

Chart 1 *Relative demand and supply of skills*



The above framework assumes that demand and supply of skills are in equilibrium in a perfectly competitive world. This is not necessarily the case, especially in developing countries. For example, there may be a surplus of unskilled labour in the informal sector, lowering wages of unskilled wages. Consider, too, the cobweb model, where it takes time for supply to adjust to new skill demands. TNCs wanting to transfer technologies to the host country require the use of skilled labour. Such skills become available only with a considerable time lag¹⁰, by which time demand for skills may have changed. This market failure calls for policy intervention (Lall, 2000 and 2001). More generally, there are various factors and labour market institutions which cause a wedge between actual and equilibrium relative demand and relative wage of skilled labour, such as imperfect competition in wage setting (e.g. employment protection, minimum wage, rent-sharing, efficiency-wage models, see Söderbom and Teal, 2001).

3.2 TNC activity, human capital formation and income inequality

The supply and demand framework allows us to analyse how TNC activity can affect human capital and income equality. We compare TNC *activity* with that of local firms by considering evidence in three areas: the demand for skills; the supply of skills; and industrial relations.

and positive by assumption. These points (not shown) are at the intersection of the supply and demand curves in Chart 1. Wages can also be affected by ‘wage-push’ factors related to industrial relations such as minimum wages or wage bargaining. Unemployment can also be analysed in this framework, as this may affect wage bargaining.

¹⁰ TNCs that raise the demand for skilled labour would also raise the return to education, which should lead to a supply response. However, in case of formal education, it can take 6 years before another level of education will be attained. In terms of the supply/demand framework, it means that countries may reach the equilibrium, if at all, only after significant oscillations.

Demand for skills:

We consider three effects of TNC on the demand for skills: scale, composition and technique. First, TNCs may affect the scale of operations. This depends on whether they substitute for or complement local employment. There are no effects on the scale when TNCs replace existing local employment. By contrast TNCs add to employment if they serve export markets not previously served by local firms, as tended to happen in countries such as Ireland and with some export processing zones, or create significant employment indirectly if they increase demand for goods produced by local suppliers. There are, however, no generalisations on the TNC-*scale of employment* link and much depends on the country, industry, type of investment and time span under consideration (see e.g. OECD, 1995).

Secondly, TNCs can employ a more skilled workforce than otherwise similar local firms: *the composition effect*. The effect is not entirely predetermined. 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 simply assembly operations. However, new trade models but still based on Heckscher-Ohlin foundations consider cases where TNCs transfer activities abroad, which are less-skilled compared to the home average but more-skilled compared to the host-country average (Feenstra and Hanson, 1997). In addition, new trade models have been developed where TNCs locate abroad because of firm-specific assets (Markusen and Venables, 1997) and TNCs are assumed more skill intensive than local firms. The latter appears to be the case for FDI in relatively complex production processes and in particular sectors using above average skills (electronics, pharmaceuticals, etc.), bringing up the national average employment of skilled labour. The evidence appears to show that TNCs are also more skill-intensive than local firms within sectors (see e.g. Te Velde, 2001b; and Te Velde and Morrissey, 2001). Increased TNC activity would thus tend to shift the relative demand for skills outwards (raise a_S), thereby raising income inequality but also raising human capital formation through an increase in the relative employment of skilled workers.

Finally, (indirect) evidence is emerging that TNCs have accelerated *skill-biased technological change* (SBTC). SBTC within firms or sectors (hence no composition effect) is widespread in both the developed and the developing world (Berman *et al.*, 1998, and Berman and Machin, 2000), at least in the last 30 years. There is also evidence that TNCs affect technical change in host countries (Borensztein *et al.*, 1998). This would suggest that TNCs have transferred technologies that were skill biased and which make skilled workers more productive. Te Velde (2001b) shows that TNCs have been behind the spread of skill-biased micro-electronic technologies in Britain, but specific evidence for developing countries is lacking.¹¹ *Ceteris paribus*, when TNCs enhance opportunities for skill-biased technical change, income inequality (and the relative demand for skills) increases unambiguously (rising a_S).

Supply of skills:

TNCs are also involved on the supply side of skills through 1) general education, 2) official training and 3) informal on-the-job training. Informal on-the-job training is

¹¹ Vishwasrao and Bosshardt (2001) show that foreign-owned firms are more likely to be engaged in foreign technical collaborations, but it is not clear whether these lead to more skill-biased technology.

likely to correlate with the skill-content of the job, and hence TNCs offer more of this when they are more skill-intensive.

The involvement of TNC in general education is twofold. On the one hand, there is evidence that TNCs sometimes 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 (see Box 1). However, the total effects on human capital are considered small and it seems difficult to rely on voluntary assistance. TNCs are also involved in the setting up of general education centres which 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 (see Box 2), and hence seem more prevalent in the more wealthy developed countries.

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 \$60m annually (0.2 per cent of Nigerian GDP), with \$1.2m for vocational training and \$2.5m for secondary and tertiary scholarships.

There are similar examples. Over 1998-2000 BP-Amoco expenditure on social investment rose from US\$64.9m to US\$81.6m, 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 US\$92m on community investment, worth around 0.3 per cent of total sales, with US\$19 million spent outside the US. Rio Tinto spent US\$49.5m 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’.

Sources: *Shell-Nigeria annual report*, *Rio Tinto Social and environmental review*, *BP Amoco Environmental and Social Review*, *ExxonMobil annual report*.

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 directly due to efforts made by the government’s EDB. Sharp started the Sharp Design Centre in the mid-90s, after realising that Asia was becoming increasingly important in many electronics segments. Oki founded the Oki Techno Centre in 1996 for research in multimedia for wireless communications. 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 SEK20-25m). Philips has a Centre for Industrial Technology, with one of only two regional centres in Singapore. The PSDC is an example of a state/enterprise training centre in Malaysia (see box 6).

Source: *Sigurdson (2000)*.

The involvement of TNCs in firm-specific and general vocational *training* is more common than in providing general education. There is evidence that TNCs provide

more training than their local counterparts. Using a sample of firms for Colombia, Mexico, Indonesia, Malaysia and Taiwan, ranging from 500 to 56000+ firms in single years in the early 90s, Tan and Batra (1995) find that firms are more likely to offer worker training when they are large, employ a highly educated workforce (except Indonesia), invest in R&D investment (except Indonesia), are export oriented (except Malaysia) and use quality control. All these characteristics are associated with foreign ownership (see Dunning, 1993). However, on top of this, foreign ownership was also associated with increased training in Malaysia and Taiwan¹².

UNCTAD (1994) provides further evidence about the extent and nature of TNC training practices. TNCs spend more on training in their foreign affiliates than do local firms (see e.g. Table 2), but the differential varies according to size, industry¹³, entry strategy and motivation of 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 attention and are sent on international training courses using the TNCs international networks (e.g. see Box 4). Workers in electrical, machinery and chemical industries receive more training than other industries, partly because these industries use complex technologies, which requires skilled and trained workers to implement it.

Table 2: TNCs and training practices; illustrative examples.

Study	Data used	Training practices of TNCs
Tan and Batra (1995)	Sample of manufacturing firms in Malaysia (2200) and Taiwan (56000+)	Controlling for R&D, exports firm size, and education, foreign owned firms train more in Taiwan 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 holds 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 of indigenous firms, and aimed relatively more at white-collar and relatively less at blue-collar workers.

Training may be sensitive to whether FDI is through mergers and acquisitions, or greenfield, but so far there is too little evidence to draw any clear conclusions. If it is through greenfield investments and thereby introduces new techniques (e.g. just-in-time production methods), such investments may require an initial burst of training activities. The boom in M&As, e.g. following privatisation of utilities, has led to a surge in FDI inflows in developing countries. An immediate effect is to lower employment (see Barrell and Te Velde, 2000, for the East German case), but the

¹² The proportion of female workers also 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 Taiwan. In theory, the effect of unions can go different ways, depending on whether unions bargain for higher wages or more training.

¹³ Dearden *et al.* (2000) show that training varies significantly by sector (in the UK), independent from FDI, with workers in telecommunications, pharmaceuticals, office machinery having five times as much training (in the past four weeks) as in the food, textile and footwear industries.

effects may not be different from other types of FDI in the long-run. Training needs are high, especially for utilities changing from state to private foreign ownership, but this may be independent from FDI.

Using Dunning's (1993) breakdown of the motivation for FDI, we can see that different motivations may potentially affect the extent of training activities.. *Natural resource* investments are usually labour extensive requiring a handful of skilled workers (sometimes ex-patriates) needed to operate the complex extraction methods. *Efficiency seeking* manufacturing investments (Box 3) may offer more scope for training, but are perceived to be less beneficial to human capital development than *strategic-asset seeking* investment (as discussed in Box 2).

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 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 such as the Multi-Fibre Agreement. The search for cheaper location (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.

Sources: 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 skills (see 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 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.

The 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 3000 employees in 1999.

Training 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 2728 factory and administrative workers. Total expenditure amounted to \$783,000. Over 100 employees received training overseas

Source: *Unilever Social Review 2000*

While the effects of training on human capital formation are clear and positive, the effects of training on income inequality are more complex, partly due to the definition of skills used. Training can raise the skills of a worker but there is no continuous definition of skills and a worker is classified as either skilled or unskilled. Beginning with the simpler case, where TNC training changes unskilled into skilled workers (increase in c and shift towards q^{S2}), this tends to raise the relative demand for skills, but reduce income inequality.

However, when workers remain in one of the two skill categories after training, for instance in the case on-the-job management training, we need to bring in the effects on productivity, and the effects of training become similar to skill-biased technological change. Training for managers alone would tend to make them more *productive* and more able to introduce new management and other techniques. Higher productivity of managers leads to higher wages of managers, which leads *ceteris paribus* to greater income inequality.

Tan and Batra (1995) find that training positively affects productivity but the impact is largely confined to skilled workers, as opposed to unskilled workers (see Table 3). Some minor positive effects for unskilled workers are discernible when disaggregating by type of training. The productivity effects of in-house training of unskilled workers in Colombia were negative and significant, while training for unskilled workers provided by external buyers and suppliers was positive and significant. On the whole, educated workers are better learners with greater absorptive capacity and hence benefit more from training. If we assume that higher productivity is reflected in higher incomes, an equal amount of training to all individuals widens income inequality.

Table 3: Percentage productivity effects of training by skill level

Country	Skilled workers	Unskilled workers
Colombia (1992, 500 firms)	38.6*	-26.3
Indonesia (1992, 300 firms)	143.1*	-55.0
Malaysia (1994, 2200 firms)	25.2*	-4.1
Mexico (1992, 5072 firms)	20.4*	-13.2

* significant. Source: *Tan and Batra (1995, Table 12)*

Industrial relations:

There are fears that increased international capital mobility weakens the bargaining position of labour, but a more nuanced view is required. Capital mobility can affect certain skill groups more than others (Rodrik, 1997). Those skill groups that are relatively scarce (in most cases skilled labour) gain in bargaining position relative to abundant skill groups. A firm employing unskilled workers in a skilled-labour abundant country can (threaten to) locate in an unskilled-labour abundant country, affecting the bargaining position of unskilled workers in home and possibly host country. Thus we need to study not only the reduction in the demand of unskilled labour *per se*, but the reduction of the price elasticity of unskilled workers. Just as outward FDI can reduce the bargaining position of unskilled workers in developed countries, inward FDI in developing countries can lead to further bargaining and rent-seeking opportunities for scarce, skilled workers as they are often key to TNC operations.

There is little explicit evidence on how FDI affects the bargaining position of skilled and unskilled workers in developing countries.¹⁴ However, some is implicit in studies that relate inward FDI to the wage bill share of skilled workers. Feenstra and Hanson (1995) and others have estimated an equation such as the following

$$\Delta S_{sit} = \alpha_{it} + \beta_{1i} \Delta \ln\left(\frac{K}{Y}\right)_{it} + \beta_{2i} \Delta\left(\frac{INW}{Y}\right)_{it} + \varepsilon_{it}$$

where ΔS_{sit} is the annual change in the wage bill share of skilled workers, K is the real capital stock, Y is real value added, and w are wages of skilled (s) and unskilled (u) workers, and INW is a measure of inward FDI. They found a positive coefficient β_2 and interpreted it as evidence for skill-biased technological change, induced by FDI. However, this is not the only interpretation, since the above equation does not contain information on the effect on productivity. An alternative interpretation is that skilled workers are more effective in rent-seeking behaviour.

Te Velde and Morrissey (2001) find that foreign ownership is associated with higher wages at individual worker level in five African countries, after controlling for other controls such as size, location and sector (and hours worked). However, skilled

¹⁴ Slaughter (1997) tested one of Rodrik's hypotheses but argued that increased trade did not raise the price elasticity of demand in a significantly different way for production or non-production labour in US manufacturing during 1960-1990.

workers benefit much more than less-skilled workers (46 per cent versus 4 per cent).¹⁵ There are two potential explanations: 1) foreign ownership is associated with skill-biased technology; and 2) skilled workers in foreign firms are more effective in bargaining. In the specific case of Ghana it was found that foreign firms can afford to pay higher wages as they have lower capital costs, but since foreign firms are not more efficient, the fact that they do pay higher wages must also reflect a rent-seeking explanation.

4. How do FDI policies affect human capital and income inequality?

We identified various FDI policies across the entire policy spectrum in the second section and their implications for the relationship between FDI and human capital. In this section we discuss *how* FDI policy affects human capital formation and income inequality using the framework discussed in the previous section. We analyse whether FDI policy affects the supply of, demand for and bargaining position of skilled and less skilled workers, as this is crucial in determining implications for income inequality. We discuss three categories of FDI policies: FDI attraction, FDI upgrading and linkages. FDI policies are then divided into whether they affect the demand (D) or supply side (S) of labour, or industrial relations (IR).

4.1 FDI attraction: demand side measures

We analyse four different FDI policies that can affect the relative *demand* for skills: specific targeting, grants, fiscal incentives and international agreements. Some countries (Ireland, Singapore, Malaysia, Costa Rica, etc.) have been trying to attract high-tech and skill-intensive electronic TNCs and have built strong and flexible institutions to achieve this. Investment promotion agencies (Ireland's IDA, Singapore's EDB) trying to attract asset-seeking TNCs have consistently targeted specific sectors to build industry clusters (including pro-active planning of infrastructure and business parks) that draw on specialised labour skills and R&D centres. Wells and Wint (1990) show that FDI-promotion policy works. Using cross-country study in 1985, the presence of a promotional body in the US raised total inward FDI flows in developing countries by 30 per cent. The effectiveness of FDI attraction strategies is likely to differ by country, and depends partly on financial resources, organisational structure and method of implementation. General promotion is considered much less effective than targeting specific TNCs.

Using the supply and demand framework, a policy of firm-specific targeting and development of key sectors/clusters will help to raise the relative employment of skills (composition and possibly technique effect), and hence human capital formation. But the policy is also likely to raise income inequality (conditional upon freely moving factor prices), see a move towards q^{D2} in Chart 2. Conversely, incentives to attract low-skill operations, e.g. the Multi Fibre Agreement, may raise

¹⁵ Others have reported similar findings for other countries. The wages of skilled (here non-production) workers within foreign-owned establishments are 28.7 per cent higher than within local establishments in Venezuela, 21.5 per cent in Mexico and 22 per cent in Indonesia. However, wage differentials for less-skilled workers (here: production workers) are much less: 22 per cent in Venezuela, 3.3 per cent in Mexico and 12 per cent in Indonesia (see Lipsey and Sjöholm, 2001, and Aitken *et al.*, 1996).

human capital to some extent (creating jobs) but are expected to reduce income inequality.

Box 4: 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. China 18 million, Mexico 1 million, 47.000 in Costa Rica, 166.000 in Guatemala, 50.000 in El Salvador, 61.000 in Honduras, 200.000 in Malaysia, 460.000 in the Philippines; these numbers can amount up to 20 per cent 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 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. However in a sample of 31 countries, EPZs in 7 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 usually higher than those outside EPZs (compulsory in Bangladesh), but exceptions exist (Costa Rica, Panama and Mexico). Working hours can be long.

While EPZs raise the level of employment, only 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 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 such a process 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 started with minimum basic conditions (infrastructure, stability, some trade liberalisation, etc.) in place; when zones are well managed with few administrative burdens, streamlined customs procedures; when zones are built in appropriate locations, with reliable infrastructure and utilities; and when zones were aimed at specific industries.

Sources: ILO (1998), Madani (1999), Radelet (1999), UNCTAD (1999).

Attracting skill-intensive TNCs requires a well-educated, trained and/or trainable workforce. There are a number of policies and institutions to achieve this, including offering specialised courses as happened in the Intel/Costa Rican case, (see Spar, 1998); or consistent skill upgrading as in Ireland, (see Fitz Gerald, 2000). TNCs cannot replace the entire system for basic education, but they can develop particular engineering skills once basic skills are available.

There are also specific trade policies that can help to attract competitive and innovative TNCs, especially in the manufacturing industry. Facilitating trade (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. However, it depends on TNC strategies and the host country level of development, whether such TNC affiliates are below or above the average level of skills in the host country. 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 (not as much as critics would like). But it may reduce income inequality since jobs inside EPZs are usually unskilled labour-intensive (e.g. women in the garments industry), see Box 4. Throughout the 1990s many countries have actively sought to attract skill-intensive

Box 5: Financial incentives in the automobile industry

Various authors have noted fierce competition for FDI in the automobile industry, leading to substantial subsidies: US\$150 million for a Toyota plant in the US (1995, \$50.000 per job), US\$484 million for a Ford plant in Portugal (1991, \$254.000 per job), US\$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 for a VW plant (1995, \$54.000 - \$94.000 per job), to \$133.000 per job for a Renault plant in 1996 and \$340.000 for a Mercedes plant in 1996.

Are financial incentives worth it? Many have examined this question, and using different approaches, they seem to indicate that this is not the case. One approach is to examine spillovers econometrically. A study estimated that spillover effects in UK manufacturing were £2440 (2000 prices) per job, applied this to two cases of subsidies to automobile plants in the US, and argued that in both cases subsidy costs exceeded spillover benefits (even if the plants would operate for another 20 years). The study shows that subsidies are inefficient based on estimates intra-industry spillovers, but some questions and caveats remain: do inter-industry spillovers exist, what is the value of job creation, what is the affect on R&D development, what exactly is the strategic alternative, etc.

Qualitative accounts can take account of 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 Sao 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 war among Brazilian states were pure waste from a national perspective. The evidence is partly suggestive, because it is impossible to assess what are foregone benefits if the TNCs had located elsewhere.

Sources: Hanson (2000), Haskel *et al.* (2001), Rodriquez-Pose (2001).

TNCs or TNCs thought to create a significant number of jobs, with governments offering fiscal and financial incentives, leading to fierce competition for FDI. This has been most visible in the case of the automobile industry where governments in developed and developing countries have offered grants to attract TNCs (Box 5).

Limited FDI promotion seems justifiable to overcome information failures in the international investment process and, as such, would raise global FDI rather than increasing FDI into one country at the costs of FDI to another country. However, while grants could be *effective* in attracting FDI (once fundamentals of the project are satisfactory), they are unlikely to be the most *efficient* use of public finances.

Given the danger of rent-seeking behaviour (Oman, 2000) especially when offering incentives on a case by case basis, the amount of money spent attracting FDI may outweigh the economic benefits. Hanson (2000) finds that the pre-conditions potentially justifying subsidies (intensive in the use of elastically-supplied factors, no lowering of market share of domestic firms and productivity spillovers to domestic

firms) are unlikely to hold in practice (reviewing large electronics and automobile investments in Brazil/Costa Rica)¹⁶.

Some governments have linked grants to the skill intensity of TNC affiliates. In Ireland, IDA grants were initially aimed to cover part of capital costs, and were later linked to employment objectives to mitigate a capital bias in times of unemployment. At present, grants have to 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 effects of financial grants in the area of human capital formation in countries with low elasticities of substitution. In addition, fiscal grants, even if they were effective, are impossible for less wealthy countries.

There is contrasting evidence whether 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 significant, perhaps because of a different model specification. Instead they found that 'infrastructure quality clearly dominates for developing countries', while specialised support services were the key determinant in developed countries (who presumably already have an adequate infrastructure).

Ireland at first sight 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. However, in other cases the tax system does appear to have influenced the type of TNCs, although it is difficult to isolate the precise effects, since FDI policies and other policies sometimes change in tandem. Singapore's Pioneer Industries Ordinance of 1959, one of many tax incentives, exempted (or significantly reduced) firms from corporation tax for a fixed period of time provided that firms 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. This was part of an industrial strategy which focused on attracting employment generating TNCs in the 1960s and early 1970s. This shifted to targeting capital intensive projects in the

¹⁶ Hanson also mentions that when one Brazilian state announced it could not afford the subsidy it had promised, Ford decided to locate in another state. This shows that incentives were effective (not necessarily efficient), at least at state level. At a national level one can even have doubts about the effectiveness, since Ford 'appeared to have concluded that they needed to increase production capacity in Brazil'.

1980s, and knowledge intensive sectors in the 1990s, after wages rose and labour was upgraded. To tackle the emerging skill shortages, firms were encouraged to recruit foreign workers. The EDB's regionalisation programme encourages firms to set-up skill intensive regional headquarters in Singapore, with labour and land intensive production processes transferred abroad (see e.g. Yeung, 2001).

4.2 The effects of international agreements

Many international agreements relating to FDI aim at curbing competition for FDI as well as providing TNCs with more protection. The GATT/WTO Agreement on Subsidies prohibits subsidies contingent on the use of domestic goods or export performance. Combined with EU legislation, this agreement has been effective in removing zero or low taxes and grants offered to foreign investors in Ireland that produced for the export market. The adoption of the GATT/WTO Trade Related Investment Measures, should lead to the abolishment of performance criteria for most countries (officially by 2002 for least developed countries). Training or employment criteria still seem possible, especially when they are on a 'National Treatment' or 'Most Favoured Nation' basis.

Other GATT/WTO agreements, such as mandatory (from 2006 for all WTO countries) TRIPs and voluntary GATS, are expected to raise FDI flows (Maskus, 2000) and with it potential technology flows and human capital formation, but protect highly skilled operations (R&D operations) in developed countries and makes certain R&D operations in developing countries illegal. This may have possible negative dynamic and long-term consequences for human capital formation in developing host-countries, when they are forced to specialise in sectors with fewer learning opportunities.

Many countries are involved in other type of international economic and political agreements and schemes (BIT, Regional Trade Agreements, MIGA, Export Credit Agencies). These can often be used to lock-in economic reforms, which may attract additional TNCs. Bilateral Investment Treaties do tend to be correlated with more investment flows (Blonigen and Davies, 2000), but there is less evidence of the investment effects of RTA *per se* or of political risk insurance. RTAs are correlated with further FDI inflows only if certain other economic reforms are implemented at the same time (Blomström and Kokko, 1997).

While TNCs do use political risk insurance, especially in the extractive industries because of the long-term and sunk-cost nature of such investments, there is no consistent evidence to show that risk insurance attracts *additional* TNCs or are highly desirable from a host-country point of view.

4.3 FDI attraction: Supply side measures

We will now discuss FDI policies that affect the *supply* side of skills offered by TNCs. Delivering an appropriate and skilled workforce is an effective and efficient way to attract (asset-seeking) TNCs beneficial to human capital formation. But, more generally, human capital (measured by education enrolment rates) is correlated (note: no causation) with FDI inflows to developing countries (Noorbakhsh *et al.*, 2001) and this correlation has become stronger over time. TNCs can locate more complex and skill-intensive affiliates in countries with well-educated workforces. Policies aimed at

raising educational attainment enhance human capital and also growth when educational attainment is appropriate (often technical and numerate subjects) to expanding sectors. Education aimed at the lower end of the education scale helps to reduce income inequality (a move towards q^{S2} in Chart 3).

Chart 2 *Expected effects of targeting skill-biased sectors or fostering skill-biased technology transfer to TNC affiliates*

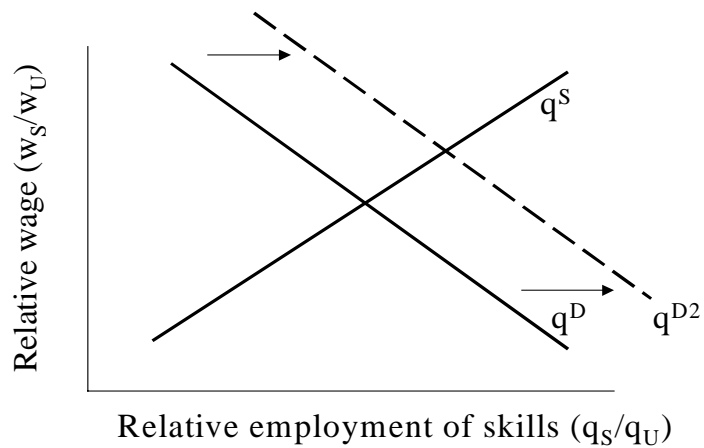
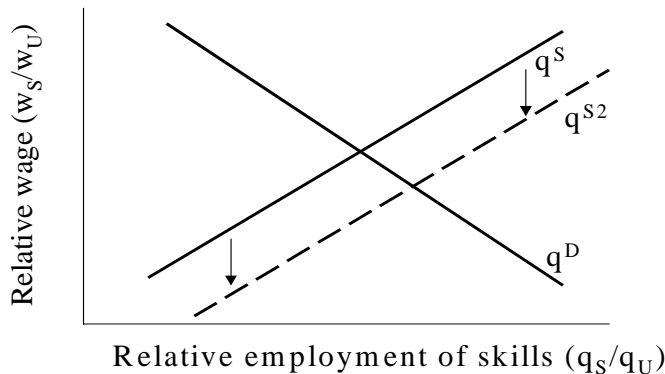


Chart 3 *The effects of education/training policies to raise skilled labour supply*



Less is known about the effects of regulations on training or employment programmes when TNCs enter the 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. Finally, policies, such as union recognition, that improve industrial relations in sectors or EPZs associated with TNC activity may help to reduce income inequality by raising wages and employment practices of the less-skilled workers, but when a low-level of wages is the main reason for the investment it could lead to lower FDI inflows¹⁷.

4.4 FDI upgrading

It is an open question whether, and if so how, FDI policies affect the operations of TNCs when they have already invested in the country. Can a low-income country design policies that avoid a low-income low-skill trap? Can a country design a policy and institutional framework where TNCs have sufficient incentives to upgrade towards more skill-intensive 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, with 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 or *ad hoc*

¹⁷ See also Jun and Singh (1996) on the relationship between labour relations and FDI inflows.

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 Riddo-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. There is no such evidence on the effects of FDI inflows, 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 to have an initial advantage, for instance in the levels of skills, before engaging in trade and FDI liberalisation.

The process of upgrading can be a difficult process and would probably imply targeting different types of TNCs depending on the initial level of development. 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 (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 (Box 4). Singapore appears to have done so 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 relatively easily. Different policies to upgrade seem important in different settings, and here we discuss FDI policies affecting supply and the demand of skills generally.

On the *demand* side, policies to enhance technological activity by TNC affiliates is likely to lead to a further demand for skills, since most of the latest technology has been skill-biased for the last 30 years. Various regressions in Blomström *et al.*, (2000, Chapter 13) indicate that the presence of fewer performance requirements raised the payments of royalties and licence fees to US parents in 1982 in a sample of 32 developing and developed countries, and hence the abolition of TRIMs may encourage technology inflows. There is no consistent evidence that restrictions on equity shares (minority stakes) are in the interest of host economies (see e.g. 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 asset. Policies that encourage technology inflows are likely to raise human capital and income inequality.

Technology policy as part of the FDI and industrial strategy can be seen as a complement to education and training policy. The incentive structure can be geared to promote the use of new technologies. This consists of liberalising capital goods imports, fiscal incentives and R&D subsidies¹⁸. However, 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 (see

¹⁸ R&D subsidies are still permissible under new GATT/WTO rules.

Box 2). For poorer countries, technology policy involves building of effective support services in the area of technology and training.

Supply side policies to upgrade FDI (i.e. improve factor markets and factor quality) aim to encourage TNCs to engage in more training. 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, share costs of training instructors, equipment or locations. Governments have also supported the co-operation between public research institutions and TNCs. Rich governments can support new R&D centres, acting as a magnet for asset-seeking TNCs, as part of a cluster strategy.

The Skill Development Fund (SDF) in Singapore (see e.g. 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 (used to be 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-paying employees to approved training courses.¹⁹ This has had a significant impact on skill-upgrading in Singapore (an estimated 10 per cent of workforce has been on approved training courses) and, in terms of Chart 3, has led to a move towards q^{S2} , reducing income inequality *ceteris paribus*. However, as noted in the earlier discussion on FDI effects, training provided by TNCs is usually aimed at the higher end of the workforce, because developing countries often lack experienced managers. While such training initiatives raise human capital, they tend to raise income inequality.

Some developing countries actively attempt to engage the private sector in the provision and planning of training. Malaysia is a one such example. It has seen significant initiatives towards 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 plays 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

¹⁹ Other countries have also introduced such as tax. 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.

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 the setting-up of a task force to identify skill needs, for instance by identifying growth sectors. In this way, skill creation can be made more appropriate to private sector needs (see also Box 6). Various countries also use tri-sector partnerships, involving employees as well as government and businesses, to address skill needs and training policies and systems (see ILO, 2001).

Box 6: 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 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, but is now self-financing offering courses at competitive rates and is officially recognised to offer technical and managerial skill training and higher education. The centre has 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 centre has no social objective.

Host-country policies related to industrial relations include enforcement of union recognition. These can lead to lower income inequality and training. However, unions can also stop the introduction of new technology, which can be vital for long-run human capital formation.

Linkages

TNCs can also affect domestic human capital formation indirectly through spillovers and linkages with local firms. Measures that raise the capacity for local firms to learn from TNCs are likely to lead to long-lasting positive effects on human capital development. These include raising technical capabilities through general education and training, strengthening specific support services, enhancing information and knowledge flows from TNCs and by promoting linkages with TNCs through institutions.

For instance, governments can encourage R&D and training in local firms helping them to absorb positive spillovers from TNCs. An educated workforce is more open to introduce new techniques and facilitates the transfer of complex technology to TNC affiliates (Teece, 1977). The right type of knowledge is needed and this is likely to vary by country and sector.

TNCs 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). Governments (Ireland, Singapore, Taiwan, China etc.) have set up linkage programmes to speed up the development of direct linkages between TNCs and local firms. It is important that any government intervention is 'demand-led' by building on the (dynamic) comparative advantage of the country.

Summary

The main findings of this section are summarised in Table 4. In this table FDI policies affect human capital formation and income inequality either is positively, negatively, or the effect is uncertain (represented by +, -- and ?, respectively). The final column of Table 4 shows the expected effect on FDI inflows. FDI policies can be divided into attraction, upgrading and linkage related policies.

Many FDI policies that maximise the effect of FDI on human capital formation also appear to increase income inequality. Exceptions appear to be the delivery of good quality primary and secondary education, tax schemes linked to employment or training of unskilled workers, and targeting low-skill FDI activities. Of these, general education policy appears to be an effective policy to attract and upgrade FDI beneficial for human capital formation, but is also expensive. Tax levies may also be useful when carried out effectively using strong institutions. Targeting low-skill FDI runs the risk of a low-income, low-skill trap, posing difficulties for long-run development of human capital. Perhaps governments need to balance the objectives in the areas of income equality and human capital formation. It may not be possible to achieve both objectives at the same time with one policy instrument.

Table 4: FDI policy, human capital formation and income inequality (summary)

FDI policy	Effect on human capital formation ++ very positive + positive ? depends	Expected effect on income inequality + increase in inequality - reduction in inequality ? depends	Expected effect on volume of FDI inflows + positive ? uncertain
A FDI attraction:			
Firm-specific targeting/clustering/developing key sectors	+/? TNCs are more skill intensive than local firms (Singapore, Ireland, Costa Rica), but can also locate in low-skill sectors (garments)	+/- Depends on sector. Targeting high-tech industry is (+), but targeting garments is (-)	+ FDI promotion works (Wells and Wint, 1990), but depends on implementation
Trade facilitation (imports of capital goods, export orientation, trade agreements, etc.)	++ Attracting, export intensive asset-seeking affiliates + Efficiency seeking affiliates (e.g. EPZs)	+ See high-tech manufacturing - TNC affiliates in EPZs employ low-skilled workers	+ Experience of EPZs + Trade openness raises FDI inflows (Morissey, 2000)
Fiscal incentives linked to technology status	+ Pioneer status (see Singapore)	+/? Depends on type of TNC operations	? + see Brazilian automotive industry, Hanson (2000)
Financial incentives	? Depends on elasticity of substitution between skilled and unskilled workers (see Ireland case)	? Depends on elasticity of substitution	
TNC training	+ TNCs tend to train more (see Table 2)	?/+ Training tends to be aimed at skilled workers	
Supply of skilled labour	++ By definition	- Especially when aimed at delivering primary and secondary education	+ see e.g. Noorbaksch <i>et al.</i> , (2001). + Wheeler and Mody (1992)
Specific and general infrastructure policies	+ Improved infrastructure attracts FDI inflows	? ?/- Training at all levels, but tax could be linked to unskilled workers	+ Wheeler and Mody (1992) ? Contrasting evidence on effects of taxes
B FDI upgrading:			
Payroll tax, with revenues hypothecated for training.	+ see e.g. experience of SDF, HRDF and the Dominican Republic	+/? Even if training was equal among skill groups, this is likely to raise inequality	? see above
Tax deduction for training expenses	+ anecdotal evidence, e.g. in Malaysia	+ in absence of social objective training aimed at skilled workers	? +
Public-private partnerships	+ see PSDC – Malaysia	? + R&D centres employ skilled workers	? +
Create training institutions with private sector/TNC involvement in planning of training	+ to ensure that training is more relevant to needs of private sector		
Promote technology and innovative capacity (R&D policy) within TNC affiliates	+ see Box 2 (Singapore)	+ R&D centres employ skilled workers	? ?
Abolition of performance criteria (TRIMs)	+ /? 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	? ?	? Fewer TRIMs could lead to more inflows
C Linkages:			
Promote TNC linkages	+ Spillover effects on local firms	- when local firms employ unskilled workers	+/?
Raise local capabilities through skill enhancement	+ Reduced costs of technology transfer from TNCs, see Teece (1977)	- when local firms employ unskilled workers	

5. 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 is 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 are 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, with due attention to the effects on income inequality.

Table 4 provides a summary of the interaction between FDI policy, human capital formation and income inequality. 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 can include the setting-up of a skills taskforce that predicts future skill needs. Education policies which are executed effectively and consistently increases the likelihood that TNCs will come to the country, and will have more incentives to train and upgrade dynamically. To speed up this process governments have used various policies and measures: target certain types of TNCs; build effective institutions; impose tax levies linked to training; engage the private sector in education and training planning; design an effective technology policy where R&D centres interact with TNCs, etc.

Improving business conditions favourable to export intensive TNCs seems important. These include: provide general education and a good infrastructure; streamline entry procedures; reduce (non)-tariff barriers to trade; and reduce transaction costs (and corruption) wherever they are too high. Once TNCs doing simple operations have located a country, measures can be taken to attract more complex and skilled operations to avoid a low-skill, low-income trap e.g. moving from natural resource FDI to manufacturing FDI, or upgrading existing firms.

This paper suggested that many FDI policies that maximise the human capital formation aspects tend to raise income inequality. It is possible that countries need to go through a phase of rapid (FDI-based) technological growth that is often associated with rising income inequality.²⁰ However, certain policies appear to be helpful in both attracting and upgrading FDI and in reducing income inequality, usually by investing in human capital. One such policy is a one per cent tax levy on the pay roll of firms, based on the number of a firm's unskilled employees, and whose revenues are used to train unskilled workers. A number of East Asian countries appear to have introduced this tax more effectively.

²⁰ 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.

As much evidence was based on the experience of a handful of countries, it remains to be seen whether conclusions reached are generalisable. Additional research is needed to confirm these general lessons, and to determine exactly how to customise general lessons about appropriate policies and institutions to 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. Wood and Riddo-Cano (1999) have shown that trade (exports to GDP) has raised international inequality in education by raising secondary and tertiary enrolment rates more in high-skill, high-income countries than in other countries. There is no evidence on the effects of FDI inflows; does FDI have similar effects? If so, pro-active and strategic FDI policy interventions affecting the dynamic pattern of comparative advantage seem to be required to avoid being stuck in a low-skill, low-income trap.

Second, successful FDI policy formulation requires detailed empirical studies to examine the impact of TNC activity at country level. Key research questions are: do TNCs introduce skill-biased and more efficient technologies²¹? Is foreign ownership linked to rent-seeking behaviour of skilled workers (e.g. Te Velde and Morrissey, 2001)? 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 may also be needed to predict the effects of fiscal and financial incentives. Such empirical work would help to determine what type of policy is more effective and efficient in achieving the objective of human capital formation in specific country settings.

Finally, we need better descriptions and comparisons 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? What type of policies have helped 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.

²¹ Te Velde, 2001b, examined the role of foreign ownership in the spread of technologies over time.

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