

Working Paper 254

Globalisation and Education

What do the trade, investment and migration literatures tell us?

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Table of Contents

Acknowledgements	2
Table of Contents	3
Tables and Charts	4
List of Acronyms and Abbreviations	5
Executive Summary	6
1 Introduction	11
2 Defining Globalisation and Education	12
2.1 Globalisation	12
2.2 Education	15
3 Methodology of Survey	18
4 The Effects of Education on Globalisation	19
4.1 Returns to education and economic growth	19
4.2 Education and the ability to trade	20
4.3 Education and the ability to attract private capital flows	26
4.4 Education and the probability of migration	31
4.5 Conclusions	36
5 The Effects of Globalisation on Education	37
5.1 The effects of trade on education	37
5.2 The effects of Foreign Direct Investment on education	41
5.3 The effects of migration on education systems	46
5.4 Conclusions	49
6 Role of Public Policies in Reconciling Processes of Human Resource Development & Globalisation	50
6.1 Human resource development policies	51
6.2 Investment policies	55
6.3 Trade policies	56
6.4 Migration policies	57
6.5 Coordination of sectoral policies	58
6.6 Conclusion	59
7 Conclusions and Policy Implications	61
References	63
Appendix A Education indicators, by region in 2001.	69

Tables and Charts

Table ES1	The effects of education on economic globalisation processes	7
Table ES2	Effects of globalisation processes on education	8
Table ES3	Policies that use globalisation–education linkages for development	9
Table 1	Trade as per cent of GDP	12
Table 2	Share of imported to total intermediate Inputs (%) in manufacturing	13
Table 3	Inward FDI stocks, as a per cent of GDP by region and county	14
Table 4	World population and migrant stocks (million)	15
Table 5	Enrolment rates¹ as percentage of population	16
Table 6	Globalisation–education matrix example	18
Table 7	Private rate of return to investment in education (one additional year), by level of education	19
Table 8	Determinants of FDI in developing countries	26
Table 9	Enrolment rates as percent of population	28
Table 10	Technological indicators by region	28
Table 11	Econometric Evidence on FDI and Human Capital	31
Table 12	Emigration rates by educational attainment and country of birth	32
Table 14	Number of foreign students in tertiary education by country of origin and destination (2001)	34
Table 15	Temporary work permits for services-related occupations in the UK (2000)	35
Table 16	The effects of education on economic globalisation processes	36
Table 17	Wage premia in exporting firms, by skill level	40
Table 18	Examples of MNEs and training practices	44
Table 19	Remittances and migration	48
Table 20	Effects of globalisation processes on education	49
Table 21	Policies that use globalisation–education linkages for development	60
Chart 1	Resource flows to developing countries 1988–2003	14
Chart 2	The effects of trade on education	37
Chart 3	The effects of foreign direct investment on education	41
Chart 4	Effects of emigration on education	46

List of Acronyms and Abbreviations

AIDC	Automotive Industry Development Centre (South Africa)
AIDS	Acquired Immune Deficiency Syndrome
BAT	British American Tobacco Group
BP	British Petroleum
CSR	Corporate Social Responsibility
DFID	Department for International Development (UK)
EDB	Economic Development Board (Singapore)
EPZ	Export Processing Zone
ERT	European Round Table
FDI	foreign direct investment
GATS	General Agreement on Trade in Services
GDP	gross domestic product
GVC	global value chain
HIV	Human Immunodeficiency Virus
HO	Heckscher-Ohlin
HRDF	Human Resource Development Fund
HSPP	Hospitality Service Providers Programme
IDA	Irish Development Agency
ILO	International Labour Organisation
IT/ICT	information technology/information communication technology
MFA	Multi Fibre Arrangement
MNE	multinational enterprise
NHS	National Health Service (UK)
NIE	Newly Industrialized Economy
OBM	original brand manufacturing
OECD	Organisation for Economic Cooperation and Development
OEM	original equipment manufacturing
PC	personal computer
PIO	Pioneer Industries Ordinance (Singapore)
PMT	Professional, managers and technicians
PSB	Productivity and Standards Board (Singapore)
PSDC	Penang Skills Development Centre (Malaysia)
R & D	research and development
SBTC	skill-biased technological change
SDF	Skills Development Fund (Singapore)
TFP	total factor productivity
UNCTAD	United Nations Conference on Trade and Development
UNESCO	United Nations Educational, Scientific and Cultural Organization
UK	United Kingdom
US	United States (of America)
WTO	World Trade Organization

Executive Summary

This paper provides a state of the art survey in selected aspects of globalisation and education. It emphasises the central role that education plays in shaping and responding to globalisation. It also describes how globalisation affects education outcomes.

The methodology followed in this paper defines globalisation as a set of economic processes:

- trade in goods and services (e.g. fragmentation, offshoring and global value chains), also the education sector itself
- private cross-border finance (e.g. inward FDI [foreign direct investment], also in education sector)
- migration (e.g. teachers/nurses).

It also focuses on four key aspects of education to achieve human capabilities:

- schooling
- tertiary education
- vocational training
- foreign education.

This survey then examines the main links between economic globalisation processes and education by discussing and testing three issues:

- The quantity and quality of education and training determine whether and how countries can participate in the processes of globalisation, such as global value chains, fragmentation, increased trade in final products, and migration.
- The processes of globalisation (as measured by FDI, trade and migration) affect the demand and supply of education and training.
- Public policies (in particular national policies) have effectively attempted to reconcile human resource development and the processes of globalisation in order to obtain the maximum impact on development.

These three issues are discussed on the basis of evidence worldwide, leading to three globalisation–education processes. The combination of these three issues and the inclusion of recent studies from trade, investment and migration literatures add to the innovative nature of the survey.

The paper takes economic globalisation processes as opposed to the education sector as the starting point of the analysis. There are differences in approaches between specialists in the education field and development economists, but they discuss common themes around the issue of globalisation and education. Simply put both groups would argue around a number of policy issues, which include:

- What is education for? Should education be focused on trade, growth and poverty reduction *versus* should education be more general and aim at nation building.
- Education as a trade in services? Can the education sector be used to boost the trade in services performance of a country *versus* should a country shield the education sector from any private involvement, local and foreign (e.g. in GATS).
- Migration and education. Is migration a long-run economic development option for countries *versus* is migration just a loss in human resource capabilities?

Table ES1 provides the first of three education–globalisation matrices. This matrix summarises in simple terms how education and training affect the participation of countries in economic globalisation processes. Main points include:

- Good quality schooling determines trade and inward investment although it is not enough to guarantee competitive products and services for which continued upgrading and training is required.
- Primary and secondary schooling has little effect on the probability of migration, as the literature finds that south–north emigration is concentrated in certain skilled occupation groups in certain countries.
- Vocational training and tertiary education are helpful in attracting (manufacturing) FDI; however, they need to be appropriate and include engineering and other technical skills.

A pool of well-educated nationals abroad can act as a source for exports goods and services, and as a source for ‘diaspora’ investment back into the home country.

Table ES1 The effects of education on economic globalisation processes

	The effects of :			
	<i>Schooling</i>	<i>Vocational education</i>	<i>Tertiary education</i>	<i>Foreign education</i>
Trade (exports)	<p>A year of primary schooling raises wages by more than a year of secondary schooling (estimated Mincerian equations)</p> <p>Schooling leads to higher growth and productivity and thus exports, but macro effect depends on type of country (education important for catch-up in low income countries)</p> <p>Good quality schooling is basis for further education and training, including for entrepreneurship</p>	<p>To upgrade to higher value added exports and remain competitive (in case studies, e.g. in Thailand)</p> <p>Entrepreneurship skills relevant for marketing of products and services (e.g. for marketing forest products from Bolivia/Mexico)</p> <p>Communication and leadership skills for participating in global value chains</p>	<p>Education affects the structure of exports: the more years the more sophisticated and diversified the exports (e.g. graduates behind Chilean forestry exports)</p> <p>Important for participating in knowledge intensive services exports (e.g. India, Singapore)</p>	<p>Foreign education and networks of national abroad are associated with further trade in goods and services (see next matrix)</p>
Private cross-border financial flows (inward FDI)	<p>Schooling is an important explanatory variable in regressions explaining inward FDI in developing countries</p>	<p>Technical and engineering skills for manufacturing FDI (Asian examples).</p> <p>Little effect in simple assembly operations</p>	<p>Availability of technical and engineering graduates facilitates manufacturing FDI (case studies in Singapore, Malaysia, Costa Rica)</p>	<p>Expatriates / courses in natural resources industry.</p> <p>Might lead to diaspora investment (e.g. India)</p>
Migration (emigration)	<p>Data on skill intensity of migrations show there is little effect from primary education and a moderate effect from secondary</p>	<p>Trained nurses, teachers, accountants and IT specialists in demand in developed countries (see UK data on work permits)</p>	<p>Strong effect on emigration, but in particular occupations/ countries (e.g. Zambian doctors)</p>	<p>Students stay abroad for work; skilled foreigners associated with multinational enterprises</p>

Table ES2 provides a summary of the effects of economic globalisation processes on education. Main points include:

- Trade and FDI can have a positive effect on education and training. This is both direct (more training) and indirect (available resources). However, the overall effects are more positive in countries that are already relatively well endowed with education to start with.
- The effects of migration are complex. While the indications are that overall effects are positive through network effects on trade in goods and services and through remittances, emigration leads to a direct and noticeable, in small countries, capacity losses in specific professions such as teaching. This suggests a targeted solution to compensate for specific issues.
- Foreign provision of education might help an economy, but there are issues related to access and accreditation.

Table ES2 Effects of globalisation processes on education

Cause: Measure of globalisation	Effect on:			
	<i>Schooling</i>	<i>Vocational education</i>	<i>Tertiary education</i>	<i>Foreign education</i>
Trade (exports)	Effects are more positive in countries already well endowed (regressions)	Positive incentives to increase supply of training to remain competitive (e.g. Thailand)	Positive stimulus, because education needs to move in tandem with export opportunities (see e.g. South Korea case study)	Education services are increasingly traded; developed countries (US, UK, Australia) control most of market, but developing countries emerging
Private cross-border financial flows (inward FDI)	Effects are more positive in countries already well endowed (regressions)	Foreign firms train more (micro-econometric studies)	Foreign provision good for economic development, but presents issues related to access and accreditation	Foreign investors require expatriates
Migration	Remittances (data) might help to finance education Migration (e.g. diaspora, or short-term migration) leads to exports and development (regressions), and thus resources for schooling Loss in teaching capacity (in smaller countries) worsens schooling	?	Loss in domestic capacity, such as in teaching	Significant amount of students from developing countries seek education abroad

We then examine the effectiveness of policies aimed at reconciling the processes of globalisation and education in a way that is conducive to development (Table ES3). There is a need for appropriate policies and institutions to ensure that human resource development is appropriately aligned with the opportunities in and consequences of economic globalisation processes. Significant coordination and market failures in education and skills may cause this not to be the case and so public intervention can be appropriate. While coordination might seem trivial in theory, in practice this rarely occurs in an adequate way. This is a major shortcoming because solving market failures

will play an increasingly important role in trying to reconcile fast moving economic globalisation processes with needs for skills development. We discuss the following proposed set of policies:

- Build appropriate education and training programmes that link-in with the trade structure of the country. Good quality schooling is the best basis for this. But after this, measures or institutions are required to include the private sector in planning and executing training programmes – there are some best practice examples. The ease of this will depend on the geographical concentration and number of players.
- Design investment policies in tune with human resource development. This has mostly been ignored, though foreign firms do generally train more.
- Approach international trade negotiations on education cautiously, but not with dogmatic protection. In some countries, the education sector is already open for private firms, local and foreign. Foreign providers of education might help in economic development but may not account for education of (most of) the locals.
- Targeted approach to migration issues. Encourage temporary migration, and deal with targeted difficulties (e.g. using compensation).
- Ensure that sectoral policies do not operate in a vacuum. Issues related to globalisation and education can be complex and appropriate solutions may require more than sectoral policy solution. Common issues (but with different specifics in different countries):
 - Setting up agencies that coordinate investment opportunities with migration decisions. In practice this includes the direct targeting of the diaspora.
 - Operationalise the involvement of the private sector in skills development institutions; and use the tax and incentives system to be in line with the development of the economy and the level of skills.

Table ES3 Policies that use globalisation–education linkages for development

Measure of globalisation	Mode of achieving human capabilities:			
	<i>Schooling</i>	<i>Vocational education</i>	<i>Tertiary education</i>	<i>Foreign education</i>
Trade	Promote basic skills on which firms can build and train further	Phase liberalisation and export promotion to go hand in hand with developments in education provision	Phase liberalisation and export promotion to go hand in hand with developments in education provision Maximise opportunities to become exporter of education services	Target diaspora as a source for exports
Private cross-border financial flows (inward FDI)	Promote CSR to provide good quality education Promote basic skills on which firms can build and train further	Involve the private sector in planning of skills development, and kick start public private interactions	Involve the private sector in planning of skills development, attract investment to become	Target diaspora as a source for capital
Migration	Foster remittances for schooling, and use the diaspora to the benefit of development in home country Encourage temporary migration, through international trade negotiations	Develop accreditation of training courses to ensure full recognition of diplomas and experience	Develop accreditation of education systems; Enhance partnerships between universities across borders Encourage temporary migration; Deal with targeted losses in teaching and other capacity	Develop own university system to keep students

This survey covers several issues relevant to the three policy issues mentioned at the beginning.

What is education for? Should education be focused on trade, growth and poverty reduction *versus* should education be more general and aim at nation building. While this paper has discussed little about whether or not there is a choice, it is clear that if education is expected to help trade and growth performances, there needs to be more focused attention on how to encourage interaction between public and private sectors on education planning and provision. More interaction will help to solve market and coordination failures, and while this seems trivial in theory, it is not in practice (e.g. differences between East Asian and Latin American cases in dealing with education requirements for local and foreign investors, or between provinces in South Africa). It is also clear that the focus of support for education should not be limited to primary education. On the contrary, we have emphasised the importance of secondary and post-secondary education in participating successfully in globalisation processes, and thus poverty reduction.

Education as a trade in services? Some developing countries have been successful in attracting foreign (private) providers of higher education. This can constitute a significant source of income. However, it does not follow that this solves the education provision for locals, or that a country needs to bind this liberalisation in GATS. Many foreign schools (e.g. in the Caribbean) cater for foreign students and not the local population. Determining whether or not more transparency in the provision of education services should be bound in international trade negotiations requires an examination of expected and intended consequences – as would ideally be available for any policy decisions. Most developing countries are unlikely to have done this. But most countries are also unlikely to have been asked to commit an education sub-sector to GATS. On the other hand, not binding may limit the ability to attract foreign providers of education services somewhat, though not much, given the experiences so far.

Migration and education. Migration is increasingly helping the economic performance in ‘sending’ (developing) countries through remittances and increased trade in goods and services and possibilities as a source of FDI. However, there are specific problems related to migration of key occupational groups (IT, nurses, teachers) in certain countries (e.g. small Caribbean countries), even though the evidence shows that return migration is substantial. Thus while in general migration options could be beneficial for ‘sending’ countries – though this requires encouragement such as targeting the diaspora – developing countries need to deal with the specific problems posed by losing key workers. This can include encouraging *temporary* migration by asking for more and better access for temporary services providers or partnerships with developed countries that can support training programmes of teachers, nurses and IT workers in developing countries.

1 Introduction

This is a state of the art survey of selected aspects of globalisation and education. Education policies have long existed and have played an important role in development policy in general. Appropriate and good quality human resource development is an essential ingredient of any competitiveness strategy. (Basic) Education is also an important driver of growth and poverty reduction and is central, directly and indirectly, to achieving the Millennium Development Goals. An important policy question for donors and those involved in human resource policies addressed in this survey is how to design appropriate human resource policies that adequately respond to the changing conditions of globalisation. Insights into appropriate policies will be based on an analysis of the links between globalisation and education. The 2005 report of the UK-based Commission for Africa highlights the importance of a balanced approach towards supporting all levels of education in African countries. Before this, there had been other reports. For instance, World Bank (2002) discusses the position of tertiary education in a knowledge-based global economy.

This survey examines the main links between economic globalisation processes and education, by discussing and testing three issues:

- The quantity and quality of education and training determine whether and how countries can participate in the processes of globalisation, such as global value chains, fragmentation, increased trade in final products, and migration.
- The processes of globalisation (as measured by FDI, trade and migration) affect the demand and supply of education and training.
- Public policies (in particular national policies) have effectively attempted to reconcile human resource development and the processes of globalisation in order to obtain the maximum impact on development.

We will discuss these three issues on the basis of evidence worldwide, including in sub-Saharan Africa, Latin America and South and East Asia. The combination of these three issues and the inclusion of recent studies from the trade, investment and migration literatures add to the innovative nature of the survey.

The structure of the report is as follows: Chapter 2 introduces the main concepts of globalisation and education that we consider in our survey. Chapter 3 presents the methodology to be employed. Chapter 4 examines the link running from education to globalisation, while Chapter 5 examines the issues from the reverse angle: how does globalisation affect education? Chapter 6 mentions the main policy categories that we will consider. Chapter 7 will be the concluding chapter.

2 Defining Globalisation and Education

2.1 Globalisation

Globalisation in this study refers to three economic features that increasingly link countries together (although we acknowledge that other types of globalisation are important):

- trade in goods and services
- private cross-border investment
- migration.

Trade in goods and services

Trade in goods and services has increased faster than national incomes in almost all countries. Table 1 shows that exports as per cent of GDP is still amongst the highest in sub-Saharan Africa, although values have not increased as fast as elsewhere and have thus lost market share. The composition of trade has changed, with several poorer countries stuck in low-technology manufactures (which now also face major competition from China) and raw materials and other mainly Asian developing economies increasingly exporting sophisticated manufactures such as software and hard disks. The share of services exports in total trade has increased over the last two decades, albeit slowly, and currently stands at 23% in the world as a whole. The developing country share in trade in services has also increased in the past two decades.

Table 1 Trade as per cent of GDP

<i>Region</i>	<i>1960</i>	<i>1965</i>	<i>1970</i>	<i>1975</i>	<i>1980</i>	<i>1985</i>	<i>1990</i>	<i>1995</i>	<i>2000</i>
World	24.9	24.9	27.1	34.2	39.3	39.4	39.7	42.8	50.8
Latin America & Caribbean	21.3	19.0	19.7	23.9	26.6	26.5	26.1	32.9	37.5
Middle East & North Africa			65.5	81.6	73.3	56.6	67.3	63.0	59.7
South Asia			12.4	17.3	21.6	19.3	22.0	29.3	33.3
sub-Saharan Africa	50.3	50.5	47.8	55.8	61.8	53.8	52.7	59.0	63.4
East Asia & Pacific			18.8	25.7	35.0	36.7	49.5	63.9	78.3

Source: World Development Indicators 2003

We consider two key processes driving this expansion in trade: increased fragmentation and emergence of global value chains. The first significant feature of the increase in trade over the past decades is fragmentation.

Box 1 Fragmentation

The *fragmentation of production processes* is also called 'vertical specialisation' and is commonly referred to as the relocation of parts of the production process from one country to another (Feenstra, 1998). Most of the attention used to focus on fragmentation in the goods chain, but more recently attention has also focused on fragmentation of services processes

There are several estimates of the importance of fragmentation of production, and all find that it has been increasing in world trade. One approach estimates the share of world trade in commodities classified as parts and components and finds that this share is rising for manufacturing trade, at present it stands at around 30%. Campa and Goldberg (1997) provide estimates based on input–

output data (Table 2). They find that fragmentation of production as measured by the share of imports in total inputs used in production has increased substantially. This is highest for electrical and transportation equipment, and many developing countries such as Malaysia, Thailand and Mexico have benefited from this, although poorer economies have benefited less from fragmentation in such sectors as electronics or automobiles.

Table 2 Share of imported to total intermediate Inputs (%) in manufacturing

	1974	1984	1993
Canada	15.9	14.4	20.2
Japan	8.2	7.3	4.1
United Kingdom	13.4	19.0	21.6
United States	4.1	6.2	8.2

Note: US estimates are for 1975, 1985, and 1995.

Source: Campa and Goldberg (1997, Tables 1, 3, 5, 7).

Developing countries' manufacturing sectors have long benefited from the fragmentation of world production facilitated by economic liberalisation, technical change, improved services such as transport, information and communication technologies and economies of scale. Now these factors are affecting the services sector itself. The offshoring of information technology-enabled services has now emerged as a powerful example of offshoring from Western Europe and the US, going far beyond call centres in India, Mauritius, Ghana, South Africa and the Caribbean. Now it includes health services in Caribbean and South Africa, education services in South Africa, legal and other business services in India, and shipping services using Philippine labour. The developing country exports of services are beginning to have a large impact on the economies of developed and developing countries alike.

The second important feature in globalisation recently is the emergence of GVCs (global value chains).

Box 2 Global value chains

Global value chains involve trade through networks of firms across borders. A value chain includes the full range of activities required to bring a product or service from conception, through the intermediary phases of production (transformation and producer services inputs), to delivery to final consumers and ultimate disposal after use (Gereffi, 1999; Kaplinsky, 2000).

Value chain analysis has led to new practical insights in different sectors, e.g.:

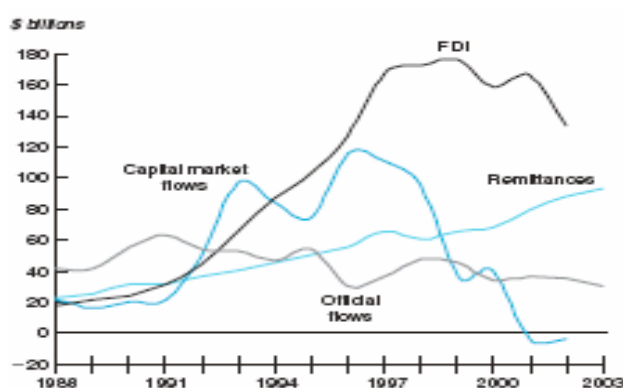
- textiles and clothing (Gereffi, 1999)
- fresh fruits and vegetables (Dolan et al., 1999)
- commodities such as tea and coffee
- wooden furniture (Kaplinsky et al., 2003)

Recent developments in value chain analysis relate to describing a typology of governance in value chains, the factors that explain this typology (Gereffi et al., 2003) and the effects of certain governance forms. In particular, concerns have been raised about the terms on which developing country firms participate in global value chains dominated by rich country importers and retailers. There is little in this literature on the role of education in how firms and countries take part in such value chains, e.g. an emphasis on education and training for communication and ICT.

Private cross-border investment

Private cross-border investment to developing countries has increased dramatically over the past three decades, depending on when regions liberalised, with a fall and rise in FDI more recently. FDI constitutes the most important part of private cross-border investment, although remittances are increasingly becoming important. While both FDI and remittances surpass the level of official assistance to developing countries as a group, the reverse applies to certain least developed countries.

Chart 1 Resource flows to developing countries 1988–2003



Source: World Bank, *Global Development Finance 2004*.

While most FDI is amongst developed countries, and most FDI to developing countries is concentrated amongst a few such as China, Mexico, Brazil, Malaysia, several African developing countries have long had a higher stock of FDI when scaled by market size (in Table 3, sub-Saharan Africa includes South Africa). With FDI increasing in importance in national economies, it is worth asking whether this evolution has different implications for education compared with when there is no such FDI.

Table 3 Inward FDI stocks, as a per cent of GDP by region and county

	1980	1985	1990	1995	2000	2002	2003
Developed countries	4.9	6.2	8.2	8.9	16.6	20.5	20.7
Developing countries	12.4	16.3	14.7	16.3	29.3	31.9	31.4
Africa	8.2	9.8	10.9	15.4	24.6	27.0	25.3
sub-Saharan Africa	10.9	13.5	12.0	16.5	32.4	31.7	27.7
Mozambique	0.4	0.4	1.7	8.7	30.2	41.8	42.6
Nigeria	3.7	15.5	28.3	50.7	42.4	49.0	42.6
South/East Asia	27.4	24.6	20.8	20.8	36.6	35.6	34.6
Central and East Europe		0.2	1.3	5.4	19.2	24.8	23.7
Latin America and Caribbean	6.5	11.0	10.4	11.7	25.6	34.4	36.8

Source: UNCTAD *World Investment Report 2004*

Movement of people

This survey will examine two forms of movement of people: temporary movement and permanent/long-run migration. The movement of people has grown less fast than other forms of globalisation. While the total number of migrants has increased from 75 million in 1965 to 175 million in 2000, this represents a very small increase in percent of total population from 2.3% to 2.9% of

the world's population. Europe and Asia shelter the largest number of migrants, but the percentage of migrants vis-à-vis total population is much higher in Oceania and North America (Table 4).

Table 4 World population and migrant stocks (million)

	<i>Total population</i>	<i>Migrant stocks</i>	<i>% of population</i>
Asia	3672.3	49.7	1.4
Africa	793.6	16.2	2.1
Europe	727.3	56.1	7.7
Latin America/Caribbean	518.8	5.9	1.1
Northern America	313.1	40.8	13.0
Oceania	30.5	5.8	19.1
Global	6056.7	174.7	2.9

Source: IOM, World Migration Report 2003.

Temporary movement of people is conceptually different and is associated with short term stays of between 3 and 18 months (but in some contexts such as services trade negotiations it can be up to 5 years) to provide a service. There are fewer data on this but it is thought that this type of migration is on the increase. Some data can be taken from the H1-B visa provided in the US. The number of temporary work permits increased to more than 160,000 in 2000 but was then capped at 65,000.

2.2 Education

Classification

There are several modes of acquiring human capabilities, such as education and training. This paper distinguishes between schooling, vocational training and tertiary education (UNESCO, 2003) in the national context, and foreign education in the international context:

- *Schooling*. This includes primary and secondary education: primary or elementary education is the first years of formal education generally beginning when children are four to seven years of age (see appendix A for enrolment rates and public spending in primary education). The division between primary and secondary is sometimes difficult to make, but it often occurs at about twelve years of age. Primary education aims to provide basic literacy and numeracy skills students and foundations in other subjects. Secondary education follows after this.
- *Vocational training/education*. This includes skills training, particularly on-the-job training.
- *Tertiary education*. This includes domestic higher education institutes.
- *Foreign education*. This includes students following tertiary education abroad or people purchasing online distance learning from abroad, and can be distinguished from tertiary education provided domestically.

The various stages of education are interlinked; good quality primary and secondary education is vital for tertiary education and good quality and appropriate education provides a good basis for productive training and employment opportunities (see Al-Samarrai and Bennell, 2003, on importance of secondary and tertiary education). There may also be differences in education and training for formal and informal employment opportunities.

Education indicators

There are various types of data to portray the education sector. We highlight enrolment rates at primary and secondary level (schooling) and tertiary level in Table 5, acknowledging that is harder to get internationally comparable data on vocational training. Most regions are on track to reach primary education for all, except Africa and South Asia. There are several secondary education deficits in Asia and Africa. Tertiary education is very weak in Africa, and while it appears stronger in Latin America than in East Asia, this does not account for quality, type and relevance of education. Foreign education will be considered later as a separate feature by which globalisation affects education.

Other dimensions of education are equally important, such as the type of education (mathematics, economics, engineering), accessibility to education (the poorest often have less access to good quality education) and educational quality. Appendix A shows a number of indicators. Sub-Saharan Africa and South Asia stand out as they are characterised by:

- lower adult literacy (almost 20 percentage points compared with nearest region)
- fewer years of schooling for adults (almost 3 years compared with nearest region)
- lower public spending on education as percentage of GDP
- fewer pupils reaching grade 5
- more pupils per teacher (10 more than nearest region)
- more repeaters.

Obviously there are differences within sub-Saharan Africa.

Table 5 Enrolment rates¹ as percentage of population

	Primary education		Secondary education		Tertiary education	
	1980	2000	1980	2000	1980	2000
East Asia and Pacific	111	111	43	66	3	14
Latin America & Caribbean	105	125	42	85	14	23
Middle East & North Africa	87	96	42	70	11	21 (1998)
South Asia	77	95	27	48	5	10
Sub-Saharan Africa	80	82	15	26 (1996)	1	4 (1997)
World	97	103	49	70	13	24

¹Gross total, as a percent of relevant age group (so can be greater than 100)

Source: World Development Indicators

Evolution of education sector

The education sector itself is subject to globalisation (Sauvé, 2002). This has led to differing views about the role of the education sector in nation building and its position in international trade in services agreements such as GATS. Some argue that GATS is sufficiently flexible for governments to decide whether or not to open up education provision to foreign providers, while others suggest that education is about more than just a (traded) commodity.

Education systems are regarded as contributing to (international) knowledge public goods. A public good must exhibit two characteristics. First, the good must be non-excludable: once it has been provided, nobody can be excluded from enjoying its benefits. If it is difficult or costly to exclude, private providers will not have any incentive for providing it. Second, the good must be non-rival in consumption: one person can benefit from the public good without reducing the amount available to others. Thus education systems (including accreditation) can be seen as providing public goods, though this is less clear when it comes to individual education subsidies (which could be seen as rival when public resources are scarce).

Nonetheless, public goods do not need to be provided solely by public providers. The fundamental point about public goods is that they will be under-supplied if provision is left to the market, and hence there is a role for public agents to ensure the provision of public goods. This paper discusses the effects of public, private and public-private provision of education under changing conditions of globalisation, leaving aside questions related to whether GATS has anything to do with domestic reforms that bring about a changing balance of public and private provision.

3 Methodology of Survey

The survey will examine the linkages between three processes of globalisation and four types of acquiring human capabilities (i.e. 12 cells). The causation of the linkages can work in both ways, from globalisation to education or vice versa. Certain linkages will cover more than one cell.

Table 6 Globalisation–education matrix example

Measure of globalisation	Mode of achieving human capabilities:			
	<i>Schooling</i>	<i>Vocational education</i>	<i>Tertiary education</i>	<i>Foreign education</i>
Trade				
Imports	(1)	(2)	(3)	(4)
Exports				
Private cross-border financial flows				
Inward	(5)	(6)	(7)	(8)
Outward				
Migration				
Immigration	(9)	(10)	(11)	(12)
Emigration				

Initial scoping and screening has led us to concentrate on the areas listed below; it has been necessary to do this in order to keep the survey to a manageable size and avoid overlaps with other projects focusing on globalisation and education.

- *Literatures.* We will discuss in detail what the trade, investment and migration literatures tell us about globalisation and education. We think this choice is important for the value-added of this study.
- *Globalisation processes as starting points.* Consequently, within globalisation we will focus on specific economic globalisation processes such as the fragmentation of production and the emergence of value chains, cross-border private capital and FDI in particular, and migration.
- *Specific contexts.* The degree of detail and the selection of national contexts will be determined by whether it can highlight the main issues surrounding globalisation and education. For some processes (cross-border private capital) we would focus on different sectors (e.g. services sectors including the education sector itself, manufacturing such as textiles and clothing or automobiles) or firm strategies (natural resource seeking, efficiency seeking, market seeking or strategic asset seeking), exploiting the fact that different countries have responded differently to the same globalisation processes with different effects. For others (e.g. teacher mobility), we will focus on specific contexts of countries or country groups (e.g. small versus large countries).

Below, we will first present a globalisation–education matrix which examines how different types of achieving human capabilities affect participation in globalisation (Chapter 4). Chapter 5 does the reverse: how globalisation affects education outcomes. It is not always clear-cut to separate the complex materials in a two-way causation methodology. Chapter 6 will consider the interaction between globalisation and education from a policy perspective.

4 The Effects of Education on Globalisation

This chapter examines whether and how the quantity, quality and type of human resources determine how countries can participate in globalisation. It can be hypothesised that more productive and competitive economies are more likely to participate successfully in globalisation than those economies that are not. This can be validated first by a review of whether and how education raises the Mincerian rate of return, national economic growth, (labour) productivity and competitiveness, and secondly by showing whether and how education facilitates globalisation processes such as trade, investment and migration. This part will lead to one of three globalisation–education matrices as in Table 6.

4.1 Returns to education and economic growth

The idea that education contributes to economic performance is most strongly embodied in findings based on so called Mincerian earnings equations. Mincerian earnings equations are based on human capital theory (Mincer, 1974) and relate the wage rate of an individual to a host of individual characteristics including the level of education attainment status. This can be measured in years of schooling or the type of education completed. The coefficient on education in these equations, though not without estimation biases, is usually interpreted as the percentage increase in wages due to an additional year of education.

There are many such studies and there are several reviews. Psacharopoulos and Patrinos (2002) provide a comprehensive review of 4 decades of estimating Mincerian equation across 98 countries. They find that:

- the rates of return are generally falling by level of education and level of economic development (Table 7)
- the average private rate of return to a year of schooling is 19%
- the average returns are highest in Latin America and sub-Saharan Africa
- while average years of schooling have increased, the rate of return is declining.

Table 7 Private rate of return to investment in education (one additional year), by level of education

	<i>Primary</i>	<i>Secondary</i>	<i>Higher</i>
Asia	20	15.8	18.1
Europe/Middle East/North Africa	13.8	13.6	18.8
Latin America/Caribbean	26.6	16.0	19.5
OECD	13.4	11.3	11.6
sub-Saharan Africa	26.6	17.0	19.0

Source: Psacharopoulos and Patrinos (2002)

While one can debate the precise estimates (they might be biased for a number of reasons) the basic finding is that more education raises wages and thus likely also economic performance.

It is however more difficult to find a similar correlation between education and economic growth at the macro level. Several methods have been used to examine the relationship between education and economic growth (Stevens and Weale, 2003) and include growth accounting, factor of

production models, and endogenous growth models. A common approach is the production function approach whereby output depends on a number of factors such as physical capital and human capital (unskilled and skilled labour). Human capital is measured by the percentage of working age population in secondary school. Mankiw et al. (1992) estimate an equation for output per person for 98 non-oil producing countries in 1985 and find that human capital raises output.

Other findings include:

- Barro (1997) finds that one year of additional education raises growth by 1.2% per annum. He also suggests that education is important in catch-up of low-income countries in terms of growth and productivity.
- Benhabib and Spiegel (1994) find low to negligible rates of returns to investment in education.
- Krueger and Lindahl (1999) find a statistically significant relationship between education and growth for countries with lower income levels.
- Wolff and Gittleman (1993) find that tertiary education is the only level of education that is statistically significant for output per person for richer countries; primary education is statistically significant in poorer countries.

Thus, while it is clear that higher educated workers earn more, it is less clear whether all types of education raise growth in all type of countries. The effect of education appears larger for low-income countries, and this might be consistent with the hypothesis that education is important for catch-up. Generally it is important to distinguish between education that contributes to scientific advance and education that aims to create an absorptive capacity to foster the adoption and benefits from best practice technology. For example, Borensztein et al. (1998) suggest that education is important to benefit from inward FDI. Education for scientific advance seems most relevant for the high-income countries, as around 90% of R&D (research and development) is done in the five richest countries.

The above evidence is based on neoclassical economic models or endogenous growth models. There is a different strand of thought emphasising the importance of innovation and learning to the growth process. This argues that technological progress requires learning by firms. This needs competitive firms and countries. Education and training are key elements of successful competitiveness strategies (Lall, 2001). Building an absorptive capacity is a slow process that involves learning, including through education and training. There are market and coordination failures in learning, education and training and several Asian countries have intervened successfully (Korea, Singapore) in their education system to improve their competitiveness and learning processes.

4.2 Education and the ability to trade

Education and skills development allow firms and people to take part in globalisation processes such as exports of processed goods and global value chains. It is important to have a flexible education system in order to adjust to new trading conditions (complementary policy for successful globalisation): while more advanced countries (especially East Asians) have been able to have an active national policy stance to promote education for exports (Korea is the prime example, see Galhardi, 1999), poorer countries have faced more difficulties adapting, probably due to less flexible education systems. We need to acknowledge that causalities here are very complex – most poorer countries do have inflexible education systems but also little to be flexible to in terms of obvious economic opportunities.

There are various ways in which the effects of education on trade can be studied. Below we consider the following evidence:

- education and exports (macro and micro level)
- education and globalisation processes (global value chains, offshoring of services)
- education and the ability to respond to trade

Education and Exports at macro level

Quantitative studies have examined the determinants of exports and the role of education in this at both macro and micro level. Wood and Mayer (2001) provide a good example of how skills determine exports at the macro level. They examine whether the export structure can be explained by differences in resource supply and discuss the performance of Africa relative to several groups of countries. The HO (Heckscher-Ohlin) model – the main model employed by traditional trade theorists to understand trade flows – predicts that natural resources and skilled/unskilled labour will determine the comparative advantage of a country and thus its specialisation. Africa is abundant in low-skilled labour and land per person/worker and this determines its comparative advantage in international trade. Land abundance and lack of skilled labour explain Africa's export concentration on unprocessed primary products. The econometric analysis suggests that the low skill¹/land ratio explains the low ratio of manufactured to primary exports in Africa relative to other groups of developing countries.²

The education variable was defined as the average number of years of schooling. Wood and Mayer (1998) are specific on the level of education helpful for achieving more exports. They argue that it is important to think about the appropriate mix of different levels and types of education. On the one hand, there is the need to provide everyone with good basic education, while on the other hand a minority needs to be equipped with relevant advanced skills. They cite the example of growth of forestry exports in Chile which was facilitated by the availability of forestry engineering graduates from local universities.

The fact that Table 7 provides increased returns to an additional year of education when moving from secondary to tertiary education in Africa suggests that there is now a strong demand for skilled workers (this is also mirrored in the numerous surveys suggesting that the lack of appropriate skills is a constraint on investment in Africa, see e.g. ERT European Round Table for Industrialists, *Improved Investment Conditions. Third survey on improvements in the developing world*, ERT Brussels, 2002).

There is less evidence on the effects of vocational training on exports. The effects are likely to depend on the specifics of the training. Many developing countries operate a levy on a firm's payroll that can then be spent on approved training courses. In this way, skill upgrading may occur. However, there is no guarantee that training works for all, that quality is the same for each type of programme, and that such training is aimed at unskilled or just the skilled workers with sufficient education. In some countries, training levies are voluntary and few graduates pass through approved training courses. It is important to realise that there is a long tradition of training institutes in Latin America and there may be more than in East Asia, where skill upgrading has been faster and more

¹ Skill per worker is defined as average number of years of schooling of the adult population (above 15) using data from Barro and Lee, 1996. Stock of skill is defined as number of years of schooling per person, obtained by multiplying average years of schooling by the number of adult inhabitants. Supply of land is the country's total land area and land per worker is the total land area divided by the adult population.

² Other factors determining the gap between the actual share of manufacturing in exports and the predicted one based on the resource supply are the following: lack of infrastructure, macroeconomic mismanagement, ineffective administration and external perceptions of risk, followed by geography and sectoral bias of trade policies.

appropriate (e.g. the Singapore SDF [Skill Development Fund], and similar schemes in Malaysia), suggesting that the mere existence of such institutes is not sufficient. Indeed many institutions do not appear to provide appropriate training, although Chile may have improved the relevance of human resource development to private sector needs recently.

Education and exports at micro level

At the micro level, Soberbom and Teal (2000) use time series data from Ghana to examine how skills affect manufacturing investment and exports in the 1990s. Skills are defined in two ways: observable skills such as education and experience; and unobservable skills (the residuals), which correspond to the underlying efficiency of the firm. Unobservable skills are found to be the most important determinants of investment and exports. The evidence tends to show that firm efficiency is more important than the standard observable skills. This cannot be explained by traditional trade theory (as discussed above) in that firm level factors are also important determinants of the ability to export.

Teal (1999) summarises the existing literature on the export ability of Africa and also its limited ability to export manufacturing goods. An important part is explained by its relative abundance in unskilled labour and natural resources. A further view suggests that the poor performance is because of the high transaction cost environment and the lack of policy to promote technological and human resource capabilities (such as firm specific learning). Low firm technical efficiency which causes low export growth in terms of manufacturing (and processing in general) can also be an explanatory variable.

Teal examined factors that caused Mauritian firms to export manufactures while Ghanaian firms did not export. The explanations include differences in macroeconomic environment, a better trained workforce and more efficient firms. Their analysis shows that firms in Ghana which are big enough to export are characterised by wages which are too high to enable them to compete given the efficiency level at which firms operate.

On the other hand, there are several longitudinal studies that find that exporters are skill intensive and more productive than non-exporters (e.g. Aw et al., 1998; Clerides et al., 1996). Such studies suggest that firms self-select into exporting, which means that productive and skill intensive firms turn into exporters.

Quantitative studies rely on the availability of good quality data which are not always forthcoming in low-income countries. A further shortcoming is that quantitative studies are usually based on neoclassical trade theory which does not spell out how learning and R&D affects the ability to trade. Other studies are more explicit on this (though hard evidence is more difficult to obtain). Lall (2000) examines the role of skills required to both build technological capabilities in developing countries and to be effective in promoting manufacturing exports. He argues that new skills are required for developing countries to reach new practices and increase their competitiveness. These new skills are more advanced and varied than those needed to serve the domestic markets. Even low technology activities (such as clothing) require demanding technical, management and design skills as well as communication skills. At the same time several changes are taking place. The nature of competition is changing, firms are specialising in different segments of the production process, outsourcing and economies of scale are becoming more important. Since outsourcing appears in very distant regions of the world, skills such as handling information flows and networking are becoming extremely important. The key skills identified in this paper are the following: work teams, group responsibility, broader skills, frequent rotation, problem solving, quality improvement, health and safety. In that sense there is a set of generic skills and there is a new set of technological capabilities.

As developing countries are technology followers and firms in these countries operate with imperfect knowledge of technological alternatives, technology is often imported but then it requires new skills and knowledge for its efficient use. More difficult technologies offer greater rewards in terms of further learning. Some of them also create great spillovers, such as mechanical and electrical engineering. According to this approach competitiveness differences among countries can be explained in terms of differences in their national systems for technological training. The evolution of competitiveness also depends on how effectively a country supports its enterprises in accessing new technologies and mastering them.

The World Bank (1993) also tried to explain the mechanism through which education affects the ability to trade. It is argued that high investment rates permitted rapid capital accumulation in East Asia with these economies adopting industrial technologies from more advanced countries and assimilating them successfully. Certain issues and conditions were thought crucial in this process: good macroeconomic policies and policies which provided incentives to become more proficient and thus encourage firms to assimilate new technologies more quickly. There were no constraints to exports from technologically advanced firms based on insufficiently skilled labour forces. Instead, the relevant countries were characterised by very high rates of tertiary education enrolment in engineering and science and it is thus likely that constraints to exports come more from insufficient management and financial skills.

The analysis in the World Bank report suggests that a fairly advanced education system and a robust and dynamic private sector have their greatest effect when they are part of an international network. An example of this type of strategy comes from the Indian software industry, which has grown significantly, and which is partly due to the Indian Institute of Technology and other less research oriented institutions which operate in the country. An additional factor of importance in the development and growth of the software industry was the transfer of knowledge and management skills by foreign firms. Although wholly foreign-owned firms account only for a small share of software firms in India, their share in investment is disproportionately large.

Education and global value chains

The literature on GVCs is increasing; it emphasises the importance of relationships amongst firms in a value chain. It would suggest that particular (communication) skills are required to take part in such value chains. However there is not much evidence on the role of education and skills in this process. Only a few papers discuss skill requirements for participating in global value chains. We discuss value chains for clothing and commodities.

The structure of trade in clothing is changing. Clothing in the US and Northern Europe is now dominated by a handful of retailers, leading to *buyer-driven* commodity chains. While large and transnational manufacturers play a central role in coordinating production networks in producer-driven commodity chains, in a buyer-driven commodity chain large retailers, branded marketers and branded manufactures play an important role in coordinating and relocating production networks, typically towards developing countries whose firms are contracted to supply goods according to specification. A handful of firms (retailers, branded marketers/manufactures, etc.) determines where to source clothing.

Some countries have fared well under the buyer-driven system, with some Asian countries becoming OEM (original equipment manufacturing) producers and/or OBM (original brand manufacturing) producers. Such a movement requires a skilled workforce with appropriate design and marketing skills. The newly industrialised economies in East Asia became OEM producers partly through 'triangle manufacturing', whereby US buyers place an order with East Asian NIEs,

who in turn shift part of the production to low-wage countries (China, Indonesia, Vietnam), and finished goods are shipped directly from that country to the US under the US quota system (in operation until the quotas of the MFA (Multi Fibre Arrangement) were phased out in 2005) which applies to the exporting country (Gereffi, 1999). However, other countries are locked into the upstream part of the production chain with few incentives (from actors lower and further down the value chain) and few skills to upgrade to OEM production. It is thus important to keep upgrading and acquiring new skills.

The emergence of China and the abolition of MFA quotas on garments and textiles agreed under the WTO have changed the balance. China has access to cheap labour. This is useful for simple assembly operations which require unskilled to semi-skilled labour. Much employment is taken up by female workers in low to semi-skilled repetitive functions which require little training (UNCTAD, 2000), so relocation is relatively easy for garments assembly operations and does depend marginally on the availability of skilled workers. On the other hand, if workers are able to upgrade skills and perform other functions (functional upgrading in value chains), this may lead to an expansion of the design and marketing operations.

Similar issues play a role in commodity trade. In order to supply the major importers of fruits, vegetables, coffee, cacao, tea and other commodities in the developed markets, it is not sufficient to focus only on efficiency of individual operations. It is now increasingly important to understand how individual operations fit in the entire value chains. This requires good communication skills and methods as well as entrepreneurship skills that can help operations to fit into the value chain. Te Velde et al. (2005) discuss the importance of entrepreneurship in driving the value chain for non-timber forest products in Bolivia and Mexico. Key individuals with good entrepreneurship skills are responsible for breaking into new markets including export markets. While it may be difficult to design appropriate education in entrepreneurship, at the least a good basic schooling was found important. Individuals with more schooling, particularly secondary, were also more likely to upgrade from simple extraction and harvesting to processing and other activities further along the value chain. Education was also important in diversifying into different products.

Education and offshoring of services

Gereffi (2004) discusses the significant increase of global outsourcing which took place in the last four decades. The first waves of outsourcing in manufacturing started in the 1960s and 1970s. The countries mostly involved are India, China, Philippines, Malaysia, Singapore, Mexico, Russia, parts of Eastern Europe and South Africa. Not all activities within a firm moved to developing countries, as some activities (usually design, marketing) remained in the developed world. This explains the emergence of global value chains, a very complicated structure of firms and production, as discussed above.

While the services sector has facilitated both fragmentation of the production process and the emergence of global value chains in the goods sector (Jones and Kierzkowski, 2001), it has itself been less associated with global outsourcing. This has probably been because services have needed to be provided directly to customers, on site, or at least within the country of the customer. This has all changed, thanks mainly to rapid changes in information and communications technology.

Offshoring of services from developed to developing countries (and from developing to other developing) has now taken off. While offshoring started in low value-added activities (back-office transactions and call centres) it has now moved to areas more clearly associated with knowledge work activities (software programming, engineering, design, accounting, legal and medical advice), and hence with activities that require tertiary level and further education. The relocation of activities does not simply follow the rules of comparative advantage, but is now also based on competitive

advantages. This is most clearly illustrated by India which is commonly called the back-office of the world. India was able to attract export intensive services such as call centres, back-office work and knowledge intensive IT related services for various reasons but obviously the presence of an appropriately skilled workforce has been crucial. This includes good administrative skills for administrative back-office work. Other poor countries are also defying the rules of comparative advantage and move onto this offshoring bandwagon; while Caribbean countries moved into this during the 1990s, some African countries (Ghana, Mauritius, Senegal) are beginning to participate in the globalisation of services production.

Arora and Gambardella (2004) examine the expansion of the software industry in India, Ireland, Israel and Brazil. The growth in the first three countries has been fuelled by exports whereas that of Brazil is rather based on the domestic market. Among the factors explaining the growth is the expansion of defence R&D and the fast accumulation of IT skills by university graduates and graduates of the military technological units. These countries were characterised by a large supply of skills (an excess supply of human capital), especially an excess supply of engineering and technology graduates. The presence of multinational firms was an additional element determining the growth of IT services, which shows the interdependence between inward FDI and exports.

A further question Arora and Gambardella try to answer in this paper is whether this model of the software industry could be potentially applied to other sectors of the economy. The main concern about this is its requirement of extremely skilled labour, which is hard to find on most developing countries. Few potential candidates could be found, such as Finland and South Korea, Hungary and the Czech Republic, which all have a highly educated population. Moreover these countries have good domestic sources for the formation of software industries.

There are many Indians studying or teaching at American universities; they have also helped the IT revolution in the US (Balusabramanyam, 2003). Having access to this network of foreign educated Indians facilitates exports of IT services to the US.

Education and responding to trade

Above we argued that education is important in driving the volume and structure of exports. Thus, education may form an important way to respond to increased trade liberalisation. For instance, following standard trade theory, a reduction in tariffs reduces the domestic prices of imported goods. This will lead to a shift away from demand for domestic products to demand for imported goods. The volume of imports will increase and will compete with domestic producers of import-competing goods, who will have to adjust and shift to other sectors. For this to happen, the institutional framework needs to be supportive of firms to raise their productivity and to shift into other activities. This includes a flexible and appropriate education system.

Adjustment through education cannot happen overnight and may take a long time. People need to be educated to operate in new activities. Countries such as South Korea or Singapore have been able to focus the education system quickly so they can benefit from trading opportunities. Other countries have struggled. Nevertheless, education in such countries will help to adjust to changes. For example, Christiansen et al. (2003) show that for Ethiopia households with a higher education are less likely than others to fall into poverty, and more likely to escape from it, and far more likely to benefit from growth.

4.3 Education and the ability to attract private capital flows³

Education helps to attract private capital. We first discuss the importance of human capital in attracting inward investment generally, and then argue that specific types of education are important for attracting certain types of investment (e.g. engineering skills for manufacturing, centres of excellence for strategic asset seeking FDI) and that education plays a different role in different sectors. While local education is key, the presence of nationals abroad which are taking foreign education may also be important because they are a source of investment back into the home country. Finally, education is also important in benefiting from investment.

Human capital and FDI

At a general level, econometric evidence for developing countries shows that educational achievement (or human capital) is correlated with FDI inflows (Noorbakhsh et al., 2001). Te Velde (2005) estimates the determinants of the stock of UK FDI and US FDI in a range of developing countries. He finds that education measured as the average of primary, secondary and tertiary education is a positive and significant determinant of UK and US FDI in developing countries. The same holds for total (not just UK and US FDI) inward FDI inflows, the final column in Table 8.

Table 8 Determinants of FDI in developing countries

	<i>UK and US FDI (log of real stock) (1981–2000)</i>		<i>Total FDI (flows) (1981–2000)</i>
GDP in host country (log)	0.68**	0.67**	0.79**
GDP growth			0.035**
Education (average primary, secondary and tertiary enrolment)	0.004**	0.004**	0.006**
Inflation	0.00	0.00	-0.00
Phone lines per 1000 inhabitants	0.003**	0.003**	0.0007*
Roads (% paved)	0.17**	0.11*	0.01
Regional Investment Provisions	0.41**	0.17*	0.38*
Regional Investment Provisions * ratio of host country to largest GDP in the region		0.80**	
No. of observations	1521	1521	2230
No. of countries	68 for UK 97 for US	68 for UK 97 for US	
R-squared	0.44	0.45	0.61

Notes: robust standard errors within parentheses, Constant, US fixed effect and time dummies omitted from Tables, ** (*) denotes 5% (10%) significance level

Technical and engineering skills and manufacturing FDI

It is frequently asserted that the attraction of manufacturing FDI and the development of technical skills need to go hand-in-hand. From the available but patchy data, we find some evidence for this. For instance, the partial correlation coefficient between the stock of UK manufacturing FDI and the number of PCs installed in education is 0.78 and significant at the 1% level (based on FDI in 14 low to middle income countries in 2000); there are positive and significant partial correlations between UK (and US) FDI and research and technicians in R&D; and the stock of UK (and US) FDI as

³ We do not include outward FDI, which is low for many low-income developing countries, though relevant for countries such as South Africa which is expanding rapidly in the rest of Africa.

percent of GDP is positively and significantly correlated (significant only at the 10% level for the year 2000 only) with ICT spending.

Multinationals are often at the leading-edge in the use of new technology. They are also often more capital intensive and skill intensive than local firms, requiring workers with knowledge of technical subjects, such as engineers (Lall, 2001). The growth in FDI therefore leads to a growing demand in skilled workers. This further leads to an increase in the relative scarcity of skilled workers unless the education system provides appropriate and good quality workers that can be employed in sectors where FDI is locating. Good quality and appropriate education in this context requires a good educational basis (at least secondary education) on which MNEs (Multinational Enterprises) and their training systems can build as well as provision of tertiary technical education.

Competition on the basis of human resources has increased with globalisation (Lall, 2001). The quantity, quality and type of education required to participate in globalisation processes vary. It is noticeable that the Asian Tigers (e.g. Singapore, Malaysia, and Korea to some extent) traditionally relied on education expansion with a focus on technical subjects facilitating exports and inward FDI in those technology and knowledge intensive sectors that use such skills, suggesting that the type of education is important, though in Thailand, secondary education was inadequate leading to growth constraints and scarcity of skilled workers (Te Velde and Morrissey, 2004). Many Latin American countries, by contrast, have struggled to provide good quality and appropriate education and have performed less well in terms of high-value added exports and inward FDI. Good quality education is also stressed as an important factor behind capturing productivity spillovers, i.e. adapting to an increase of FDI.

Table 9 provides data on primary, secondary and technical tertiary enrolment rates in developing countries. The traditional Asian Tigers stand out as having high enrolment rates in secondary and tertiary education and, particularly, in the tertiary technical subjects. This is less true, however, for Latin American countries which are positioned between the Asian Tigers and the other developing countries such as Middle Eastern and African countries. In particular, Latin America faces a secondary schooling deficit. There is also a lack of appropriate technical education to attract and benefit from much of manufacturing FDI. Most African countries have severe disadvantages in almost all human and technological indicators (Table 10).

The situation facing many Latin American countries is also affected by the overall quality of their education systems. As well as lacking in quantity, Latin American schooling is lacking in quality. Countries such as Brazil, Mexico and Chile were at the bottom of the world-class in a recent OECD study comparing education systems, in comparison to other countries in Eastern Europe and Asia some of which exceeded the quality levels of many Western countries.⁴ To make matters worse, Brazil, Argentina and Chile are usually among the top in Latin America, showing that the rest of the region has education of poor quality. Observers argue that much of education spending is wasted because schools are disorganised and teachers are poorly trained. They have also argued that there appears to be a lack of accountability, for example in terms of standard exams and school evaluation.

⁴ See <http://www.pisa.oecd.org/> for relevant studies and information.

Table 9 Enrolment rates as percent of population

	Enrolment ratio 1 st level ¹		Enrolment ratio 2 nd level ¹		Tertiary enrolments		Technical tertiary enrolments (natural science, maths, computing, engineering)	
	1980	1995	1980	1995	1995	Percentage point changes 1980-95	1995	Percentage point changes 1980-95
	Developing Countries	88	91	34	44	0.82	0.46	0.16
sub-Saharan Africa	74	78	17	23	0.28	0.21	0.04	0.03
MENA	88	92	42	59	1.26	0.70	0.22	0.11
Latin America	102	103	45	53	1.64	0.34	0.30	0.05
Argentina	106	113	56	77	3.08		0.47	
Bolivia	84	95	36	37	1.48		0.34	
Brazil	99	112	34	45	1.08		0.18	
Chile	109	99	53	69	2.58		0.73	
Colombia	128	114	44	67	1.80		0.51	
Costa Rica	105	107	48	50	2.58		0.35	
Honduras	93	111	30	32	0.96		0.20	
Mexico	115	111	46	58	1.56		0.44	
Panama	106	106	61	66	2.92		0.59	
Paraguay	104	109	26	38	0.88		0.11	
Peru	114	123	59	70	3.21		0.46	
Trinidad & Tobago	97	96	68	72	0.64		0.14	
Uruguay	106	111	60	82	2.14		0.29	
Venezuela	109	94	41	35	2.52		0.29	
Asia 4 Tigers	106	100	72	82	4.00	2.39	1.34	0.68
Hong Kong	106	96	64	75	1.59		0.49	
Korea	110	101	76	101	4.96		1.65	
Singapore	108	104	58	62	2.52		0.47	
Asia 4 new Tigers	103	102	43	60	1.61	0.65	0.28	0.12
Philippines	113	116	65	79	2.70		0.33	
Thailand	99	87	29	55	2.10		0.19	
China	112	120	46	96	0.60	0.48	0.13	0.08

Source: Lall (2001, Tables 5.1 -5A4), this also contains explanations of the term 'Tigers'¹ as percent of relevant age group

Table 10 Technological indicators by region

	R&D expenditure per capita		Telephone mainlines per 1000 people		% road paved 1990 and 1996		ISO 9000 quality certificates	
	1985	Late 90s	1975	1997	1990	1996	1993	2002
Developing Countries	0.6	4.6					1512	154311
sub-Saharan Africa	0.6	1.3	7	16	17	16	824	3343
Middle East & North Africa	0.4	1.4	13	75	38	41		
Latin America	0.6	7.5	29	110	67	50	43	16168
Asia 4 Tigers							382	26949
Asia 4 new Tigers	3.2 ²	31.0 ²	2 ²	50 ²	17 ²	10 ²		
China							10	75755

Source: World Development Indicators and ISO

Centres of Excellence and attracting strategic asset seeking FDI

FDI in high-tech manufacturing or services operations is often based on the availability of local capabilities such as skills, technology and R&D centres. Singapore is a case in point. Sigurdson (2000) considers various examples. Sharp started the Sharp Design Centre in the mid-1990s after realising that Asia was becoming increasingly important in building up capabilities in many segments of electronics. Oki founded the Oki Techno Centre in Singapore in 1996 for research in multimedia for wireless communications, and STMicroelectronics, ranked high in the semiconductor industry, and 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. Philips has a Centre for Industrial Technology, with one of its two regional centres located in Singapore. The establishment of such centres of excellence in the first place depends on available skills, but later on such centres are magnets for further FDI.

The effects of education on FDI at the sectoral level

The effect of education on the attraction of FDI is likely to differ by sector. Here we distinguish amongst natural resource dependent industries, automobile industry, and the education sector itself.

The presence of natural resources (gas, oil, natural beauty) is the main attractor for natural resource seeking FDI (e.g. Angola, Nigeria, Bolivia, Trinidad and Tobago). However this does not exclude the fact that other factors also need to be supportive, or can be useful, including mining codes⁵, infrastructure arrangements and others. Oil extraction is highly capital and skill intensive and this requires skilled engineers and managers. Frequently, oil companies such as Shell and BP (British Petroleum) send expatriates to run the subsidiaries. The same occurs in the tourism industry in poor countries, where there is a lack of good quality local managers to manage the local franchisee of large international brand hotels (e.g. in St Lucia).

Education plays a more important role in another industry at the forefront of globalisation: the automobile industry. Barnes, Kaplinsky and Morris (2003) analyse the Motor Industry Development Programme and industry specific policy in South Africa. It shows that a well designed policy can help to supply global quality products at global prices. Several countries attempted to use targeted policies to enhance industrial development following the example of East Asia. However, this did not bring in any result in most of the cases, which was due to the different conditions (macro, education, R&D etc.) in these countries, relative to those in East Asia.

This motor industry development programme was linked to the automobile and automobile components sector. Its goal was to improve the international competitiveness of the firms in the industry, enhance its growth through exporting, improve vehicle affordability, improve the industry's trade balance and stabilise employment. It used several export-oriented incentives along with lower import tariffs. The critical success factors identified by the authors are the following: cost, quality, flexibility, capacity to change based on human resources development and innovation capacity. Targeted industrial policies can work in developing countries if they complement functional and horizontal policies and can be matched to the local environment.

While education and training policies were supportive of the automobile industry in general, they were never the main factor for attracting automobile investors in the first place (see e.g. McGrath,

⁵ For instance, UNCTAD's Investment Policy Reviews (see www.unctad.org/ipr) for Tanzania and Ghana show very clearly the benefits of modern and up-to-date mining codes: Ghana had an old investment codes, while Tanzania's code was up-to-date, while at the same time Tanzania was a major receiver of mining investment, including from Ghana,

2005). As in Latin America (Mexico, Brazil and Argentina, see UNCTAD 2000) automobile assemblers in South Africa had to jump high tariffs that were aimed at protecting the local market. Once automobile assemblers were in the country, and after they were exposed to foreign competition, human resource development came to the forefront of enhancing their competitiveness, without which it would be difficult to justify the existence of automobile investors.

Education is important in attracting FDI in the education itself. International education providers have also set up centres (subsidiaries) in developing countries (e.g. Bennell and Pearce, 1998). Many Caribbean countries are now actively seeking to attract offshore universities. There are offshore medical schools in Antigua, Belize (3), Dominica, Grenada, St Kitts and Nevis (4), St Lucia, St Vincent and Guyana. Demand for places on such offshore schools seems to be outpacing supply, e.g. to fill the shortage of nurses for the US. Increasingly, there are partnerships between Caribbean (including St Lucia and Barbados) and US and UK institutes, now amounting to 100 (Brandon, 2003). Developing countries are usually at the receiving end of foreign schools. While this can be seen as a sign of weakness in the education system, FDI in education can also be seen to be building on strengths and promote specialisation and centres of excellence (which can in turn attract FDI). St Kitts has received several medical schools and Singapore has been trying to attract all the major business schools and universities.

Foreign education and diaspora investment

So far we have focused on local education, but we also need to consider the effects of nationals obtaining foreign education abroad. The diaspora can form a significant source of investment. There are many Indians studying or teaching at American universities. They have also helped the IT revolution in the US; the wealth generated by Indian IT experts in the Silicon Valley is estimated at \$250 billion, around half of India's GDP. Despite this, the total amount of investments by Indian expatriates over 1991–2001 was only \$2.6 billion. This is low compared with around 50% of \$40 billion or so of FDI received by China during the late eighties and the nineties (Balusabramanyam, 2003).

Jansen and Piermartini (2004) provide preliminary evidence on the effects of temporary movement of people on FDI. They find that an increase in 10% of temporary immigrants to the US and UK would raise outward FDI by around 7%. However, the authors exercise caution with respect to the reliability of their results, which were based on just 50 observations.

Education and benefiting from FDI

Some recent studies have argued that the contribution of FDI to growth is strongly dependent on the conditions in recipient countries, e.g. trade policy stance (Balasubramanyam et al., 1996) or human resource policies. In an influential paper, Borensztein et al, (1998) suggest that the effectiveness of FDI depends on the stock of human capital in the host country. Only in countries where human capital is above a certain threshold does FDI positively contribute to growth. Xu (2000) estimates a growth equation for different samples of countries and finds a significant positive effect of FDI on growth in samples of countries with higher levels of human capital (see Table 11).

Table 11 Econometric Evidence on FDI and Human Capital

<i>Study</i>	<i>Type of domestic policy</i>	<i>Comments on performance</i>
Borensztein et al. (1998)	Raise human capital (years for schooling)	Positive effect of FDI on growth is conditional on reaching a critical level of human capital
Xu (2000)	Reach minimum level of human capital (years of schooling)	Raise average (male) educational attainment to above the range 1.4–2.4 to obtain positive technology transfer effects

There are various authors that have tried to set the literature on FDI and development in the framework of learning by local firms. Lall and Narula (2004) argue that FDI *per se* does not provide growth opportunities unless a domestic industrial capacity exists which has the technological capacity to profit from the externalities from MNE activity. Thus an understanding of how technological knowledge is acquired is relevant to how FDI affects development. There are widely varying experiences, with some countries having used FDI to upgrade domestic firms, while other countries have been less successful. Countries are most successful if they use policies to maximise the impact on learning in local firms. Learning depends on appropriate training and education.

4.4 Education and the probability of migration

There are several pull and push factors that influence the probability of migration. For instance, wage differences between sender and receiving country are often regarded as the most important determinant (or pull factor) of migration. Education is another factor that may affect migration. We distinguish between permanent (or long-run) migration and temporary migration. We will also examine how different types of education affect migration.

Permanent migration

Migrants tend to be relatively well educated compared to the average of the source country. Carrington and Detragiache (1998) estimate emigration rates (emigration/emigration and national labour force) for 61 developing countries in 1990 using immigration flows to the OECD countries. Due to data limitations, they applied the US structure of immigration by education level (based on US census level data) to all other OECD countries. They found that:

- individuals with little or no education have limited access to international migration
- migrants tend to be better educated than the rest of the population of their country of origin.

Docquier and Marfouk (2004) updated the data for 170 countries in 1990 and provided new data for 2000. They also relaxed the assumption of applying the US structure to other OECD countries by using data from individual OECD countries (but also abstract from south–south migration). Table 12 provides emigration rates by education level in 1990 and 2000.

Table 12 Emigration rates by educational attainment and country of birth

	1990				2000			
	<i>Primary education</i>	<i>Secondary education</i>	<i>Tertiary education</i>	<i>All</i>	<i>Primary education</i>	<i>Secondary education</i>	<i>Tertiary education</i>	<i>All</i>
Central America	5.6	10.4	12.9	7.3	8.1	15.6	16.1	11.0
Caribbean	4.8	17.6	41.4	11.6	5.1	17.8	40.9	13.9
South America	0.2	2.5	4.7	1.0	0.4	3.0	5.7	1.5
Northern Africa	2.2	1.8	6.8	2.4	2.3	1.5	6.2	2.5
Central Africa	0.5	1.0	9.8	0.6	0.4	1.3	13.3	0.8
Western Africa	0.3	1.1	20.7	0.5	0.3	2.8	26.7	0.8
Eastern Africa	0.2	1.0	15.5	0.4	0.2	1.6	18.4	0.6
Southern Africa	0.1	0.6	6.9	0.5	0.3	0.5	5.3	0.9
Western Asia	2.6	4.7	6.9	3.3	2.8	2.9	5.8	3.2
South Central Asia	0.1	0.4	4.0	0.3	0.1	0.5	5.1	0.5
South Eastern Asia	0.4	1.9	10.3	1.2	0.5	2.1	9.8	1.7
Eastern Asia	0.1	0.3	4.1	0.4	0.2	0.3	4.3	0.5
Oceania	3.5	1.7	6.1	3.3	3.3	3.4	6.6	4.3

Note: emigration rates = emigration/(emigration plus national labour force)

Source: Docquier and Marfouk (2004)

Docquier and Marfouk (2004) find that:

- of African immigrants in the OECD 31.4% were tertiary educated in 2000 (23% in 2000), whilst the share of tertiary educated workers in Africa was 3.6% (2.2% in 2000); similar skewed results for tertiary education (called brain drain) are present for Asia and Latin America
- the emigration rate of tertiary educated workers is high particularly in Central America and the Caribbean, South Eastern Asian countries and Western and Eastern Africa
- brain drain (emigration of tertiary educated workers) generally increased between 1990 and 2000 but also decreased e.g. in certain Caribbean countries
- the US received 53% of tertiary educated migrants, the EU 16.3% and Canada 13.9%
- small countries are the most affected by high tertiary migration rates; the top 30 countries include only 6 with a population of more than 4 million. Five Caribbean countries top the list. In such countries there are more skilled workers outside the country than inside.

It is thus clear that the higher the level of education, the more likely it is that an individual will emigrate. This can be because there is more demand for educated workers and because the skilled are less poor and more capable of planning and financing migration. North–South migration is usually done by skilled workers, and there appears to be some historical evidence that the poor migrate less (see Clark et al., 2003, and Hatton and Williamson, 2001, for the poverty constraint).

Temporary migration

We need to distinguish between temporary service providers, such as Indian IT programmers who came to the UK on a temporary basis e.g. to solve the Y2K issue or developing country consultants on a short business trip, and permanent migrant flows. Temporary migration to provide a service is usually for less than 12–18 months (or in some cases up to 3 years), a reference point in international services negotiations on temporary migration. It may be more difficult to classify the migration of nurses and teachers between specific countries as temporary, such as between the Caribbean and the UK. South Africa is also a major exporter of doctors, nurses and teachers –

comparable to Philippines for volume of nurses and ICT, but many of such workers leave South Africa for 2–3 years to earn foreign currency before returning again. Thomas-Hope (2002) offers evidence on return migration in the Caribbean.

There are no systematic data on the share of emigration that is temporary, so both short and long-run migration would be included in the data above. There are records of the number of foreign students in tertiary education by country of origin and country of destination. Table 14 shows that there are 1.6m foreign students, of which 6% are in non-OECD countries. Thus, developed countries are the main receivers, with the US receiving 29%, the UK 14% and Germany 12%. However, South America (4%), Asia (41%) and Africa (11%) are responsible for the majority of foreign students.

There are also records of temporary work permits in the US and the UK, showing a concentration in certain occupations (See e.g. WTO, 2004). The US H-1B visas are for ‘Professional workers in specialty occupation’, such as computer specialists or fashion models from foreign countries. H-1B visas are granted for an initial period of up to three years. In 2000, 136,800 new permits were approved for initial employment, mainly in computer-related occupations. This increased further to 165,000 but decreased since to a new cap of 65,000 in 2004. The second largest group was electrical/electronics sector workers, industrial engineers, and architects, followed by specialized administrative occupations, such as accountants and specialist auditors in related services industries. The UK permits are for less than a year (one third of total number) and for up to 5 years (the rest).

Table 13 Number of temporary work permits granted

	<i>US</i>	<i>UK</i>
Total services	136787	64574
Computer related (all)	74551	10470
<i>Of which:</i> India	50827	5973
China	5725	108
Philippines	1217	–
United States	–	1404

Source: WTO annual report 2004

Table 14 Number of foreign students in tertiary education by country of origin and destination (2001)

<i>Receiver country</i>	<i>Total from Africa</i>	<i>Total from Asia</i>	<i>Total from South America</i>	<i>Total from all countries</i>
Australia	3,837	77,849	920	120,987
Austria	965	3,885	320	31,682
Belgium	10,976	2,609	648	38,150
Czech Republic	239	727	82	7,750
Denmark	382	1,027	123	12,547
Finland	716	1,666	69	6,288
France	75,465	19,828	4,253	147,402
Germany	19,394	67,658	4,265	199,132
Hungary	175	1,602	15	11,242
Iceland	5	29	2	421
Ireland	415	1,399	21	8,207
Italy	2,186	3,463	1,233	29,228
Japan	676	58,170	761	63,637
Korea	44	3,299	41	3,850
Mexico	24	41	568	1,943
Netherlands	2,559	3,308	1,079	16,589
New Zealand	143	7,971	106	11,069
Norway	733	1,017	149	8,834
Poland	296	1,081	57	6,659
Slovakia	133	390	11	1,690
Spain	4,013	1,131	6,604	39,944
Sweden	641	2,303	572	26,304
Switzerland	1,802	2,175	866	27,765
Turkey	410	10,944	6	16,656
United Kingdom	18,134	74,400	2,926	225,722
United States	29,677	294,230	28,142	475,169
Total OECD	174,040	642,202	53,839	1,538,867
Argentina			2,598	3,255
Chile	7	139	1,890	3,477
India	2,558	4,004	n	6,988
Indonesia	3	266	a	377
Malaysia	1,552	16,217	24	18,892
Philippines	69	1,656	4	2,323
Russian	n	28,013	n	64,103
Thailand	19	1,445	4	2,508
Tunisia	1,869	233	n	2,535
Uruguay	n	N	2,100	2,100
Total non-OECD destinations	6,077	51,973	6,620	106,558
Total	180,117	694,175	60,459	1,645,425

Source: www.oecd.org

Types of education

There is evidence to suggest certain types of education and training are particularly important for migration purposes, as they are in demand. Thus, migration tends to affect specific skills groups in specific countries and is not necessarily an economy-wide issue. For instance, there is emerging evidence for migration of health workers (both doctors and nurses, from South Africa, Philippines and West Indies), teachers (likewise) and IT workers (e.g. India). Case study evidence (mainly from the ILO) reveals that:

- Khadria (2002) finds that 56% of the graduates from the All India Institute of Medical Sciences in Delhi emigrated between 1956 and 1980; 25% of graduates from the Indian Institute of Technology in Madras emigrated.
- Thomas-Hope (2002) finds that two-thirds of Jamaican nurses emigrated over the last 20 years and were replaced by Cuban doctors. More recently, a substantial number of Cuban doctors and nurses have gone to Venezuela.
- Lowell and Findlay (2002) report that 10% of the tertiary educated population in Mexico had emigrated by 1990, and 30% of its scientific and engineering graduates
- Filipinos go to the Middle East under temporary migration schemes but under permanent schemes to the US; 30–50% of IT workers and 60% of physicians have emigrated (Albuero and Abella, 2001).
- South Africa has lost 4600 professionals every year (0.3% of national stock) (Bhorat et al., 2002); 10000 health professionals emigrated between 1989 and 1997, up to half of health graduates emigrate each year; detailed data for the UK reveal that South Africa sent 2,500 nurses to the UK in 2001 alone, and an average of 2,000 teachers a year.
- 60% of Ghanaian physicians trained locally during 1980s have left the country (Chanda, 2001).
- Between 9–12% of all Uruguayan professionals and technicians lived abroad in 1980 (Pellegrino, 2002).

There is further supporting evidence from UK immigration data. Table 15 shows temporary work permits for services-related provisions. These are targeted at professional and technical occupations, such as IT and health professionals. Doctors, lawyers and builders from outside the EU feature less, in part because they face accreditation issues and economic needs testing.⁶

Table 15 Temporary work permits for services-related occupations in the UK (2000)

	<i>All</i>	<i>US</i>	<i>India</i>	<i>Philippines</i>	<i>China</i>	<i>Malaysia</i>
Total	64,144	12,654	12,292	6,772	1,541	866
Managers and administrators	13,487	5,247	1203	55	211	139
Professional occupations	15,187	1,767	2,947	247	285	348
Engineers and technologists	6,626	932	2,616	222	147	147
Associate professionals and technical occupations	33,715	5,493	7,879	6,442	885	329
Computer analysts and programmers	10,470	1,404	5,973	82	108	73
Health associate professionals	14,477	188	1,301	6,327	179	136
Personal and protective occupations	1,587	38	194	28	125	43
Other	168	42	69		35	7

Source: UK Home Office

⁶ Australia has tried to minimise the problem of brain drain through appropriate recognition agreements based on a 'competency-based' assessment rather than on educational qualifications (Martin, 2003).

4.5 Conclusions

Table 16 provides the first education–globalisation matrix. This matrix summarises in simple terms how education and training affect the participation of countries in economic globalisation processes. The main points include:

- Good quality schooling determines trade and inward investment although it is not enough to guarantee competitive products and services for which continued upgrading and training is required.
- Primary and secondary schooling has little effect on the probability of migration, as the literature finds that South–North emigration is concentrated in certain skilled occupation groups in certain countries.
- Vocational training and tertiary education is helpful in attracting (manufacturing) FDI, but they need to be appropriate and include engineering and other technical skills.
- A pool of well-educated nationals abroad can act as a source for exports of goods and services, and as a source for ‘diaspora’ investment.

Table 16 The effects of education on economic globalisation processes

	The effects of :			
	<i>Schooling</i>	<i>Vocational education</i>	<i>Tertiary education</i>	<i>Foreign education</i>
Trade (exports)	<p>A year of primary schooling raises wages by more than a year of secondary schooling (estimated Mincerian equations)</p> <p>Schooling leads to higher growth and productivity and thus exports, but macro effect depends on type of country (education important for catch-up in low income countries)</p> <p>Good quality schooling is basis for further education and training, including for entrepreneurship</p>	<p>To upgrade to higher value added exports and remain competitive (in case studies, e.g. in Thailand)</p> <p>Entrepreneurship skills relevant for marketing of products and services (e.g. for marketing forest products from Bolivia/Mexico)</p> <p>Communication and leadership skills for participating in global value chains</p>	<p>Education affects the structure of exports: the more years the more sophisticated and diversified the exports (e.g. graduates behind Chilean forestry exports)</p> <p>Important for participating in knowledge intensive services exports (e.g. India, Singapore)</p>	<p>Foreign education and networks of national abroad are associated with further trade in goods and services (see next matrix)</p>
Private cross-border financial flows (inward FDI)	<p>Schooling is an important explanatory variable in regressions explaining inward FDI in developing countries</p>	<p>Technical and engineering skills for manufacturing FDI (Asian examples)</p> <p>Little effect in simple assembly operations</p>	<p>Availability of technical and engineering graduates facilitates manufacturing FDI (case studies in Singapore, Malaysia, Costa Rica)</p>	<p>Expatriates/courses in natural resources industry</p> <p>Might lead to diaspora investment (e.g. India)</p>
Migration (emigration)	<p>Data on skill intensity of migrations show there is little effect from primary education and a moderate effect from secondary</p>	<p>Trained nurses, teachers, accountants and IT specialists are in demand in developed countries (see UK data on work permits)</p>	<p>Strong effect on emigration, but in particular occupations/ countries (e.g. Zambian doctors)</p>	<p>Students stay abroad for work; skilled foreigners associated with multinational enterprises</p>

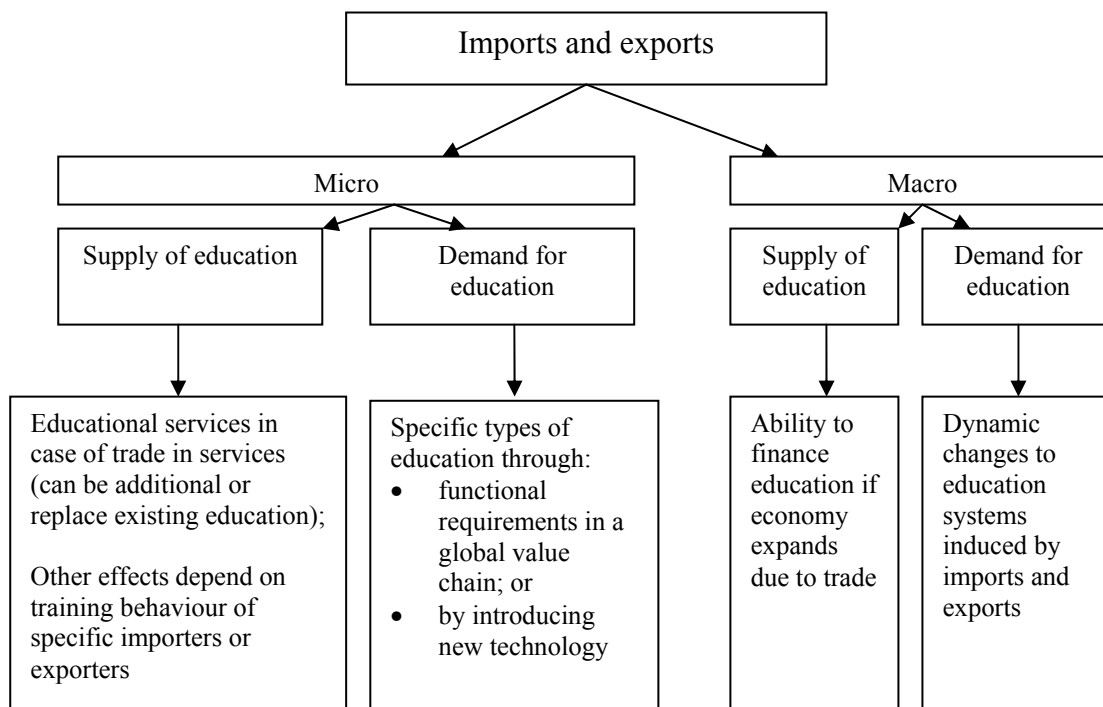
5 The Effects of Globalisation on Education

This chapter focuses on how the processes of globalisation (measured by trade, FDI and migration) affect education and human capabilities. We distinguish between effects on the demand side and the supply side, because in some cases globalisation processes add the human capital stock, while in other cases globalisation processes put certain requirements on the demand for education.

5.1 The effects of trade on education

While education helps the economy adjust to new conditions due to globalisation, trade can affect education in various ways, see Chart 2. Trade can have macro effects if imports and exports shift the structure of the economy, requiring that countries specialise in certain types of education (Wood and Ridao-Cano, 1999). There are also micro effects when the emergence of global value chains force countries to specialise in certain *functions* (lock in), e.g. when large importers of clothing require developing country firms to maintain simple operations where little training and education is needed. Kaplinsky (2000) further makes the point that it is not important whether countries participate but on what terms they participate. It is often asserted that developed country importers put developing country suppliers under severe pressure to cut costs and improve quality. In this way suppliers would still supply the same quality but command lower prices. Trade can also affect the supply of education, and act as a substitute or complement to domestic provision.

Chart 2 The effects of trade on education



Below we will discuss the effects of trade at the macro level (both demand and supply) and micro level.

Trade and demand for education at macro level

There is a rapidly emerging literature that deals with the relationship between openness to trade and the demand for skills and education. In many of the developing and developed countries there has

been an increase in the relative position of skilled workers. There are three factors which are usually suggested as possible candidates. The first is openness to trade (and the globalisation process) and the second is technical progress and the associated organisational change. The third is based on institutional factors such as the presence of unions. Increased openness to trade increases the demand for skilled workers which gives rise to their wages (higher returns to human capital and education) relative to those of unskilled workers. These higher returns to education and skill provide higher incentives to invest in human capital. One question is whether this will lead to higher supply of skills.

The evidence on the effects of trade on the structure of labour markets emerged in the 1990s, (see e.g. Wood, 1997). It might be helpful to recall some recent studies as they relate to how openness to trade affects the labour market and ultimately the provision of education and training. Chuang (2000) argues that there exists a close relationship between trade and human capital accumulation. Opening up to trade increases the returns to skill and opens up new opportunities. Export growth promotes learning and the diffusion of technical knowledge (Grossman and Helpman, 1991; Chuang, 2000). Even though exports of developing countries are usually of low skill content, they can induce technology transfer from developed to developing countries. Because technical change has been skill-biased in the past decades in several countries (Berman and Machin, 2000) technology transfer promotes the accumulation of human capital (Pissarides 1997). This is reinforced by the fact that learning from technology transfer is faster in the presence of trade.

Stokey (1996) shows that trade may result in a rise in wage rates and skill premia and thus an acceleration of human capital accumulation (through the complementarity of capital and skilled labour and the substitutability between physical capital and unskilled labour). Hanson and Harrison (1995) show this for Mexico. Accumulation of human capital enhances the quality of labour which increases factor productivity creating a comparative advantage. At the same time there exist significant feedback effects from growth to human capital accumulation.

Sanchez-Paramo and Schady (2003) explain increases in wage inequality across countries and within countries, in Argentina, Brazil, Chile, Colombia and Mexico. They find evidence of increases in the demand for skilled workers, which occur within sectors and in the same sectors in different countries. Galhardi (1999) argues that rapid growth of international trade, international investment and technological upgrading and transfers in manufacturing have led to the emergence of new centres of production. This mostly applies to the late industrialised countries in East Asia and Latin America. The move away from manual assembly to machine production required the replacement of specialised manual skills by broad generic skills. This has subsequently led to a shift in the distribution of skills and the demand for labour. Galhardi shows evidence of increased skill content of labour in Korean manufacturing exports. This is indicated by increases in the highest levels of educational attainment and the growth of certain occupations such as managers, professionals, technicians and associated professionals. Despite an increasing concentration on less-skilled intensive manufacturing export sectors as a result of trade liberalisation there was a reduction in the proportion of production and related workers and an increase in non-production workers (a within-sector shift). A similar trend was observed in Brazil. Thus the skill content within the manufacturing sectors has improved and has more than offset the negative impact across sectors.

Wood and Ridao-Cano (1999) examine the impact of trade on skill inequality in theory and empirically. There are conflicting economic theories in this area. Classical trade theory suggests that increased trade would lead developing countries to converge with developed countries. Other theories suggest a specialisation based on differences and inequalities between trade patterns which shift the structure of production in low-skill countries away from sectors of greater productivity growth potential, as suggested above. Wood and Ridao-Cano provide an alternative explanation,

based on a skill version of the H-O model (the traditional trade model as discussed before), and which is consistent with increased international skill inequality. Trade-induced changes in the relative wages of skilled workers stimulate supply responses which widen the initial gap in skill endowments among countries. The application of the model shows that trade has raised inequality in education by raising secondary and tertiary enrolment rates more in high-skill, high-income countries than in other countries. This would imply that trade has raised income per capital levels, but more so in more advanced countries.

Trade and supply of education at macro level

Trade provides an incentive to increase the supply of skilled workers if the country specialises in more skill intensive sectors. However, it can have a more direct macro effect on the supply of education. There are basically two channels. The first is that increased trade can lead to faster growth (traditional trade theory anticipates this to be temporary, while new growth theory expects this to be permanent) which should free up more fiscal resources for the supply of education.

The econometric evidence demonstrates that there is a positive correlation between export-orientation and growth (and between openness to imports and growth). Dollar and Kraay (2000) find a positive relationship between openness, growth and incomes of the poorest one-fifth of the income distribution. They include results with regard to the relative importance of domestic policies (in as far as they can control government consumption, inflation, primary education and the rule of law) and trade *outcomes* (export and imports as per cent of GDP). But studies like these do not confirm the direction of causality (on which evidence is less conclusive) nor the importance of trade policies, as it is not clear what drives exports (or imports). On balance, the evidence suggests that openness to trade is conducive to growth, conditional on appropriate domestic policies and institutions (see also Rodrik, 1999).⁷

A second channel is through fiscal revenues from trade taxes. A number of countries depend on trade taxes (e.g. import duties) for their fiscal revenues, and recently these may have decreased as a result of lower import duties (if not compensated for by a more than proportional increase in the volume of imports) and this would lower the amount of resources available for the provision of education.

Trade and education at the micro level

The effects at the micro level are basically similar to the effects at the macro level. They manifest themselves in two ways. First, returns to education are often highest in the export firms/sectors, particularly for the skilled workers, see Table 17.

⁷ Several researchers have investigated the importance of domestic institutions in determining differences in per capita income. Based upon a sample of 64 ex-colonies in 1995, Acemoglu *et al.* (2000) find that over 75% of the difference in per capita incomes is due to differences in institutions (as indicated, for example, by protection of property rights). A difference is made between countries where Europeans settled in large numbers leading to institutional developments, and countries where a local elite was empowered to extract natural resources, leading to weaker conditions for broad-based growth.

Table 17 Wage premia in exporting firms, by skill level

	<i>Country</i>	<i>Wage Premia in exporting firms</i>
Aw and Batra (1999)	Taiwan	30 % for skilled workers; 14 % for less skilled workers
Isgut (2001)	Colombia	12.2 % on average, but greater for white collar workers
Milner and Tandrayen (2003)	Five African countries	8.5 % to 17.6 % for all workers, but greater for white collar workers

Secondly, trade (imports as well as exports) forces firms to become more productive and competitive, employing more skilled workers and providing more training. Moran (1998) and Chuang (1998) finds that exposure to foreign competition is important for skill upgrading. 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 requiring further training. Thus, continued participation in export markets requires continuous skill upgrading through training.

There is also increasing interest in the impact of global value chains on upgrading of suppliers in developing countries. Value chain governance influences how production capabilities in suppliers are upgraded. Value chain analysis considers four types of upgrading (Kaplinsky and Morris, 2001). Process upgrading is associated with increases in the efficiency of production processes within or between stages of the value chain. Product upgrading leads to improvement and introduction of products. Functional upgrading changes the mix of activities and functions conducted within the value chain or firm (for example, taking responsibility for marketing and design, improving transactions, and optimal redistribution of activities). Finally, chain upgrading involves moving to a new value chain. As discussed before, upgrading requires human capabilities.

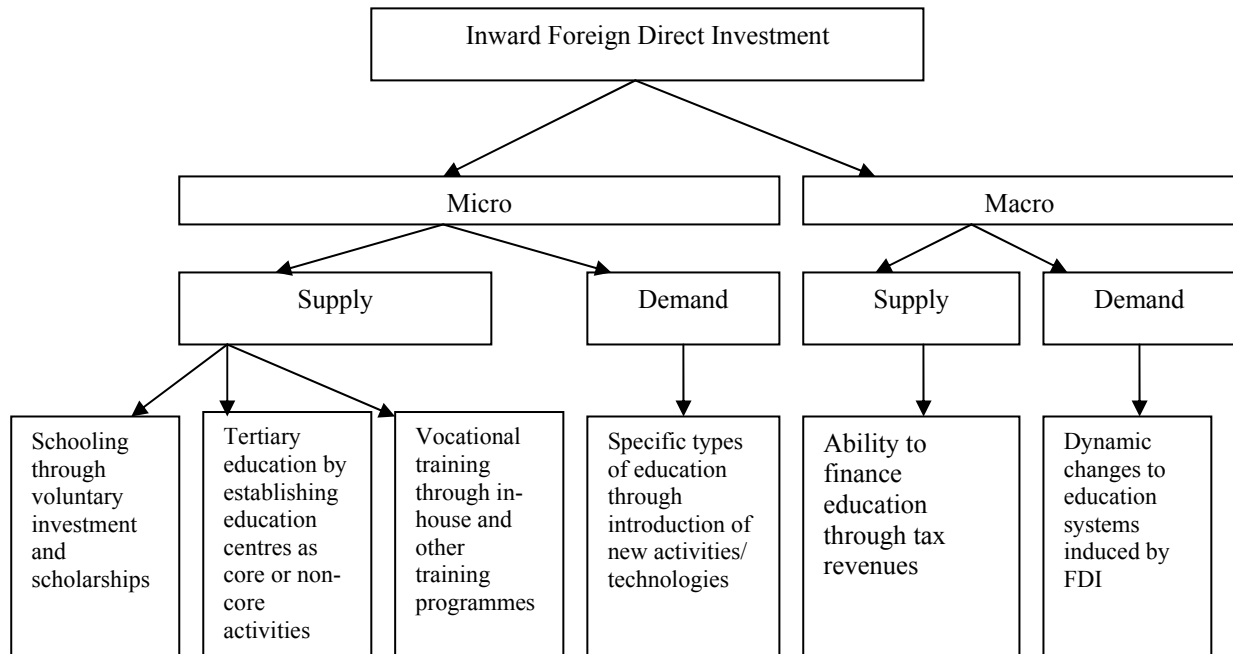
In a ‘captive’ value chain (when producers are locked into a buyer-driven system) as one example, there are both opportunities and barriers to achieving success for suppliers by upgrading in such chains. A classic example where upgrading helped to raise the human capabilities of suppliers is the textile and clothing value chain in several Asian countries (Gereffi, 1999). East Asian countries upgraded production processes and functions (from simple assembly to marketing and design) in the context of ‘triangle manufacturing’, whereby developed country buyers place orders with East Asian countries, who in turn became successful entrepreneurs and outsourced parts of the production to low-wage countries (China, Indonesia, Vietnam). East Asian countries are now much more involved in design and other functions further down the value chain. However, other countries (e.g. Central American countries) are locked into the upstream part of the value chain with few incentives (from lead firms lower down the chain) to upgrade.

Kaplinsky et al. (2003) discuss the global value chain of wooden furniture in South Africa where pine furniture has faced increasing price competition putting pressures on export prices. Products were also considered of low quality and poor delivery reliability. The global buyer in this captive value chain did not consider increasing the efficiency of this manufacturing stage and switched to more competitive East Asian suppliers, while South Africa had to focus on a different value chain using environmentally friendly wood (and upgraded in that way). Hence, in one example taking part in global value chains enhances human capabilities while in the other example this is less clear.

5.2 The effects of Foreign Direct Investment on education⁸

Chart 3 illustrates the links from FDI (inward) to education. FDI can affect the demand and supply of education and training, and the effects are usually different from the effects of local investment. We also distinguish between micro (firm level) and macro effects. The latter incorporate dynamic effects. The discussion in this section 5.2 follows the links as set out in Chart 3. The section includes a number of crucial points relevant for country policies towards education, growth, FDI, and working with MNEs and these will be linked to the discussion on policies in Chapter 6.

Chart 3 The effects of foreign direct investment on education



Macro effects on demand for education

MNEs can affect the demand for skills in different ways (see Slaughter, 2001 for further analysis). Firstly, MNEs may affect the scale of operations. This depends on whether they substitute or complement local employment. It is difficult to generalise on the *MNE-scale of employment* link as much depends on the country, industry, type of investment and time span under consideration (see e.g. OECD, 1995) and policy interventions (Lee and Vivarelli, 2004). Secondly, MNEs can employ a more skilled workforce than otherwise similar local firms, resulting in a *composition effect*.⁹ Increased MNE activity tends to shift the relative demand for skills upwards.

Finally, (indirect) evidence is emerging that MNEs have accelerated SBTC (skill-biased technological change). 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, and Berman and Machin, 2000), and MNEs may have transferred skill-biased technologies,

⁸ See discussion in Te Velde (2002).

⁹ 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 (1995) or Markusen and Venables (1997), where MNEs are assumed to be more skill intensive than local firms.

making skilled workers more productive. When MNEs enhance opportunities for skill-biased technical change they raise the relative demand for skills, holding other factors constant.

The combined effects of FDI can be estimated in a relative wage curve that includes inward FDI. Te Velde and Morrissey (2004) do this for East Asia and find that inward FDI did raise the demand for skilled workers in Thailand, and because the supply side had not responded soon enough, it raised wage inequality.

Macro effects of FDI on the supply of education

The macro effects of FDI on education are complex and run in part through increased growth and productivity and through dynamic incentives provided to the economy. It is generally acknowledged that FDI leads to growth in developing countries, conditional upon appropriate policies (education, infrastructure etc.) being in place (UNCTAD, 1999, and Mortimore, 2004, for a survey and critique of spillover studies). This can lead to more (private and fiscal) resources, some of which can be used for the provision of education.

As discussed before, new growth models and international business studies predict that when countries liberalise their trade and investment regime in an environment of imperfect technology transfers, they will specialise in activities depending on the initial conditions such as skill endowments. Countries with few skills tend to specialise in low-skill intensive production, while countries with a high innovation rate and skill endowment tend to specialise in the production of high-skill intensive goods. The econometric evidence based on an unbalanced panel for 111 countries over seven five-year time periods from 1970 to 2000 confirms that FDI enhances skill development (particularly secondary and tertiary enrolment) in countries that are relatively well endowed with skills to start with (Te Velde and Xenogiani, 2005).

Not all countries use financial and natural resources well. For instance, Mauritius and Botswana are very different from Nigeria though all have received significant FDI. Nigeria did attract a lot of FDI in petroleum related activities but the presence of this FDI has not led to new incentives for developing secondary education; the indirect impact on education through fiscal revenues was also not used sufficiently for investment in human resource development. Mauritius, a small country relatively well endowed with human resources skills, on the other hand, has been able to develop since the 1980s on the basis of foreign and local investment in garments and textiles in the EPZ programme (UNCTAD, 1999; Subramanian and Roy, 2003). Skills, and secondary enrolment rates in particular, developed further as a result, although currently certain technical skills required to move into high skill activities such as financial services are under supplied. Mauritius engaged positively with globalisation with successful human resource development. Botswana used the resources from diamond exploitation by foreign companies in a responsible way by investing in education.

Micro effects on demand for education

As foreign owned firms operate at the technology frontier, they need to install the latest technology which requires skilled and educated workers. The idea that technology and skills go hand in hand has been discussed since Griliches (1969). There is some disagreement about what is cause and what is effect. On the one hand, Bartel and Lichtenberg (1987) provide evidence that the availability of skills facilitates the adoption of new technology. On the other hand, the use of superior technology often requires skilled workers. Teece (1977) investigated the nature and costs of technology spillovers from firms in one country to firms in another country, including spillovers between parents and affiliates. He argued that technology is not simply a set of blueprints available

at zero costs. Instead there is ‘a great deal of uncodified information ... carried by supervisors, engineers, and operators...’ (p.249). On this view, new technology requires skilled workers.

There is supporting evidence that foreign owned firms introduce the latest technology and thus affect the demand for skills in the national economy. Te Velde (2003) shows that MNEs have been behind the spread of skill-biased micro-electronic technologies in Britain over the period two decades up to 1998. Tan (2000) uses panel establishment data from Malaysian manufacturing and identified an increase over the 1977–1995 period in the employment of highly skilled professionals, managers and technicians (PMT). He finds that technological change proxied by total factor productivity growth (TFP) is skill-biased for the most highly skilled group of PMT workers. Tan also found that foreign firms are more likely to be using most types of IT, followed by joint-ventures, then by local firms. This implies that foreign firms introduce technologies that are associated with skill-upgrading, benefiting particularly the educated workers.

Micro supply of education and training – voluntary contributions

MNEs affect the supply side of human resources through voluntary contributions, general education, official training and informal on-the-job training. Informal on-the-job training is likely to correlate with the skill content of the job, and hence MNEs offer more of this when they are more skill intensive. Little is known about the effects of voluntary contributions by private companies on education.

The Commonwealth Business Council (2004) provides three examples of voluntary involvement of the private sector in education provision: Alcan operates 180 schools in Canada, US, Brazil and South East Asia, where 30,000 students at any time are taught about environmental protection and entrepreneurial skills; BAT (British American Tobacco) provides funds each year to follow tertiary education for 10 students from underprivileged backgrounds; Diageo/East African Breweries in Kenya sponsors 30 students to go to University. There are various reasons for this, but is in part motivated by self interest. For instance, in the case of Diageo, it had difficulties finding good quality technically educated graduates.

Voluntary investments are also common by natural resource companies. Shell’s behaviour changed after its debacle in Nigeria and it stepped up its community spending there and in 2000 it amounted to US\$60m annually (0.2% of Nigerian GDP), with US\$1.2m for vocational training and US\$2.5m for secondary and tertiary scholarships. Over 1998–2000 BP-Amoco expenditure on social investment rose from US\$64.9m to US\$81.6m, worth around 0.6% 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 worldwide, worth around 0.3% of total sales, with US\$19 million spent outside the US. Rio Tinto spent US\$49.5m on communities programmes worldwide in 2000, worth over 1% of value added; 77% of Rio Tinto businesses offer programmes to improve secondary school education.

The automobile sector is also involved in voluntary contributions at all levels of the education system. McGrath (2005) examines the automobile industry in South Africa. DaimlerChrysler is involved in a wide range of CSR (corporate social responsibility) programmes that have an education focus. It is supporting the provision of technology equipment to 100 schools in partnership with others. The company is supporting improved teaching and learning in science, mathematics and technology in rural schools. In conjunction with Africa Scientific Instrumentation (Pty) Ltd, DaimlerChrysler is supporting mathematics, science and technology education in Gauteng. The company also sponsors the national Baja competition in mathematics and science. DaimlerChrysler supports CIDA University, which is a low cost higher education institution based in central Johannesburg and focused on disadvantaged students. The current agreement is for R9

million over three years. The company also provides sponsorship of students at four public universities.

In general, however, the lack of systematic evidence prevents us from understanding all linkages, the extent of these, what best practice linkages constitutes and how these came about. The developments in the field of CSR have meant that the meaning of CSR is broadening from simple charitable giving towards using the core competencies of companies for the benefit of the local economy. The hypothesis is that employing companies' core competencies (supply chain management, financial management) will have more effective and efficient consequences for poverty reduction than sticking to charitable giving alone.

Micro supply – vocational training

The involvement of MNEs in firm-specific and general vocational *training* is another way MNEs can affect the supply of skills. This goes beyond charitable giving and is in the self-interest of firms. There is evidence that MNEs provide more training than their local counterparts. Using a sample of firms in Colombia, Mexico, Indonesia, Malaysia and Taiwan – ranging from 500 to 56,000+ firms in single years in the early 90s – 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 (see Dunning, 1993). In addition, foreign ownership was associated with increased training in Malaysia and Taiwan.

UNCTAD (1994) provides further evidence on the extent and nature of MNE training practices. MNEs spend more on training in their foreign affiliates than do local firms (see Table 18), 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% of staff received training) and less at sales employees (16%) and production workers (2%). While MNEs can train production workers on the job, professional employees get more formal training and are sent to international training courses using the MNEs' international networks. 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 18 Examples of MNEs and training practices

<i>Study</i>	<i>Data used</i>	<i>Training practices of MNEs</i>
Tan and Batra (1995)	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.
Gerschenberg (1987)	72 managers in 41 firms	MNEs offer more training only when host country governments hold part of the equity.
Lyanda and Bello (1979)	14 Lagos/ Nigeria-based firms	Training expenses per employee five times higher in MNEs compared to indigenous firms, and were aimed relatively more at white-collar and relatively less at blue-collar workers.

While foreign firms tend to train more than local firms, there may be difference amongst foreign firms according to their specific characteristics. Dunning (1993) suggests a breakdown according to the motivation for FDI and suggests that different motivations may potentially determine the extent to which MNEs 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 (sometimes foreign education), but key employees are flown in. *Efficiency seeking* manufacturing MNEs offer only limited training because such MNEs are often motivated by the availability of low-skill, low-wage labour. Finally, training plays an important role in *strategic asset-seeking* MNEs. These often try to innovate and implement new leading-edge technologies. Both activities require well-educated workers, whose skills can be augmented by specific training.

Finally, *market-seeking* investments involve limited training of local people to exploit the firm-specific advantage. Such MNEs are often replicas of their parents (horizontal MNEs) and may devote training efforts to specific technological or marketing approaches skills. 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).

Micro supply – tertiary education

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

Business schools (for example, Harvard, MIT, London Business School, Stockholm School of Economics) have become international companies 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 standards¹⁰ in business education.

International education providers are increasingly setting up centres in developing countries (e.g. Bennell and Pearce, 1998). Host-country governments increasingly allow (including through liberalisation in GATS) or actively attract (e.g. Singapore) business education supplied by foreign companies (and the content is under scrutiny). This may help the spread of best practice techniques and international standards in business education, but there are consequences for equitable access to education, as in South Africa (Akoojee and McGrath, 2003), of the increase in private provision of education (including in sub-Saharan Africa).

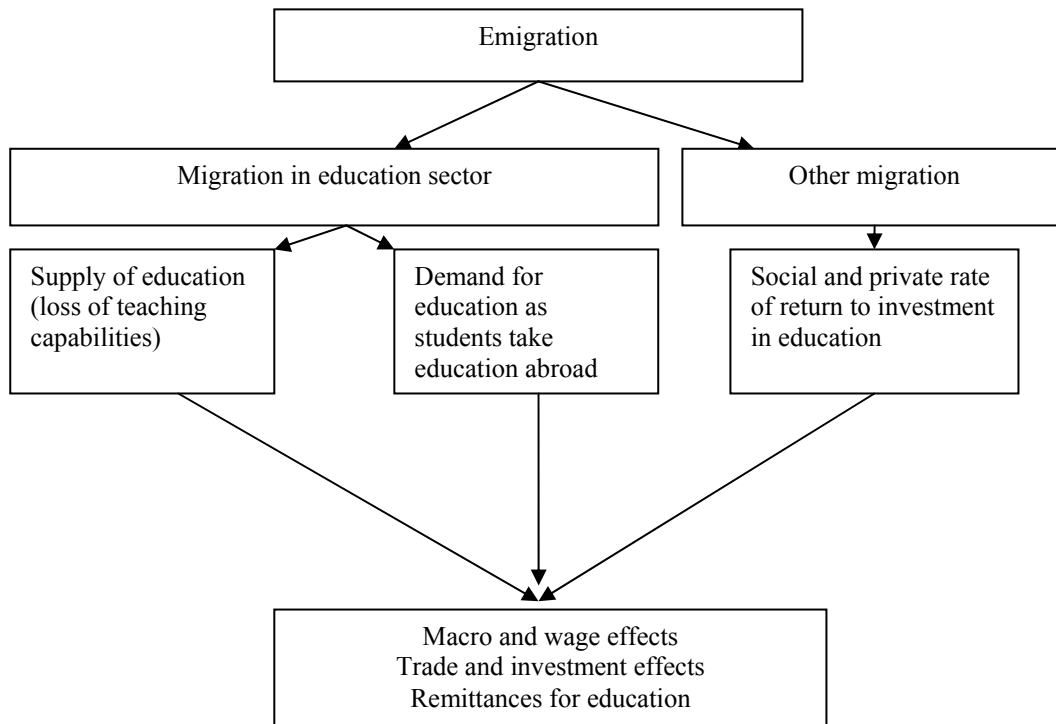
It is possible that foreign business schools in Asia can find a market, but offshore schools in the Caribbean cater often for developed country students (who come over from the US for a year or more) and only at the margin for local people. Thus, international schools may not be a substitute for local public or private provisions of tertiary education. Instead, from a development perspective they might bring in fees (license fees can be a substantial form of income for small countries). On the other hand, the host country is responsible for accreditation and ensuring the provision of good quality education and building up a good reputation.

¹⁰ The *Financial Times* supplement on *Business Education* indicates that several quality control bodies have been formed in recent years where international business schools can seek accreditation. Accreditation guarantees a minimum of quality.

5.3 The effects of migration on education systems

There are several effects of migration on the supply and demand for education. Chart 4 shows the main links that we need to assess for the effects of emigration on ‘sending’ countries: effects of emigration on the education sector, both directly and through macro effects, and on the economy as a whole, both directly and through other effects. There is a separate literature on the effects of education which we do not discuss here.

Chart 4 Effects of emigration on education



Migration and the supply/loss in teacher capacity in the education sector

The literature on migration from 1960s (e.g. Grubel and Scott, 1966) emphasised that skilled migration affects ‘sending’ countries negatively. This is when the migrants contribute more to the economy than the marginal product, or when education and training of skilled emigrants is partly funded by revenue. Migration will lower the social rate of return of public investment in education. Teacher migration/mobility has been highlighted as having possible adverse effect on the delivery of education services (Sives, Morgan and Appleton, 2004).

The literature indicates that it is important to consider the effects of emigration on domestic capacity according to type of country: smaller countries have more capacity problems when teachers emigrate than larger countries. This is because larger countries can respond more easily to the emigration of teachers, while the smaller countries tend to have the highest emigration rates. In part this is because it will more costly to replace workers in smaller countries than in larger countries.

Macro effects of migration on education

Migration processes have several macro effects, some of which can benefit education systems in 'sending' countries, or groups within them. For instance, when teachers are scarce emigration of teachers will push up their wages in the source country. This is often a theoretical option only for the poorest countries, as they cannot afford to pay much more.

Many developing countries have a comparative advantage in labour and would benefit from migration possibilities which would free up resources e.g. for education provision. Unfortunately, there are significant barriers for developing country labour to move to developed countries. Winters (2002) finds that an opening of developed countries to allow temporary entry by foreign workers, equal to 3% of the current workforce, would generate welfare (real-income) gains that exceed those from full merchandise trade liberalisation. If developed countries permitted movement of labour of up to 3% of the total labour force, world incomes would rise by \$156 billion. Developing countries would be the main gainers and the net welfare for the African region would be \$14 billion.

Several studies have examined the impact of emigration on growth in 'sending' countries. The effects are complex. For example, Beine et al. (2003) find, using a cross-section of 50 developing countries, that most countries combining low levels of human capital and low migration rates of skilled workers are affected positively by emigration. That is emigration leads to *more* investment in human capital. By contrast, the brain drain appears to have negative growth effects in countries where the migration rate of the highly educated is above 20% and/or where the proportion of population with higher education is above 5%.

Migration and private incentives to invest in human capital

The effects of migration prospects on human capital formation have been the focus of several studies (see Vidal, 1998; Beine et al., 2001; Docquier and Rapoport, 2004), suggesting that such prospects may in fact foster human capital formation and growth in 'sending' countries. If the return to education is higher abroad than at home, the possibility of migration increases the expected return to human capital, thereby enhancing domestic enrolment in education. More people, therefore, invest in human capital as a result of increased migration opportunities. This acquisition can contribute positively to growth and economic performance. Docquier and Rapoport (2004) go as far as to suggest that the optimal migration rate of a highly educated population is likely to be positive. Much of this argument remains a hypothesis and based on unrealistic assumptions, such as perfect capital markets; unfortunately not everybody who wants to invest in human capital can borrow the funds to do so.

Other effects of migration

There are other effects. Firstly migration is associated with remittances (World Bank, 2004); migration raises the possibilities of finance for education through remittances (e.g. Adams, 2003). Total remittances to developing countries amounted to US\$80 billion in 2002, about 50% more than official aid flows. Remittances to sub-Saharan Africa were US\$4.1 billion in 2002 (US\$2.1 billion over 1991–2000), compared to US\$19.4 billion in gross aid and US\$7.8 billion in net inward FDI. The impact of remittances can be high, especially for small countries whose labour force tend to emigrate in larger proportions (Lesotho, 26.5% of GDP; 19% in Eritrea, 13.6% in Cape Verde; Uganda, 8.5%; 6% in Comoros); much is spent on consumption and a small proportion is spent as investment (Sander and Maimbo, 2003). Not all remittances are North–South; in fact, the contrary applies to countries such as Lesotho where South–South migration tends to be high. Remittances are substantial for the Caribbean, see Table 19. Latin America is the largest receiver of remittances and about \$6bn of the total of \$46 billion in 2004 was used for investments.

Table 19 Remittances and migration

<i>Country</i>	<i>Remittances, 2002, US \$ million</i>	<i>Tertiary educated share of total migrants (%)</i>	<i>Migration rates of tertiary educated (%)</i>
Barbados	84		
Cuba	1,138		
Dominican Republic	2,111	22.6	14.2
Guyana	119 (16.6% of GDP)	40.7	77.3
Haiti	931 (24.2% of GDP)		
Jamaica	1,288 (12.2% of GDP)	41.7	67.3
Trinidad and Tobago	59	46.7	57.2

Source: Nurse, K. (2004) and own calculations

Secondly, migrants can learn valuable skills which can offer benefits to the ‘sending’ country if and when migrants return (Domingues Dos Santos and Postel Vinay, 2003) and skills have been acquired abroad. Thomas-Hope (2002) finds that Caribbeans in the UK increasingly return to the Caribbean – this would be consistent with decline in brain drain reported before. For instance, children of migrants have become skilled in the UK and then returned. Most of the return migrants in Jamaica and Barbados are from the UK, and a significant proportion come from high level occupational groups.

Thirdly, the diaspora helps to create business and trade networks (Dustmann and Kirchkamp, 2002; Mesnard and Ravallion, 2002). Arora and Gambardella (2004) discuss the diaspora and human capital flows. The diaspora creates links with other countries by acting as intermediaries. The network effects and externalities of the diaspora have already been recognised for trade in goods (Gould, 1994; Rauch and Trindade, 2002) but it is just as valid for trade in services, for example, inbound tourism and well-known carnivals and other festivals in the Caribbean (see also Thomas-Hope, 2002).

Permanent and temporary migration may raise merchandise trade flows (Jansen and Piermartini, 2004):

- migrants prefer goods they were used to consuming at home, and may import from the country of origin
- migrants possess knowledge about their country of origin that makes matching/network search costs lower
- migrants facilitate a stronger enforcement of international contracts.

Jansen and Piermartini cite several studies which find a positive impact of migration on trade flows based on augmented gravity models:

- A 10 % increase of immigrants in the US will increase US exports to the country of origin by 4.7 % and US imports from the country of origin by 8.3 % (46 countries, 1970–1986); thus the trade balance for the ‘sending’ country will improve overall.
- A 10 % increase in immigrants in Canada raises Canadian exports to the country of origin by 1.3 % and imports from the country by 3.3 % (again, the trade balance of the ‘sending’ country will improve).
- A 10 % increase of migrants in the UK from a non-Commonwealth country raises UK exports (imports) to those countries by 5 % (1 %) in the long-run, while the effect is insignificant for migrants from Commonwealth countries.

- They have also preformed their own preliminary regressions suggesting that temporary migration is associated with similar effects as in the above studies.

5.4 Conclusions

Table 20 provides a summary matrix of the effects of economic globalisation processes on education. Main points include:

- Trade and FDI can have a positive effect on education and training. This is both direct (more training) and indirect (available resources). However, the overall effects are more positive in countries that are already relatively well endowed with education to start with.
- The effects of migration are complex. While the indications are that overall effects are positive through network effects on trade in goods and services and through remittances, emigration leads to direct and noticeable, in small countries, capacity losses in specific professions such as teaching. This suggests a targeted solution to compensate for specific issues.
- Foreign provision of education might help an economy, but there are issues related to access and accreditation.

Table 20 Effects of globalisation processes on education

Measure of globalisation	Effect on:			
	<i>Schooling</i>	<i>Vocational education</i>	<i>Tertiary education</i>	<i>Foreign education</i>
Trade (exports)	Effects are more positive in countries already well endowed (regressions)	Positive incentives to increase supply of training to remain competitive (e.g. Thailand)	Positive stimulus, because education needs to move in tandem with export opportunities (see e.g. South Korea case study)	Education services are increasingly traded; developed countries (US, UK, Australia) control most of market, but developing countries emerging
Private cross-border financial flows (inward FDI)	Effects are more positive in countries already well endowed (regressions)	Foreign firms train more (micro-econometric studies)	Foreign provision good for economic development, but presents issues related to access and accreditation	Foreign investors require expatriates.
Migration	Remittances (data) might help to finance education Migration (e.g. diaspora, or short-term migration) leads to exports and development (regressions), and thus resources for schooling Loss in teaching capacity (in smaller countries) worsens schooling	?	Loss in domestic capacity, such as in teaching	Significant amount of students from developing countries seek education abroad

6 Role of Public Policies in Reconciling Processes of Human Resource Development and Globalisation

This chapter examines the effectiveness of policies aimed at reconciling the processes of globalisation and education in a way that is conducive to development. As we have seen, the current forms of economic globalisation have put new requirements on education and training (different types in different countries) opening up a potential wedge between supply and demand of education if education and training systems are not sufficiently responsive. On the other hand, the right type of education enables countries (or firms) to take part in economic globalisation processes with ultimate benefits for development. The crucial issue is to make sure that the supply of education and training is in tune with the new demands arising from globalisation. Hence the need for appropriate policies and institutions to ensure that human resource development is appropriately aligned with the opportunities and consequences of economic globalisation processes.

Good quality and appropriate education is amongst the main drivers of competitiveness and successful participation in globalisation processes. Johansen and Adams (2004) argue that globalisation and competition require higher skills and productivity among workers, both in modern companies and in the micro and small enterprises that support them. But it is widely acknowledged that there are market and coordination failures in providing education, and the market for training is also characterised by market failures. We will briefly review the existing literature on education-related market failures related to trainees, firms and coordination failures in education and training systems more generally (Lall, 2001).

Coordination failures affect education and training systems, technological development, trade, and the interaction between them. Many skills relevant for industrial upgrading and competitiveness arise from learning-by-doing and specialisation in skill and technology intensive activities. Lall and Teubal (2001) argue that a market for setting priorities in technology development does not and cannot exist. Technological development is based on learning, and stimulating this process requires the setting of priorities, identification of linkages and selection of technological promotion. This requires an overall vision of where the economy should or could be heading (see Hausman and Rodrik, 2002, on learning about costs of industrial policy), in addition to an analysis of the more traditional market failures such as for adoption of individual technologies. A failure of coordination amongst skill formation policies and industrial or technological policy can prevent an economy from achieving a higher development path. This is because moving into new activities and adopting new technology requires sufficient, good quality and appropriately skilled workers (Bartel and Lichtenberg, 1987; Stewart and Ghani, 1991) while working with new technologies involves learning and acquiring practical experience as well as informal skills.

The existence of market and coordination failures justifies government involvement in many aspects of human resource development. We would therefore need to discuss to what extent market and coordination failures in the education system are more severe in times of globalisation-induced changes. This implies examining coordination failures that span across national borders. Coordination failures related to cross-border capital-skill complementarity are evident from the fact that a significant share of African skills *and* capital is based outside the continent. For instance, DFID finds that 40% of capital is based outside the continent (DFID, 2000), while the Commonwealth Business Council¹¹ finds that 40% of skills is currently based outside the continent. Further details on emigration rates, see Adams (2003) or the data in Table 12.

Government involvement can also fail to achieve its objectives. Governments may have imperfect information and foresight (Arrow, 2002), or it may be too costly to design a full corrective policy

¹¹ See www.cbcbelink.com

(Stiglitz, 1994). Government intervention can suffer from moral hazard problems (Stiglitz and Uy, 1996; Hausman and Rodrik, 2002) and private non-market intervention, such as collective private action, can also solve market failures. Addressing national coordination failures based on scale economies is probably the most far reaching, but also the most risky. Finally, government intervention carries the risk of misallocation and rent-seeking behaviour.

None of this, however, undermines the rationale for government intervention, but clarifies that it is important to discuss the scope and effectiveness of public policies. We discuss the evidence on what policies have worked where to reconcile the processes of globalisation with human resources needs and supplies, resulting in a third globalisation–education matrix. We need to consider the specific contexts in which these policies work; the literature sometimes distinguishes between interventionist policies, proactive but market friendly national policies and a laissez-faire policy stance. Countries with strong governments and consistent policies are more likely to have successful proactive policies than other governments. We consider the following four categories of policies, and a combined category:

- human resource development policies
- investment policies
- trade policies
- migration policies
- coordination of policies.

6.1 Human resource development policies

Intervening in human resource development

Governments may want to address failures in the market for skills to encourage training in MNEs and other firms. There is extensive 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 investments.¹²

Market and coordination failures are likely to be greater due to the emergence of globalisation processes. Globalisation has meant an increase in the development of technology, technology flows across countries and increased fragmentation of production processes world wide. This has required an ever greater need for information flows to manage and take part in the processes of globalisation. Lack of information is precisely at the heart of market and coordination failures. So in times when technology moves faster and faster around the world, there is an increased need to be up to date with the latest needs for human resource development in order to solve market failures which would prevent a match between demand and supply of skills.

Policies that have tried reconciling the supply of and demand for education in times of globalisation include e.g. payroll taxes for training, use of sectoral skill taskforces and public–private consultations in determining human resources needs, public–private provision of education. There

¹² 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 (1920) 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.

are various examples of incentives and public–private partnerships to encourage training within firms, including the use of subsidies and tax breaks for MNE training expenditure, tax levies dedicated to support training, sharing the costs of training instructors, equipment or locations. Governments have also supported cooperation between public research institutions and MNEs. Rich governments can support new R&D centres as part of a cluster strategy, acting as a magnet for asset-seeking MNEs. Above all, appropriate schooling is necessary as a basis for further education and training.

Appropriate human resource development policies

There have been widely varying experiences in the use of training programmes. There are examples of successful human resource programmes in Malaysia and Singapore, while several programmes did not work properly in South American countries (except Chile and Costa Rica).

Green et al. (1999) examined the role of state in skill formation in the newly industrialised countries of East Asia. Education was very important in the competitiveness of the Tiger economies. Appropriate human resource policies enabled Singapore, South Korea and Taiwan to achieve the transformation of their workforce skills to match their economic transformation. They argue that economic miracles have been accompanied by education miracles. The key education elements in these countries are a group of schools, polytechnics and universities along with public and private training centres. The reforms of the education system were complemented by a sophisticated and modern public training system and lifelong learning. The reforms consisted of spending more on education and concentrating more effort on primary and secondary education. Education attendance was already at high level, partly because it affects social status and the egalitarian character of these economies. At the same time job and work related training was introduced.

According to Green et al., the first element which helped these economies was the greater focus put on basic skills and primary schools at the first stage of the industrialisation process. At later stages of economic growth they had to switch to higher level occupational as well as general skills. One particular issue about Taiwan's education for example, was a sufficient supply of vocational skills. In South Korea the focus was put instead on heavy industry and training systems so that students could go straight from schools to factories. Engineers and professionals needed technicians to assist them, and junior colleges created a supply of skilled technicians. Moreover, training was provided by several companies. In Singapore the basic literacy and IT skills were important, with the purpose of upgrading basic workers' skills with lifelong learning.

Galhardi (1999) argues in the case for South Korea that whilst exporting manufacturing industries were less skill intensive than other industries during the period 1970–1990, skill-upgrading was fastest in the exporting industries to meet global competition. Overall demand for skilled workers increased sharply and was met by an active role of the government in providing the skills in order to meet the needs of the rapid growth in the exporting sectors. Based on the experiences of Korea and Brazil, she argues that domestic policies to support human capital accumulation are essential complements of outward oriented trade policies.

In the case of Brazil, there was a change in the sectoral composition of imports and exports. In fact, the comparative advantage moved from sectors intensive in technology (machinery and electrical and communication equipment) to sectors intensive in natural resources (wood, cellulose, metallurgy, iron and steel industries). This change seems natural given the abundance of Brazil in natural resources. In Korea, the structure has changed from one based on food, textile and chemicals to one based on machinery, electronics and transport equipment (from labour intensive to capital and skill intensive sectors). At the same time the Korean economy has been very successful in import substitution of heavy industry products such as basic metals and machinery products, as well

as in their export promotion. In terms of employment growth, the most successful ones were exporting heavy industries and import competing industries. Export light and the domestically oriented industries lost their employment shares. In other words industries which were open to foreign competition managed to increase their employment shares.

The difference between the two countries, apart from natural resources, stems from the role played by the government. In Korea the government played an important role in promoting exports and prompting technological change and development of human resources. It controlled the degree of foreign competition through specific policies to promote exports, build up domestic industrial capacity and in-house developments. In Brazil, by contrast, there were no government policies attempting to foster skill intensive sectors. In Korea export promotion and import substitution have played an important role in upgrading the industrial and employment structures. In Brazil the skill level of sectors facing high competition from imports, that is the human capital intensive sectors, has increased.

In the 1970s South Korea, used to put more emphasis on developing vocational and technical skills for the newly emerging heavy and chemical industries. Later on the emphasis shifted towards higher education due to the increased demand for skilled workers promoted by the technological progress and policies in the 1980s. This story suggests that skill upgrading must be followed by a set of human resource and trade policies which are adjusted to the changing circumstances. Domestic policies which foster human capital accumulation are essential to more outward oriented trade policies. Moreover skill policies must be matched with patterns of sectoral development. Thus the educational and training systems must be redesigned to meet the needs of the most demanding exporting markets.

Johansen and Adams (2004) reviewed skills development in sub-Saharan Africa, which is on the whole very different from skills development in other regions. They conclude that:

- reform of skills development in the informal sector is essential to poverty reduction
- the record of technical and vocational education and training reform over the past decade has been promising
- public training continues to face challenges in reform
- non-government training institutions and enterprises account for most of the regional capacity for skills development
- management and finance provide powerful instruments for promoting reforms.

They also encourage governments to foster partnerships with other providers and argue that getting the policies right to encourage efficient training markets is an important first step.

Successful examples of appropriate education and training

Asian countries have actively attempted to engage the private sector in the provision and planning of training, in contrast to much of the Latin American experience where training institutions have been supply and state driven. Malaysia for example has seen 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 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% of employees' wages which

employers can partly reclaim for training budgets; as well as through a liberalisation of regulation of private sector training. The performance of the HRDF was impressive, helping more than 5% of the workforce in the first three years (Kiong 1997).

- Promoting the sharing of public and private sector training resources, through exchange of trainers or allowing the use of public training facilities (this was less successful).

The private sector in Malaysia is playing an increasingly important role in (the planning of) training. The Malaysian PSDC (Penang Skills Development Centre) is a good practical example of coordinating public and private sectors with respect to post-secondary training. The PSDC was set-up in 1989 in response to a growing shortage of skilled labour in the skill intensive operations (e.g. electronics and IT) of MNEs in the free trade zones and industrial estates. Financed initially through a pooling of public (grants, training materials, equipment and trainers) and private (donations, loan of equipment, furniture, private training facilities) resources, but it is now self-financing and offers courses at competitive rates and is officially recognised to offer technical and managerial skill training and higher education. The centre has the unique position of obtaining immediate feedback from the private sector about course content and future training needs.

The SDF in Singapore (Lall, 1996) is another example of how private firms (including MNEs) can be engaged in more training. The PSB (Productivity and Standards Board), responsible for the SDF, imposes a 1% levy (it was 4% 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 courses. This has had a significant impact on skill-upgrading in Singapore (an estimated 10% of the workforce has been to approved training courses).

The example of Singapore brings up another important issue, which is that Singapore has been able to use its tax and incentives framework successfully at the same time that it upgraded the workforce.

Outside Asia, good examples are scarce. McGrath et al. (2005) examine the relationships between the automotive industry and education and training systems in South Africa. The automotive industry consists of seven MNEs and has gone from a protected industry under the Apartheid system to producer and exporter of top quality cars. Skills development has been at the forefront (in addition to the incentives programme) in making this industry internationally competitive, and the car producers have taken an active role in the formulation of human resource policies. Key institutes include the public AIDC (Automotive Industry Development Centre), which sees itself as a facilitator between the supply-side (public further and higher education and training institutions) and the demand side (the automotive sector). It has signed agreements with a number of higher education providers to develop programmes for which there is a clear industry demand. Between 2001 and 2004 the AIDC invested R28 million in three public providers in Gauteng, leveraging in an additional R16 million from industry to support capacity-building. The investments have led to 26 new academic posts and reached more than 13,000 learners by mid-2004. The industry is now a supporter of human resource policies. While the industry is not representative for the rest of (South) Africa, the account shows that it is possible to build up a competitive industry in the presence of appropriate mechanisms to coordinate skills development.

Of course, the performance of such centres is not equal across locations or sectors. For instance, in the poorer regions there appeared to be more difficulties in communications amongst automobile companies as well as between the automobile industry and the providers of post-secondary education and training. It also appeared that coordination for human resource development was easier in the automobile sector than in others such as tourism, because of the geographical concentration and limited number of players.

6.2 Investment policies

There are several investment policies which may have a direct or indirect impact on education outcomes.

Targeting

Firm-specific targeting may be helpful when the government has the capacities to do this and when the basic fundamentals are in place. The targeting strategy by the investment promotion agency in Costa Rica has helped to attract electronics FDI. Attracting skill intensive FDI (such as Intel plants, etc.) will offer opportunities for skilled workers and provide a dynamic stimulus to human capital formation (Spar, 1998).

Incentives

Generally, incentives are not the main attractor of FDI but may help at the margin, and may be crucial in a handful of cases. However, it is surprising that developing countries offer incentives without linking these to performance. Relevant for this paper is that incentives can be linked to human resource development (and WTO consistent), either before entry (so that foreign firms bring in more skills) or after entry to upgrade the workforce, and these would not be different from incentives offered to local firms.

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 and capital, which varies from case to case.

Only a few governments link investment grants to the skill intensity of MNE affiliates. In Ireland, 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. 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, less wealthy countries cannot easily provide fiscal grants, even if they were effective.

After care

The more advanced investment promotion agencies provide 'after care'. That is they look after MNE subsidiaries and promote linkages with training and technology institutes.

Promoting CSR

Host countries can also promote CSR by companies, either by promoting the use of charitable giving to the provision of education; or more broadly by asking companies to stimulate local economic activities, through training activities for the benefit of their suppliers for example.

Training programmes for suppliers are sometimes done by companies on their own accord. For instance, Anglo American is involved in facilitating black empowerment in South Africa and has invested in 30 SMEs since 2001. In other instance, 'smart partnerships', coordination between the firms, local government and international organisations, help to improve local suppliers. Such coordination of actors bringing together foreign investors and local firms has been successful in the case of the Mozal investment in Mozambique.

6.3 Trade policies

There are three types of trade policy that may directly or indirectly affect education and training. Firstly, tariff liberalisation affects education, though indirectly. If done too quickly, while not giving the domestic private sector time to respond, tariff liberalisation can wipe out the domestic production (Lall, 1999). A loss in domestic manufacturing production reduces job opportunities and thus dynamic incentives for investing in human capital. It will also reduce on-the-job learning. So while consumers (and intermediate production) should benefit from lower import prices, there is a balance to be struck with regard to the timing of liberalisation order to give producers of import competing products time to respond in an appropriate way, including by stepping up the efforts to train the workforce to become competitive (e.g. Moran, 1998).

Secondly, export promotion in the broad sense needs to move in tandem with the human capital base. In the 1960s industrial policy in South Korea was focused on producing goods provided that they were for exports (Rodrik, 1995). The skill levels have been sufficient to sustain this.

Thirdly, there is considerable discussion about the role of education in international trade negotiations on services (GATS, see e.g. Sauvé, 2002; UNESCO, 2003a). Some of this is clearly misguided. Countries are free to commit sectors for liberalisation, but are never compelled to do so, and the services requests they face are usually not aimed at the education sector. Even so, many countries (we discussed the situation in the Caribbean) already allow foreign providers of tertiary education, so committing the education sector would not be liberalisation *per se* and would signal a commitment to foreign providers and would set a transparent level playing field. Without binding legislation, foreign providers such as medical offshore schools may be unclear about the investment climate.

There are however questions as to how to schedule a sector in GATS. Some 44 countries have scheduled tertiary education services in GATS. These include nearly full commitments in Jamaica (subject to registration and local certification). This has led to some concerns relating to education in Jamaica, where a private education provider is alleged to have challenged the government to give the same level of subsidies to private as to public providers (e.g. UWI and Utech which depend heavily on Jamaican subsidies). While there appears to be some ambiguity as to whether education services under control of the government are or are not covered by GATS when scheduling the sector, Jamaica made it clear that publicly funded educational institutions are not included in the scope of the commitment to liberalise tertiary educational services as that commitment applies only to private institutions engaged in the commercial supply of these services.¹³ It is thus important to be clear when scheduling the sector. The Caribbean region increasingly recognises the benefits of the education sector for trade and economic development.

¹³ Jamaican Observer, 22 November 2004

6.4 Migration policies

Migration raises welfare and provides benefits to ‘sending’ countries up to a point, so it does not seem sensible to restrict migration. However, the mobility of nurses and teachers is a concern to small ‘sending’ countries. Caribbean countries have become the target of recruitment agencies from bodies such as the UK NHS and the UK health private sector. There are several options to address the problems, to maintain a good education system and to limit the negative effects on human resources:

- Limit migration. Countries would not limit emigration by legislation, but they could try to limit the activities of recruitment agencies.
- Change the nature of migration from permanent to short-term, by encouraging temporary migration.
- Maximise the benefits of migration by targeting the diaspora.
- Seek compensation for loss of capacities.

We discuss these in turn. There are limits to voluntary agreements on recruitment because these would normally exclude the private sector, which is also involved in recruiting. However, there are signs that a ban on active recruitment of nurses abroad by the NHS (National Health Service) reduced emigration of nurses from the target countries. Martin (2003) reports that after the UK Department of Health instructed NHS employers not to recruit nurses in South Africa and the West Indies, the number of nurses from these countries fell (at the end of the 1990s). Another way to make it more difficult to migrate is the withhold accreditation for doctors for a specified period, as occurred in South Africa, but this may help only temporarily.

Another way to diminish long-term migration is by encouraging temporary migration. Offshored services can be delivered by workers who deliver services through temporary migration. Well-known examples of temporary migrants include Indian IT programmers but also South African doctors. Netcare of South Africa whose fast-track centres offer surgery to the UK NHS patients at a total of £2billion. The providers run mobile operating units and Netcare was to bring over surgical teams from South Africa on rotation once every 11 weeks, which would avoid poaching from the NHS or permanent jobs loss in South Africa. Temporary migration can be facilitated by negotiating improved market access for temporary movement, so that it is also easier for people to return.

A sensible approach is to accept the fact that emigration happens, and use it to the best possible and manage any negative consequences, e.g. on human resources capabilities. We suggested that networks are both a source of diaspora investment and a source of export revenue for goods and services. There are between 200–500 new nurses arriving from Trinidad and Tobago each year in the UK. While the loss of capacity in home countries needs to be taken into account, the diaspora is important for services exports (Hope, 2002). Festival tourism in Trinidad and Tobago accounts for up to 12% of total tourism receipts (6% in St Lucia for its Jazz festival) and remittances account for US\$88 million in 2003 equal to around 15% of services exports.

Finally, migration can lead to very specific shortfalls or problems. For instance, the Commission for Africa Report in 2005 mentions the case of Malawi where the number of doctors decreased from 1,600 to 400 in a matter of years due to HIV/AIDS and migration. Such long-run emigration is likely to lead to losses in human capabilities (‘brain drain’), particularly in small developing countries where labour markets cannot react easily. As developed countries benefit from this immigration and are apparently unable to prepare relevant workers domestically, and as training nurses will generally be cheaper in developing countries, developed countries could compensate exporting countries for the amount of nurses, teachers and other labour exporting countries through

transfer of technology, skills and financial assistance. In particular they can set up training centres in developing countries targeted at specific skill groups.

As one example in St Lucia, the principal of the Sir Arthur Lewis Community College supported the idea of negotiating HSPP (Hospitality Service Providers Programmes) to increase trade in tourism services through temporary movement of people. However, he also pointed at the costs of training students (EC\$10,000 annually) in the HSPP. It was suggested that developed countries offer financial compensation for costs required to train workers (including nurses) filling shortages in developed countries (Dunlop, 2003).

6.5 Coordination of sectoral policies

This survey has identified a number of interrelated issues which cannot be addressed solely by sectoral policies. An appropriate solution for such issues is coordination higher up the government, coordinating policies across sectors, and/or that those responsible for policy in one sector take into account their effect on other sectors.

Brain drain and capital flight

Some suggest that 40% of sub-Saharan Africa's domestic savings together with 40% of African skills are currently based outside the continent. There are some obvious cross border coordination failures related to cross-border capital-skill complementarities. Targeting the African diaspora for foreign direct investment, remittances as well as skills needs a coordinated approach.

For instance, the Irish investment promotion agency questioned well-educated Irish citizens abroad about whether they wanted to work for a US multinational planning to locate in Ireland. Generally, such approaches, that coordinate investment opportunities with available inputs such as skilled workers, are useful to solve this cross-border coordination failure. There appear to be few institutions actually doing this.

Investment and human resource development

Appropriate institutions in tune with private sector needs are required to provide better quantity and quality education, thereby coordinating the supply and demand of skills planning with investment decisions. The involvement of the private sector in planning and setting priorities for skills development will improve the relevance of the education and training in terms of scope and volume. The Costa Rican investment promotion agency pointed at the presence of local universities that could produce relevant graduates and a consistent and good education policy over time which helped to persuade an Intel plant (and other high-value added firms) to invest in Costa Rica. On their side, Intel and the government have set up joint training and technology institutes, which benefit Intel as well as other firms working in the sector. This will also help to provide a stimulus for skill development throughout the whole education system. More generally, as in Costa Rica, consistent skill development policies that delivered good education outcomes have been able to attract not just garment assembly investors but also electronic investors who in turn, in coordination with local governments and institutes, attempt to develop skills providing incentives throughout the whole education system. The government's policies are more in tune with strategies of MNEs (Mortimore, 2004).

Singapore has long followed a similar targeting approach. Singapore's EDB (Economic Development Board) which is well resourced, well placed and in tune with the private sector tries to coordinate the demand of investors with education provision. In some cases, the EDB will be

proactive in planning infrastructure or relevant support institutions in order to attract FDI. It has also followed a deliberate attempt to gear the investment incentives package towards the movement of the economy. It has apparently done this successfully from late 1960s. Whilst in the 1960s and early 1970s, employment was a major focus, later in the 1980s it was capital intensive projects, and in the 1990s knowledge intensive sectors were targeted.

The investment incentive framework in Singapore is complex and has developed gradually according to needs of the economy. Two types of incentives have proven to be good examples of this in practice. Singapore's PIO (Pioneer Industries Ordinance) of 1959, one of several tax incentives, reduced corporation tax to develop 'new' products. This policy appears to have been successful, since the share of manufacturing output by firms with pioneer status increased from 7% in 1961 to 51.1% in 1971 and 69% in 1996. The PIO was part of an industrial strategy which focused on attracting employment generating MNEs 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 encourages firms to set up skill intensive regional headquarters in Singapore, with labour and land intensive production processes transferred abroad (Yeung, 2001). The point is that investment policies move in tandem with human resources policies and outcomes.

Migration and trade

Migration, and the diaspora, help exports of goods and services and are a source for investment. Thus, national economic policies need to take their diaspora into account and this may require coordination in terms of investment, trade and migration policies.

6.6 Conclusion

Significant coordination and market failures in education and skills require public intervention. We have discussed the following set of policies:

- Building appropriate education and training programmes that link in with the trade structure of the country. Good quality schooling is the best basis for this. But after this, measures or institutions are required to include the private sector in planning and executing training programmes – there are some best practice examples. The ease of this will depend on the geographical concentration and number of players.
- Design investment policies in tune with human resource development. This has mostly been ignored, though foreign firms do generally train more.
- Approach international trade negotiations on education cautiously, but not with dogmatic protection. In some countries, the education sector is already open for private firms, local and foreign. Foreign providers of education might help in economic development but may not account for education of (most of) the locals.
- Targeting approach to migration issues. Encourage temporary migration, and deal with targeted difficulties (e.g. using compensation).
- Ensure that sectoral policies do not operate in a vacuum. Issues related to globalisation and education can be complex and appropriate solutions may require more than sectoral policy solution. Common issues (but with different specifics in different countries):
 - Setting up agencies that coordinate investment opportunities with migration decisions. In practice this includes the direct targeting of the diaspora.

- Operationalise the involvement of the private sector in skills development institutions; and use the tax and incentives system to be in line with the development of the economy and the level of skills.

Table 21 Policies that use globalisation—education linkages for development

Measure of globalisation	Mode of achieving human capabilities			
	<i>Schooling</i>	<i>Vocational education</i>	<i>Tertiary education</i>	<i>Foreign education</i>
Trade	Promote basic skills on which firms can build and train further	Phase liberalisation and export promotion to go hand in hand with developments in education provision	Phase liberalisation and export promotion to go hand in hand with developments in education provision Maximise opportunities to become exporter of education services	Target diaspora as a source for exports
Private cross-border financial flows (inward FDI)	Promote CSR to provide good quality education Promote basic skills on which firms can build and train further	Involve the private sector in planning of skills development, and kick start public private interactions	Involve the private sector in planning of skills development, attract investment to become	Target diaspora as a source for capital
Migration	Foster remittances for schooling, and use the diaspora to the benefit of development in home country Encourage temporary migration, through international trade negotiations	Develop accreditation of training courses to ensure full recognition of diplomas and experience	Develop accreditation of education systems; Enhance partnerships between universities across borders Encourage temporary migration; Deal with targeted losses in teaching and other capacity	Develop own university system to keep students

7 Conclusions and Policy Implications

This paper provided a state of the art survey in selected aspects of globalisation and education. It has emphasised the central role that education plays in shaping and responding to globalisation. It has also noted how globalisation affects education outcomes. We have focused specifically on economic globalisation processes.

An important issue to note is that we have uncovered many interlinkages in this survey. Globalisation processes and training and education systems and outcomes are linked directly and indirectly, touching upon several important policy issues. We have not been able to examine certain linkages in detail, and have aimed to provide a general study of what the trade, investment and migration literatures tell us about the links between globalisation and education. For some, the matrices included in this paper will be too general.

The paper was centred around three education–globalisation matrices. The first such matrix (Table 16) summarises in simple terms how education and training affects the participation of countries in economic globalisation processes. The second part of the survey examined education and globalisation the other way around: the effects of economic globalisation processes on education (Table 20). We then examined the effectiveness of policies aimed at reconciling the processes of globalisation and education in a way that is conducive to development. There is a need for appropriate policies and institutions to ensure that human resource development is appropriately aligned with the opportunities in and consequences of economic globalisation processes. Significant coordination and market failures in education and skills may cause this not to be the case and so public intervention can be appropriate. We discussed a number of policies (Table 21) and the reader should look at section 6.6 for the main policy implications.

We conclude this paper by suggesting what the evidence presented in this state of the art review tells us about the following important policy issues:

- What is education for? Should education be focused on trade, growth and poverty reduction *versus* should education be more general and aim at nation building.
- Education as a trade in services? Can the education sector be used to boost the trade in services performance of a country *versus* should a country shield the education sector from any private involvement, local and foreign (e.g. in GATS).
- Migration and education. Is migration a long-run economic development option for countries *versus* is migration just a loss in human resource capabilities?

What is education for? Should education be focused on trade, growth and poverty reduction *versus* should education be more general and aim at nation building. While this paper has discussed little about whether or not there is a choice, it is clear that if education is expected to help trade and growth performances, there needs to be more focused attention on how to encourage interaction between public and private sectors on education planning and provision. More interaction will help to solve market and coordination failures, and while this seems trivial in theory, it is not in practice (e.g. differences between East Asian and Latin American cases in dealing with education requirements for local and foreign investors, or between provinces in South Africa). It is also clear that the focus of support for education should not be limited to primary education. On the contrary, we have emphasised the importance of secondary and post-secondary education in participating successfully in globalisation processes, and thus poverty reduction.

Education as a trade in services? Some developing countries have been successful in attracting foreign (private) providers of higher education. This can constitute a significant source of income. However, it does not follow that this solves the education provision for locals, or that a country

needs to bind this liberalisation in GATS. Many foreign schools (e.g. in the Caribbean) cater for foreign students and not the local population. Determining whether or not more transparency in the provision of education services should be bound in international trade negotiations requires an examination of expected and intended consequences – as would ideally be available for any policy decisions. Most developing countries are unlikely to have done this. But most countries are also unlikely to have been asked to commit an education sub-sector to GATS. On the other hand, not binding may limit the ability to attract foreign providers of education services somewhat, though not much, given the experiences so far.

Migration and education. Migration is increasingly helping the economic performance in ‘sending’ (developing) countries through remittances and increased trade in goods and services and possibilities as a source of FDI. However, there are specific problems related to migration of key occupational groups (IT, nurses, teachers) in certain countries (e.g. small Caribbean countries), even though the evidence shows that return migration is substantial. Thus, while in general migration options could be beneficial for ‘sending’ countries – though this requires encouragement such as targeting the diaspora – developing countries need to deal with the specific problems posed by losing key workers. This can include encouraging temporary migration by asking for more and better access for temporary services providers or partnerships with developed countries that can support training programmes of teachers, nurses and IT workers in developing countries.

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Appendix A Education indicators, by region in 2001.

	<i>Median</i>	<i>Unweighted average</i>	<i>Weighted average</i>
Adult literacy rate (%)			
sub-Saharan Africa	67.9	63.2	64.1
East Asia & Pacific	89.8	85.2	90.2
Europe & Central Asia	99.4	99.1	97.1
Latin America & Caribbean	91.3	87.2	88.5
Middle East & North Africa	74.1	71.1	69.4
South Asia	61.3	59.1	59.3
Average years of schooling of adults			
sub-Saharan Africa	3.1	3.4	-
East Asia & Pacific	6.4	5.5	6.2
Europe & Central Asia	-	-	-
Latin America & Caribbean	6.1	6.1	6
Middle East & North Africa	5.4	5.4	5.3
South Asia	3.2	3.8	4.7
Duration of compulsory schooling			
sub-Saharan Africa	7	7.6	N/A
East Asia & Pacific	9	7.3	N/A
Europe & Central Asia	9	9.3	N/A
Latin America & Caribbean	9	8.5	N/A
Middle East & North Africa	9	8.2	N/A
South Asia	6.5	6.3	N/A
Girls as % of total enrolled, primary			
sub-Saharan Africa	47.6	46	45.8
East Asia & Pacific	48.5	48.1	47.7
Europe & Central Asia	48.5	48.4	48.1
Latin America & Caribbean	48.5	48.5	48.3
Middle East & North Africa	47.4	46.7	46.5
South Asia	47.4	42.7	44.1
Girls as % of total enrolled, secondary			
sub-Saharan Africa	44.8	44.1	-
East Asia & Pacific	48.6	47.3	-
Europe & Central Asia	49.3	48.5	47.7
Latin America & Caribbean	51.2	51	51.2
Middle East & North Africa	48.9	48.7	46
South Asia	47.2	42	40.9
Public spending on education, total (% of GDP, UNESCO)			
sub-Saharan Africa	N/A	N/A	3.4
East Asia & Pacific	N/A	N/A	3.2
Europe & Central Asia	N/A	N/A	4.3
Latin America & Caribbean	N/A	N/A	4.5
Middle East & North Africa	N/A	N/A	4.3
South Asia	N/A	N/A	2.3
Pupils reaching grade 5 (% of cohort)			
sub-Saharan Africa	69.3	-	-
East Asia & Pacific	88.5	75.7	98.1
Europe & Central Asia	-	-	-
Latin America & Caribbean	78.4	77.4	-
Middle East & North Africa	94	93.2	94.2
South Asia	63.5	62	59.9

Appendix A (continued)

	<i>Median</i>	<i>Unweighted average</i>	<i>Weighted average</i>
Ratio of pupils to teachers, primary			
sub-Saharan Africa	42.6	45.1	45.1
East Asia & Pacific	28.6	30.8	21.7
Europe & Central Asia	18.4	17.9	17.2
Latin America & Caribbean	23.9	25.9	25.8
Middle East & North Africa	23.7	22.1	23.6
South Asia	39.7	44.2	42.2
Repeaters as % of total enrolled, primary			
sub-Saharan Africa	19.7	17.9	-
East Asia & Pacific	2.4	5.8	2
Europe & Central Asia	0.3	1.2	-
Latin America & Caribbean	6.2	7.3	13
Middle East & North Africa	7.7	7.1	7.8
South Asia	9.6	9.6	4.6

Source: www.worldbank.org