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# The international mobility of highly educated workers among OECD countries\*

Steven Globerman and Daniel Shapiro\*\*

In this study, we specify and estimate an augmented gravity model of the determinants of bilateral migration flows across OECD countries. Our specific focus is on the migration of highly educated workers (HEWs), and the impact on migration of bilateral trade and foreign direct investment (FDI). We argue that transnational corporations are efficient, direct channels for the movement of HEWs across international borders. Our results confirm the importance of FDI and trade as determinants of migration flows: both are complements to migration. We also find that migration of HEWs is greater between countries with large populations and less when geographic, linguistic and religious “distances” are relatively large. Migration is also influenced by labour market conditions. Specifically, migrants tend to leave countries where economic conditions are relatively poor (high unemployment; low GDP per capita) and move to areas where conditions are better. Finally, the results indicate that there are important differences in the determinants of migration outcomes by level of education. In particular, we find evidence that bilateral trade and FDI have a greater impact on the migration of HEWs. In addition, highly educated migrants are more influenced by the “pull” of economic conditions in host countries, while those with less education are more heavily influenced by the “push” of economic factors in their home countries.

JEL Classification: F2, J6

**Key words:** migration, highly educated workers, globalization, gravity model.

## 1. Introduction

While the forces of globalization that have increased flows of goods and capital also appear to have facilitated the international mobility of highly

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educated and skilled workers (Lopes, 2004; Docquier and Lodigiani, 2007), the precise determinants of the international flows of such workers are not yet clear, in part because consistent international data on the migration patterns of highly educated workers (HEWs) have been unavailable until recently. Therefore, although there is a substantial literature on migration, both within and between nations (recent examples include Pedersen et al., 2004; Gonzalez and Maloney, 2005; Mayda, 2005; Peri, 2005; Docquier and Marfouk 2006), there are relatively few studies that focus specifically on HEWs.<sup>1</sup> As a result, there is a substantial amount of theorizing about the determinants of HEW migration with relatively limited accompanying empirical evidence. In particular, there is limited evidence regarding the impact of trade and foreign direct investment (FDI) on the international flows of HEWs.

The primary purpose of this study is to specify and estimate a model of international migration using relatively recent OECD data that distinguish migrants by education levels and country of origin. We employ a gravity model specification to estimate the determinants of bilateral migration among OECD countries using data for both sending and receiving countries, while focusing particularly on the impact of bilateral movements of trade and FDI. We also add explanatory variables that account for cross-country differences in economic, geographic and cultural “distance”. The model is estimated for both HEWs and other migrants in order to identify what might be unique about the impact of trade and FDI on HEW migration.<sup>2</sup>

It can be argued that transnational corporations (TNCs) are efficient, direct channels for the movement of HEWs across international borders. Specifically, the internal labour markets of TNCs can be used to re-locate people across international borders, particularly HEWs with knowledge or skills that can be efficiently shared across the locations in which the TNC operates. For example, Mahroum (1999) notes that the migration of managers and executives often originates with temporary intra-corporate transfers that, later, turn into longer term, or even permanent moves. Thus, the extent of bilateral FDI can have a potentially important influence on bilateral migration flows. To the extent that TNCs use internal labour

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<sup>1</sup> For relatively recent studies, see Peri (2005) and Docquier and Marfouk (2006).

<sup>2</sup> It should be noted explicitly that the OECD data identify migrants, and not strictly employed migrants. That is, the data do not specifically identify workers, but more accurately potential workers. While it seems reasonable to conclude that most highly educated migrants obtain employment in host country labour markets, the foregoing distinction should be borne in mind. Nevertheless, for convenience, we may occasionally refer to highly educated “workers” rather than the more precise highly educated “individuals”.

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markets to reallocate managers and technical personnel who are resident in different countries across transnational production units around the world, FDI and the migration of HEWs will be complements.<sup>3</sup> Docquier and Lodigiani (2007) find evidence of such complementarity in that the emigration of skilled migrants appears to encourage future inflows of FDI to the home countries. Using United States Census data, Kugler and Rapoport (2007) find that skilled migration and FDI inflows are negatively correlated contemporaneously, but past skilled migration is associated with an increase in current FDI inflows. Buch et al. (2003) find a relatively strong link between the stocks of German migrants and the stocks of FDI abroad but the link between the immigration of foreigners to Germany and FDI inflows is weaker. Aroca and Maloney (2004), on the other hand, find that FDI and labour flows are substitutes in the case of Mexico. Hence, there is no strong consensus on whether FDI and labour flows are complements or substitutes and there are very few studies of the empirical linkage between FDI and the migration of HEWs specifically.<sup>4</sup>

At a general level, both the migration of HEWs and FDI flows represent movement across borders of relatively mobile factors of production that are directly or indirectly human capital intensive. Factors that conceptually influence the migration decisions of HEWs are similar in many cases to those that conceptually influence FDI movements, particularly the degree of economic and social development of sending and receiving countries, and the sizes of the sending and receiving countries' economies. In theory, FDI and international migration might be substitutes or complements, and the relationship could be different for HEWs and other migrants (Kugler and Rapoport, 2007). FDI and migration might be substitutes, for example, if FDI results in migrant workers in the home country being displaced by local workers in the host country. Alternatively, FDI and the migration of HEWs might be net complements if TNCs use internal labour markets to reallocate managers and technical personnel who are resident in different countries across transnational production units around the world.

Similarly, trade and migration are likely to be linked directly. The efficient exploitation of information about trade opportunities and key success factors in importing and exporting activities may require the physical movement of HEWs across countries. Effectively, labour

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<sup>3</sup> An offsetting factor might be noted. If FDI increases real wages in the host country, outbound migration might be reduced at the margin.

<sup>4</sup> The latter two studies focus on total immigrants and not specifically HEWs.

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mobility is an instrument for diffusing information about geographically segmented markets (Combes *et al.*, 2005). At the same time, FDI is indirectly linked to the migration of HEWs through the relationship between trade and FDI. A substantial share of international trade takes the form of intra-firm trade carried out by TNCs, and for that reason trade and FDI tend to be complements (Globerman and Shapiro, 2002). The implication for models of HEW migration is that trade-creating FDI can be expected to encourage HEW migration flows.<sup>5</sup>

In sum, we suggest that a key input to the efficient operation of TNC global networks is the effective diffusion of information and skills within the TNC that requires substantial intra-corporate transfers of HEWs among TNC affiliates. These transfers create a complementary relationship between the mobility of HEWs and both FDI and trade flows.

In fact, a key empirical finding of our study is that HEW migration is strongly complementary to FDI and trade flows suggesting that the migration of HEWs is increasingly an aspect of the global production systems created and operated primarily by TNCs. We also find that while local economic conditions in the home and host countries are important determinants of migration for individuals at all levels of attained education, the “pull” factor of host country conditions is apparently more significant the higher the individual’s formal education level. Both physical and cultural distances between host and home countries influence migration, although not identically across different levels of education.

The remainder of the article proceeds as follows. Although it is somewhat unusual to begin with a discussion of data, we do so in section 2, where we describe the OECD migration data employed in our empirical analysis. The data report *stocks* of immigrants and emigrants for 29 OECD countries. Immigration and emigration data are reported for three categories of educational attainment. The stock data therefore reflect the cumulative flow of both permanent and temporary potential workers at different educational levels over past decades, as reflected in 2000 Census data or equivalent sources.

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<sup>5</sup> The potential for the participation of migrants in trade networks to increase trade by reducing transaction and other types of information costs is discussed by Gould (1994), Rauch and Trindade (2002) and Docquier and Lodigiani (2007), among others; however, this potential is not explicitly linked to intra-industry trade among TNC affiliates.

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Section 3 presents a simple model of international migration decisions which we use to derive an equation to be estimated, based on the gravity model. In the gravity equation, the logarithm of the number of foreign born persons in any one country that originate in a second OECD country are regressed on a number of variables that measure characteristics of both countries. Section 4 discusses the specification of that equation, mainly with respect to the choice of explanatory variables.

Section 5 presents and discusses the empirical results. The results suggest that the international migration of individuals is well-explained by a model that includes both economic and non-economic variables. As noted above, we find that bilateral movements of goods and capital are positively related to bilateral movements of people. Thus, the globalization of economic relationships is important to our understanding of international migration. Although we expected these relationships to be more important for HEWs, we find that they affect all international migration. Nevertheless, some differences exist between the determinants of HEW migration and total migration. A summary of our findings is presented in section 6.

## **2. The OECD database**

Our empirical analysis is based on recently published OECD data on migration patterns for individuals possessing different levels of education.<sup>6</sup> These data are collected in a uniform way, thereby addressing some previous problems surrounding earlier studies of international migration patterns. In particular, many countries previously reported data only for the number of foreign nationals, rather than the number of foreign-born. A focus only on foreign nationals is likely to understate considerably the number of immigrants (Dumont and Lemaitre, 2004).<sup>7</sup> Moreover, it might distort comparisons across countries to the extent that the ratio of foreign nationals to total immigrants varies across

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<sup>6</sup> The underlying data are described in J.C. Dumont and G. Lemaitre (2004, 2005). Peri (2005) uses this data set for his empirical model of international migration. A similar database has been constructed by Docquier and Marfouk (2004, 2006). However, Docquier (2006, p. 5) reports a very high correlation between the Docquier-Marfouk and Dumont-Lemaitre estimates of emigration rates by educational attainment (between .88 and .91) for 2000.

<sup>7</sup> In a small number of cases, the foreign born classification may reflect the separation of previously integrated countries. Thus, defining migrants on the basis of country of birth may be especially problematic for some countries such as the Czech Republic and Slovakia which used to be one country.

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countries. The OECD database provides an internationally comparable data set with detailed information on the foreign-born population of OECD countries, by country of origin and by level of education. Thus, this data set allows a reliable means to compare immigrant populations across countries and, importantly, to identify the migration patterns of HEWs.

The OECD data report stocks of immigrants and emigrants in 29 OECD countries based on country of birth. For most countries, the data were collected from population censuses or population registers that identified people by country of birth and level of education. In some cases, such as the Republic of Korea and Japan, where country of birth was not available, nationality was used as a proxy measure for country of birth. For most countries, the data are recorded as of 2000, and for most countries the data were obtained from population census for the year 2000. For the 29 countries participating in the data collection, fairly detailed data were obtained. The objective was to minimize the number of residual categories (“Other”). As a result, 227 OECD and non-OECD countries and areas were identified as “countries of birth” for each of the 29 OECD countries. By focusing on country of birth, the OECD data provide a more comprehensive measure of international migration than earlier databases because they include all migrants, and not just those who are permanent residents. For the purposes of this study, we focus on the bilateral flows among OECD countries.<sup>8</sup>

The education and skill qualifications were based on the International Standard Classification of Education System (ISCED). Since data were unavailable for all countries on a sufficiently detailed basis, the ISCED system was used to create three broad categories of education: less than upper secondary (ISCED 0/1/2); upper secondary and post-secondary non-tertiary (ISCED 3/4) and tertiary (ISCED 5/6). A residual category was also created for “unknown status”.

Evidently, creating the data involved a variety of judgments, including those regarding how to define countries.<sup>9</sup> Perhaps the most important point to note is that the immigration data are stocks, not flows. The stock data therefore reflect the cumulative flow of permanent and temporary workers over past decades as reflected in 2000 Census data or equivalent sources. It is likely that the stock of immigrants reported

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<sup>8</sup> We focus exclusively on OECD countries because reliable data on bilateral FDI flows for the period of this study were available only for those countries.

<sup>9</sup> Many of these issues are discussed more fully in Dumont and Lemaitre (2004).

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in 2000 census migrated in the 1980s and, particularly, in the 1990s. For one thing, a substantial percentage of immigrants who migrated in earlier decades are likely to be deceased. For another, temporary immigration based upon work-related visas was substantially greater in the 1990s than in earlier decades. The implication is that the most relevant determinants of the immigrant stocks reported in the OECD database are likely to reflect economic and other conditions prevalent in the 1980s and 1990s, rather than much earlier periods.

Table 1 provides a summary of some elements of the data. Specifically, it reports the percentage of foreign born, the major OECD country of origin for foreign born, the percentage of foreign-born immigrants possessing a tertiary education and the percentage of expatriates possessing a tertiary education. As can be seen in column 1 of table 1, there is considerable variation across countries in the percentage of foreign-born with the “settlement” countries of Australia, Canada and New Zealand having foreign-born populations as a share of total population well above the OECD mean. It is also seen that Luxembourg and Switzerland have foreign-born populations that exceed 20 percent of total population, while some European countries, including Austria, Germany and the Netherlands, have percentages that exceed that for the United States. As noted by Dumont and Lemaitre (2004), the percentages reported in column 1 are appreciably higher than those obtained when immigration is measured on the basis of foreign-born nationals, and this is particularly true for Europe.

The immigrants originated from over 200 countries and areas, but in this study we focus only on OECD countries of origin. Column 2 identifies the most prominent OECD country of origin for each of the OECD countries in the sample. For the most part, these are also the largest source countries in general, e.g. the United Kingdom. It can also be seen that the largest source country is often characterized by former colonial ties, (the United Kingdom is the largest source country for Australia, Canada and New Zealand), by contiguous borders (Germany with Austria and Poland), or by previous history (Czech Republic and Slovakia; the United Kingdom and Ireland). In addition, the importance of Turkish immigrants, often as guest workers, across Europe is clearly evident. Columns 3 and 4 illustrate the propensity of the highly educated to migrate. Specifically, the mean percentage of foreign-born with a tertiary education is well above the population means for the sample countries, as is the percentage of expatriates with a tertiary education.

**Table 1. OECD Sample Characteristics**

	(1) Percentage foreign born	(2) Major OECD country of origin	(3) Percentage of foreign born with tertiary education	(4) Percentage of expatriates with tertiary education
Australia	23.0	United Kingdom	42.9	43.6
Austria	12.5	Germany	11.3	28.7
Belgium	10.7	France	21.6	33.8
Canada	19.3	United Kingdom	38.0	40.0
Czech Republic	4.5	Slovakia	12.8	24.6
Denmark	6.8	Turkey	19.5	34.6
Finland	2.5	Sweden	18.9	25.4
France	10.0	Portugal	18.1	34.4
Germany	12.5	Turkey	15.5	29.5
Greece	10.3	Germany	15.3	16.1
Hungary	2.9	Slovakia	19.8	28.7
Ireland	10.4	United Kingdom	41.0	23.5
Italy	n.a.	n.a	n.a.	12.4
Japan <sup>1</sup>	1.0	United States	n.a.	48.9
Republic of Korea <sup>1</sup>	0.3	Japan	32.2	43.2
Luxembourg	32.6	Portugal	21.7	26.2
Mexico	0.5	United States	37.8	5.6
Netherlands	10.1	Turkey	17.6	34.0
New Zealand	19.6	United Kingdom	31.0	40.6
Norway	7.3	Sweden	31.1	32.1
Poland	2.1	Germany	11.9	25.7
Portugal	6.3	France	19.3	6.5
Slovakia	2.5	Czech Rep.	14.6	13.8
Spain	5.3	France	21.8	18.0
Sweden	12.0	Finland	24.2	37.8
Switzerland	22.4	Italy	23.7	35.8
Turkey	1.9	Germany	16.6	6.3
United Kingdom	8.3	Ireland	34.8	39.2
United States	12.3	Mexico	25.9	48.2
Total	7.8		22.8	28.9

*Source:* Compiled by the authors from the OECD Database on Immigrants and Expatriates which is described in Dumont and Lemaitre (2005).

The immigration data employed in this study therefore cover 29 OECD countries for which bilateral data are available.<sup>10</sup> Two types of migration data were available: foreign born (the number of foreign born in country *i* originating in country *j*) and foreign nationals (the number of foreign nationals in *i* originating in *j*). Within each category, the data identify migrants by their level of education (high, medium and low). In this study, we employ foreign born as the measure of international migration because using foreign nationals understates the degree of immigration (Dumont and Lemaitre, 2004). However, as is seen in table 2, these measures are highly correlated, particularly across comparable

<sup>10</sup> The countries are listed in table 1. Italy was not included as a home country, because data were not available, but was included as a source country.

education categories. For example, the correlation coefficient for total migration (FORT and NATT) is  $r = 0.849$ , whilst that for high education (FORH and NATH) is  $r = 0.808$ .<sup>11</sup> The correlation coefficients among educational categories are also quite high. Thus, countries receiving high levels of one type of migrant from another country tend to receive more of all types of migrants.<sup>12</sup>

**Table 2. Means and Correlation Matrix, Immigration Variables\***

	Mean (sd)	FORT	FORH	FORM	FORL	NATT	NATH	NATM	NATL
FORT	23298 (258445)	1.000							
FORH	4253 (17717)	.687	1.000						
FORM	6219 (58312)	.993	.740	1.000					
FORL	12076 (189012)	.994	.611	.977	1.000				
NATT	20637 (106012)	.849	.827	.868	.814	1.000			
NATH	5084 (22860)	.425	.808	.470	.356	.802	1.000		
NATM	7291 (37196)	.765	.814	.804	.721	.962	.811	1.000	
NATL	7867 (54493)	.948	.696	.941	.696	.936	.560	.845	1.000

Source: Authors.

**VARIABLE DEFINITIONS:**

**FOR:** number of foreign born in country *i* originating in country *j*. FORT= total, FORH=high education, FORM=medium education, FORL= low education.

**NAT:** number of foreign nationals in country *i* originating in country *j*. NATT= total, NATH=high education, NATM=medium education, NATL= low education

\* The number of observations for the calculation of correlation coefficients is 606. For means and standard deviations,  $n = 747$  for FOR and 606 for NAT.

### 3. Modelling international migration

The conceptual foundation of economic models of migration is the assumption that an individual will seek to migrate from one location to another only if the expected present value of the anticipated

<sup>11</sup> Given this high correlation, it is not surprising that the empirical results do not change in any material way when foreign nationals is used as the dependent variable for model estimation.

<sup>12</sup> This does not gainsay the fact that some countries (e.g. the United States and the United Kingdom) enjoy higher ratios of HEWs to total workers compared to other countries, e.g. France and Germany. See Peri (2005).

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benefits exceeds the expected present value of the anticipated costs. The substantive theoretical and empirical issues therefore involve the identification of the important determinants of the anticipated benefits and costs.

A basic framework of a model of migration is provided in Gonzalez and Maloney (2005). In their model, the potential migrant chooses among a set of possible destinations. If  $j$  is the region of origin and  $i$  is the migration region chosen, the migration decision reflects the value of the function identified in equation 1:

$$(1) \quad I^* = V_i - V_j - C,$$

where  $I^*$  is the potential migrant's overall level of welfare in any of  $k$  countries,  $V_i$  is an indirect utility function reflecting the pecuniary and non-pecuniary attributes of living and working in specific country  $i$ ;  $V_j$  is an indirect utility function reflecting the attributes of living and working in specific country  $j$ ; and  $C$  is a measure of the direct and indirect costs of migrating between the two countries.

The utility of living and working in any country  $j$  is assumed to be a linear or log-linear combination of location characteristics denoted as a vector  $X$  in equation 2:

$$(2) \quad V_j = (X_j)B + \varepsilon_j,$$

where  $B$  represents a vector of coefficient values reflecting the importance of the individual location attributes of country  $j$  to the utility of living and working in country  $j$  and  $\varepsilon$  represents random determinants of the indirect utility of living and working in country  $j$ .

If any specific destination region is more desirable than a specific originating region, and if the migrant has sufficient resources to move, migration from  $j$  to  $i$  will take place. That is, migration will take place if the expected value of  $I^*$  is greater than zero. From equation 1, the expected value of  $I^*$  will be greater than zero if the expected value of  $(V_i - V_j - C)$  is greater than zero. Equivalently, by virtue of substituting equation 2 into equation 1, the likelihood of migrating from region  $j$  to region  $i$  is expressed by equation 3:

$$(3) \quad \text{Prob}(I^* > 0) = \text{Prob}((X_i)B + \varepsilon_i - (X_j)B - \varepsilon_j - C) > 0.$$

Assuming that the  $\varepsilon$  terms are randomly distributed around a mean value of zero, equation 3 suggests that if we observe actual migration from region  $j$  to region  $i$ , it is because the weighted value of

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the attributes of living and working in region  $i$  impart greater utility than the weighted value of the attributes of living and working in region  $j$ .<sup>13</sup> That is, observed migration from  $j$  to  $i$  ( $M_{ij}$ ) will be a function of  $X_i$ ,  $X_j$  and  $C$ .

$$(4) \quad M_{ij} = f ( X_i , X_j , C ) .$$

The specification of a migration model therefore requires specifying the vectors  $X_i$  and  $X_j$  for all sample countries, as well as the precise functional form of the equation. We discuss the  $X$ -vectors in the next section, and here focus on functional form, for which we employ a gravity model.

Gravity models have become the standard technique for the empirical analysis of inter-regional and international bilateral flows of capital and goods. The basis of most empirical models of bilateral trade and FDI flows is the “barebones” gravity equation, whereby any interaction between a pair of countries is modelled as an increasing function of their sizes and a decreasing function of the distance between the two countries (Sen and Smith, 1995; Frankel and Rose, 2002). Indeed, the gravity equation has become “the workhorse for empirical studies...to the virtual exclusion of other approaches”, (Eichengren and Irwin, 1998, p. 13).<sup>14</sup> While this statement was written with reference to trade flows, the logic of the gravity model also underlies migration studies (recent examples include Karemera *et al.*, 2000; Gonzalez and Maloney, 2005; Mayda, 2005; Peri, 2005) and FDI studies (Hejazi and Safarian, 2001; Hejazi and Pauly, 2005).

The underlying logic of applying the gravity model to migration was first set out by Zipf (1946). Clearly, the likelihood of an individual migrating from any country should increase as the population of that country increases, holding other factors constant. Less obviously, the likelihood of that individual migrating to any specific country should increase as the total population of the specific country increases, to the extent that potential receiving countries have implicit or explicit targets, or quotas, on allowable numbers of immigrants that, in turn, are functions of total population of potential host countries.<sup>15</sup>

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<sup>13</sup> In a cross-section of paired countries, migration from region  $j$  to region  $i$  would indicate that region  $i$  is preferable to all other possible regions for the relevant observations.

<sup>14</sup> Frankel and Rose (2002) also note that the gravity equation as applied to international trade is one of the more successful empirical models in economics.

<sup>15</sup> For additional discussion of how the supply and demand for migrants can be linked to the sizes of the sending and receiving countries, see Karemera *et al.* (2000).

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Accordingly, we employ a gravity model specification such that bilateral flows from  $j$  to  $i$  are directly proportional to the “mass” of  $i$  and  $j$ , and inversely proportional to the “distance” between  $i$  and  $j$ , where distance can be interpreted to include geographic, cultural and economic distance. Thus, we estimate variations of equation 5:

$$(5) \quad M_{ij} = f ( (POP_i \times POP_j), D_{ij}, L_{ij}, Z_{ij} ) .$$

In the equation,  $M_{ij}$  represents migration from country  $j$  to country  $i$ ; POP is the population of each country;<sup>16</sup> D is vector of terms representing measures of geographic and socio-cultural distance between  $i$  and  $j$ ; the L terms represent economic distance in terms of labour market differences (unemployment rates and average real wages); and the Z’s reflect other attributes of countries  $i$  and  $j$  that might plausibly affect migration between the two countries. In our case, the Z vector includes measures of bilateral trade and FDI, as well as a dummy variable equal to unity when the United States is the receiving country. These variables are discussed in the next section.

#### 4. Model specification: independent variables

The dependent variables  $M_{ij}$  have been discussed above, and are based on the OECD data. The full set of explanatory variables included in the model, with their predicted impact on migration, is summarized in table 3, and the variables are more fully defined in table 4. Before considering each variable, three broad comments are in order.

First, although we have not to this point explicitly distinguished HEW migration from other migration, we do so in table 3. Although the hypothesized direction of the impact of each explanatory variable is the same for all types of migration, we suggest that the magnitude may differ. We will argue below that an important difference between HEW and other migration is likely to be linked to the trade and FDI variables. However, where relevant, we will also note other cases where the impact of a specific variable might be different for HEWs.

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The latter suggest another possibility. Namely, that as more resources are diverted to a growing home population, attractive opportunities available to migrants decline, thereby discouraging migration to growing countries.

<sup>16</sup> In migration models, it is typically population measures that serve as a measure of mass (Zipf, 1946; Gonzalez and Maloney, 2005). In trade and FDI models, GDP is more typically employed. Estimates replacing POP with GDP are similar to those reported below.

**Table 3. Expected Signs of Explanatory Variables**

Variable	Highly educated migrants (j to i)	Other Migrants (j to i)
Log (POPi*POPj)	+	+
Distance between i and j	-	--
Adjacent Countries	+	++
Common Language	+	++
Common Religion	+	+
Unemployment rates,(i – j)*	-	-
Log GDP per capita,(i – j)*	+	+
Human Development Index (HDI),(i – j)*	+	+
Government revenues as percentage of GDP,(i – j)*	-	-
Former Socialist Country	-	-
United States	++	+
Log (EXPORTSij*EXPORTSj)**	++	+
Log (FDIij*FDIj)**	++	+

Source: Authors.

Country *i* is the host country, and country *j* is the home country. (*i – j*) indicates that the variables are calculated as differences. Detailed definitions are found in Table 4. The direction of the hypothesized effects are indicated by + (positive) and – (negative), but the magnitudes may differ between highly educated and other migrant samples. Where we hypothesize this to be the case, double signs are used. For example, in the text we suggest that trade and FDI variables should have a more significant impact on highly educated migration, whereas physical distance and common language will be more important for other migrants..

\* Denotes labour market variables (L)

\*\* Denotes trade and FDI variables (Z)

Second, in table 3, we present a specification in which the relevant variables are defined as either differences between country *i* and country *j* (as is the case with the labour market variables) or log products (as is the case with the trade/FDI variables). Alternative specifications are possible. For example, in migration gravity models, it is often the case that labour market variables are measured as ratios (Lowry, 1966). We also estimate the models using ratios in place of differences, and the results are similar. Perhaps more important is the issue of whether host and home effects should be entered separately. The variable specification reported in table 3 essentially assumes that home and host effects are equal. This may not be appropriate in a migration equation, since it has sometimes been found that destination area variables have a greater influence on the migration decision than originating area variables (Gonzalez and Maloney, 2005; Peri, 2005). F-tests were not always conclusive with regard to this restriction, and we therefore first present and discuss the restricted model, and later present results using an unrestricted model (where home and host variables are entered separately, and not as differences or products).

**Table 4. Variables, Definitions and Data Sources**

VARIABLE	DEFINITION	SOURCE
Log (POP <sub>i</sub> *POP <sub>j</sub> )	POP <sub>i</sub> is the populations of the host country; POP <sub>j</sub> is the population of the home country, averaged 1985–2000 (five year intervals).	United Nations Statistics Division - Common Database
Distance	Log of weighted distance between major cities in each country (in kilometers).	CEPII (see Mayer and Zignano, 2006)
Adjacent Countries	A dummy variable =1 if country i and country j share a common border.	CIA World Fact Book
Common Language	A dummy variable =1 if country i and country j share a common official language.	John Haveman's International Trade Data. <a href="http://www.maclester.edu/research/economics/PAGE/HAVEMAN/trade.resources/tradedata.htm#Gravity">http://www.maclester.edu/research/economics/PAGE/HAVEMAN/trade.resources/tradedata.htm#Gravity</a>
Common Religion	A dummy variable =1 if country i and country j share a common religion.	Sala-i-Martin (1997) <a href="http://www.colombia.edu/~xs23/data.htm">http://www.colombia.edu/~xs23/data.htm</a>
Difference in unemployment rates, ij	Difference in unemployment rates, averaged over the period 1985–2000 (five year intervals).	International Labour Organization, Geneva - LABOURSTA - Labour Statistics Database
Difference in log GDP per capita, ij	GDP per capita measured in terms of purchasing power, averaged over 1985–2000 (five year intervals).	United Nations Statistics Division - Common Database
Difference in Human Development Index (HDI), ij	HDI includes measures of GDP per capita, education and health. Averaged over the period 1996–2000.	Reports on Human Development, United Nations Development Programme
Difference in government revenues as percentage of GDP, ij	Government revenues as a percentage of GDP measured in constant US dollars, and averaged over 1985–2000 (five year intervals).	Penn World Data
Former Socialist Country	A dummy variable = 1 if either country i or country j were formerly officially a socialist country.	Authors' calculation
United States	A dummy variable = 1 if the United States is the host country	Authors' calculation
Log (EXPORTS <sub>ij</sub> *EXPORTS <sub>ji</sub> )	Exports from i to j and from j to i, measured in constant US dollars and averaged over 1985–2000 (five year intervals).	United Nations Statistics Division - Common Database
Log (FDI <sub>ij</sub> *FDI <sub>ji</sub> )	FDI inflows from i to j and from j to i, measured in constant US dollars and averaged over 1994–2000.	OECD - International Direct Investment Statistics Year Book 1989-00

Third, it is important to recall that the dependent variable,  $M_{ij}$ , is in fact the stock of people born in country  $j$  now residing in country  $i$  in 2000. As noted above, this stock reflects the cumulative migration of people, mainly over the previous 10–20 years. As a consequence, we measure the explanatory variables over that period. Where possible, variables are measured over the period 1985–2000, but in some cases (noted in table 4) shorter time periods were required because of data availability.

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Most studies proxy migration costs using various measures of distance. Dostie and Leger (2004) suggest that the physical distance between origin and destination locations might be a good proxy for the costs associated with migrating from one location to another. Gonzalez and Maloney (2005) link physical distance to moving costs but see networks of migrants from the same home country as an important factor influencing the costs directly or indirectly borne by immigrants associated with assimilating into the host country. Pedersen *et al.* (2004) and Mayda (2005) use dummy variables for countries that share common borders and common languages as proxies for migration costs. Presumably, employment should be easier to secure when the migrant already possesses host country language skills; however, since HEWs are more likely to have acquired other languages, a common language at the country level may be a less relevant determinant of HEW migration.<sup>17</sup>

We include four “distance”-related variables (physical distance, adjacent country, common language and common religion). Physical distance accounts for both transportation and communications costs. The expected effect on migration is negative, because the costs of acquiring information, communicating with potential employers and travelling between the originating and destination countries will increase with physical distance. We suggest, however, that the impact of physical distance will be less for HEWs, who are both better able to afford the pecuniary costs associated with travel and have better access to transaction-cost reducing means of communication and information gathering (such as the Internet).<sup>18</sup> For international migration, it is not obvious how to measure physical distances, since distances will also be functions of location within countries. Accordingly, we use the weighted distance measure provided by CEPII as described in Mayer and Zignano (2006). In addition, however, we also include a dummy variable for geographic adjacency to account for the ease of movement across common borders. Other things equal, adjacency should encourage migration. For similar reasons as above, we expect the effect of geographic adjacency to be weaker for HEWs than for other migrants.

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<sup>17</sup> A number of authors have noted that foreign students enrolled in host country educational institutions obtain country-specific knowledge that, in turn, reduces the costs normally associated with migration to that host country as an HEW in the future (Tremblay, 2004). In some cases, foreign students may retain their residency in the host country by converting their visa status upon obtaining permanent employment.

<sup>18</sup> Arguably, physical distance, *per se*, should increasingly be a less important influence on migration decisions as costs of communicating with family and friends in the home country, as well as costs of traveling between home and host countries, decline in real terms.

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In addition to physical distance measures, we account for the effects of non-physical distance by including two variables reflecting specific socio-cultural differences between countries. One is a dummy variable identifying whether countries  $i$  and  $j$  share a common language. A second dummy variable identifies whether the two countries share a common religion. We expect that countries sharing common languages and religions will experience greater bilateral migration flows. Of these variables, the one most likely to differ in impact between HEW and other migrants is the language variable. To the extent that HEWs are more likely to acquire capabilities in languages other than those of their home country, the effect of common official languages may be weaker for HEWs.

We also include a dummy variable for countries that were officially socialist over parts of the relevant time period. Such countries had in place restrictions on the movement of people, both inward and outward, that would result in lower levels of migration, all other things equal. We therefore include this term as a control variable and expect its sign to be negative.<sup>19</sup>

A specific assumption in most models of migration is that prospects of higher real income levels associated with labour market employment are the main anticipated benefit associated with migration (Head and Ries, 2004). The OECD (2002) highlights the presumed importance of labour market conditions in noting that differences in skills premia, job opportunities and career opportunities are key drivers of the mobility of highly qualified individuals in the new global economy.

Most econometric analyses of bilateral migration flows do find that labour market conditions, as measured by relative unemployment and wage rates, are important determinants of migration decisions (Pedersen *et al.*, 2004; Gonzalez and Maloney, 2005; Mayda, 2005). We employ four broad measures of labour market conditions, although two are somewhat indirect. The first is the difference in unemployment rates between  $i$  and  $j$ . Unemployment rate differences between countries are likely to provide a meaningful demarcation between countries in terms of

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<sup>19</sup> The dummy variable for “socialist countries” is meant to capture the immigration and emigration policies of those countries. It may also, in part, capture the measurement problems created by the division of Czechoslovakia as discussed in footnote 7. It is acknowledged that a focus on former socialist countries ignores potentially important differences in immigration and emigration policies across other countries in our sample; however, it is extremely difficult to measure and compare such policies across countries for purposes of regression analysis.

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the likelihood of finding employment within any period of time and with normal search behaviour.<sup>20</sup> For this variable, it is plausible that a migrant from country  $j$  will react to information about unemployment rates in country  $i$  differently from information about unemployment in country  $j$ , perhaps because it is easier to verify information about labour market conditions in country  $j$ . In this case, it might be appropriate to allow for the estimation of separate coefficients for the two unemployment variables. On the other hand, if the migrant's criterion strictly involves a comparison of labour market conditions between countries, holding other determinants of migration constant, then the ratio specification of the unemployment rates is arguably more appropriate. Because HEW migrants are more likely to have access to information, the assumption of equal coefficients is more likely to be justified for HEWs.

Another labour market-related variable is real per capita income in countries  $i$  and  $j$ . Higher per capita incomes are indicators of higher average wages. Higher values of real per capita income therefore signal the potential for higher real incomes to potential migrants from lower income countries. The use of purchasing power equivalent exchange rates to convert per capita income values into United States dollars for purposes of defining the variable mitigates any measurement error that might result from not incorporating cost-of-living measures explicitly into the migration equation. In addition, real per capita income also implicitly measures a variety of economic and social amenities that might influence migration decisions. For example, education and health care infrastructure is likely to be more advanced in high-income countries. We try to isolate the labour market-related influence of real per capita income from the indirect (amenity) influence by using the UN index of human development (HDI) as an additional variable. In fact, the two variables are highly correlated, and we ultimately employ them as separate measures.<sup>21</sup> The general hypothesis is that larger differences in income per capita or HDI in favour of the host country will encourage migration.

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<sup>20</sup> Unemployment rate differences across countries may vary by education and skill level. However, consistent data on unemployment rates by education/skill level are not available for our sample period.

<sup>21</sup> As with the unemployment variable, there is a specification issue regarding the per capita income variables. Namely, should the variables be entered separately and thereby be allowed to take on separate coefficients, or should the relevant variable be specified as a ratio of per capita income values of the countries involved? As in the case of unemployment rates, we try both specifications.

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Borjas (1987) argues that what matters for migration incentives are not just the average incomes in the destination and origin countries but the dispersion of incomes. While Borjas has in mind dispersion across skill levels, dispersion across workers within skill levels might also be relevant. Simply put, migration might be encouraged if the income rewards to “better performance” are relatively high compared to the rewards for “average” performance, even holding skill level constant. This phenomenon might help explain why the United States attracts relatively large numbers of immigrants at all skill levels even after differences in average wages between the United States and other countries are taken into account. The relatively large income dispersion in the United States, both within and across educational attainment levels, in comparison to other high-income OECD countries, could act as an inducement to migrants to the extent that those interested in migrating see themselves as having above-average talent for their educational cohort.<sup>22</sup> To acknowledge this possibility, we include a dummy variable whose value equals unity when the United States is the receiving country and zero otherwise.

Different tax rates may be an important component of the migration decision, particularly for HEWs, although the evidence is equivocal on the importance of tax rate differences as an incentive for HEW migration (Globerman, 1999, Wagner, 2000). An indirect effort to estimate the influences of taxes on migration decisions is made by including a variable measuring the share of government revenues in GDP in country *i* relative to that same ratio for country *j*. In the absence of explicit and relevant marginal tax rates for each of the sample countries, the share of government revenues in GDP is used as a proxy for the average tax rate facing workers in that country; however, to the extent that the progressivity of tax rates varies across countries, this average measure will fail to identify accurately differences in marginal tax rates, particularly for (higher income) HEWs. Other unique circumstances of HEWs in different national tax jurisdictions may also make this average tax rate proxy a biased measure of the tax burden facing HEWs in specific countries. The hypothesis is that migrants will move from high- to low-tax jurisdictions, other factors held constant.

A particular focus of this study is the inclusion in the migration equation of variables relating to trade and FDI. As suggested above, the internal labour markets of TNCs can be used to relocate people

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<sup>22</sup> For some recent data on income distribution patterns in OECD countries, see Forster and d’Ercole (2005).

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across borders, and this is particularly true for HEWs with idiosyncratic knowledge of host and home country conditions, or with technical and managerial skills that are especially valuable to the home or the host country affiliate. Thus, we include a term for the degree of bilateral FDI between  $i$  and  $j$ , and expect it to have positive impact on bilateral migration, particularly for HEWs. We initially employ a specification in which  $FDI_{ij}$  and  $FDI_{ji}$  are entered in multiplicative form, because it is the total interaction that should determine migration flows.

The potential relevance of the multiplicative specification can be illustrated as follows. Imagine that a company based in country  $j$  acquires a company based in country  $i$ . The acquiring company might well transfer managers and other HEWs to the acquired company to assist in the transfer of parent company technology and other firm-specific assets. At the same time, the acquired company might transfer managers and other HEWs to the acquiring company to assist in the integration of operating systems and other aspects of consolidation. Similarly, if a company from country  $i$  were to acquire a company in country  $j$ , the former might also transfer HEWs from  $j$  to  $i$  to assist in the integration of the two companies. Thus, FDI flows from  $i$  to  $j$  might be indirectly linked to migration of HEWs from  $j$  to  $i$ ; however, it seems plausible that the FDI flow from  $j$  to  $i$  is the more important influence on HEW migration from  $j$  to  $i$ . Hence, we also employ a specification that focuses on the FDI flow from  $j$  to  $i$  exclusively.

Similar considerations apply to bilateral trade. Much international trade takes the form of intra-firm trade carried out by TNCs, and such trade may require employees with specialized knowledge about local markets. The effective diffusion of information within the TNC network might involve substantial intra-corporate transfers of HEWs among TNC affiliates, contributing to international migration. Even in the case of arms-length trade, migrants with knowledge of trading conditions in different countries have potentially valuable human capital to employers in trading partner countries. Thus, we expect a positive effect of bilateral trade on migration, and, in particular, on HEWs. Because FDI and trade tend to be complements, it may be difficult to separate the effects of the trade and FDI variables in capturing the enhanced returns to mobility associated with a greater demand for HEWs as agents that facilitate international business.

As specified, the estimated equation assumes that causality runs from FDI/trade to migration. However there is some evidence to suggest

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that causality might also run in the opposite direction.<sup>23</sup> Given the relatively small share of the total work force that consists of immigrants in most countries, and the even smaller HEW portion of the workforce, our inclination is that any statistical influence running from migration flows to FDI or trade is likely to be quite weak, and that ordinary least squares estimation of the migration equation, including FDI and trade as independent variables, is unlikely to be troubled by significantly biased coefficients. In addition, although the migration of HEWs from country  $j$  to country  $i$  might make country  $i$  a more attractive location in which to locate from the perspective of foreign investors, there is no obvious reason to believe that the migration of HEWs from  $j$  to  $i$  would make country  $j$  a more desirable location for MNC affiliates. Hence, by specifying the relevant independent variable as the product term of the bilateral FDI flows, the potential endogeneity of the FDI variable should be mitigated. Nevertheless, we do test for exogeneity of the FDI and trade terms, and estimate the migration equation using instrumental variables as necessary.

The inclusion of the trade and FDI terms also limits the need to consider other potentially relevant variables frequently included in models of international trade or FDI. One such variable is whether countries  $i$  and  $j$  belong to a free trade area or a common market. A second is whether the countries share a common currency.<sup>24</sup> The inclusion of such variables is likely to be superfluous once trade and FDI are included in the model, since both trade and FDI should be strongly and positively related to conditions such as membership in a common market or use of a common currency. Formal trade agreements such as NAFTA might still be relevant independent variables to the extent that they incorporate provisions that ease restrictions on the migration of HEWs between

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<sup>23</sup> Head and Ries (2004) note the potential for two-way causality between the migration of HEWs and FDI stocks. Specifically, the activities of TNCs in a country should promote increases in HEWs. At the same time, TNCs will be attracted to locations with a relative abundance of HEWs, as the FDI literature tends to suggest (Eaton and Tamara, 1994; Mody and Srinivasan, 1998; Checchi *et al.* (2007). In addition, the presence of relatively large numbers of foreign-born HEWs in a host country might promote increased trade between that country and parent countries of the migrants, especially if the migrants possess proprietary knowledge about foreign markets that lowers transaction and information costs associated with international trade. For a theoretical discussion of this possibility, see Globerman (1994). See Gould (1994), Rauch (2001), Rauch and Trinidad (2002) and Head and Ries (2001) for some empirical evidence on the linkage between migration and subsequent changes in international trade.

<sup>24</sup> For examples of the use of these variables in trade models, see Chen (2004) and Slangen *et al.* (2004).

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countries. However, almost all of these agreements are encompassed by the variables indicating common borders and/or common language.

The definition of each variable, together with the source of the data, is reported in table 4. The major issue with respect to the data pertains to the bilateral FDI data. These data were obtained from the *International Direct Investment Statistics Year Book 1989-2000*, published by the OECD. These data are, in turn, obtained from national statistical sources, often in local currencies. As a consequence for many countries there are two available estimates of FDI: outflows from  $i$  to  $j$ , as recorded by  $i$ , and inflows from  $i$  to  $j$ , as recorded by  $j$ . While in principle these numbers should be the same, that is often not the case, and in some cases the discrepancy is large. We adopted the convention of using the data as recorded by the host country, on the grounds that countries are more likely, and more able, to track inflows accurately. However, this also means that inflows and outflows are often recorded in different currencies and therefore sensitive to exchange rate values. We used both nominal and PPP United States dollar exchange rates to convert reported FDI values, although there were no significant differences in results using either method. However, of all the data employed in this study, the FDI data are possibly subject to the largest measurement errors.

## 5. Estimation results

We first examine results using the most parsimonious specification, in which all relevant variables are expressed as either differences or log products. We later consider alternative specifications and the problem of endogeneity.

Table 5 reports the means and standard deviations (in parentheses) for the independent variables, as well as the correlation coefficients among the independent variables. The simple correlation coefficients are quite low with a few exceptions. One is the .703 correlation coefficient between the product term for bilateral exports between countries  $i$  and  $j$  and bilateral FDI between the two countries. The relatively strong positive correlation between bilateral trade and bilateral FDI is unsurprising. As noted earlier, the bulk of international trade among developed countries is carried out by TNCs, and most previous studies indicate that FDI and trade are complements. Another strong correlation exists between the differences in per capita GDP between countries and the difference in scores of the HDI in the two countries. This is also not surprising given that the HDI includes GDP per capita. As a consequence, however, we do not use HDI and GDP per capita in the same equation. We do include

Table 5. Means and Correlation Matrix, Independent Variables

	Mean (sd)	1	2	3	4	5	6	7	8	9	10	11	12
1. Log (POP*POPj)	5.30 (2.14)	1.000											
2. Distance	7.99 (1.16)	.176	1.000										
3. Adjacent Countries	0.08 (0.27)	.054	-.424	1.000									
4. Common Language	0.07 (0.26)	.057	-.016	.298	1.000								
5. Common Religion	0.44 (0.49)	-.016	-.299	.233	.164	1.000							
6. Unemployment Rates (Difference)	-.153 (5.11)	.103	.013	-.005	.026	.099	1.000						
7. Log Per Capita GDP (Difference)	.006 (0.64)	-.223	-.005	-.025	-.057	-.072	-.263	1.000					
8. HDI (Difference)	.002 (0.06)	-.152	-.008	.006	.003	.001	-.107	.687	1.000				
9. Government Revenues (Difference)	-.012 (5.64)	.054	-.012	-.006	-.014	-.157	-.021	-.040	-.230	1.000			
10. Former Socialist Country	.27 (0.44)	.117	-.250	.081	-.121	.168	-.017	.051	.026	-.024	1.000		
11. Log (EXPj*EXPj)	10.13 (4.31)	.394	-.394	.393	.214	.195	.002	-.023	.003	.041	-.117	1.000	
12. Log (FDIj*FDIj)	11.72 (7.78)	.174	-.273	.235	.160	.245	.008	.030	.025	.031	-.200	.703	1.000

Source: Authors.

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both FDI and trade in the same equation, but as reported below, the outcome is problematic.

Table 6 reports regression results for two groups of migrants. Our primary focus is on highly educated migrants in a sample country  $i$ , born in another country  $j$  (FORH). These results are reported in columns (1)–(5). We compare these results to a second sample, the total number of low education migrants in country  $i$  who originated in country  $j$  (FORL).<sup>25</sup> These results are reported in columns (6)–(10).<sup>26</sup>

Equations (1), (2), (5) and (6) report regression results of an augmented gravity equation that excludes the bilateral export and bilateral FDI variables. The odd-numbered equations report estimates using HDI, while the even numbered ones replace that term with GDP per capita. In all four equations, all coefficients have the expected signs, and all are statistically significant, with the exception of the government revenues term. Although this particular result may reflect measurement error owing to the limitations on interpreting this variable as a measure of relative tax rates in the two countries, it is consistent with most previous research suggesting that differences in tax rates may not be significant influences on migration decisions.<sup>27</sup>

For the most part, all of the other independent variables in the four equations are statistically significant at the .05 level. Of particular interest, higher unemployment rates in the host country relative to the home country discourage migration, while higher relative standards of living/GDP per capita in the host country encourage migration. Variables serving as proxies for lower costs of migration (physical distance, adjacency, common language and common religion) all perform as expected, i.e. lower costs of migration significantly promote increased migration. However, we do not find that physical distance is a lesser deterrent to HEWs, as we had hypothesized. In contrast, the effects of language and religion are similar for both groups. Also, countries which were once officially “socialist” both sent and received lower number

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<sup>25</sup> We also estimated the same equations for the total sample of migrants, and for all migrants who are not HEWs. These results do not change our conclusions.

<sup>26</sup> Because country-pair data were missing in specific cases, the total number of observations is less than the potential number ( $29 \times 28 = 812$ ) country-pair observations.

<sup>27</sup> Our measure of government revenues may also fail to accurately identify public social expenditures which could influence migration decisions. However, the HDI term might be an indirect measure of public social expenditures.

Table 6. The Determinants of International Migration: Regression Results

	High Education Migrants					Low Education Migrants				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Log (POP <sup>i</sup> *POP <sup>j</sup> )	.582*	.659*	.268*	.539*	.257*	.488*	.687*	.338*	.542*	.334*
	(.031)	(.030)	(.0324)	(.032)	(.031)	(.032)	(.037)	(.043)	(.039)	(.043)
Distance	-.378*	-.405*	-.223	-.252*	.223	-.653*	-.688*	-.198*	-.544*	-.196*
	(.062)	(.061)	(.064)	(.064)	(.064)	(.075)	(.070)	(.087)	(.078)	(.088)
Adjacent Countries	.735*	.690*	.226	.671*	.247	1.238*	1.144*	.858*	1.197*	.888*
	(.247)	(.229)	(.214)	(.241)	(.214)	(.289)	(.2255)	(.286)	(.291)	(.150)
Common Language	1.832*	1.814*	1.421*	1.777*	1.447*	1.531*	1.512*	1.221*	1.451*	1.211*
	(.215)	(.218)	(.184)	(.217)	(.181)	(.269)	(.260)	(.253)	(.278)	(.255)
Common Religion	.543*	.574*	.347*	.391*	.384*	.527*	.584*	.387*	.425*	.421*
	(.122)	(.116)	(.104)	(.123)	(.108)	(.154)	(.144)	(.146)	(.156)	(.150)
Difference in unemployment rates, i - j	-.076*	-.046*	-.062*	-.082*	-.060*	-.063*	-.061*	-.051*	-.067*	-.051*
	(.012)	(.011)	(.010)	(.012)	(.007)	(.014)	(.012)	(.014)	(.015)	(.014)
Difference in Log GDP per capita, i - j		1.102*					1.780*			
		(.104)					(.134)			
Difference in Human Development Index (HDI), i - j	6.811*		5.416*	6.754*	5.283*	12.728*		11.636*	12.585*	11.558*
	(.982)		(.786)	(.957)	(.797)	(1.295)		(1.260)	(1.317)	(1.292)
Difference in government revenues as % of GDP, i - j	-.002	-.005	-.003	-.002	-.003	.010	-.006	.011	-.008	.012
	(.010)	(.009)	(.008)	(.009)	(.008)	(.013)	(.011)	(.012)	(.013)	(.013)
Former Socialist Country	-1.504*	-1.546*	-.485*	-1.151*	-.545*	-1.810*	-1.874*	-1.046*	-1.531*	-1.081*
	(.137)	(.131)	(.135)	(.156)	(.142)	(.171)	(.161)	(.199)	(.196)	(.135)
United States	1.802*	1.328*	.974*	1.465*	.996*	1.712*	1.022*	1.095*	1.431*	1.091*
	(.206)	(.192)	(.183)	(.221)	(.188)	(.321)	(.285)	(.329)	(.350)	(.341)
Log (EXPORTS <sup>ij</sup> *EXPORTS <sup>ji</sup> )		.282*			.305*			.211*		.221*
		(.016)			(.020)			(.025)		(.029)
Log (FDI <sup>ij</sup> *FDI <sup>ji</sup> )		.008*		.008*	-.002			.006*		-.001
		(.002)		(.002)	(.002)			(.002)		(.002)
Intercept	6.118*	5.926*	-8.385*	4.959*	-9.064*	7.748*	7.438*	-3.126*	6.746*	-3.441*
	(.524)	(.498)	(.531)	(.539)	(.980)	(.623)	(.571)	(1.426)	(.661)	(1.502)
Adjusted R Square	.543	.590	.672	.567	.676	.480	.547	.527	.489	.525
Observations	747	746	743	698	698	747	746	743	698	698

Source: Authors.

\* Indicates statistical significance at the 5% level; \*\* indicates statistical significance at the 10% level. Values in parentheses are heteroskedastic-consistent standard errors.

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of migrants, other things equal, while the United States received more immigrants of all kinds.

In equations (3)–(5), and (8)–(10), the product terms for bilateral trade and FDI are added, first one at a time and then together. For these purposes, we use the more general HDI measure, but the results are similar when GDP per capita is used in these same equations. When entered alone, both the trade and FDI terms are positive, and statistically significant in all equations. For the most part, all other variables are unaffected by the addition of these terms. In addition, while both terms add to the explanatory power of the model, the addition of the trade term creates a substantial increase in the  $R^2$  (compare columns 1 and 3; 5 and 8). Thus, comparable estimation results for the two sets of coefficients reinforce our interpretation of the linkages between FDI, trade and migration. Specifically, the human capital of HEWs is complementary to other assets possessed by TNCs that facilitate profitable trade and FDI carried out primarily by those same TNCs. Although trade and FDI also affect low education migration, the effects are less pronounced, a result discussed further below.

Equations (5) and (10) include both bilateral trade flows and bilateral FDI flows in the estimating equation. Given the strong correlation between the two variables, there is a concern about multicollinearity, and it is perhaps not surprising that only one is statistically significant: the trade variable. On the surface, the result suggests that trade flows are a more important determinant of HEW migration than FDI flows; however, it is impossible, as a practical matter, to separately identify the impact of trade versus FDI on HEW migration when the bulk of international trade is carried out by TNCs. In addition, the potential measurement issues regarding bilateral FDI noted above contribute to the uncertainty regarding the precise strength of its influence on migration.

A question that might be asked is whether trade carried out by TNCs has a stronger effect on HEW migration than inter-firm trade. To gain some insight into this issue, we replaced the bilateral FDI variable in equations (5) and (10) with an interaction variable, the bilateral trade variable multiplied by the bilateral FDI variable (not reported). In this specification, if the coefficient for the interaction variable is positive and statistically significant, it would indicate that intra-firm trade undertaken by TNCs has a greater impact on HEW migration than trade in general. However, this variable proved not to be statistically significant in either equation. Taken at face value, this latter result suggests that the complementary relationship between migration and

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trade is not necessarily enhanced when trade takes the form of intra-firm exports and imports within TNCs.

In general, the results for the low education migration equations are qualitatively similar to those for the highly educated migrants even when the multiplicative trade and FDI terms are added. However, the magnitude and statistical significance of some key coefficients does vary across the sets of equations. Thus, there are some important factors that distinguish HEW migrants from others. The most of important of these are the effects of physical distance, national income (HDI), trade and FDI. HEWs are less constrained by the costs associated with physical distance. They are also less attracted by differences in living standards. The larger coefficient for the HDI term for low education migrants (also found for GDP per capita) implies that less well educated migrants are more responsive to pecuniary income differences across countries, whereas highly educated workers are more likely to move to countries with more comparable standards of living. At the same time, HEWs are more attracted by bilateral trade and FDI (though the latter difference is not statistically significant), as we hypothesized. However, one of the possible expected differences discussed in the previous section is not evident. The coefficient for common language is somewhat greater for the highly educated migrant cohort. Although this result is not what was expected, it perhaps reflects the fact that highly educated migrants are more likely to pursue jobs that require a high degree of literacy, thereby requiring fluency or near-fluency in the language of the host country.<sup>28</sup>

As discussed in the previous section, an important specification issue in gravity models is whether variables expressed as differences or log products should be entered separately. We therefore estimated models in which all relevant variables (unemployment rates, HDI, GDP per capita, government revenues, bilateral trade and bilateral FDI) were included in unrestricted form. For example, in the case of HDI, the unrestricted specification includes both HDI<sub>i</sub> and HDI<sub>j</sub>, whereas the restricted specification includes (HDI<sub>i</sub> - HDI<sub>j</sub>). In the case of FDI, the restricted specification is log (FDI<sub>ij</sub>\*FDI<sub>ji</sub>) whereas the unrestricted specification includes log FDI<sub>ij</sub> and log FDI<sub>ji</sub> individually. However, specifications involving both FDI terms were problematic because the terms are highly collinear and, when entered separately, the coefficient

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<sup>28</sup> In their study of international emigration, Docquier and Sekkat (2006) find that “linguistic proximity” is a significant influence on emigration only for high-skill migrants. They also report that high-skill workers are more affected by differences in terms of living standards compared to unskilled workers, although emigration rates for both are negatively related to physical distance and to the unemployment rate at the destination country. Hence, our findings are quite similar to their reported results.

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on one or both is not statistically significant. The same was true for the export terms.<sup>29</sup> As a consequence, we could include only one FDI (and export) term in each specification. Given our speculation that flows from  $j$  to  $i$  are likely to be more important influences on HEW migration, we adopted a final specification that includes only exports and FDI from  $j$  to  $i$  (home to host).<sup>30</sup> These results are presented in table 7.

Since GDP per capita and HDI could not be included in the same equation, we report separate specifications using each variable. Similarly, since the FDI and trade terms could not be entered together, we report results separately for each. Since the results were similar for all cases, we report the trade equations using GDP per capita, and the FDI equations using HDI. We report each equation for the most highly educated migrants (FORH), and the least highly educated migrants (FORL). The relevant results are found in table 7, columns (1)–(4).

For comparable variables, the results reported in table 7 are not very much different from those discussed above. However, the results in table 7 also reveal greater differences among migrants with different levels of education. In particular, the trade and FDI terms are still more important for HEWs, but the differences are more pronounced and are statistically significant. Moreover, it is clear that “pull” factors (those associated with the host country,  $i$ ) are relatively more influential for highly educated migrants. In contrast, “push” factors (those associated with the home country,  $j$ ) are relatively more important for migrants in the lowest education category. For the most part, unemployment rates, GDP per capita and HDI in country  $i$  are more important relative to the comparable effects in country  $j$  for those with the highest levels of education.<sup>31</sup>

These results suggest that highly educated migrants are likely to do well in their home country, and therefore require more positive incentives to re-locate. In addition, they are likely to have more information about host country markets. Those with lower levels of

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<sup>29</sup> As a consequence, the outcome of F-tests comparing restricted and unrestricted models depends on the specification. For example, when a restricted model (models reported in table 6) is tested against an unrestricted model which includes both FDI terms, the restricted model is accepted. When only one FDI term is included in the unrestricted model, the latter is accepted.

<sup>30</sup> We also estimated models with only the reverse ( $i$  to  $j$ ) flows of exports and FDI, but do not present them. They are discussed in the text.

<sup>31</sup> This result is also consistent with findings reported in Docquier and Sekkat (2006).

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education leave when local conditions deteriorate, and may have less information about potential destinations.

The estimated coefficients for the United States dummy variable are suggestive, inasmuch as they indicate that the United States attracts more of all types of migrants, holding other factors constant. The results are consistent with our speculation that migrants at all educational levels who view themselves as potentially above-average performers in the receiving country see greater economic opportunities in the United States than in other countries beyond the differences suggested by disparities in average wage or income levels.

The results in table 7 continue to indicate that FDI and trade are important determinants of migration flows, and that both variables are more strongly related to the migration of HEWs than other migrants. However, these results focus on the flows from  $j$  to  $i$ . When we estimate the equations including only trade and FDI flows from  $i$  to  $j$ , the results are weaker, as we had speculated. Although both variables are positive and statistically significant in all equations, the evidence that they have a greater effect on HEWs is weaker. In addition, because of the collinearity associated with these variables, we are unable to say whether the trade and FDI effects are best captured by the total size of the FDI and trade networks (the interactive product term) or by individual bilateral trade and FDI effects. This issue should be pursued in subsequent research.

As discussed above, there is reason to believe that the potential endogeneity of the FDI and trade variables may create biased estimates, and that our results might not be robust to specifications that account for the potential endogeneity of these variables. Thus, unobserved variables may simultaneously affect immigration, trade and FDI, and/or two-way causality may exist. For example, unobserved heterogeneity across countries may result in simultaneous movement of capital, goods and people, or strong trade and FDI links may result from immigration. As a consequence, we adopted an instrumental variables estimation procedure, using a method initially proposed by Evans and Kessides (1993), but more recently employed by Edwards and Waverman (2006) and Cubbin and Stern (2006).

We constructed a rank based instrument for all trade and FDI variables, including the interaction terms reported in tables 6 and 7. For example, following Edwards and Waverman (2006), we sorted the  $\log(\text{FDI}_{ij} * \text{FDI}_{ji})$  variable into three ranks (1, 2, 3) and so created

an FDI rank index. By construction, this rank index is correlated with the original FDI term, and will also be orthogonal to the error term if exogenous disturbances do not affect a country's rank, a condition that is unlikely to be violated except for observations near the rank thresholds. For this reason, the number of ranks should be relatively small. A regression of this rank index on the FDI variable produced an  $R^2$  of .90. Following Cubbin and Stern (2006), the residual from that equation was used to test for endogeneity, and the predicted value of FDI derived from this equation was used as an instrument for estimation by instrumental variables. A similar procedure was used for  $FDI_{ij}$  and  $FDI_{ji}$  separately, and

**Table 7. The Determinants of International Migration: Additional Regression Results**

	(1)	(2)	(3)	(4)	(5)	(6)
	HIGH	LOW	HIGH	LOW	HIGH	LOW
					(IV)	(IV)
Log (POP <sub>i</sub> *POP <sub>j</sub> )	.480*	.494*	.542*	.508*	.542*	.490*
	(.049)	(.056)	(.032)	(.037)	(.031)	(.037)
Distance	-.025	-.315*	-.281*	-.533*	-.254*	-.496*
	(.071)	(.082)	(.062)	(.075)	(.062)	(.075)
Adjacent Countries	.415*	1.054*	.713*	1.420*	.718*	1.412*
	(.210)	(.263)	(.233)	(.284)	(.230)	(.283)
Common Language	1.425*	1.208*	1.665*	1.372*	1.648*	1.325*
	(.194)	(.245)	(.203)	(.257)	(.199)	(.252)
Common Religion	.339*	.451*	.337*	.451*	.331*	.403*
	(.103)	(.136)	(.117)	(.152)	(.117)	(.152)
Unemployment i	-.022**	.074	-.089*	-.010	-.083*	.014
	(.013)	(.088)	(.016)	(.021)	(.016)	(.020)
Unemployment j	.066*	.098*	.083*	.146*	.079*	.143*
	(.015)	(.020)	(.018)	(.023)	(.018)	(.021)
GDP per capita i	1.345*	1.795*				
	(.198)	(.244)				
GDP per capita j	-.334*	-1.246*				
	(.130)	(.208)				
HDI i			15.195*	17.013*	14.121*	15.821*
			(1.358)	(1.834)	(1.390)	(1.857)
HDI j			.861	-7.700*	1.157	-8.083*
			(1.509)	(2.220)	(1.468)	(2.173)
Ratio of government revenues as percentage of GDP, i - j	-.003	.001	-.001	-.012	-.001	.011
	(.008)	(.011)	(.010)	(.014)	(.009)	(.013)
Former Socialist Country	-.698*	-1.464*	-.905*	-1.652*	-.857*	-1.531*
	(.135)	(.193)	(.152)	(.207)	(.149)	(.208)
United States	.640*	.805*	1.486*	1.771*	1.389*	1.609*
	(.192)	(.309)	(.209)	(.351)	(.205)	(.347)
Log (EXPORTS <sub>ij</sub> )	.397*	.259*				
	(.047)	(.062)				
Log (FDL <sub>ij</sub> )			.066*	.030	.071*	.027
			(.018)	(.023)	(.016)	(.020)
Intercept	-13.60*	-6.35*	-9.02*	-2.38	-8.95*	-2.06
	(2.12)	(3.12)	(1.92)	(2.75)	(1.93)	(2.77)
Adjusted R Square	.684	.593	.598	.508	.596	.507
Observations	742	742	698	698	698	698

Source: Authors.

\* indicates statistical significance at the 5% level; \*\* indicates statistical significance at the 10% level. Values in parentheses are heteroskedastic-consistent standard errors. HIGH refers to highly educated migrants; LOW to low educated migrants. Log (EXPORTS<sub>ij</sub>) and Log (FDL<sub>ij</sub>) refer to movements from j to i. Columns (5) and (6) present results obtained by using instrumental variables estimation (IV).

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for the trade terms. We adopted this technique because of the difficulty in finding suitable and different instruments (different variables that are both correlated with the suspected endogenous variable and uncorrelated with the error term) for *both* the trade and FDI terms.<sup>32</sup>

The results suggest that although the trade and FDI terms are endogenous, the instrumental variables estimates are not different in any material way from the OLS estimates reported in tables 6 and 7. As an example, we provide one set of estimates in columns (5) and (6) of table 7. Other results are similar in that none of the estimated coefficients are impacted in any significant way through estimation by instrumental variables.<sup>33</sup>

## 6. Summary and conclusions

In this study, we specify and estimate an augmented gravity model of the determinants of bilateral migration flows across OECD countries. Our specific focus is on HEWs, and the impact on migration of bilateral trade and FDI. We argue that TNCs are efficient, direct channels for the movement of HEWs across international borders. This study adds to the literature in two main ways. First, it employs relatively recent data that distinguish migrants by level of education. Second, it includes measures of both bilateral trade and FDI as determinants of bilateral migration flows.

The primary migration data employed in this study are based on the stock of foreign born individuals from country  $j$  in country  $i$ , organized by level of education. There is a relatively high level of correlation among the various education categories: countries with high numbers of foreign born from a specific home country tend to have high numbers for all education groups. We speculate that this may be linked to the importance of immigration networks within a host country that provide cultural amenities and other forms of support.

Our results indicate that bilateral migration flows for migrants at all levels of education are well explained by a basic gravity model. In particular, migration is greatest between countries with large populations,

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<sup>32</sup> The chosen instruments must still be approached with some caution. In particular, the 2000 immigration stock measure reflects cumulative flows over the preceding 40 years, while the FDI and trade flows are measured over shorter time periods. However, the method does create rankings that are unlikely to have changed in a significant way over the years.

<sup>33</sup> These results are available on request.

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and is reduced when geographic, linguistic and religious distances are high. Migration is also influenced by relative labour market conditions. Specifically, migrants tend to leave countries where economic conditions are relatively poor (high unemployment; low GDP per capita) and move to areas where conditions are better. Our results also confirm the importance of FDI and trade as determinants of migration flows. We find that both are complements to migration. In general, we find no evidence that higher levels of bilateral trade or FDI replace movements of labour. This stands in contrast to Gonzales and Maloney (2005) who include both trade and FDI variables in their examination of migration *within* Mexico and find that they are substitutes. Clearly, more research on this issue is required.

Finally, our results indicate that there are important differences in the determinants of migration outcomes, by level of education. In particular, highly educated workers are less constrained by physical distance and are more likely to move to countries with similar standards of living. Importantly, highly educated migrants are more influenced by the “pull” of economic conditions in host countries. In contrast, workers with less education are more heavily influenced by the “push” of economic factors in their home countries. We also find evidence that highly educated migration is more responsive to bilateral trade and FDI flows. All results are robust to correction for the potential endogeneity of trade and FDI variables.

An important policy implication of our results is that macroeconomic performance is an important determinant of migration. In particular, a robust labour market and a rising real income level are strong attractions for migrants, especially HEWs. As is true in so many areas of economic policy, conditions encouraging real economic growth stimulate investment decisions that contribute further to future real economic growth. In this regard, while an increasing number of developed countries have been focusing on specialized programmes to encourage immigration of HEWs, it may well be that conventional public policies focused on promoting long-run real economic growth are more powerful factors encouraging the immigration of HEWs. At the same time, these same policies should also encourage the retention of native-born HEWs

Perhaps the most important policy inference emerging from this study is that policies to promote deeper trade and investment integration have important implications for attracting and retaining HEWs, as well as other migrants. Most trade agreements, particularly bilateral agreements,

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have traditionally focused on reducing barriers to the movement of goods and capital. Our results suggest that this focus is incomplete because it ignores a major complement to trade and investment, namely migration. By ignoring or minimizing the importance of provisions for liberalized migration most trade agreements are therefore arguably failing to exploit the full benefits arising from the complementarity among increased international flows of goods, capital and highly educated workers.

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# **FDI-assisted development in the light of the investment development path paradigm: Evidence from Central and Eastern European countries \***

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Some forms of foreign direct investment (FDI)-assisted development strategies have been widely adopted among developing and transition economies. The Central and Eastern European countries (CEECs) are an interesting case because of the surge of inward FDI over the past decade and the recent increase in outward FDI from the region. But the uneven distribution of FDI among the CEECs raises a question as to whether and to what extent the CEECs are converging in terms of FDI-assisted development path with the EU15 countries, and with each other. The analysis in this study is based on the investment development path (IDP) framework. First, a cluster analysis is used to divide the CEECs into more homogeneous groupings. Econometric and statistical analyses are then carried out to delineate the different IDPs followed by the CEECs. The results indicate that (i) the position of the CEECs is at stage one or two of the IDP; (ii) the CEECs are diverging from EU15 in terms of outward investment position but converging in terms of GDP; (iii) the IDPs within the five sub-groups are converging, and (iv) less developed CEECs are converging with more developed CEECs in terms of outward investment position but not in terms of GDP.

**Keywords:** Central and Eastern European countries (CEECs), foreign direct investment (FDI), investment development path (IDP), transnational corporation (TNC), panel method

**JEL classification:** F21, F23, O11, O57

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## 1. Introduction

In the Central and Eastern European Countries (CEECs),<sup>1</sup> foreign direct investment (FDI) is expected to play a crucial catalytic role in their transition from a centrally planned economy to a market system. Not only are the CEECs experiencing a systemic upheaval in the economy but also they are undergoing integration into the EU. The opening up of these countries through the globalization process and EU accession are expected to favour institutional change and promote FDI (Kaminski, 2001).

But the CEECs do not make up a homogeneous group, either in terms of size and factor endowments, or of the macro-economic stabilization process, or of the extent to which they have enacted systemic reforms and, therefore, of their attractiveness to FDI. The accession to the EU of eight CEECs in May 2004 and two further countries in January 2007 may be perceived both as a result of these differences and as a source of the possible accentuation of these differences in the future. This gives rise to the hypothesis that the CEECs' development paths might diverge from one another. This article will examine whether or not the differences in the FDI-assisted development paths among the CEECs have become more significant. More specifically, it assesses to what extent the CEECs are converging in terms of their development paths among themselves and also in relation to the advanced core countries (EU15).

To this end, we apply the most widely used analytical framework for examining the relationship between FDI and development, i.e. the investment development path (IDP) paradigm. This approach was first put forward by Dunning (1981a, 1981b) and was subsequently revised (Dunning, 1986a, 1986b, 1988a, 1993a; Dunning *et al.*, 2001; Dunning and Narula, 1996; Narula, 1996; Narula and Dunning, 2000).

This article is organized as follows: section 2 reviews the IDP paradigm. Section 3 uses a cluster analysis to group the CEECs according to their international investment position and their level of development. Based on clustered groupings, section 4 undertakes an econometric and

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<sup>1</sup> Unless otherwise stated, the term "the CEECs" here refers to the following countries: Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Poland, Romania, Russia, Serbia and Montenegro (which separated in 2006), Slovakia, Slovenia, Tajikistan, The former Yugoslav Republic of Macedonia, Turkmenistan, Ukraine and Uzbekistan.

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statistical analysis of the IDP for the CEECs. The final section presents our conclusion.

## **2. The IDP framework**

### **2.1 Nature and characteristics of the IDP**

The IDP is a dynamic concept which relates the international investment position of a given country to its level of development. It draws on Dunning's eclectic paradigm of international production and is framed by the OLI variables (ownership, locational and internalization advantages). The model assumes, first, that development induces significant structural change to the economy and, second, that such change has a systematic relationship with the pattern of FDI (Lall, 1996, p. 424). It contends that the change in the locational advantage of a country as well as in its firm's ownership and internalization advantages *vis-à-vis* other economies explains how its international investment position evolves from only receiving inward FDI to exporting FDI. Dunning initially postulated that a country would go through four stages of development (Dunning, 1981a, 1981b), to which Narula later added a fifth stage (Narula, 1993). The five stages are defined according to the propensity of a country to be a net recipient or a net exporter of FDI. This propensity depends on the relative importance of a country's natural and created assets, as defined by Dunning and Narula (1996, p. 38, note 4). The five stages of the IDP are summarized in table 1.

It is worth noting that similar approaches involving stages of development have been proposed by other scholars. Ozawa (1992, p. 30) suggested an "evolutionary path", starting from a labour-intensive stage and moving on to a physical capital-intensive stage and finally to a human capital-intensive stage. Porter (1990) distinguished four stages according to the countries' competitive advantages: factor-driven, investment-driven, innovation-driven and wealth-driven. But, as emphasized by Dunning himself (Dunning, 1992), Porter's approach does not provide a framework relevant for analysing the development path of developing countries, since the role of the globalization of economic activity is neglected, and only one developing country (the Republic of Korea), among eight selected countries, was taken into account in his exposition. Moreover, Porter's analysis is not supported by any formal testing, and is illustrated only by examples which could have been differently chosen and could have led to very different conclusions (Dunning, 1992, p. 141).

**Table 1. Characteristics of the IDP**

Stage	Inward FDI	Outward FDI	NOIP
1	Insufficient location advantages → No inward FDI except natural resource-seeking FDI	Absence of domestic firms' ownership advantages → No outward FDI	Around zero
2	Development of 'generic' location advantages → Faster growth of inward FDI than of GDP	Emergence of domestic firms' country-specific ownership advantages ( $O_a$ ) → Little outward FDI	Increasingly negative
3	Erosion of location advantages in labour-intensive activities Development of created-asset location-advantages → Decrease in the rate of growth of inward FDI	Growth of $O_a$ advantages → Increase in the rate of growth of outward FDI	Negative but increasing
4	Location advantages entirely based on created assets → Superiority of outward FDI over inward FDI	Firm-specific ownership advantages ( $O_i$ ) more important than $O_a$ advantages	Positive
5	Theoretically, fall and then fluctuation around zero of the NOIP, but in fact no longer a reliable relationship between a country's international investment position and its relative stage of development		

Source: Author's tabulation based on Dunning (1986a, 1986b, 1988a, 1993a), Dunning and Narula (1996), Narula and Dunning (2000).

## 2.2 Limitations of the IDP

Dunning and Narula themselves (Dunning and Narula, 1996; Narula, 1996) pointed to the necessity of reconsidering the initial version of the IDP in two different ways.

First, unlike previous stages, the relationship between the international investment position of an economy and its level of development is no longer stable at stage 5. Indeed, the FDI profiles of industrialized countries are diverse and their international investment positions do not necessarily fluctuate around zero as initially postulated. The question regarding reconsideration of the fifth stage, however, does not affect the relevance of the IDP in the case of the CEECs, since they are far from reaching this stage.

Second, the factors influencing the IDP have changed since the 1980s. It is likely that the form of the IDP is now also shaped by differences in countries' economic structure, as transnational corporations (TNCs) have developed countless affiliates in an increasingly globalized world economy and the national boundaries of firms have blurred. Thus, the firm-specific ownership advantages of TNCs no longer depend solely on conditions in their home country but also on those of host

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countries, i.e. their economic structure, the type of FDI undertaken and government policies (Dunning and Narula, 1996; Narula and Dunning, 2000). Moreover, the firm-specific ownership advantages of TNCs have become more “transaction advantages” than “asset advantages”, since they result precisely from the firms’ transnational nature, i.e. their ability to gain, enlarge and efficiently coordinate geographically dispersed created assets (Dunning, 1983a, 1983b, 1988b; Dunning and Narula, 1996). To sum up, if the basic relationship between FDI and economic development postulated by the IDP is still relevant, the nature of the relationship varies between countries. It may be argued that the IDP has become idiosyncratic, i.e. country-specific.

As far as the CEECs are concerned, these limitations of the IDP point to the need to consider their two distinctive characteristics: the specificity of their internationalization process and their heterogeneity.

### **2.3 Specificity of the internationalization process of CEECs**

The internationalization of CEEC firms is very specific given its historical context. The IDP the CEECs followed before the fall of the Berlin Wall appears to be in reverse in some sense (Jaklič and Svetličič, 2001a): outward FDI did not follow inward FDI, as predicted by Dunning and Narula (1996, p. 35), but appeared before inward FDI really took off. Indeed, under the centrally planned economic system, outward FDI from the CEECs had a “system-escape dimension” (Jaklič and Svetličič, 2001a) and was a defensive instrument (Svetličič *et al.*, 2000), undertaken mainly to escape the system’s failures, i.e. to facilitate trade and/or to facilitate foreign currency inflows. Exceptions were production-oriented investment in developing countries or operations abroad for political reasons.

The systemic transformation since the late 1980s again changed the rationale of the CEECs’ outward FDI. During the first half of the 1990s, CEEC firms were confronted with the privatization process and the related disintegration of large firms, together with the opening-up process in a globalized world. In addition, in countries emerging out of the partition of former states, some firms experienced what Svetličič and Rojec call “forced and inherited transnationalization” (Svetličič and Rojec, 2003, p. xxxi) and suddenly became outward investors without necessarily having the requisite expertise. Until the mid-1990s, outward FDI from the CEECs was very low or even negative. But since then, it has been expanding under the pressure of globalization.

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Because of these systemic circumstances, it is all the more difficult to compare the development path of the CEECs with the previous experience of developing countries. Indeed, the CEECs are not so much developing countries as “misdeveloped” countries. As such, they possess a relatively good endowment of human capital (Barro and Lee, 1996), technology and infrastructure. Such endowments, which are receptive to technology transfer, can be upgraded and contribute to economic growth through positive external economies related to FDI (Blomström and Kokko, 1997; Borensztein *et al.*, 1998; Dowrick and Gemmell, 1991). But, as the CEECs engaged in redesigning their economic system, it became evident that they lacked, above all, institutional structure for a functioning market economy (Dunning, 1993b, p. 227).

Two possible comparable cases would be the experience of the Asian NIEs and of the cohesion-fund countries in the EU. Economic development in East Asian economies was also based on an outward-oriented strategy. But it took place during the post-World War II era, a period very different from the globalized era of the past two decades. In fact, CEEC development is based on the opening-up of the economy, which involves deregulation and a reduction, or even absence, of restrictions on trade and investment flows. Openness, however, cannot be equated to outward orientation (Rowthorn and Kozul-Wright, 1998, p. 21), and it is unlikely the East Asian economic miracle can be repeated in today’s global economic environment. The internationalization of CEEC firms is more “pulled” by external factors than “pushed” by internal factors (Svetličič and Rojec, 2003, p. xxi, foreword of Sanjaya Lall) and appears to be a proactive response to globalization and integration into the EU (Jaklič and Svetličič, 2001b). The CEECs’ TNCs appear as “leapfrogging” TNCs (Svetličič, 2003, p. 11): they have not had time for a sequential internationalization process and are obliged to invest abroad without necessarily acquiring the experience of international market through exporting first. Outward FDI from the CEECs has therefore developed earlier than predicted at a lower level of development (Svetličič *et al.*, 2000; Svetličič, 2003). The IDP model is nevertheless relevant to the study of the CEECs (Svetličič, 2003, p. 11), but only for the period beginning with the transition to market economy, i.e. from the early 1990s onwards.

Concerning the comparison with the cohesion-fund countries, it is worth noting that the internationalization process in the CEECs presents certain similarities with the experience of Portugal in terms of timing. Portuguese firms started to internationalize at a similar level of development to the CEECs’ at present, and in particular its labour force

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was comparable both in terms of wage and skills. To a certain extent, it faced similar organizational constraints (Simões, 2003). If Portugal's experience is any guide, outward FDI from the CEECs is likely to be further encouraged by EU membership as it brings an increasingly stable and competitive environment (Buckley and Castro, 1998; Simões, 2003). In fact, FDI into and from the CEECs is interlinked with the process of integration into the EU, which is likely to have a profound impact since, in addition to the level of development, external and macro-organizational factors are important determinants of FDI flows.

## **2.4 Heterogeneity of CEECs**

Duran and Ubeda (2001) point out that countries at the same level of GDP per capita can have divergent economic structures. In the case of the CEECs, they are heterogeneous in terms of the distinguishing elements identified by Duran and Ubeda: the availability of natural resources; geographical and cultural distance from investors' home countries; potential market; economic system; and the types of action taken by government (Duran and Ubeda, 2001, p. 9). Hence, empirical analysis of the relationship for such a large group of countries must be carried out with care (Dunning and Narula, 1996, p. 22). In this respect, most recent empirical research on the IDP paradigm focus on a particular country (Bellak, 2001; Svetličič and Bellak, 2003; Buckley and Castro, 1998; Dunning *et al.*, 2001; Ozawa, 1996; Twomey, 2000; Zhang and Van den Buckle, 1996) or on a bilateral investment relationship (Barry *et al.*, 2003; Dunning and Narula, 1994) rather than cross-sectional studies across countries (see table 2).

In view of these methodological concerns, a cluster analysis was carried out to identify homogeneous groups among the CEECs, before testing the IDP over the 1991–2005 period, i.e. the period beginning with the transition to market economy.

## **3. The grouping of CEECs according to their IDP: a cluster analysis**

In the empirical analysis of the IDP, a country's international investment position is evaluated on the basis of its net outward investment position (NOIP), i.e. outward direct investment stock minus inward direct investment stock, while the level of development is proxied by GDP.

**Table 2. Summary of recent research carried out to test the IDP**

Author(s) and date	Scope of the study	Main results
Barry, Görg & McDowell (2003)	Irish-US FDI relationship, 1980–1999	Confirmation of the IDP's idiosyncratic nature but Irish FDI outflows are disproportionately horizontal and concentrated in non-traded sectors
Bellak (2001)	Austria, 1990–1999	Confirmation of the IDP's idiosyncratic nature: the Austrian NOIP is below average and largely varies according to industry type and type of partner country
Buckley & Castro (1998)	Portugal, 1943–1966	- Confirmation of the IDP's idiosyncratic nature; - Beyond a country's level of development, non-economic variables affect FDI; - Replacement of the quadratic equation
Dunning & Narula (1994)	United States-Japanese FDI relationship	Modifications of the IDP paradigm: inclusion of macro-organizational policy variables and importance of acquisition of ownership advantages
Dunning & Narula (1996)	Cross-section of 88 developed and developing countries, 1980 and 1992	- Confirmation of the IDP's idiosyncratic nature; - Polarization of countries into three groups
Dunning <i>et al.</i> (2001)	Rep. of Korea, 1981–1997 and Taiwan Province of China, 1968–1997	Interface between the IDP and the trade development path
Durán & Ubeda (2001, 2005)	85 developed and developing countries, 1997 95 countries, 2000	- New approach to IDP using factor analysis - Test of the power of structural variables to explain inward and outward FDI - Reformulation of the fourth stage
Narula (1993)	Industrialized countries over 20 years six industrialized countries over a decade Japan and the United States over 40 years	Decreasing significance of country-specific determinants of the ownership advantages of TNCs and increasing significance of firm-specific determinants
Narula (1996)	Cross-section of 40 countries, 1975 and 1988	- Support for the J-shaped curve of the IDP - Polarisation of countries around two points due to the convergence among industrialised countries, and the divergence of developing countries away from industrialised countries. - Support for the IDP when supplemented by the technology development path
Ozawa (1996)	Japan	- Idea of a 'ratchet-like upscaling of the industrial structure stage by stage'
Svetlicic Bellak (2003)	Austria and Slovenia, 1993-1999	- Confirmation of the IDP's idiosyncratic nature - Importance of macro-organisational factors
Tolentino (1993)	Cross-section of 30 countries	Nullify the IDP relationship which could be due, according to Narula (1996), to the use of flow data instead of stock data
Twomey (2000)	Canada, 1900-1996	Confirmation of the IDP's idiosyncratic nature
Zhang & Van den Bulcke (1996)	China, 1979-1993	Support for the role of the government in the early stages of the IDP

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### 3.1 Note on data

Following Dunning and Narula and most existing studies on the IDP, FDI stock data were used to estimate NOIP, and GDP per capita was used to proxy the level of development. Data on FDI stocks are obtained from UNCTAD, data on population from the World Bank and data on GDP from IMF. FDI stock as well as GDP are expressed in current prices and in the United States dollars.

FDI stocks are a better proxy than flows for the extent of international production.<sup>2</sup> Nevertheless, as pointed by Cantwell and Bellak (1998) and Bellak and Cantwell (2004), FDI stock data provide a very imperfect measure of international production, since they are reported at historical cost and not at replacement cost. In the case of the CEECs, however, the resulting underestimation of FDI stocks is less likely to be a problem than in other regions, since the CEECs have only recently emerged as significant host and home countries of FDI.

### 3.2 Main patterns of FDI coming into and from CEECs: some descriptive statistics

The opening-up of the CEECs is reflected in the rapid increase in both inward and outward FDI since 1990, while integration into the EU is evident from the fact that inward FDI originated mainly from the EU. The ratio of inward FDI stock to GDP grew from two-fifths of the EU average in 1995 (5.4) to more than 70% in 2003 (23.7) (UNCTAD, 2004, annex table B6<sup>3</sup>). This is more than the ratios for Greece, Portugal and Spain, though falling short of Ireland's, which was 129.7 in 2003. Nevertheless, there are striking differences among the CEECs, reflecting the divergence in the level of development and/or attractiveness to foreign investors. In 2004, 55% of the inward FDI stock in the CEECs was concentrated in the new EU members plus Croatia; the Czech Republic, Hungary and Poland alone accounted for 45%.<sup>4</sup>

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<sup>2</sup> The use of flows data by Tolentino (1993) was criticised by Narula (1996).

<sup>3</sup> These data do not take the Central Asian countries into account. Moreover, as of 2004, the FDI to GDP ratio is no longer available for the CEECs because of changes in geographical groupings used by UNCTAD. The eight new Eastern members of the EU have been reclassified from Central and Eastern Europe to EU and are now included among the developed countries. The rest of the CEECs as well as the CIS members are now classified under South-East Europe.

<sup>4</sup> Author's calculations based on UNCTAD data.

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Compared to inward FDI, outward FDI remains at a low level. According to UNCTAD data, the CEECs' outward FDI accounted for 1.4% of world FDI in 2004 in terms of flows and for 2.2% in terms of stock, and the ratio of inbound FDI stock to outbound FDI stock is much higher for the CEECs than for EU15. But the CEECs' FDI outward stock soared more than 20 times between 1995 and 2002 to an estimated \$131 billion.

As outward investors, the CEECs are very heterogeneous. In terms of absolute figures, the Russian Federation comes first with more than 80% of the CEECs' outward stock, followed by Hungary with a mere 4.6%. Croatia, the Czech Republic, Poland and Slovenia are all very similar, with approximately 2% of the total. Outward FDI from other countries in the region remains very limited. Only Azerbaijan has experienced growth in its outflows. In per capita term, the picture is somewhat different. Slovenia, whose outward FDI stock per capita reached \$1,522 in 2004, has taken the lead, followed by Estonia (\$1,052), the Russian Federation (\$746) and Hungary (\$596) (appendix 2).

As a result of such evolution of inward and outward FDI flows, every CEEC has an increasingly negative NOIP per capita (appendix 2). But these data show how unevenly FDI is distributed among the CEECs and therefore how unequal its effects on the host economies may be. In order to sub-divide the CEECs into homogeneous groups in terms of both their NOIP and GDP, a cluster analysis was carried out. This then allowed an econometric test and a statistical evaluation of the IDP for the CEECs to be implemented.

### **3.3 CEEC clustering groups**

Based on a selected distance measure, the cluster analysis allows natural grouping of observations according to chosen variables. Since our data are standardized, no one variable dominates the cluster analysis. Among the two general types of methods (hierarchical and partition), we chose hierarchical analysis, which produces hierarchically related clusters. More specifically, we used Ward's linkage hierarchical agglomerative cluster analysis (also known as minimum-variance clustering), which is based on the minimization of squared error.

The results of clustering on the basis of their NOIP per capita and GDP per capita using 2004 data are presented in table 3. First, a two-cluster partition reveals two main groups among the CEECs. The first group (CEECs1) is composed of CEECs whose NOIP per capita

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is the most negative. These countries are also the most economically developed and the most advanced in terms of economic stabilization and structural reform. As such, they are the most attractive to FDI, as can be seen from the high levels of inward FDI per capita. At the same time, they have emerged as nascent outward investors since the mid-1990s. Moreover, all of them with the exception of Croatia are new EU members, and are geographically located in Central Europe or the Baltic region. By contrast, CEECs in the second group (CEECs2) are less developed and their NOIP per capita is less negative, as a result of their lower attractiveness to inward FDI. In particular, they are experiencing difficulty in implementing the legal framework needed to switch to a market economy. Furthermore, many of them suffer from political instability. On the outward side, FDI of CEECs2 is very small except for the Russian Federation and, to a lesser extent, Azerbaijan. All of these countries are in the Balkans or the CIS.

Since each of the two groups is relatively heterogeneous, it is necessary to partition them further. Cluster analysis results in further demarcation into three sub-groups among CEECs1 and two sub-groups among CEECs2 (see table 3).

Among CEECs1, Slovenia stands alone in the first sub-group (CEECs1.1), placing it in front of the rest. On the one hand, Slovenia has experienced the most stable economic growth and has the highest GDP per capita in the region, not far short of Greece and Portugal. On the other hand, Slovenia's reluctance to attract inward FDI (Mencinger, 2003, note 4, p. 494), coupled with the internationalization through FDI of Slovenian locally owned firms, accounts for a less negative NOIP per capita than the Czech Republic, Estonia or Hungary, which comprise the second sub-group (CEECs1.2). Their NOIP per capita is the most negative in the region, reflecting the highest level of inward FDI per capita, while their GDP per capita, although among the highest in the region, lies far behind Slovenia's (tables 3 and 5). Finally, other 2004 accession countries plus Croatia constitute the third sub-group (CEECs1.3).

Among CEECs2, the poorest countries in the region (CEECs2.2) are behind in terms of inward FDI, except Azerbaijan, and their NOIP is negative, though less negative than other CEECs. All of them belong to the CIS. The countries of the second sub-group (CEECs2.1) are more developed and attract more FDI, but lag behind the countries of the first group (CEECs1).

**Table 3. The clustering of CEECs according to their NOIP per capita and GDP per capita using Ward's linkage hierarchical agglomerative method, US dollars, 2004**

	NOIPpc	GDPpc		NOIPpc	GDPpc
<b>CEECs1</b>			Bosnia	-442	2209
<b>CEECs 1.1</b>			Bulgaria*	-789	2550
Slovenia	-2268	16267	Kazakhstan*	-1159	2064
<b>CEECs 1.2</b>			Romania	-933	3464
Czech Republic	-5238	10602	Russian Fed.	-74	4105
Estonia	-6411	8311	Serbia	-484	2691
Hungary	-5606	9966	TFYR Macedonia	-876	2648
<b>CEECs 1.3</b>			Turkmenistan	-272	2871
Croatia	-2351	7943	<b>CEECs 2.2</b>		
Latvia	-1883	5923	Armenia	-324	992
Lithuania	-1736	6517	Azerbaijan	-1171	1040
Poland	-2158	6618	Georgia	-410	1188
Slovakia	-2745	7773	Kyrgyzstan	-117	434
<b>CEECs2</b>			Moldova	-210	720
<b>CEECs 2.1</b>			Tajikistan	-73	329
Albania	-430	2390	Ukraine	-198	1372
Belarus	-208	2361	Uzbekistan	-35	384

Sources: Author's calculations based on IMF data (World Economic Outlook database, available on-line, [www.imf.org](http://www.imf.org), accessed on April 2007), UNCTAD data (FDI interactive database, available on-line, [www.unctad.org](http://www.unctad.org), accessed on April 2007) and World Bank data (World Development Indicators database, available on-line, [devdata.worldbank.org](http://devdata.worldbank.org), accessed on April 2007).

\* 2003 figures since 2004 figures are not available.

Based on this clustering, an econometric test and then a statistical evaluation were carried out in order to answer the research question: are CEECs converging in terms of IDP with EU15 members, and among themselves?

## 4. Evaluation of the convergence of the CEECs' development trajectories

### 4.1 Difficulty of an econometric test

The relationship between NOIP and GDP for the CEECs was analysed by estimating the quadratic equation proposed in Dunning (1981b):

$$NOIPpc = \alpha + \beta_1 GDPpc + \beta_2 GDPpc^2 + \mu ,$$

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where  $NOIP_{pc}$  is net outward investment position per capita,  $GDP_{pc}$  is real gross domestic product per capita, and  $\mu$  is a regression error term. All FDI and GDP figures are in the nominal United States dollars.

The IDP has generally been tested on a cross-sectional basis (i.e. across countries), using OLS regression. Cross-sectional analysis is, however, problematic for studying the IDP, which is a dynamic concept (Durán and Ubeda, 2001, p. 2). Moreover, as discussed in subsection 2.4, heterogeneity among the CEECs has to be taken into account and evaluation of the CEECs' IDP based on cross-sectional equations may not be appropriate. It was therefore decided to test Dunning's quadratic equation on a panel of the NOIP per capita of the 27 CEECs over the 1991–2005 period and to run the regression not only for the entire sample, but also for the two identified clustering-groups, CEECs1 and CEECs2. Since data are not available over the whole period for every country (see appendix 3), the panel is incomplete. In order to check the robustness of the results, the equation was also tested on a balanced panel, by excluding two years (i.e. 1991 and 1992) and four economies (Bosnia and Herzegovina, Georgia, Kazakhstan and Serbia and Montenegro). Table 4 gives descriptive statistics on the dependent variable and the explanatory variables for both panels, and appendix 4 presents the correlation matrix. The figures are very close for both panels. The results for both the unbalanced and balanced panels are presented in table 5.

It would have been preferable to run the regression on the basis of the five sub-samples or of each country throughout the 1991–2005 period, but due to the limited size of the sample, this was not possible. The time-span is very short and therefore the number of observations is very small (15 observations, at the most).

The equation was tested using a fixed-effect model. From a conceptual point of view, since individual effects are linked to country-specific characteristics, they can be assumed to be deterministic and non-random. From a statistical point of view, a fixed effect model seems more appropriate since NOIP is examined for countries which are not randomly drawn from a larger population but belong to a predetermined sample. Finally, from an econometric point of view, whether individual effects should be modelled as random or fixed depends on the correlation between the explanatory variables and the individual effects. The Hausman specification test revealed (see note below table 5) that the random-effect model suffers from correlation between the individual effects and the regressors at 1% significance level and gives biased

parameter estimates, which led to the rejection of the use of a random-effect model in favour of a fixed-effect model. Heteroskedasticity detected by the Breusch-Pagan/Cook-Weisberg test was corrected by using White's method for heteroskedasticity robust variances.

**Table 4. Summary statistics**

	Unbalanced panel		Balanced panel	
	NOIPpc	GDPpc	NOIPpc	GDPpc
	CEECs		CEECs	
N	346	346	298	298
Mean	-581	2637	-636	2841
Standard deviation	1032	2796	1098	2947
	CEECs1		CEECs1	
N	121	121	117	117
Mean	-1316	5380	-1357	5468
Standard deviation	1453	3066	1461	3078
	CEECs2		CEECs2	
N	225	225	181	181
Mean	-185	1162	-170	1143
Standard deviation	247	868	240	918

Source: Author.

**Table 5. The estimation of CEECs' IDP based on a quadratic relationship over the 1991–2005 period**

**Tested equation:  $NOIPpc = \alpha + \beta_1 GDPpc + \beta_2 GDPpc^2 + \mu$**   
 Panel estimation with fixed effects<sup>a</sup> and with robust standard errors

	Unbalanced panel			Balanced panel		
	CEECs	CEECs1	CEECs2	CEECs	CEECs1	CEECs2
<b>GDPpc</b>	-0.5587684 ***	-0.7487564 ***	-0.4422752 ***	-0.5735609 ***	-0.754003 ***	-0.4127117 ***
<b>GDPpc<sup>2</sup></b>	0.0000042	0.0000146 ***	0.0000457 ***	0.00000527	0.000015 ***	0.000042 **
<b>Adj. R-squared</b>	0.8337	0.8214	0.6217	0.8401	0.8263	0.5924
<b>F statistic</b>	***	***	***	***	***	***
<b>N</b>	346	121	225	298	117	181

Source: Author's calculations based on IMF data (World Economic Outlook database, available on-line, [www.imf.org](http://www.imf.org), accessed on April 2007), UNCTAD data (FDI interactive database, available on-line, [www.unctad.org](http://www.unctad.org), accessed on April 2007) and World Bank data (World Development Indicators database, available on-line, [devdata.worldbank.org](http://devdata.worldbank.org), accessed on April 2007).

<sup>a</sup> The Hausman specification test led to reject the random effect model in favour of a fixed effect model. Hausman statistic :  $\chi^2(2) = 165.62$ , Prob >  $\chi^2 = 0$ . Significant at \*\*\* 1% and \*\* 5% levels.

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The results of the estimation are consistent with the IDP model. Excluding countries and years in order to have a balanced panel does not substantially alter the results. In both cases, the coefficients on  $GDP_{pc}$  and on  $GDP_{pc}^2$  are significant and have the expected sign: the coefficient on  $GDP_{pc}$  is negative while the coefficient on  $GDP_{pc}^2$  is positive. In other words, the IDP for the CEECs has a U-shape as proposed by Dunning and Narula, capturing the increasing marginal effect of GDP on NOIP. The fact that the coefficient on  $GDP_{pc}^2$  is not significant when testing the equation on the entire sample and becomes significant in the CEECs1 and CEECs2 specifications confirms the need to test the equation on homogeneous sub-groups.

There is a turning point (or minimum of the function), i.e. a positive value of GDP per capita, where the effect of GDP per capita on NOIP per capita is zero. This point represents the beginning of stage 3. Before this point, GDP per capita has a negative effect on NOIP per capita; after that, GDP per capita has a positive effect on NOIP per capita. In the estimated equation, the turning point occurs at minus the coefficient on  $GDP_{pc}$  over twice the value of the coefficient on  $GDP_{pc}^2$  ( $GDP_{pc}^* = -\beta_1 / 2\beta_2$ ). For CEECs1, the point is at about \$25,642 and for CEECs2 at about \$4,838. In fact, none of the CEECs1 or of the CEECs2 countries has reached the turning point, so that the part of the curve to the right of the points representing per capita income of \$25,642 and \$4,838 respectively can be ignored. A conclusion that may be drawn from this finding is that, whichever group they belong to, the CEECs are still either at stage 1 or stage 2.<sup>5</sup>

Working out a finer interpretation of the turning points would require testing the IDP per country or on the basis of the five sub-samples. However, as pointed out before, the lack of data makes it particularly difficult to undertake a rigorous econometrical test of the IDP relationship at the individual country level and does not allow us to assess which stage should be attributed to each CEEC. In any case, the investigation of how the nature of the relationship changes over time for the same country is outside the scope of this article. Rather, its aim is to examine if the nature of the relationship changes between the groups and sub-groups among the CEECs, and between the CEECs and EU15. Thus, following Dunning and Narula (1996) and Narula and Dunning (2000), a statistical analysis was conducted next by using three measures of dispersion in order to assess these changes.

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<sup>5</sup> For detailed explanations on quadratic equations, see Wooldridge (2006).

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## 4.2 A statistical evaluation of the convergence of CEECs' development trajectories

Three measures of dispersion, i.e. the mean, standard deviation and ratio of the standard deviation to the mean, were used. Calculations were based on 1995 and 2004, rather than on the last available year, 2005, taking into account the likelihood of data revision.

Results are given in table 6 for the whole CEECs' sample and sub-samples and, in addition, for the EU. Calculations were made for EU15 as a whole, but also on its less developed members, the so-called cohesion-fund countries (i.e. Greece, Ireland, Portugal and Spain). In view of the significant structural differences, Ireland was excluded.<sup>6</sup>

In line with the predictions of the IDP, the mean of the CEECs' NOIP becomes more negative as time passes, decreasing by a factor of 9.6, while for EU15, it is increasingly positive and for the cohesion-fund countries, it is still negative but slightly increasing. The increasingly negative NOIP per capita of the CEECs is due to the faster growth of inward FDI compared to that of outward FDI. This expected divergence between the CEECs and EU15 members illustrates differences in the stage on the IDP; the CEECs are somewhere between the first stage and the end of the second stage while EU15 countries are at more advanced stages.

By contrast, the CEECs appear to be converging within the sub-groups, as shown by the decrease of the ratio of the standard deviation to the mean of NOIP per capita, except for CEECs2.2 whose ratio is increasing (0.7 to 1.2). Moreover, a greater decline in their NOIP per capita occurs for CEECs2 (the coefficient is 13), while CEECs1 experience a significant but smaller decrease (the coefficient is 9). But among CEECs1, the CEECs1.3 sub-group exhibits a greater decline (with a 20.7 coefficient) than the two sub-groups among CEECs2 (with a coefficient of 11.6 for CEECs2.1 and 17.4 for CEECs2.2). It may thus be inferred that the less developed CEECs have become more attractive to FDI than the more developed CEECs, which are emerging as nascent outward investors.

In terms of GDP per capita, the situation is rather the opposite: whereas the CEECs converge on EU15 and within the sub-groups, they

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<sup>6</sup> The difference between mean NOIP and mean of NOIP was calculated for all cohesion-countries on the one hand and for the group less Ireland on the other. The fact that the discrepancy is much higher in the first case than in the second case indicates that the inclusion of Ireland induces strong structure effects.

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do not converge between the groups. For the CEECs as a whole, GDP per capita grows by a factor of 2.1. This coefficient is higher than that of the cohesion-fund countries (1.6), as well as that of EU15 (1.4). It means that convergence in terms of income levels does occur, albeit on a small scale, between the CEECs and the cohesion-fund countries, and between the CEECs and EU15. Convergence also occurs within the CEEC sub-groups: the ratio of the standard deviation to the mean of GDP per capita decreases slightly for each CEEC sub-group, except for CEECs2.2 whose ratio remains unchanged. But GDP per capita rises more rapidly for CEECs1 – with the exception of Slovenia – than for CEECs2, reflecting a tendency to diverge in terms of income level.

Finally, it is apparent that the GDP per capita of the CEECs rises more slowly than their NOIP per capita decreases. The difference may be explained by the fact that part of inward FDI has been driven by privatization rather than by growth in the first stage of the transition process.

### **4.3 Are CEECs1 on their way to stage three?**

The improvement in the locational advantages of CEECs1 has led to the growth of inward FDI, especially import-substituting manufacturing investment (e.g. in consumer goods) and/or vertical investment (i.e. driven by factor costs and associated with the international fragmentation of production). Government policies (e.g. incentives, tariff and non-tariff barriers, etc.) have reinforced this trend in targeted industries (for example, the automotive industry in Central Europe in the first half of the 1990s) or areas (through incentives such as free economic zones). As the larger recipient of the region, CEECs1 appear to have attracted the threshold level of inward FDI, which has created spillover effects and led indigenous firms to develop their ownership-specific advantages (Scott-Kennel and Enderwick, 2005).

At present, CEECs1 have the lowest NOIP per capita among the CEECs (table 3). However, as outlined above, NOIP per capita in CEECs1 is now decreasing more slowly than in the other groups, because of the convergence in the growth rates of outward and inward FDI flows. On the one hand, the growth of inward FDI is decreasing because of the gradual decline of privatization-related FDI. In future, the growth of inward FDI will depend on the magnitude of the impact of Eastern EU enlargement, both on inward FDI coming from EU15 members and from non-accession countries, which may try to gain a foothold in the EU. On the other hand, outward FDI has shown significant growth since 1995,

**Table 6. Changes in GDP per capita and NOIP per capita, 1995 and 2004, US dollars and ratio (absolute values)**

	1995			2004			Ratio of means	Ratio of standard deviations
	Mean	Standard deviation	Ratio	Mean	Standard deviation	Ratio		
<b>EU</b>								
Inward FDI pc	3566	2844	0.8	14381	12333	0.9	4.0	4.3
Outward FDI pc	4000	3380	0.8	15682	11187	0.7	3.9	3.3
NOIP pc	434	2199	5.1	1301	4910	3.8	3.0	2.2
GDP pc	23831	7700	0.3	32544	8011	0.2	1.4	1.0
<b>Greece, Ireland, Portugal, Spain</b>								
Inward FDI pc	1863	817	0.4	6184	3373	0.5	3.3	4.1
Outward FDI pc	505	330	0.7	4848	3729	0.8	9.6	11.3
NOIP pc	-1358	536	0.4	-1336	777	0.6	1.0	1.4
GDP pc	12548	2315	0.2	20367	4392	0.2	1.6	1.9
<b>CEECs: all</b>								
Inward FDI pc	175	291	1.7	1637	1999	1.2	9.3	6.9
Outward FDI pc	27	58	2.2	201	376	1.9	7.5	6.5
NOIP pc	-149	263	1.8	-1430	1757	1.2	9.6	6.7
GDP pc	2017	2161	1.1	4212	3902	0.9	2.1	1.8
<b>CEECs1</b>								
Inward FDI pc	447	382	0.9	3870	2054	0.5	8.7	5.4
Outward FDI pc	72	86	1.2	493	501	1.1	6.9	5.8
NOIP pc	-375	365	1.0	-3377	1828	0.5	9.0	5.0
GDP pc	4176	2542	0.6	8880	3174	0.4	2.1	1.2
<b>CEECs1.1: Slovenia</b>								
Inward FDI pc	948	/	/	3790	/	/	4.0	/
Outward FDI pc	263	/	/	1522	/	/	5.8	/
NOIP pc	-684	/	/	-2268	/	/	3.3	/
GDP pc	10194	/	/	16267	/	/	1.6	/
<b>CEECs1.2: Czech Republic, Estonia, Hungary</b>								
Inward FDI pc	758	315	0.4	6423	949	0.1	8.5	3.0
Outward FDI pc	36	10	0.3	672	348	0.5	18.7	33.3
NOIP pc	-723	325	0.4	-5751	600	0.1	8.0	1.8
GDP pc	4088	1392	0.3	9626	1183	0.1	2.4	0.8
<b>CEECs1.3: Croatia, Latvia, Lithuania, Poland, Slovakia</b>								
Inward FDI pc	160	64	0.4	2354	469	0.2	14.8	7.3
Outward FDI pc	55	65	1.2	179	172	1.0	3.3	2.7
NOIP pc	-105	92	0.9	-2175	398	0.2	20.7	4.3
GDP pc	3025	1115	0.4	6955	869	0.1	2.3	0.8
<b>CEECs2</b>								
Inward FDI pc	39	46	1.2	521	406	0.8	13.2	8.9
Outward FDI pc	4	6	1.5	55	175	3.2	12.8	27.1
NOIP pc	-35	47	1.3	-456	372	0.8	13.0	7.9
GDP pc	937	633	0.7	1878	1114	0.6	2.0	1.8
<b>CEECs21: Albania, Belarus, Bosnia, Bulgaria, Kazakhstan, Romania, Serbia, TFYR Macedonia, Turkmenistan</b>								
Inward FDI pc	56	56	1.0	650	318	0.5	11.6	5.7
Outward FDI pc	7	8	1.1	83	233	2.8	11.7	31.0
NOIP pc	-49	60	1.2	-567	354	0.6	11.6	5.9
GDP pc	1383	486	0.4	2735	620	0.2	2.0	1.3
<b>CEECs22: Armenia, Azerbaijan, Georgia, Kyrgyzstan, Moldova, Tajikistan, Ukraine, Uzbekistan</b>								
Inward FDI pc	19	13	0.7	359	466	1.3	18.9	34.8
Outward FDI pc	1	2	2.1	20	40	2.0	26.7	26.2
NOIP pc	-18	13	0.7	-317	367	1.2	17.4	27.5
GDP pc	380	175	0.5	808	398	0.5	2.1	2.3

Source: Author's calculations based on UNCTAD data (UNCTAD FDI database, available on-line, [www.unctad.org](http://www.unctad.org), accessed on April 2007) and World Bank data (World Development Indicators database, available on-line, [devdata.worldbank.org](http://devdata.worldbank.org), accessed on April 2007).

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except for Latvia and Lithuania. This can be interpreted as an indication that indigenous firms have acquired firm-specific assets by reaping the benefits of the learning-by-doing process and have thus become able to compete abroad.<sup>7</sup>

Nevertheless, it must be pointed out that part of FDI originating from the CEECs is “indirect” FDI (Altzinger *et al.*, 2003), since it is undertaken by foreign affiliates, i.e. resident but not necessarily domestic firms. The unavailability of detailed outward FDI data according to the ultimate nationality of the investor makes it impossible to say to what extent the CEECs’ outward FDI stock is “direct” or “indirect”. However, “indirect” outward FDI is positively correlated with the level of inward FDI that a country attracts (Altzinger *et al.*, 2003, p. 92), and empirical studies indicate that a substantial share of outward FDI is made by foreign affiliates in the case of Estonia (particularly in the banking sector), Hungary and the Czech Republic (e.g. Svetličič and Rojec, 2003). By contrast, outward FDI is directly made by locally owned firms in the Russian Federation and Slovenia. In particular, Slovenian firms are in the best position to invest abroad because of their exposure to Western markets over the past 30 years (Svetličič *et al.*, 2000; Jaklič and Svetličič, 2003).

Although the NOIP per capita of CEECs1 is not yet increasing, it is very likely that the upswing of outward FDI together with the slowing down of inward FDI will gradually close the gap. The upward pressure on labour cost makes this hypothesis even more plausible. Indeed, rising unit labour costs affect both inward and outward FDI flows. On the inward side, the deterioration of the cost advantages of CEECs1 in activities based on unskilled labour, together with improving indigenous innovatory capacity, create push factors for foreign investors to shed lower value-added industries and to enter into more capital- and technology-intensive industries. Thus, foreign firms increasingly invest in the service sector activities such as logistical and R&D centres in

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<sup>7</sup> Research by the Internationalisation Studies Research Group managed by Urmas Varblane at the University of Tartu provides some evidence for such learning-by-doing effects, particularly in the Estonian case. The author of the present research studied the case of Vistula, a Polish clothing firm, which has become a TNC through a learning-by-doing process (Bensebaa and Boudier, 2008). During the 1990s, Vistula learnt from Western contractors through OPT relationships, assembling garments to the specifications desired. At the turn of the 21st century, the firm became able to engage in OBM (Original Brand Manufacturing) and ODM (Original Brand Design) for foreign markets.

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the CEECs. This shift can also occur at an intra-industrial level, as in the electronics industry of Hungary, where TNCs are closing facilities in low value-added product segments in favour of higher value-adding segments (UNCTAD, 2003, p. 61). On the outward side, rising labour costs are likely to encourage indigenous firms to move the labour-intensive segments of the production process to less advanced countries. Outward FDI is likely to play a crucial role in the restructuring of CEECs1' declining activities, whose cost advantages are eroding.

But at present, outward FDI of CEECs1 seems to be driven more by market considerations than cost considerations (Jaklič and Svetličič, 2001a). Indeed, the small size of markets (except for Poland) pushes domestic firms to engage in horizontal FDI. Geographical proximity and cultural and historical ties reinforce this tendency. Outward FDI from CEECs1 is increasingly directed to neighbouring countries, often based on links inherited from the past, whereas it is decreasing to the EU and more generally to developed countries. Thus, 95% of Estonian outward stock in 2001 was located in the Baltic States and 58% of Slovenian stock was located in Croatia.<sup>8</sup> The increase towards the CEECs and the decrease towards the EU are linked. On the one hand, CEECs1' domestic firms possess ownership-specific advantages with regard to the CEEC markets through their long-standing ties, and therefore face lower transaction costs (Jaklič and Svetličič, 2001a). On the other hand, firms originating from abroad, and more particularly from the EU, use their affiliates in the CEECs as a springboard for outward FDI in other CEECs, but have little interest in investing back into their home country.

The emergence of this concentration pattern in some geographically and/or culturally close host countries presents strong similarities with the IDP of other small emerging or late-developed countries. For example, outward FDI from Portugal is concentrated in Brazil and Spain (Buckley and Castro, 1998; Simões, 2003); from Ireland in the United States and the United Kingdom (Barry *et al.*, 2003); and from Finland (Luostarinen, 1979) in Denmark, Norway, Sweden and the former Soviet republics.

#### **4.4 CEECs2 as hinterland for the enlarged EU?**

The loss of competitive advantages based on low labour costs in CEECs1 should prompt a shift of cost-sensitive investment from

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<sup>8</sup> Author's calculations based on OECD online database.

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CEECs1 to South-East Europe and CIS countries. At the very least, it will certainly ensure a shift in FDI from EU15. In fact, this shift concerns all labour-intensive activities, whether they are relocated through equity or non-equity forms of investment.<sup>9</sup> For example, outward processing trade, particularly in clothing, is moving from Central Europe (especially Poland) to South-East Europe and CIS countries. But this transfer of foreign firms' activities to CEECs2 through cooperative agreements are not incorporated into FDI data, which only take into account equity forms of investment. If the non-equity forms of investment were taken into account, it would probably make the NOIP of CEECs2 more negative.

Since CEECs2 appear essentially as labour-surplus economies<sup>10</sup>, the question is whether they attract too much "footloose" FDI to the detriment of "good" FDI, even if they receive market-seeking FDI in the frame of TNCs' overall strategies. Even worse, CEECs2.2 countries, above all Kyrgyzstan, Tajikistan and Uzbekistan, do not appear to possess sufficient assets to attract FDI. These countries suffer from insufficient locational advantages because of the limited domestic market, slow structural reform, difficult business environment and political instability. Except for Azerbaijan, which possesses oil and gas fields, these countries are marginalized in terms of FDI inflows, a situation unlikely to change in the near future. TNCs prefer to access these countries through trade or non-equity forms of investment.

Among CEECs2, Azerbaijan and Kazakhstan emerge as the most attractive location for FDI in terms of relative figures (appendix 2). The importance of natural resource-seeking FDI in the oil industry<sup>11</sup> makes the NOIP per capita of Kazakhstan and Azerbaijan much more negative than other countries in the group. But as few other locational

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<sup>9</sup> According to UNCTAD, non-equity forms of investment allow foreign investors "to obtain an effective voice in the management of another business entity through means other than acquiring an equity stake" (UNCTAD, 2006, p. 294).

<sup>10</sup> Labour-surplus economies refer to dualistic economies in which there exist some sectors or sub-sectors with high unemployment rate or a high number of disguisedly unemployed workers. Initially developed in a closed economy context, the analysis has been amended to take openness into account. This has led to a recognition that labour-surplus activities may be agricultural activities as well as industrial and services-oriented activities, particularly in the informal sector, which is more urban than rural. See for example, Ranis (2004).

<sup>11</sup> Two thirds of the FDI stock in Kazakhstan in 2002 and more than 70 per cent of the accumulated FDI inflows attracted into Azerbaijan in the 1995-2002 period were in the petroleum sector (UNCTAD WID country profile, available on-line, accessed on April 2007, and our own calculations).

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assets beyond natural resources have been developed, the potential of Azerbaijan and Kazakhstan to attract FDI is limited. Unlike these two countries, the Russian Federation, whose GDP per capita is the highest of the group, receives very little FDI in relation to its size and natural resources (table 5). Its NOIP per capita is hovering around zero.

Azerbaijan, Kazakhstan and the Russian Federation are the only outward investors among CEECs<sup>2</sup>. But the rationale for undertaking outward FDI differs from that of CEECs<sup>1</sup>. As resource-rich countries, these countries may have developed sufficient ownership advantages in the exploitation of natural resources and invested abroad on this strength. Furthermore, outward FDI from the Russian Federation in the oil and gas industries is motivated by the desire of Russian firms to become global players (UNCTAD, 2003, p. 61).

However, the level of outward FDI from the Russian Federation, whose FDI outflows have been higher than its inflows since 2000, has to be interpreted with care. First, the increases in FDI flows into and out of the Russian Federation partly reflect the “round-tripping” phenomena.<sup>12</sup> Second, Russian outward FDI may be underestimated because of capital flight (UNCTAD, 2002, p. 2) generated by domestic instability or because some investments have been made carrying flags other than the Russian Federation’s (Liuhto and Jumpponen, 2003).

It is difficult to assess which stage of the IDP should be attributed to Azerbaijan and Kazakhstan, since the relationship between a country’s natural resource endowment and its level of development on the one hand, and its FDI inflows and outflows on the other, is uncertain, if not nonexistent, as pointed out by Durán and Ubeda (2001, p. 11). The presence of natural resources can be considered as an exogenous variable (Durán and Ubeda, 2001, p. 10). The NOIP per capita of the Russian Federation, which remains near zero, might suggest a stage one or stage five position. Stage five is usually associated with wealthy industrialized countries. Developing resource-rich countries are often at stage one, but would not have such large outward FDI, as is the case with the Russian Federation.<sup>13</sup>

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<sup>12</sup> According to UNCTAD (1998, p. 290, note 3), the term, “round-tripping”, refers to “the transfer of funding abroad in order to bring some or all of the investment back as FDI and claim the tax and other benefits to foreign investors”.

<sup>13</sup> The fact that a net FDI position of zero can be a characteristic of countries at both the first and fifth stages of IDP is pointed to by Durán & Ubeda (2001, pp. 3-4) as one of the two disadvantages of the use of NOIP.

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## 5. Conclusion

This article applies the concept of the IDP for the CEECs and investigates whether the CEECs' development trajectories converge on those of EU15 members, as well as between sub-groups. This kind of study has never, to our knowledge, been carried out for these countries.

Using the IDP framework is helpful in evaluating the CEECs' FDI assisted-development trajectories in the context of globalization and integration into the EU. There is undoubtedly a causal relationship between a country's FDI profile and its level of development, and therefore its locational advantages and the ownership advantages of its domestic firms. But the case of the CEECs exemplifies the change in the nature of the IDP and the difficulty in testing it. Indeed, the present research confirms the idiosyncratic nature of the IDP, and thus the difficulty of econometrically testing its applicability on a large group of economies. Due to the problem of the short observation time-span for the CEECs, it is not possible to test the validity of the paradigm on each CEEC. But the difficulty was overcome by using cluster analysis in order to identify homogeneous groups and sub-groups among the CEECs and by carrying out a statistical evaluation in addition to the econometric test.

The results indicate that (i) the position of the CEECs is at stage one or two of the IDP; (ii) the CEECs are diverging from EU15 in terms of NOIP per capita but converging in terms of GDP per capita; (iii) the IDPs within the five sub-groups are converging, and (iv) less developed CEECs are converging with more developed CEECs in terms of outward investment position but not in terms of GDP per capita.

These results raise questions for further research addressing the fragmentation of the eastern periphery of EU15. First, accession to the EU of more CEECs is likely to affect the international investment position of these countries. EU15 countries are expected to account for a growing part of inward FDI into new EU members and in the destination of their outward FDI. Depending on the pace of convergence of the new EU members, the question then is whether an enlarged homogeneous core is likely to emerge as a result of the enlargement process or the periphery continues to lag behind.

Second, among the less developed-country periphery (CEECs2) of the EU, some CEECs are likely to be marginalized in that they may prove unable to draw significant FDI (except in natural-resource activities). In this respect, one question is how the Eastern EU enlargement will

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affect FDI from EU15 as well as from accession countries towards non-accession CEECs. In particular, it is an interesting question to ask whether a further division in terms of economic performance between accession CEECs and non-accession countries is likely to emerge.

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**Appendix 1. Magnitude of inward FDI stock compared to outward FDI stock, 2004**

Accession countries + Croatia		Non-accession countries	
Czech Rep.	15.2	Albania	17.3
Croatia	5.8	Armenia	40.8
Estonia	7.1	Azerbaijan	4.9
Hungary	10.4	Belarus	250.8
Latvia	20.8	Bosnia and Herzegovina	46.0
Lithuania	15.1	Bulgaria	143.7
Poland	26.6	Kazakhstan	1.6
Slovakia	26.3	Kyrgyzstan	8.1
Slovenia	2.5	Moldova	33.9
		Romania	89.7
European Union	0.7	Russian Federation	1.1
		TFYR Macedonia	805.5
		Ukraine	48.5

*Source:* Author's calculations based on UNCTAD data (UNCTAD FDI database, available on-line, [www.unctad.org](http://www.unctad.org), accessed on April 2007).

*Note:* Since no outward stock was recorded in 2004 for Bulgaria and Kazakhstan, the ratio has been calculated on 2003 data. The ratio cannot be calculated for those countries whose outward FDI stock is nil (Serbia, Tadjikistan, Turkmenistan, Uzbekistan).

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**Appendix 2. Inward FDI stock per capita, outward FDI stock per capita, and NOIP per capita, 1995, 2004, US dollars**

	1995			2004		
	Inward stock pc	Outward stock pc	NOIP pc	Inward stock pc	Outward stock pc	NOIP pc
European Union	3049	3563	630	10865	13771	2907
Ireland	17410	5300	-12110	57509	25802	-31707
Spain	2666	883	-1782	9257	8694	-563
Portugal	1893	382	-1582	6719	4603	-2117
Greece	1032	276	-755	2576	1247	-1329
CEECs	94	14	-80	1159	346	-813
Accession countries	397	35	-362	3385	269	-3116
Czech Republic	711	33	-678	5605	368	-5237
Croatia	102	151	48	2837	486	-2351
Estonia	469	47	-422	7463	1052	-6411
Hungary	1094	27	-1067	6202	596	-5606
Latvia	245	92	-153	1978	95	-1883
Lithuania	97	0	-97	1860	123	-1736
Poland	203	14	-189	2242	84	-2158
Slovakia	151	16	-135	2853	108	-2745
Slovenia	948	263	-684	3790	1522	-4530
Non-accession countries	22	9	-13	589	365	-224
Albania	64	15	-49	456	26	-430
Armenia	20	0	-20	332	8	-324
Azerbaijan	43	0	-43	1468	297	-1171
Belarus	5	18	13	209	1	-208
Bosnia and Herzegovina	3	4	-1	452	10	-442
Bulgaria*	53	12	-41	798	9	-789
Georgia	6	0	-6	414	4	-410
Kazakhstan*	183	0	-183	1180	20	-1159
Kyrgyzstan	31	0	-31	132	16	-117
Moldova	22	4	-17	216	6	-210
Romania	36	5	-31	946	14	-933
Russian Federation	2	16	14	819	746	-74
Serbia and Montenegro	31	0	-31	484	0	-484
Tajikistan	7	0	-7	73	0	-73
TFYR Macedonia	81	0	-81	877	1	-876
Turkmenistan	99	0	-99	272	0	-272
Ukraine	17	2	-16	202	4	-198
Uzbekistan	5	0	-5	35	0	-35

Sources: Author's calculations based on UNCTAD data (UNCTAD FDI database, available on-line, [www.unctad.org](http://www.unctad.org), accessed on April 2007) and World Bank data (World Development Indicators database, available on-line, [devdata.worldbank.org](http://devdata.worldbank.org), accessed on April 2007).

\* 2003 (2004 outward stock figures not available).

<b>Appendix 3. Data availability</b>		
Country	Covered period	Number of observations
Bulgaria, Czech Rep., Hungary, Poland, Romania	1991-2005	15
Albania, Armenia, Belarus, Croatia, Latvia, Lithuania, Macedonia, Slovenia, Tajikistan, Ukraine, Uzbekistan	1992-2005	14
Azerbaijan, Estonia, Kyrgyzstan, Moldova, Russia, Slovakia, Turkmenistan	1993-2005	13
Georgia	1994-2005	12
Kazakhstan	1993-2003	11
Bosnia	1996-2005	10
Serbia	1998-2005	8

<b>Appendix 4. Correlation matrix</b>						
	Unbalanced panel			Balanced panel		
	NOIPpc	GDPpc	GDPpc <sup>2</sup>	NOIPpc	GDPpc	GDPpc <sup>2</sup>
	CEECs			CEECs		
NOIPpc	1.0000			1.0000		
GDPpc	-0.7228	1.0000		-0.7195	1.0000	
GDPpc <sup>2</sup>	-0.6303	0.9205	1.0000	-0.6248	0.9210	1.0000
	CEECs1			CEECs		
NOIPpc	1.0000			1.0000		
GDPpc	-0.6005	1.0000		-0.5908	1.0000	
GDPpc <sup>2</sup>	-0.4969	0.9558	1.0000	-0.4879	0.9559	1.0000
	CEECs2			CEECs2		
NOIPpc	1.0000			1.0000		
GDPpc	-0.4865	1.0000		-0.4697	1.0000	
GDPpc <sup>2</sup>	-0.4095	0.9240	1.0000	-0.4066	0.9259	1.0000



# Changing governance patterns in European food chains: the rise of a new divide between global players and regional producers \*

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Florence Palpacuer and Selma Tozanli \*\*

This article traces general trends in European food markets and the strategies of leading firms in selected European food chains (milk, sugar, cereals, meat). The analysis highlights the emergence of a growing divide between the largest downstream firms on the one hand and specialty and upstream producers on the other. The former have adopted globalization and financialization strategies over the past decade and promoted global sourcing under the deregulated conditions of European primary food and agricultural markets while the latter remain anchored in national or regional markets and production systems. Implications of these findings for both Global Value Chain (GVC) analysis and European policy are discussed.

**Key words:** Global Value Chains, Europe, CAP reform, food industry

## Introduction

European food industries have historically been characterized by significant public intervention in regulating agriculture and food production. Building on national agricultural policies launched after World War II, the European Common Agricultural Policy (CAP) established detailed schemes of a Common Market Organisation (CMO) in agricultural and food industries during the 1960s, including various forms of price support, production incentives and market protection, with the objectives of achieving self-

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sufficiency in agricultural and food supply and ensuring stable income for European farmers. The CAP entered into a phase of crisis in the mid-1980s, when it continued to stimulate production increases in the context of stagnating demand both within and outside European markets, thus generating huge stocks of unsold agricultural products. In the face of rising liberal doctrines in the international political arena, and the need to control skyrocketing budget expenditures, the EEC – and subsequently the EU – implemented a series of major reforms in 1992, 2000 and 2003, with the objective of reintroducing market forces to the European agricultural and food production system. In 2006, a further set of reforms were introduced aimed at the sugar industry – an industry that had remained largely untouched by previous regulatory changes thanks to the strong lobbying capacity of European sugar producers and upstream beet-producing farmers.

The guiding principles of these reforms have been the paradigm of free competition according to which economic welfare is enhanced by market liberalization. While European agri-food producers would lose the rents generated by the traditional system of market regulation – or at least part of these rents affected by liberalization policies – and a number of them would be pushed out of the market, deregulation was considered to benefit consumers and tax-payers – who supported agricultural rents either directly through public subsidies or indirectly through higher retail prices for food products – together with foreign competitors who would gain greater access to the European market. Major agricultural exporting countries, including members of the Cairns Group<sup>1</sup>, were expected to become the main beneficiaries of the liberalization of European markets and had an influential voice in the agricultural reform debate at the World Trade Organisation over the 1990s and early 2000s. Agricultural reforms were also considered to advantage food producers operating in the downstream segment of European agri-food chains by allowing greater market choice in their sourcing of agricultural and primary processed inputs. However, they met strong resistance from upstream producers, particularly in the sugar industry where the European Association of Sugar Producers sought to preserve CAP protection on account of the lower environmental, social and product quality standards adopted by large competitors such as Brazil, and of losses incurred by European sugar producers if global competitive forces were to be unleashed in the industry.

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<sup>1</sup> The Cairns Group was formed in 1986 and now includes 17 countries from Latin America and the Asia-Pacific region, as well as Canada and South Africa.

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This article aims to shed light on such conflicting positions in the CAP reform debate by using a Global Value Chain (GVC) perspective to analyze changes in the competitive dynamics and governance patterns of selected European food chains from the late 1980s to the early 2000s. As laid out in the seminal work of Gereffi (1994), the earlier GVC analysis identified large branded firms and retailers in the Western hemisphere as key players – “lead firms” – in the deployment and continuous redeployment of production systems involving networks of affiliates and suppliers on a world scale.<sup>2</sup> It is thus from the perspective of major European firms, including large brand firms but also primary processing producers, that changes in the governance of European food chains will be analyzed in this article. Our study focuses on products and firms belonging to the meat, cereals, sugar and milk chains,<sup>3</sup> and draws on databases on food markets (Food for Thought) and food transnational corporations (TNCs) (Agrodata), as well as interviews conducted with European industry associations and leading food TNCs in 2002–2003 (see appendix 1). First, we highlight the emergence of a new type of “global” food products on European markets, and the rising heterogeneity of product/market strategies adopted by major food producers in Europe. Second, we identify a new divide between global players on the one hand, i.e. the largest firms operating downstream European food chains (secondary processing), and regional producers on the other, including both upstream producers (primary processing) and specialty downstream firms. We differentiate the two camps on the basis of a typology characterizing the ownership structure, chain position, market, production and sourcing strategies of leading TNCs in our selected European food chains. The theoretical and policy implications of these empirical results are discussed in light of recent advances in the socio-economic literature on GVCs and current orientations in EU food and agricultural reforms.

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<sup>2</sup> Gereffi (1994) initially referred to Global Commodity Chains (GCCs) and adopted a Global Value Chain (GVC) terminology in subsequent publications including Gereffi and Kaplinsky (2001) as well as Gereffi, Humphrey, Sturgeon (2005).

<sup>3</sup> The choice of chains studied was made by the European Commission, for which this research was undertaken, on the basis of selected product categories: (i) sugar, soft drinks and confectionaries in the sugar chain, (ii) butter, cheese and ice cream in the milk chain, (iii) animal feed, starch, flour, bread, biscuits and pasta in the cereal chain, and beef, pork, poultry, delicatessen and frozen prepared meat in the meat chain.

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## 1. Downstream European food chains: the rise of global market strategies

The analysis of market trends and market concentration ratios allowed us to establish a distinction between “global” products developed and marketed by large TNCs, and “local” or “generic” products belonging to less concentrated industry segments (subsection 1.1). Focusing on the top 22 largest producers in our selected European food chains, we computed a globalization index showing the rise of global downstream firms since the late 1980s, and the persistence of regional strategies for firms involved in specialty as well as generic, primary processing production (subsection 1.2).

### 1.1 “Global” versus “local” and “generic” products

In consumer markets, food is certainly one of the most location-specific products, anchored in life styles, customs and habits developed over time, as well as the level of development. Inside Europe, strong differences persist between countries; for example, the share of food expenditures in the household budget is twice as large in Portugal (20%) as in the United Kingdom (9.9%).<sup>4</sup> Nevertheless, homogeneous consumption patterns are beginning to emerge in world markets, across countries and macro regions, resulting in the rise of high-growth “global” product segments. A.C. Nielsen (2002) found that seven product categories were exhibiting growth rates of 10% or more in 2001 in the majority of the 47 countries under study. With the exception of alcoholic beverages, these products are related to the consumers’ preferences for health (dairy products, light and vitamin-enhanced products), ease of use, innovation and sophistication (prepared meals, bottled waters). Similar trends could be observed in the six main European food markets over the 1990s for products in the milk, meat, cereals and sugar chains (table 1).

While food consumption grew at the average annual rate of 3% in these markets, most product categories exhibiting superior growth rates in table 1 have the characteristics of sophistication (soft drinks, chewing gum), newness (bread spread), ease of use (prepared meals, melted cheese), health (artificial sweetener) or fitness (energetic sweets in sugar confectionary) – all associated with key consumption trends in the emerging global segment of the world food market. By contrast, the majority of product categories exhibiting sales growth rates below 3%

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<sup>4</sup> Eurostat, 2000, <http://europa.eu.int/comm/eurostat>.

**Table 1. Retail sales of selected food products in six EU countries\***  
(Millions of euros)

Product	1991	2001	Average annual growth rate (%)
Artificial sweeteners	242	572	13,7
Chewing gum	1 161	2 267	9,5
Delicatessen products	10 195	18 048	7,7
Dairy spreads	272	428	5,7
Soft drinks	13 441	20 845	5,5
Frozen convenience meat	4 278	6 020	4,1
Sugar confectionery	6 781	9 416	3,9
Melted cheese	2 161	2 927	3,5
Poultry	18 855	25 903	3,2
<i>Average annual growth rate of food consumption expenditures**</i>			<b>3,0</b>
Savoury biscuits	866	1 073	2,4
Bread products	32 132	38 596	2,0
Sweet biscuits	7 377	8 762	1,9
Natural cheese	22 075	26 212	1,9
Pork	30 625	36 289	1,7
Dry pasta	3 641	3 947	0,8
Flour	547	593	0,8
Ice cream	9 665	10 401	0,8
Butter	5 811	5 616	-0,3
Sugar	2 961	2 723	-0,8
Beef	41 719	30 371	- 3,1

Source: Authors' calculations based on data provided by Food For Thought, 2003, Geneva.

\* Belgium-Luxembourg, France, Germany, Italy, Spain, United Kingdom

\*\* Calculation based on data from Euromonitor for 1990 and 2000 (local currencies and current prices).

were either “generic” products such as flour, sugar, butter and meat, or “local” specialty products such as natural cheese, both incorporated into traditional consumption patterns. A few low-growth products (savory and sweet biscuits, ice cream) have also been partly touched by global trends as these can cut across traditional products categories. For instance, the practice of “snacking” affects ice creams, biscuits as well as sugar confectionaries that might be sold under the same brand, such as Mars, in the global product segment. As a consequence, a given food category such as ice cream might include both highly sophisticated products, such as those developed and marketed by Unilever, and traditional, local products such as the Italian craft-produced ice cream. Overall, applying the Fisher’s exact test of independence to our 20 product categories shows that the association between products’ sales growth rate and their

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characteristics (i.e. global versus generic or local) is significant with a P value of 0.032.<sup>5</sup>

Table 2 provides additional information on these emerging market features by distinguishing four types of products on the European market: branded, private label, specialty and generic products. The ranking of products according to the concentration ratios in the European markets, i.e. the market share of top four producers (CR4), shows that “global” products such as chewing gums, artificial sweeteners, and soft drinks exhibit significantly higher concentration ratios (above 50%) than do “generic” and “local” products such as bread, flour, butter, meat, and natural cheese, for which CR4 ratios are in the range of 12% to 30%.<sup>6</sup> As discussed further in the next section, high concentration ratios in the “global” product segment stem from the leading market positions occupied by large TNCs, such as Wrigley in chewing gum, Coca Cola, PepsiCo and Cadbury Schweppes in soft drinks, and Unilever and Nestlé in ice cream, which have developed a capacity to sell their branded products on several major European markets. A few large retailers have also set up sourcing and distribution systems at the European level with these transnational producers, thus contributing to promote the diffusion of their global products across Europe (Rabobank, 2001). Accordingly, large branded producers are emerging as major lead firms in the “global” segment of the European food market.

The market shares of leading producers of local and generic products have not reached such a European scale. Interestingly, table 2 shows that private labels tend to be more important, with market shares of 20% or more, for generic products, such as butter, flour and bread, than for most global-type product categories, while meat continues to be predominantly sold without branded labels. Lead firms appear to be emerging here in the retail segment, rather than manufacturing, of European food chains. Retail concentration has indeed doubled in Europe during the 1990s, from a top five retailers’ market share of 13% in 1990

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<sup>5</sup> The Fisher’s exact test is used to calculate an exact probability value of the relationship between two dichotomous variables, as found in a two by two cross-table. It works in the same way as the Chi-square test for independence, but can be used when the number of observations is small (less than five) in one of the cells. The table program used here can be found at <http://home.clara.net/sisa>.

<sup>6</sup> Using the Fisher Exact test of independence in a 2 by 3 table, a classification of food products into three categories of high (above 50%), medium (above 30% and below 50%) and low (30% or less) CR4 levels shows that the relationship between concentration levels and average annual sales growth rate (above or below 3%) is significant with  $P = 0.009$ .

**Table 2. Market share of top four producers (CR4), retailers' private labels, craft production, and no-label products in Western Europe\*, December 2001**

Products	CR4 (%)	Private label (%)	Craft production (%)	No-label products (%)
Chewing-gum	75.8	1.6		
Savoury biscuits	68.5	20.1		
Artificial sweeteners	66.0	12.6		
Soft drinks	64.0	15.7		
Ice cream	58.3	14.7	11.2	
Dairy spreads	56.3	8.8		
Melted cheese	54.3	12.6		
Sweet biscuits	47.9	22.4	0.3	
Sugar	41.7	15.9		
Dry pasta	38.2	23.7	2.4	
Sugar confectionery	35.1	14.7	0.1	0.2
Frozen prepared meat	31.2	19.7		1.1
Natural cheese	30.1	16.7	1.0	1.8
Delicatessen	26.1	20.4	15.1	13.4
Butter	26.5	21.2		3.1
Flour	25.6	32.1		9.7
Beef	19.4	15.2		69.1
Poultry	18.1	14.8		31.9
Pork	14.0	10.3		69.6
Bread	12.1	22.7	53.6	

Source: Food for Thought, 2003, Geneva.

Notes: Craft production is defined as direct sales from producer to consumer (e.g. bakeries, delicatessen). No-label products are low-cost generic products sold without any branding

\* EU15, Switzerland and Norway.

to 26% in 2000,<sup>7</sup> although it remained much higher in Northern Europe than in Southern Europe so that on average, retail concentration did not come near the level in the most concentrated segments of manufacturing in European food chains. With the exception of Carrefour, most retailers had not reached leadership positions in a significant number of national markets in Europe by the early 2000s. However, retailers' buying power within the chain was strengthened by a growing centralization of sourcing. For instance, the top six central buying offices accounted for as much as 65% of retail chain food sales in Italy, up to 72% in the United Kingdom and 98% in France in 2000.<sup>8</sup> Dominant players in European food chains could thus be identified as either major producers in the case of branded products, or large retailers for generic products sold under

<sup>7</sup> Here Europe refers to EU-15, Norway and Switzerland; M+M Planet Retail, www.planetretail.net; M+M Eurodata, www.mm-eurodata.com.

<sup>8</sup> Institut de Liaison et d'Etudes des Industries de la Consommation, 2000.

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private labels. For other types of products, leadership in European food chains remained much more dispersed.

## 1.2 Assessing market globalization of large food TNCs in Europe

This section seeks to identify the international scope of activity exhibited by top food producers in the selected European food chains. A distinction is drawn between global strategies, characterized by homogeneous market approaches and the search for economies of scale across world macro regions on the one hand, and more home region oriented strategies by which firms concentrate a large proportion of their activities in the home region and operate a smaller range of business activities outside, on the other. We computed an index of “sector globalization” to assess the extent to which a firm has developed homogeneous product-market approaches across world macro regions. The index is obtained by dividing the total number of business segments the firm operates in outside a company’s home region by the total number of business segments within its home region. A globalizing firm would have about the same type and number of businesses in its region of origin as in other regions, whereas a more home region oriented firm would typically have a greater variety of businesses in its home region than in other regions.<sup>9</sup> Our methodology<sup>10</sup> combined this sectoral index with an index of “geographical globalization” measuring the scope of a firm’s activity outside its country *and* macro region of origin. This was obtained by multiplying two measure: the share of foreign affiliates in the firm’s total number of affiliates; and the proportion of macro regions where the firm’s affiliates are established in the total number of world macro regions used in this study.<sup>11</sup> For both indicators, values close to 1 indicated high globalizing intensity in a firm’s strategy while values closer to zero signalled a primarily home-oriented strategy. Globalization indices were computed for 22 leading producers in the meat, cereal, sugar and milk chains. This sample consists of firms which are among the top four European leaders in each of the product categories listed in

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<sup>9</sup> The case where a food processing firm would have a greater number of activities outside its home region than in its home region has not been observed in our sample.

<sup>10</sup> Tozanli (2005) developed this methodology and applied it to the top 100 world food TNCs included in Agrodatabase.

<sup>11</sup> Africa, Latin America, Asia, North America, Western Europe, Eastern and Central Europe, Mediterranean and Oceania.

table 2, and belong to the world top 100 Agrodata database in 2002.<sup>12</sup> Appendix 2 provides information on the country of origin, type of chain position, majority ownership, product portfolio, total sales and geographical scope of these 22 firms, while appendix 3 provides values for the computed globalization indices. Figures 1 and 2 indicate their degree of globalization in 1988 and 2002 respectively. Firms located in the upper right quadrant of the figures exhibit high levels of both sector and geographic globalization, whereas firms located in the lower left quadrant are following home region oriented strategies both in terms of geographical and product scope. The upper left quadrant corresponds to the strategies by which firms operate a similar range of business within and outside its home region, but the presence outside the home region is relatively limited. In the lower right quadrant, firms exhibit high levels of internationalization outside their macro region, but the range

**Figure 1. Globalization of leading TNCs in selected European food chains, 1988**



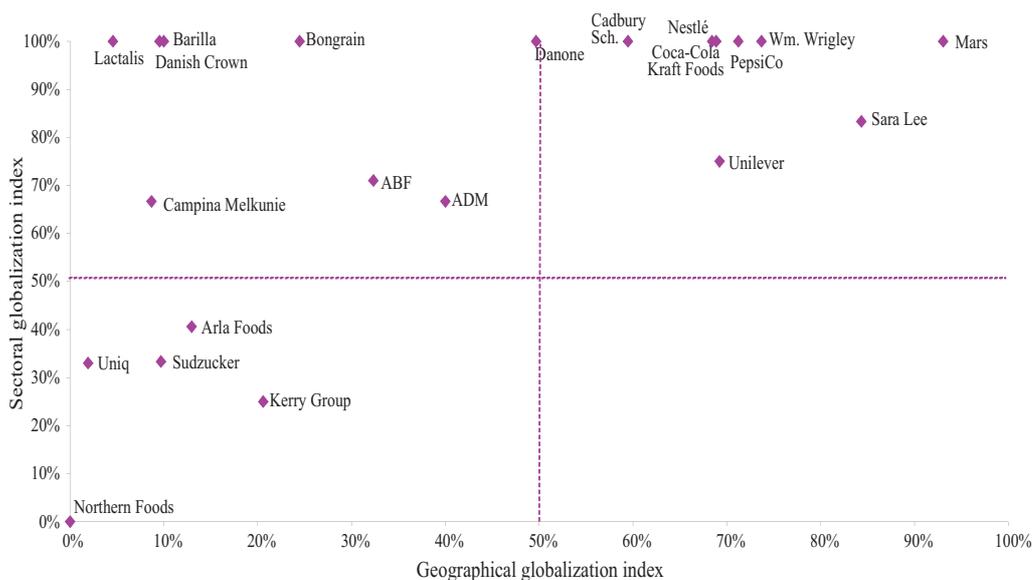
Source: Authors' elaboration based on Agrodata.

<sup>12</sup> The whole business portfolio of each firm was taken into account in computing globalization indexes. Three of the firms belonging to the sample in 2002 had not entered Agrodata list of top 100 by the late 1980s (Kerry, Sudzucker, Danish Crown), so that the sample is of only 19 companies for 1988. Out of 22 firms, only 7 are mainly positioned in upstream primary processing activities, both because the world largest food TNCs tend to focus on downstream, higher value secondary processing activities, and because market shares are assessed in Table 2 with reference to final markets, so that a number of primary processing firms with marginal presence on end markets, such as Cargill, do not appear in the sample.

of businesses it operates outside the home region is limited compared to those within the home region.

Comparing the two graphs reveals a striking evolution from home-oriented towards global strategies in the sample studied. In 1988, only Coca Cola exhibited significant levels of both geographical and sector globalization, while Unilever and Nestlé had developed a strong presence outside their macro region of origin but in a narrower range of businesses. A majority of firms operated mainly in their home macro region. By 2002, nine downstream firms had joined Coca Cola into the upper right “global” quadrant of figure 2. Another five firms had homogenized their business portfolios across regions either in upstream, primary processing (Campina, ABF, ADM) or in downstream specialty segments (Barilla, Bongrain) while remaining predominantly in their macro region of origin, thus moving from the lower left to the upper left quadrant in figure 2. Only five out of 22 firms continued to follow home region oriented strategies, i.e. remained in the lower left quadrant of figure 2, including two new comers in the world top 100 food TNCs (Sudzucker, Kerry). A growth path could thus be identified for about half of the sample between the late 1980s and early 2000s, based on the development of global businesses across major world macro regions. By contrast, other firms did not reach such levels of globalization, highlighting the existence of heterogeneous market strategies across European food chains.

**Figure 2. Globalization of leading TNCs in selected European food chains, 2002**



Source: Authors' elaboration based on Agrodata.

## 2. Changing governance patterns in European food chains

By linking the types of international strategy identified in the previous section with a variety of firms' characteristics including their chain position, product and market approach, size, ownership and country of origin – see appendix 2 – as well as their production and sourcing strategies, distinct profiles of leading producers in European food chains could be identified. Table 3 summarizes these various dimensions, highlighting differences between global firms on the one hand, and regional firms on the other. The statistical significance of differences observed along a number of variables was assessed using the Fisher's exact test of independence, for which P values are indicated in the last column.

First, all the global firms with a homogenized business activities – located in the upper right quadrant of figure 2 – were operating in the downstream segment of food chains, i.e. using primary processed materials such as sugar and flour to manufacture their own products for the end market. Although five additional downstream firms followed regional strategies, the specificity of global firms' downstream position was significant with a P value of 0.005. Second, global firms were also

**Table 3. A typology of producers in European food chains**

Characteristics	Global firms (n=10)	Regionally oriented firms (n=12)	Fisher Exact Test
Chain position	Downstream (10)	Upstream (7) Downstream (5)	P = 0.005
Size (sales value, 2002)	Above \$8 billion. (9)	Below \$8 billion. (11)	P = 0.0002
Ownership control	Institutional investors (9)	Families (4) Upstream farmers (5)	P = 0.003
Country of origin	United States (6)	Europe (11)	P = 0.015
Business and marketing strategy	Global brands Global products	National and some regional brands Local (specialty) and generic (primary processing) products	
Production	Macro-regional factories	National factories	
Sourcing	Potentially global	Locally embedded	

*Source:* Authors. Numbers in parenthesis indicate the number of firms meeting a given criteria in each category; ex: United States (6) indicates that 6 out of 10 global firms were of American origin.

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the largest in our sample, with sales value above \$8 billion in 2002, while only one regional primary processing firm, ADM, reached such sales level. Conversely, only one highly specialized global firm, Wrigley, exhibited sales value below \$8 billion in 2002. The relationship between large size and a global strategy was significant with a P value of 0.0002. Third, global strategies are significantly associated with the strong presence of institutional investors in the firm's ownership structure. Among global firms, only Mars remained under private family control. By contrast, ownership of a majority of regional firms was controlled by either families or upstream farmers. Six global firms were also of American origin, whereas most regional firms were European, with a P value significant at 0.015. A downstream chain position, large size, institutional ownership and American origin were thus key characteristics of the global segment of European food chains, contrasting with the smaller size, family and farmers ownership, European origin and varied chain positions associated with regional strategies. Although other variables listed in table III could not be systematically explored for all firms in the sample, selected case studies and interviews also allowed us to identify distinct production and sourcing patterns for global versus regional producers.

## **2.1 Global players at the downstream end of European chains**

The largest downstream firms in our sample pursued a market strategy typically characterized by the search for global leadership in selected core businesses. Organic growth was achieved mainly through the sophistication of marketing and product development responding to – and enhancing – consumer desires for health, thinness, fitness, newness as well as convenience in use and preparation. With regard to our specific product categories, the 2003 Food for Thought database indicated that global firms had reached European leadership in high growth, global products such as chewing gum (Wrigley, Cadbury), soft drinks (Coca Cola, PepsiCo, Cadbury Schweppes), artificial sweeteners (Sara Lee), sugar confectionary (Cadbury, Mars), dairy spreads (Unilever), and melted cheese (Kraft Foods). They had also built leadership in specific segments of slower-growth product categories such as ice cream (Unilever, Nestlé) or biscuits (Danone). Overall, the intensity of marketing investments made by global food firms placed them among the world top 100 'global marketers' identified by Advertising Age (2001) across industries, with advertising budgets above \$200 million in 2000.

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In order to increase returns on these large intangible investments, global firms searched to deploy “umbrella” brands by stretching core brands on a growing number of products and countries, as illustrated by the recent launch of the global ice cream Heartbrand by Unilever. Attached to well-known national brands, Heartbrand came with a sophisticated range of product options, a heavy advertising campaign at the European level, and innovative forms of distribution. Other examples of umbrella brands in our sample included Nestlé, Mars, Lu (Danone) and Cadbury.

### *A pattern of international growth based on financialization*

The global growth of large downstream firms also followed the strategy of selling off businesses with limited potential in order to expand in selected core businesses through mergers and acquisitions. Data for the world top 100 food TNCs indicated that 3,926 major corporate structural changes, including mergers, acquisitions, restructuring and disinvestments, had been recorded between January 1987 and June 2003, of which about two thirds (1,439) took place in Europe (Ayadi, Rastoin and Tozanli, 2004). A typical case is provided by Danone, refocusing on three core businesses including bottled waters, dairy products and biscuits while disinvesting from beers, pasta products, convenience foods, condiments and packaging between the mid-1990s and the early 2000s, thus extending its global reach as shown by its trajectory in figures 1 and 2 – although Danone has not yet developed a strong presence outside Europe compared with major competitors such as Nestlé.

The importance of institutional investors in the ownership structure constituted another distinctive feature of global firms, not independent from their growth strategies based on the search for global leadership. Since institutional investors are essentially “money managers”, investing household savings under conditions of tight competition rewarding short-term, relative performance, their growing presence in the ownership structure of large publicly traded corporations over the last decade has resulted in growing pressures on top management to increase returns on capital and a related “financialization” of corporate strategies, defined as the prioritization of objectives to boost “shareholder value” in the strategic management of large corporations (Froud *et al.*, 2000; Lazonick and O’Sullivan, 2000; William, 2000). In mature markets such as agri-food, large publicly traded corporations have typically searched for higher financial returns on the basis of enhanced branding and product innovation and global scale economies. Conversely, these firms

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have relied on financial markets to support their international growth by financing acquisitions (Palpacuer *et al.*, 2006). As a consequence, globalization and financialization appeared to be closely intertwined in the corporate strategies of large downstream producers in European food chains.

### *From macro-regional production systems to global sourcing?*

Global strategies had implications not only for the marketing strategy of global firms, but also for their production process. Interviews conducted by the authors indicated that global firms had launched a restructuring process aimed at developing large macro-regional factories specialized by product lines and serving the entire region, with the objective of generating scale economies and productivity increases. These macro-regional factories had been progressively replacing traditional national factories through continuous restructuring and cost cutting programmes, involving plant closures and lay-offs at the national level, together with modernization and employee training in selected macro-regional production sites. For instance, Danone launched in 2001 a restructuring programme for its entire European biscuit division, revamping 16 industrial sites into three categories: (i) five factories destined to become macro-regional production sites, (ii) five factories to be restructured through production transfer towards larger plants and lay-offs, and (iii) six factories to be closed in the following years. In the early 2000s, Nestlé launched its own version of a macro-regional production system in ice cream, distinguishing between “global factories” that would perform initial production stages for global or macro-regional markets, and “finishing factories” in which products would be adapted to local markets. According to Peter Brabeck, CEO of Nestlé: “All aspects of the product perceived by consumers should to remain local, the rest will be global”.<sup>13</sup> Authors’ interviews further indicated that global firms had been seeking to concentrate on higher value manufacturing by outsourcing lower value, upstream stages of their production process, including the primary transformation of cocoa (Nestlé), oilseeds (Unilever) and the collection of milk (Danone).

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<sup>13</sup> Sources: company press releases, 2001 (Danone), RIA, July 2001, n° 615, p. 24 (Nestlé).

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The adoption of global strategies in marketing and production entailed a centralization of support functions such as sourcing, aimed at controlling and coordinating the activity of local buyers. In the firms studied, such centralization relied on new information technologies, including shared internet platforms such as *CPGmarket.com* launched by Danone and Nestlé in the early 2000s. Although management discourses emphasized that such tools primarily aimed at increasing the efficiency of a firm's internal buying departments, centralization also allowed large volume buying and greater price pressures on suppliers. Nestlé – one of few TNCs publishing data on production – indicated that the share of raw materials in its production cost had already declined from 28% to 23% between 1990 and 2000.<sup>14</sup> The company launched GLOBE (Global Business Excellence) in 2000, a restructuring programme aimed at optimizing and standardizing management methods across divisions with the objective of increasing cost efficiency.

The globalization of sourcing would constitute the next logical step following such centralization, allowing large downstream firms to source components and raw materials on a world scale. Although a number of restrictions have historically been placed on European agricultural and primary processed imports, such option has been facilitated by recent technological and regulatory developments. Authors' interviews indicated that improvements in transportation technologies had reduced geographical constraints in terms of suppliers' proximity for the sourcing of perishable products. The use of refrigerated cargos now allows the long distance transportation of fresh meat, for instance, so that products can travel overseas for several weeks before reaching retailers' shelves or downstream firms' processing factories. Global firms are also said to have modified their product content in order to improve the transportability and conservation of ingredients. In ice cream, for instance, this could be achieved by substituting milk powder for fresh milk – to the extent allowed by European product regulation, itself under pressures from global producers towards reduction and simplification. In the milk, cereals and meat chains, regulatory changes through CAP reforms since the early 1990s have increasingly allowed the entry of foreign products on the European market. Only in the sugar chain, had highly concentrated and politically powerful national upstream producers been able to preserve a strong market protection up to the mid-2000s, although the 2006 reform adopted by the European Commission is finally introducing significant deregulation to this industry.

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<sup>14</sup> Source: annual reports.

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## 2.2 Regional producers in upstream and specialty production

With the exception of the upstream United States producer, ADM, regional producers in our sample were of European origin and had not built a significant presence outside their macro region by the early 2000s. These firms were among top four producers in low growth, low concentrated end European markets for generic and specialty products such as sugar (ABF, Sudzucker), bread and pasta (Barilla), natural cheese (Bongrain, Lactalis), butter (Arla, Campina, Lactalis), meat (Danish Crown), and flour (ADM), as well as higher growth but weakly concentrated product segments such as delicatessen (Kerry, Northern Food) (Food for Thought, 2003).

### *Specialty or generic production*

Two main types of market strategy and ownership patterns could be identified among these producers. Regional, family-controlled specialty producers formed the first group. It was adopted by a number of downstream firms (Lactalis, Bongrain, Barilla) that had developed homogeneous businesses across Europe and vertically integrated the upstream primary transformation of agricultural products. The French Bongrain and Lactalis were collecting milk for their cheese production, while the Italian dry pasta producer, Barilla, owned cereal-milling facilities. Lactalis, initially positioned on a broad range of milk-based products, moved out of easily transportable commodities, such as milk powder, in order to focus on specialty products. These medium-sized, Southern European downstream firms were also building regional brands by expanding well-known national brands such as the French cheese brand Président owned by Lactalis, or the Italian pasta brand Barilla, in foreign markets. Their specialty product strategies were associated with a strong control of families on firms' ownership. After revamping the leadership of the company in the mid-1990s, the Barilla family increased its control from 51% to 85% of the firm's ownership between 1996 and 1999, with the explicit aim of reducing the risk of a foreign takeover. Likewise, the Bongrain family owned over 80% of shares in its company, while Lactalis remained privately owned by the Besnier family. A few downstream firms (Uniq, Northern Food) departed from such family-based ownership arrangement. They struggled with diversified national business portfolios and failed to promote a regional specialty market approach. Uniq and Northern food have gone bankrupt

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and been sold to institutional investors, although these invested on their own capital resources and not – as done in global firms – as part of their fund management activities. As indicated in figure 2, regional strategies can also be adopted by upstream producers such the cooperative, Danish Crown, reaching a sectoral globalization index of 100% in its region of origin in 2002.

The second group consists of upstream producers that had launched diversification strategies either into the primary processing of other food chains, into the downstream stages of their own chain, or in unrelated secondary processing businesses. Horizontal diversification included sugar producer Sudzucker's moves into animal feed, cereal processing and sweeteners, as well as ABF's extension from cereal processing into sugar, animal feed and seed processing. Vertical downstream diversification strategies have been a distinctive feature of Northern European producers in the milk chain (Arla, Campina), leading to the development of a broad range of milk-based products. Unrelated diversification strategies included investments in ready-to-eat products (Sudzucker) or fruit juice (Arla). In our sample, ADM was the only primary processing firm significantly engaged in building global leadership in core businesses through overseas investments, as illustrated by its leaning towards the upper right quadrant in figure 2. By contrast, European upstream producers had favoured CAP-protected exports over foreign investments in developing world market sales. Under the combined effect of rising non-European competitors, declining EU regulatory support, and in some cases stagnating world demand, their international competitiveness sharply declined during the 1990s, resulting in large losses in their world export market share.<sup>15</sup> Being specialized in generic products, these producers could not easily have adopted differentiation strategies that might have provided a non-cost competitive advantage over non-European suppliers. On the other hand, as volume producers, they were no longer cost competitive *vis-à-vis* producers in emerging countries and even United States producers, as they actively invested in lower cost overseas production facilities since the late 1990s.

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<sup>15</sup> The share of EU exports in world export volumes declined from 34.1% to 6.3% in beef and veal, from 36.2% to 21.4% in butter, 24.4% to 14.1% in wheat flour, 50.4% to 38.4% in refined sugar, and 52.8% to 32.5% in milk powder between 1990 and 2000 (FAO database, 2001).

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## *Locally-embedded supply chains*

Most regionally oriented producers in our sample remained anchored in European upstream chains on the basis of sourcing or ownership linkages in the early 2000s, with half of them belonging to farmers under cooperative or private status. Beyond the presence of agricultural producers in the ownership of many primary processing firms, the perishable nature and difficult transportation conditions of agricultural raw materials generated interdependencies between agricultural producers and primary food processors. In the sugar chain, for instance, refineries worked in close collaboration with sugar beet cultivators, and processing plants are located near sugar beet plantations. In the milk and meat chains, close relationships has been developed between livestock farmers and slaughter houses or dairy producers. Major primary food processing firms had thus established high volume production plants in proximity to large EU agricultural production pools. They provided regular outlets for agricultural producers in these regions and benefited from CAP protection through CMOs in various commodity markets. Buffered from international competition, European primary processing firms were able to build local oligopolies in major European agricultural regions. Examples include, in the milk chain, large dairy co-operatives such as Campina, absorbing 50% of annual raw milk production in Holland in 2001; Arla Foods, with control over 90% raw milk supply in Denmark and 66% in Sweden in 2001; Lactalis, controlling up to 68% of annual raw milk production in the leading milk producer region of Normandy in France in 2000.<sup>16</sup> In the sugar chain, major producers also built control over sugar beet production pools in the EU. Sugar refiners developed long-term relationships with upstream beet producers, signing up annual contracts and providing agricultural inputs and technical assistance. In European meat chains, slaughter houses were established in regions specialized in husbandry. For instance, Danish Crown played an important role in absorbing and coordinating upstream production in Denmark. Authors' interviews indicated that interdependencies were looser in the grains chain, however, due to easier transportation conditions for this commodity. With this exception, European primary producers had significant vested interests in national production facilities that became threatened, under conditions of market deregulation through CAP reform, both by the rise of non-European competitors on world primary processed food export markets, and by global downstream firms' greater freedom to search for

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<sup>16</sup> *Source:* Agrodatabank 2001, Chambre Régionale d'Agriculture de Normandie, 2001.

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non-European lower cost producers for supplying the European market. Authors' interviews with European business associations indicated that in anticipation of further market losses for European production, a number of leading upstream firms had actively engaged in investing in overseas production facilities.

### **2.3 Some theoretical and policy implications**

What are we to make of this growing divide between upstream and downstream, global players and regional or national producers? How do such findings contribute to the broader debate on governance patterns in the GVC literature, and what are their implications from a policy perspective? We believe that several inferences can be drawn on the basis of our identification and characterization of diverging profiles and trajectories among large firms in the European food industry.

#### *Changing governance patterns in GVCs*

First, by highlighting the rise of “downstream power” in GVCs, we provide supporting evidence to the analysis of the changing governance patterns in the age of global capitalism by Gibbon and Ponte's (2005), who have been among the few contributors to the governance debate to take into account changes towards financialization and globalization. In characterizing such changes, however, they focused on the rise of top international retailers and only touched upon key strategic orientations of large food TNCs towards financialization, global branding, oligopolistic competition and the outsourcing of production. Our analysis of major food TNCs in Europe thus provides complementary evidence of the emergence of global, financialized firms located in the downstream segment of European chains and exercising significant market power over the upstream part of these chains.

We also agree with Gibbon and Ponte (2005) in that “the original distinction made by Gereffi (1994) between buyer-driven and producer-driven forms of governance remains a key one for understanding current changes in the global economy” (p. 164). By combining data on consumption trends, market concentration and product branding, we were able to identify distinct types of lead firms in various segments of the European food market including, on the one hand, large producers specialized in high growth, sophisticated global products that still performed in-house a major part of manufacturing activities and, on the other hand, large retailers developing their own brands for generic

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products and exercising strong buying power *vis-à-vis* primary food processing producers. Although in traditional chain structures, retailers are located a step further downstream than large producers, in current chain configurations both types of lead firms hold direct control of consumer-related branding and product development activities, as retailers have become increasingly successful in marketing private labels and branding. Such intangible activities are key sources of market power in the global economy thanks to their high rent-generating capacity (Kaplinsky, 2000; Palpacuer, 2000a; Rabat and Kim, 1994) and to their “parameter setting” role (Humphrey and Schmitz, 2001) allowing lead firms to define what is produced and – to a varying degree – how it is produced upstream the chain. Both branded manufacturers and mass retailers are thus developing new ways of building and maintaining market power to “drive” GVCs, even though the strategic role of branding and product development activities was not emphasized in Gereffi’s (1994) initial rendering of the typology.

It is important to note here that in highlighting the rise of global financialized “drivers” downstream European food chains, our contribution relates to the “overall form of governance” to be distinguished from the “forms of coordination” by which activities are organized in GVCs (Ponte and Gibbon, 2005, p. 3). Palpacuer (2000b) similarly argued for the need to differentiate between the notion of power, relating to how resources and rents are *distributed* within the chain, and the notion of coordination, pertaining to the ways in which resources are *used* in productive processes within the chain. For instance, in their influential article on GVCs governance, Gereffi *et al.* (2005) elaborated on the forms of coordination characterizing various types of chains while leaving aside the broader perspective on power initially envisioned by Gereffi (1994) and restated by Gibbon and Ponte (2005). Conversely, the characterization of coordination modes used by food TNCs in managing their relationships with suppliers falls beyond the scope of the current study focusing on sources of power and power distribution within European food chains.

### *The spread of a global model and its geographical consequences*

Our results also tie into a broader debate on the global nature of contemporary capitalism. The emergence of a GVC perspective fostered such debate in the 1990s with regard to the national versus global character of new forms of economic organization, with Whitley (1996) arguing against Gereffi (1996) that national business systems, rather than

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GVCs, remained more prevalent in shaping contemporary industries. The discussion continued in subsequent years over the diffusion of a “shareholder” type of capitalism from the United States into Japan and Western Europe, including a financialization of corporate governance in these countries. In Europe, shareholder capitalism was considered to have transformed national business systems in ways that still contain important country-specific features (Dore *et al.*, 1999; Jackson, 2002). Likewise, comparative studies of GVCs in industries such as apparel show that the trend towards concentration and financialization has been more pervasive in the retail sector of the United States and the United Kingdom than in mainland Europe, and that the spread of a global model of Anglo-Saxon origin, if occurring, was taking place against the background of strong persisting national features in terms of firms’ size, ownership, relation to financial markets and business cultures (Palpacuer *et al.* 2005; Palpacuer, 2006). Our study of major food TNCs in Europe provides additional evidence of the diffusion of a dominant pattern of global financialized corporation among lead firms in European GVCs. It also shows, however, that locally embedded, country-specific production remains significant both in the upstream segment of European food chains, among cooperatives formed by farm producers to perform primary processing activities, and in downstream specialty niches developed by family-controlled producers.

Against the backdrop of the rising power of global buyers, regulatory changes in European food chains could have far-reaching consequences for the relationship between upstream and downstream parts of the chains and the organization of upstream production. The CMOs played an instrumental role not only in shaping the geography of sourcing for agricultural products – that remained largely contained within European boundaries – but also determining the distribution of value between downstream and upstream producers on the basis of a strong upstream price support policy. Recent CAP reforms in the direction of greater market openness and price competition can thus produce significant changes both in the distribution of gains and the geographical configuration of food chains serving the European market. Authors’ interviews indicated that global sourcing had already become significant for non-perishable products such as butter and milk powder in the milk chain, where New Zealand and Australia had become key competitors of European producers, while the Russian Federation, Ukraine and Kazakhstan had emerged as low cost suppliers for the European market for cereals. With regard to the sugar industry, largely untouched by 1992 and 2000 reforms, the European Commission estimated that applying world market prices would push out of the market a significant number

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of producers so that by 2010-2015, European sugar production would decline by two thirds and be concentrated in a few countries while the end of market protection would allow as much as 80% of European sugar needs to be met by Brazil, the leading world exporting country (CEC, 2003). Authors' interviews with business associations in Brussels suggested a slightly different scenario of "inward processing" in which Brazilian sugar cane, rather than raw sugar, would be imported for further processing within major European ports.<sup>17</sup> The 2006 sugar reform is not based on full liberalization but on a 36% cut in institutional price aiming to bring the price in Europe closer to the world market level, so that changes are anticipated to be of a lesser magnitude than could be foreseeable under a full liberalization scenario. Further deregulation will nevertheless allow large TNCs operating in the downstream segment of European food chains to develop the type of global production networks that have emerged in industries such as apparel or electronics over the past decades. Retaining upstream production in Europe would require promoting the type of chains that serve niche markets, as developed by specialty producers, rather than the mass market for which global sourcing is proving to be more attractive. Since niche markets are unlikely to absorb the bulk of European mass primary-processing production capacity, current deregulation policies will significantly affect production volumes in coming years.

## Conclusion

Gereffi (1995) and others have been primarily concerned with North-South relationships in GVCs, and conditions under which suppliers located in developing countries could improve their position by following trajectories of "industrial upgrading" so that their participation in global production could contribute to economic development in these countries. Unlike most of the GVC literature, this article deals with changes taking place in a Northern setting, in the midst of regulatory reforms that are likely to promote global sourcing and significantly reshape the geography of food production for the European market. It provided evidence of a growing divide between major players at the downstream end of European chains, which have engaged in globalization and financialization strategies since the late 1980s and have strong incentives to shift from European to lower-

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<sup>17</sup> In a subsequent study assessing the 2005 reform proposal, estimates of EU production decline and the growth of extra-European imports were no longer provided (CEC, 2005).

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cost global sourcing, and upstream producers, which have maintained regional mass production schemes under CAP protection.

The CAP was inspired by a vision of European food industries that is increasing put to question by recent changes in the global economic environment. First, the CAP was guided by a territorial approach to food production and consumption responding to the traditional role of food products as key cultural components of society. The rise of global products is now transforming food consumption and production patterns, freeing them from local embeddedness and the constraints of space, and weakening the normative foundation of the CAP as a tool for constructing a European community. Second, the CAP was, implicitly, based on a view of food chains where upstream agricultural and food processing activities were primary sources of value creation, overlooking the now paramount role of marketing, product development and distribution activities. Framed with reference to the paradigm of classic market competition, the rhetoric underlying recent CAP reforms did not acknowledge the existence of a growing divide between upstream and downstream firms in European agri-food chains, nor did it recognize the patterns of global sourcing that liberalization was likely to promote the downstream segment of the chain.<sup>18</sup> Accordingly, liberalization policies are likely to favour both a downstream-driven globalization of European food chains and a significant dislocation of upstream production in Europe. At a time when issues of environmental protection and the quality of life and food are becoming more important, a key challenge will thus be to preserve European agricultural production while allowing it to evolve out of the productivist model established in the 1960s.

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<sup>18</sup> The most recent impact study of liberalization in the sugar industry performed by the European Commission provided no estimate of consequences for European production and imports (CEC, 2005).

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## **Appendix 1. List of interviews completed for the study (2002-2003)**

### **Industry associations:**

COABISCO – Association of European biscuit producers – President  
CIAA – European confederation of food industry associations – Director  
EDA – European Dairy Association – President  
EUROGLACES – Association of European ice-cream industries – Secretary General  
FEFAC – European Feed Manufacturers’ Federation – Secretary General  
GAM – European Flour Milling Association – Secretary General and Member  
UNESDA – European federation of non-alcoholic beverages industry associations – Secretary General  
CIUS – Committee of Industrial Users of Sugar – Secretary General  
CEFS – Committee of European sugar producers – Director General  
SNFSF – National association of French sugar producers – Director  
UECBV – European livestock and meat trading union – Secretary General

### **Corporations:**

BARILLA – Bakery Raw Materials & Finished Products Purchasing Manager  
BONGRAIN – Director Europe  
CADBURY SCHWEPES – Sourcing Manager Europe  
DANONE – Production Manager and Union representative  
LACTALIS – Public Relation Manager

### **Databases used in the study:**

**Agrodata** is maintained at the Institute for Mediterranean Agronomics in Montpellier, France. It records information on the businesses, affiliates, annual sales, profits and restructuring operations of the world top 100 food TNCs since 1972. Information is obtained from companies’ websites and annual reports, as well as 18 business and food trade journals.

**Food For Thought** is an online private food and drink market database covering 114 food and drink products and 25 countries in North America, Western and Eastern Europe.

**Appendix 2. Leading European agri-food TNCs in the sugar, cereals, milk and meat chains, 2002 (n = 22)**

Company	Country of origin	Product and chain position	Status	Majority shareholders (% of shares)	Product portfolio (agri-food only)	Total sales (millions of dollars), 2002	Food sales (millions of dollars), 2002	Region <sup>(a)</sup> (number of host countries)
ABF	United Kingdom	Upstream producer	Public	Weston family (54%) <sup>(a)</sup>	Seeds, cereal milling, oils and fats, bakery products, biscuits, sugar, proteins, yeast	7 066	5 959	LA (2), NA (1), Asia (1), ECE (1), OC (2), WE (5)
ADM	United States	Upstream producer	Public	Institutional (68%) <sup>(b)</sup>	Oils and fats, cereal processing, feed, malt processing, protein processing, frozen food	23 454	23 454	LA (4), NA (2), OC (1), WE (5)
Arla	Denmark/ Sweden	Upstream producer	Coop.	Cooperative members (100%) <sup>(c)</sup>	Drinking milk, butter, cheese, ice cream, fruit juices, corn flakes, baby food, drinking water	5 208	5 208	LA (3), NA (2), Asia (2) ECE (3), MED (1), WE (7)
Barilla	Italy	Specialty downstream producer	Public	Barilla family (85%) <sup>(c)</sup>	Bakery, biscuits, pasta products	2 323	2 323	LA (2), NA (1), Asia (1), ECE (1), MED (1), OC (1), WE (11)
Bongrain	France	Specialty downstream producer	Public	Bongrain family (> 80%) <sup>(c)</sup>	Cheese processing, dairy industry, feed	4 013	4 013	LA (4), NA (1), Asia (3), ECE (5), OC (1), WE (8)
Cadbury Schweppes	United Kingdom	Global downstream producer	Public	Institutional (14%) <sup>(a)</sup>	Chocolate, sugar confectionery, soft drinks	8 256	8 256	Africa (5), LA (2), NA (2), Asia (8), ECE (2), MED (2), OC (2), WE (8)
Campina Melkunie BV	Holland	Upstream producer	Coop.	Cooperative members (100%) <sup>(c)</sup>	Drinking milk, butter, cheese, baby food, feed	3 774	3 774	LA (1), NA (1), Asia (1), ECE (2), WE (5)
Coca-Cola Co.	United States	Global downstream producer	Public	Institutional (62%) <sup>(b)</sup>	Soft drinks, bottled water	19 564	19 564	Africa (4), LA (11), NA (2), Asia (8), ECE (2), MED (21), OC (1), WE (2)
Danish Crown	Denmark	Upstream producer	Coop.	Cooperative members (100%) <sup>(c)</sup>	Animal slaughtering, meat processing	5 660	5 660	ECE (2), WE (1)
Danone	France	Global downstream producer	Public	Institutional (71%) <sup>(c)</sup>	Yoghurts, dairy desserts, biscuits, bottled water, milk based soft drinks, condiments	13 799	13 799	Africa (1), LA (5), NA (2), Asia (7), ECE (7), MED (6), OC (1), WE (14)
Kerry	Ireland	Upstream producer	Ex-coop, public	Kerry Cooperative Creameries (31%) <sup>(c)</sup>	Dairy industry, meat processing, proteins, animal husbandry, poultry	3 823	3 823	LA (2), NA (2), Asia (4), ECE (2), OC (2), WE (5)
Kraft Foods	United States	Global downstream producer	Public	Institutional (48%) <sup>(b)</sup>	Biscuits, coffee, chocolate, sugar confectionery, cheese, dairy spreads, fruit juices, ready-to-eat meals, snack food, yeast	29 723	29 723	LA (20), NA (1), Asia (8), ECE (9), MED (5), OC (2), WE (16)

## Appendix 2. Leading European agri-food TNCs in the sugar, cereals, milk and meat chains, 2002 (continued)

Company	Country of origin	Product and chain position	Status	Majority shareholders (% of shares)	Product portfolio (agri-food only)	Total sales (millions of dollars), 2002	Food sales (millions of dollars), 2002	Region <sup>(1)</sup> (number of host countries)
Lactalis	France	Specialty downstream producer	Private	Besnier family (100%) <sup>(c)</sup>	Drinking milk, butter, processed and specialty cheese	5 599	5 599	NA (1), ECE (3), WE (7)
Mars	United States	Global downstream producer	Private	Mars family (98%) <sup>(c)</sup>	Chocolate, sugar confectionery, ice cream, rice milling, ready-to-eat meals, pet food	16 000	9 640	Africa (2), LA (5), NA (1), Asia (10), ECE (7), MED (3), OC (2), WE (16)
Nestlé	Switzerland	Global downstream producer	Public	Highly dispersed capital structure <sup>(d)</sup>	Chocolate, sugar confectionery, coffee, ice cream, yoghurts and dairy desserts, corn flakes, baby food, pet food, bottled water, soft drinks	61 834	50 841	Africa (11), LA (21), NA (2), Asia (17), ECE (9), MED (11), OC (5), WE (15)
Northern Foods	United Kingdom	Specialty downstream producer	Public	Franklin Resources (12%) <sup>(d)</sup>	Ready-to-eat-meals (frozen), bakery, biscuits, grain milling, Fruits & vegetables processing, yoghurts, meat processing	2 277	2 277	WE (1)
PepsiCo	United States	Global downstream producer	Public	Institutional (69%) <sup>(b)</sup>	Soft drinks, bottled water, fruit juices, sweeteners, snack food, biscuits, frozen food	25 112	25 112	Africa (5), LA (19), NA (2), Asia (7), ECE (7), MED (7), OC (2), WE (17)
Sara Lee	United States	Global downstream producer	Public	Institutional (63%) <sup>(b)</sup>	Meat processing, bakery, cakes, diet food, coffee, ready-to-eat-meals (chilled), snack food	17 628	9 219	Africa (11), LA (17), NA (2), Asia (14), ECE (7), MED (117), OC (3), WE (18)
Sudzucker	Germany	Upstream producer	Public	South German beet growers (56%) <sup>(c)</sup>	Sugar refining, sweeteners, ready-to-eat-meals (chilled), agriculture	4 853	4 853	ECE (6), WE (6)
Unilever	Holland United Kingdom	Global downstream producer	Public	Institutional (18%) <sup>(b)</sup>	Ice cream, margarine, olive oil, dairy spreads, tea, soft drinks, tea plantations	49 139	27 883	Africa (11), LA (20), NA (2), Asia (14), MED (8), OC (2), ECE (12), WE (14)
Uniq	United Kingdom	Specialty downstream producer	Public	M&G Investment Management (12%) <sup>(c)</sup>	Frozen food (ready-to-eat-meals), dairy spreads, butter	2 144	2 144	ECE (1), WE (6)
Wrigley	United States	Global downstream producer	Public	Institutional (55%) <sup>(b)</sup>	Sugar confectionery (chewing gum)	2 746	2 746	Africa (1), LA (2), NA (1), Asia (7), ECE (10), MED (2), OC (13), WE (9)

Source: Agrodatabse.

<sup>(1)</sup> Regions : Latin America (LA), Northern America (NA), Oceania (OC), Mediterranean (MED), Eastern & Central Europe (ECE), Western Europe (WE).

<sup>(a)</sup> [http://business.timesonline.co.uk/article/0,,9065-1279031\\_4-00.html](http://business.timesonline.co.uk/article/0,,9065-1279031_4-00.html) <sup>(b)</sup> [www.edgar-online.com](http://www.edgar-online.com); <sup>(c)</sup> Annual reports; <sup>(d)</sup> Corporate Watch, <http://www.corporatewatch.org.uk>; <sup>(e)</sup> Forbes [www.forbes.com](http://www.forbes.com).

### Appendix 3. Globalization index, 2002

Firm	Country of origin	Geographical globalization	Sectoral globalization
Coca-Cola	United States	69%	100%
Kraft Foods	United States	69%	100%
Mars Inc.	United States	93%	100%
Pepsico	United States	71%	100%
Wm. Wrigley Jr. Co.	United States	74%	100%
Barilla	Italy	10%	100%
Bongrain	France	24%	100%
Cadbury Schweppes	United Kingdom	59%	100%
Danish Crown	Denmark	10%	100%
Danone	France	50%	100%
Lactalis	France	5%	100%
Nestlé	Switzerland	68%	100%
Sara Lee Corporation	United States	84%	83%
Unilever	Netherlands/	69%	75%
	United Kingdom		
Associated British Foods	United Kingdom	32%	71%
Archer Daniels Midland	United States	40%	67%
Campina Melkunie	Netherlands	9%	67%
Arla Foods	Denmark/Sweden	13%	40%
Sudzucker	Germany	10%	33%
Uniq	United Kingdom	2%	33%
Kerry Group Plc	Ireland	21%	25%
Northern Foods	United Kingdom	0%	0%
Wrigley	United States	28%	100%
Lactalis	France	5%	100%
Pepsico	United States	18%	70%
Coca-Cola	United States	53%	67%
Cadbury Schweppes	United Kingdom	38%	67%
Mars Inc.	United States	29%	58%
Barilla	Italy	9%	50%
Philip Morris	United States	29%	47%
Bongrain	France	3%	44%
Archer Daniels Midland	United States	9%	43%
Northern Foods	United Kingdom	1%	40%
Sara Lee Corporation	United States	41%	39%
Associated British Foods	United Kingdom	6%	36%
Md Foods	Denmark	23%	33%
Campina Melkunie	Netherlands	17%	33%
Unilever	Netherlands/	65%	28%
	United Kingdom		
BSN (Danone)	France	28%	22%
Nestlé	Switzerland	71%	22%
Unigate (Uniq)	United Kingdom	2%	20%

Source: Agrodata database.

Globalization Index calculation :

Geographical globalisation index = (# of host regions where a food MNE is established outside its home region / 8 world regions as defined in Agrodatab)\* (# of foreign affiliates / total # of affiliates of the food MNE)

Sectoral globalisation index = # of businesses of the food MNE outside its home region / # of businesses within its home region

The definition of businesses used for the calculation of sectoral globalisation follows the United Nations' four-digit Standard Industrial Classification. Since the end of the 1980s, the Agrodatab research team has been developing the UN SIC using six-digit classes in order to better respond to the high segmentation of food markets.

The eight macro regions used for the calculation of geographical and sectoral globalisation indexes are: Africa, Asia, Latin America, Oceania, North America, Western Europe (EU-15, Norway, Switzerland, and Iceland), ECE (Eastern and Central European States, Russia Federation and Balkan countries), and the Mediterranean (Turkey, Iraq, the Syrian Arab Republic, Lebanon, Jordan, Israel, Egypt, Saudi Arabia, United Arab Emirates, Yemen, Kuwait, Bahrain, Libyan Arab Jamahiriya, Tunisia, Algeria, Morocco, Gibraltar, Malta, and Cyprus).



# RESEARCH NOTE

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## Highlights of recent trends in global infrastructure: new players and revised game rules

Ryan J. Orr and Jeremy R. Kennedy

Renewed enthusiasm in emerging market infrastructure has attracted new sources of funding and driven infrastructure development. Governments are becoming increasingly interested in private sector involvement to raise the capital needed to meet growth objectives. New sources of funding are becoming available from public financial institutions in emerging countries. At the same time, traditional multilateral agencies are trying to re-establish their relevance and role in the midst of competition from financial institutions in the emerging markets. The availability of local currency financing in many emerging markets is at an all time high. This article highlights recent trends in global infrastructure, focusing on new sources and sponsors of funds and their objectives as they relate to foreign direct investment in developing countries and regions. It also discusses the role of new geopolitical strategic investors such as China and addresses the implications of these developments for research, government policy and company strategy. It concludes by providing an overview of the implications of these developments for project sponsors, construction and engineering firms, pension funds and micro lenders, as well as for the multilateral institutions. The article finally highlights the areas where additional research is needed to ascertain the future characteristics of international infrastructure financing.

**Key words:** infrastructure finance, private infrastructure funds, public-private partnerships, equator principles, multilateral development banks, emerging markets, capital markets, project finance, China

### 1. Introduction

Government policies around the globe and the world's capital markets are currently more enthusiastic about emerging markets infrastructure. This renewed enthusiasm has attracted new sources of funding and driven

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infrastructure development. In particular, more governments are placing greater emphasis on the development of infrastructure projects and, in recognition of the unprecedented level of capital needed to meet growth objectives, there is greater interest in private sector involvement and public-private partnerships (PPPs). Yet, from the private sector perspective, the flow of PPP deals is inconsistent and, in many markets, is constrained by politics, making it difficult to build long-term businesses around the hope that this opportunity will materialize. At the same time, some emerging market host countries (such as China, India and Qatar) are ramping up aggressively as project sponsors. In particular, Chinese investors and the Government of China are taking a growing role in infrastructure investment in Africa and other parts of the emerging world.

Growth in private infrastructure investment funds has been driven by robust capital market activity and low interest rates. However, the sheer number of new funds has led to intense competition for assets, rising prices and talk of a bubble. At the same time, new sources of funding are becoming available from public financial institutions in emerging countries, particularly the export-import banks of Brazil, the Russian Federation, India and China (the BRIC countries). Traditional multilateral agencies are undergoing a period of “soul searching” as they try to re-establish their relevance and role in the midst of competition from young new financial institutions in the emerging markets. In addition, the availability of local currency financing in many of the emerging markets is at an all time high.

These trends, which highlight the shifting nature of the global dynamic for infrastructure investment, were identified at the Third General Counsels’ Roundtable on Emerging Markets’ Infrastructure held in April 2007 at Stanford University.<sup>1</sup> The Roundtable grappled with the

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<sup>1</sup> The Roundtable was hosted by the Collaboratory for Research on Global Projects (The Collaboratory) and sponsored by Akin Gump Strauss Hauer & Feld LLP, Baker & McKenzie LLP, and Zurich North America Construction. It was co-chaired by Professor Thomas C. Heller of the Stanford Law School and Mr. Barry Metzger, a senior partner of the law firm Baker & McKenzie. The Roundtable brought together project sponsors, institutional investors, professional advisors, regulators, financiers and the academic community to share experiences and research results. Participation in the Roundtable was by invitation only, with carefully selected representation from relevant sectors of the industry, and from multiple geographic regions, with a particular emphasis on maximizing the diversity of viewpoints at the table. Numbers were limited to a small and select few to encourage real discussion and debate. All discussion during the Roundtable was not for attribution. Graciela Testa and Sanjee Singla provided editorial and research assistance on earlier drafts of this article.

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relative importance of each of these trends and how they might evolve. Based on presentations and discussions at the Roundtable, this article first highlights recent trends in global infrastructure, focusing on new sources and sponsors of funds and their objectives, particularly as they relate to foreign direct investment in developing countries and regions. It also discusses the role of new geopolitical strategic investors (namely, China and the national oil companies). The article then addresses the implications of these developments for research, government policy and company strategy.

## 2. The rise of new sources and sponsors of funds

There are four current trends in emerging markets infrastructure. After full privatization stalled in many emerging markets, there has been an increase in the importance of *dual firms*; these are quasi-government, quasi-private firms that have grown out of stalled reform processes and that own and operate infrastructure (Woodhouse, 2005). In several markets, *dual firms* have been able to acquire assets at low prices after international investors have lost money and pulled out.

The second trend involves the rise in the importance of *South-South investors*; that is, infrastructure investors from within developing countries who are investing in local and regional projects. This has resulted in an increase in local currency financing (Yanosek *et al.*, 2007). A third trend has to do with the rise of *BRIC country export-import banks*. This refers to public financial institutions situated in the BRIC countries that are rapidly expanding their trade and investment promotion functions (Caspary, 2007). The fourth trend is the rise of *petrodollars*: as a result of supply-demand imbalances, national oil companies and sovereign wealth funds have become key investors in energy infrastructure and ancillary infrastructure along the extraction supply chain.<sup>2</sup>

In addition to these trends in emerging markets, EU countries have continued to broadly utilize PPPs and many states in the United States have embarked on political debates surrounding the role of PPPs to address a need for new infrastructure that the American Society of Civil Engineers (ASCE) values at \$1.6 trillion<sup>3</sup> over the next five years (The Urban Land Institute and Ernst & Young, LLP, 2007). Expanded opportunities for private sector finance and operations have contributed

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<sup>2</sup> “Really big oil”, *The Economist*, 10 August 10 2006.

<sup>3</sup> Unless otherwise noted, all values are reported in United States dollars.

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to the formation of dozens of new private infrastructure funds focused on the United States and Western European markets.

This section discusses the results of studies on the growing role played by private infrastructure investment funds and local and regional firms from emerging markets as sources of funds for infrastructure investment. In addition, it presents an overview of the perspective of rating agencies regarding these new trends in global finance markets. Finally, it reviews the impact of so-called new geopolitical strategic investors; namely, Chinese infrastructure investments and national oil companies.

## 2.1 Private infrastructure funds

The 1990s witnessed significant growth in private investment in both developed and emerging country infrastructure,<sup>4</sup> accompanied by the rise of several pioneering private infrastructure funds. Some of these firms include Emerging Markets Partnership, the Hastings Fund, Barclays Private Equity and Macquarie. Today, Macquarie has almost \$22 billion under management, which demonstrates the growth potential of infrastructure funds.

Preliminary results of a recent survey (Orr, 2007) of the managing directors of the newer funds show that there are more than 72 new funds worth \$122 billion with a primary focus on United States and European brownfield infrastructure, and that the average fund has a target size of about \$1.7 billion. For funds focused on the United States and Western Europe, the average number of investments planned ranges between 8 and 15, while the average deal size is about \$150 to \$300 million in equity contribution.<sup>5</sup> The investment period is anticipated to be 3 to 14 years, while leverage rates hover between 60 and 80%. Most funds are willing to make minority investments, and team size ranges from 6 to 19 people (except for the largest funds).

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<sup>4</sup> In the developed countries, this followed the 2001 Private Finance Initiative (PFI) in the United Kingdom. In the emerging markets, there was significant growth between 1990 and 1997 across a wide variety of industries (including telecommunications, energy, transportation, and water and sewage), which was estimated to approach \$140 billion.

<sup>5</sup> In contrast, funds in India and the Middle East are smaller, and so is the average size of deals (between \$5 and \$10 million). However, the anticipated number of investments is much larger (20 to 25).

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The survey results show that the limited partners investing in the new infrastructure funds consist primarily of institutional investors including pension funds and insurance companies. Some are heralding infrastructure as a new asset class. For others, the emphasis is on rate of return and diversification within their fixed income and alternative asset portfolios.

The survey results also show that those queried are concerned about crowding (too many funds) and the high prices that result from it, the scarcity of desirable assets and shortage of greenfield developers, as well as downward pressure on yields. However, these are likely to be short-term concerns because long-run demand for infrastructure development is very high. A more serious worry is that the expected rates of return for these funds are largely dependent on financial structuring and the persistence of historically low interest rates. An additional fear is the nature of infrastructure investment, which, unlike traded financial products, is politically, technically and legally complex and very hands-on. Funds planning to invest in emerging markets have an additional concern; namely, high political risks, and the lack of rule of law as well as fiscal responsibility and control in some countries. However, the deciding factor for this type of investor will probably rest on the quality of the project. This includes features such as project valuation, the stability of the environment and, in some cases, social and political issues that may be intrinsic to the project.

Survey respondents made note of the growing trend towards PPPs in the United States, but also highlighted the sombre mood in the market following recent incidents in Texas with the proposed moratorium on further PPP transactions.<sup>6</sup> It remains unclear whether or not the PPP model is going to gain a foothold in the U.S. as intense public policy debate unfolds in Texas, California, Oregon, Pennsylvania and

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<sup>6</sup> At the time of the survey, the fate of PPPs in Texas was very much in doubt. Several toll roads throughout the state were being planned and discussed as PPPs. Included in these planned toll roads was the Trans Texas Corridor a proposed massive freeway running north-south through the eastern portion of the state. These (in some cases controversial) projects hardened opposition to PPPs in Texas and led to the Texas Legislature's passing of a bill imposing a moratorium on PPPs in Texas. This bill (HB 1982) would have potentially shut down construction on many existing projects. After a period of uncertainty, Texas Governor Rick Perry vetoed the bill. In May of 2007, after the Roundtable was held, the Texas Legislature passed a compromise bill (SB 792) which enacts a two year moratorium on public-private road projects in Texas; however, this compromise legislation has many exceptions for projects already in the planning stages and undergoing construction. This bill was immediately signed into law by Texas Governor Rick Perry.

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other states. And yet, many infrastructure funds are counting on the materialization of the U.S. PPP market as a source of deal flow to put their capital to work.

Other researchers have also taken notice of the rise of the new infrastructure funds. A commercial report by Probitas Partners (2007) provides commentary on the ins-and-outs of infrastructure investing and reviews the universe of infrastructure funds in the market. A presentation by Corinne Namblard (2007) at Galaxy Fund provides a European perspective on this evolving market, with detailed segmentation of the new funds by target strategy and sector. Torrance (2007a), under the guidance of Gordon Clark at Oxford, argues that the urban infrastructure landscape is undergoing financialization, whereby formerly illiquid assets are becoming securitized and tradable on stock exchanges; infrastructure networks are being unbundled locally into smaller-scale more easily-tradable chunks; and simultaneously infrastructure networks are being interlinked internationally via specialist global infrastructure funds that are looking further and wider for solid infrastructure investments. In a second paper, Torrance (2007b) analyzes the governance of relationships between institutional investors and specialist global infrastructure fund managers. Torrance concludes that self-governance demonstrated by institutional investors and specialist global infrastructure fund managers – defined as their ability to recognize and anticipate conflicts of interest – improves their long-run ability to build trust with public sector agencies.

## **2.2 Local and regional sponsors from emerging markets**

Project sponsors shape speculative project concepts into functioning assets that generate financial returns. A World Bank analysis (Ettinger *et al.*, 2005; Schur *et al.*, 2006) of the involvement of local and regional sponsors from emerging markets in infrastructure projects noted that the exodus of international investors from Asia and Latin America following the 1997–1998 economic crises may have benefited local and regional investors. These investors were able to fill the void left by foreign investors, buying distressed projects and acting as catalysts in the development of local capital markets, and new projects. Indeed, the data show that the relative share of emerging country investors has been quite significant (although very unevenly distributed) since the late 1990s. Between 1998 and 2004, local and regional sponsors accounted for about 42% of investment volumes, favouring the telecom and transport industries. In addition, the data suggest that overseas investment by

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emerging country investors is about one-third of overall investment volumes (that is, 13 out of the 42% mentioned). This sub-group tends to favour ventures in regions neighbouring their own, enjoying a cultural advantage over foreign competitors.<sup>7</sup>

Across industries, in the period 1998–2004, local and regional sponsors accounted for a large portion of private investment in transportation (56%) and telecoms (46%), but much less in energy (27%) and water (19%). Across types of projects, they were responsible for almost half of all investment in concessions (54%) and greenfield projects (44%), but significantly less for management contracts, lease contracts or divestitures (30%). In terms of location, investments accounted for by emerging market sponsors were not divided evenly across regions. South Asia, East Asia and the Pacific regions stand out with larger than 50% shares, while other regions lag behind.

A second phase of the World Bank study, which is still under way, involves a representative sampling of these sponsors.<sup>8</sup> A preliminary examination of the data suggests that the number of projects per sponsor has gone up sharply over the time interval covered. A further analysis showed that the importance of fairness and competition have become more widely recognized, since 54% of the projects undertaken had been awarded through a bidding process. One of the more revealing preliminary conclusions was the identification of the main investment criteria driving local sponsors. These criteria include sustained economic growth in a local, well-known environment; familiarity with the cultural, ethnic, social and economic environment; and an understanding of government contracts. Overall, it was clear that political risk was considered to be more critical to the success of a given project than business or even financial and market risks.

Other scholars have also noted the rise of local and regional sponsors. Phillippe Marin, a water specialist at the World Bank, finds that during the period 1990–1997, five operators – i.e. Suez, Veolia, Thames, Agbar and Saur – dominated 53% of water projects awarded globally (Marin and Izaguirre, 2006). But in the period 2002–2005,

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<sup>7</sup> While local sponsors are gaining momentum, they represent only a small increase in overall investment volume.

<sup>8</sup> Forty-two per cent of survey respondents are listed. Most such sponsors have a preference for small to medium undertakings, and their average debt-to-equity ratio stands at around 50 to 75%. They are also eager to expand their operations: 65% say they plan to invest further in existing projects and 47% claim to be willing to bid for other projects in adjacent regions.

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their share dropped to 23% with many new entrants from developing countries. In 2005, national or regional firms from Argentina, Brazil, China, Colombia, Malaysia, and the Russia Federation were the primary sponsors of water concessions – and three of the top five were from developing countries. With broader coverage than just infrastructure, Antoine van Agtmael (2007) argues compellingly that the world's centre of gravity is already tipping decisively in favour of emerging economies and reviews the emerging market companies to watch in the next decade, such as Argentina's Tenaris, South Africa's Sasol, Brazilian plane maker Embraer, and the exporters, Hon Hai and Yue Yuen of Taiwan Province of China.

### **2.3 Growth of project finance from the capital markets**

The notion that “new financiers” dominate infrastructure project finance<sup>9</sup> is misleading. Actually, 70 to 80% of all project finance deals are still funded by commercial banks, although rated deals funded through capital markets are increasingly being used as a substitute. The difference is that the rating agencies conduct due diligence and debt is priced according to the rating assigned to the transaction, which is said to measure levels of risk.

The first rating for a public project finance transaction was for a co-gen power plant in Michigan and did not take place until 1991. The first cross-border, non-United States transaction rating did not occur until 1994. So, the history is relatively short, and project finance from the capital markets, as a financing tool or methodology is still in its infancy when compared to corporate finance (in general) or public finance in the United States. The industry remains in a state of flux, evolving as different players enter the market bringing with them the methods used,

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<sup>9</sup> Project finance is a financing technique used for creating, upgrading or renovating single assets (or small, homogeneous and coherent portfolios) of assets. For that purpose, debt is issued and the debt repayment is serviced by the cash flows generated by the assets. Typically, incoming cash flows are kept in a trusted account, and no dividend is paid unless the debt investors are repaid on time. Perhaps most importantly, only very limited recourse is granted to the project sponsors. The project finance approach can be used to finance any investment that provides a service generating a revenue stream that can be used to repay the lenders. This approach has grown tremendously since the 1960s and 1970s when it was applied primarily to mining and natural resource transactions. In the 1980s it was used extensively for power transactions in the United States. In the 1990s, under the United Kingdom's Private Finance Initiative, it was applied to a wide range of sectors including power, airports, toll roads, and health care, and more recently, justice centers and government buildings.

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for example, in municipal and public sector finance, corporate finance, and structured finance.

There are several key trends in the evolution of project finance from the capital markets. In terms of regional activity for rated project finance transactions, approximately half of rated transactions between 1994 and 2006 took place in the United States, although the use of this type of instrument is growing in Europe, Latin America and the Middle East. Most project ratings tend to fall in the lowest investment grade category (Baa3) with a persistent spike at the highest (AAA) level. These transactions involve a monoline insurance guarantee.<sup>10</sup> Ratings methodologies for target sectors are gradually evolving. Initially, rated deals were mostly for power projects, but today toll roads are also being financed via the international capital markets.

Growth in the rated project finance market can be explained by a combination of key factors, some of which are focused on the capital markets. For example, interest rates since 2002 have been significantly lower on average than the preceding fifteen years. Not too many years ago, when toll roads were first rated in Chile, interest rates ranged between 8 and 10%. However, a transaction in Chile was recently rated under 4%. In addition, liquidity in most markets has been quite high, increasing financings via the capital markets. The yield and profitability of project finance is currently higher than municipal and corporate finance. The interest in project finance is also fuelled by the perception that infrastructure and project finance focus on essential long-term valued assets that provide stable cash flows. The globalization of the industry is also a factor in its growth because it brings more players into certain markets, such as the monoline insurance companies. The willingness of AAA-rated monoline insurance companies to insure these transactions encourages investors.

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<sup>10</sup> The underlying or natural rating where most infrastructure projects tend to cluster is Baa3, at the divide between investment grade and non-investment grade. The reason is that, typically, this is where project sponsors *want* the transaction to reside because it balances their ability to offer lenders confidence that the loan will be fully repaid on time and their ability to save money by avoiding unnecessary enhancements. Increasing the enhancements to the transaction yield a higher rating on the loan but add additional cost to the sponsor. If the sponsor spends more on enhancements, the net cost of these enhancements outweighs the benefit of the higher-rated loan, and the sponsor's profits decline. For example, a monoline insurance guarantee from a bond insurer such as MBIA or Ambac may bump a projects natural rating up to AAA, but the cost of the bond insurance must be paid by the sponsors.

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Identifying risks is critical to the development of this market.<sup>11</sup> However, the only way that risks can be identified is if there is greater transparency; that is, if there are more frequent flows of information on the financial and operating performance of the assets. The benefit of financing projects through the capital markets as opposed to commercial banks is that the rating process tends to force sponsors to provide information that is consistent and comparable. Over time, as project financing through the capital markets matures, it should lead to increased transparency for the entire project finance industry, and lead to increased investment.

## 2.4 New geopolitical strategic investors: China<sup>12</sup>

Chinese trade and foreign investment are growing strongly. Trade has doubled, while foreign investment has grown by a factor of eight (IMF, 2006). Trade flows between China and Africa have shown particularly strong growth, much of it driven by the development of petroleum and mineral resources (Broadman, 2006).<sup>13</sup> A large part of the infrastructure being developed in Africa involves extractive infrastructure such as mines and drilling sites, as well as roads to get these export commodities to ports (Stellenbosch University Centre for Chinese Studies, 2006; Goldstein *et al.*, 2006).

In parallel with deepening business linkages, a number of authors comment on the substantial growth of official economic assistance

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<sup>11</sup> When structuring a financing package, rating agencies place particular emphasis on construction risk, political risks and transparency of sponsor risks. *Construction risk* includes a number of considerations that relate to whether or not the construction will be completed on time and on budget. Included in this calculation are technical complexities related to the nature and novelty of the project as well as the expertise and creditworthiness of the contractor. *Political risk* can take many forms, including, for example, interference in setting tariffs, non-delivery of the right of way, abusive changes to concession terms and conditions, and early termination. Political risk has been especially pernicious for project financing in China and other emerging markets that lack strong rule of law. *Transparency of sponsor risks* (the ongoing and high quality disclosure of operating and financial performance and material events) is critical to maintaining investor confidence, which suffers when there is no transparency and the quality of the information provided is poor, as was the case in several Chinese toll roads rated in the mid-1990s.

<sup>12</sup> This section is based on research by Collaboratory research assistants Henry Chan and Vishnu Sridharan.

<sup>13</sup> Some observers note that China is placing so much emphasis on investment in Africa because it is late to the table in other regions and efforts at direct investment in some countries have been rebuffed.

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provided by China to African governments.<sup>14</sup> The number of Chinese state-owned and private enterprises in Africa has been estimated at 900 spread across 49 countries (Alden and Rothman, 2006).

A study by The Collaboratory shows that Chinese infrastructure investment is largely concentrated in Angola, Nigeria and Sudan and that it involves a wide range of projects, including water and sanitation, transportation, and energy and mineral-related projects. The study also shows that Chinese contractors are now present in just about every single African country. Almost half (49%) of their work stems from international bidding for World Bank and African Development Bank projects, while 40% results from bidding for projects financed by China's Export-Import Bank. In contrast to European contractors, the Chinese are opening branch offices and moving in to stay. On average, 50% of the labour employed is Chinese and involves mostly management and technical staff. The other half of the workforce, which is largely unskilled, is local. The Chinese have created a very aggressive pricing structure that causes domestic as well as foreign contractors to exit the market.

### *The Angola Mode*

To facilitate its investments abroad, China created the Export-Import Bank (Moss and Rose, 2006). In addition, in 2001 it created Sinosure, an entity that provides export credit insurance. Since then, Chinese activity in Africa has grown rapidly. Many Chinese investments in Africa follow the Angola Mode, an approach to investment under which African nations barter natural resource exports for investment in infrastructure by Chinese firms.

The Angola Mode involves securing a senior level cooperation agreement between the Governments of China and the host country. It then requires locating a Chinese contractor willing to take on an infrastructure project and a Chinese resource company willing to make repayments in exchange for oil or mineral rights. China's Export-Import Bank plays the role of coordinator between the parties and moves payments from the resource company to the contractor.<sup>15</sup> The innovation in this approach is twofold. First, China is bundling ODA-type aid with

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<sup>14</sup> See for example Glosny (2006) and Kurlantzick (2006).

<sup>15</sup> Because the contracts are barter, the types of financing structures being used by the Chinese banks are not yet well known or understood. The World Bank is conducting research into the terms of these contracts.

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commercial trade finance in a single transaction. Second, the money from the export-import bank never passes through the host country government; that is, it goes directly to the Chinese contractor. This provides a safeguard against corruption and political instability in the host country and allows China to work in very difficult places (such as Angola and the Democratic Republic of the Congo and Sudan) without concerns of expropriation or freezing of bank accounts.

While this mechanism is new, there is some similarity between the Chinese focus on development assistance to resource-rich countries and United States foreign aid to and oil imports from sub-Saharan countries. A parallel can also be drawn to Japanese war reparations to its South-East Asian neighbours in the form of Japanese-built ships. Thus, China's relationship with the African nations, while structured in a slightly new manner, is not a new phenomenon, but rather fits into historical barter arrangements.

### *Risks and rewards*

China has long had geopolitical reasons (including concerns over United States policy, efforts to sway the balance of power at the United Nations Security Council, and a desire to isolate Taiwan Province of China) for garnering favour with African nations through infrastructure investment (Eisenman *et al.*, 2007). Today, in addition to these geopolitical concerns, Africa has become a viable market for Chinese exports.<sup>16</sup> The rapid increase in trade between China and Africa has also taken on a strong economic significance because it plays an important role in creating new jobs.

The risks to China as a nation and to Chinese companies in Africa include security risks to people and property, risk of sudden political shifts that endanger project timetables or completion, and risk of abrupt nationalization of assets. These risks are not unique; they are faced by any nation investing in weak and fragile states. However, a risk for China as a member of the international community is that of political sanctions resulting from lack of attention or sensitivity to environmental, health, safety and human rights issues surrounding infrastructure projects being developed by Chinese contractors and companies. There is evidence of a growing awareness in China about these matters and the need to carefully monitor projects. It behoves China to pay attention to issues of corporate social responsibility and to consider the needs of the local

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<sup>16</sup> Asian exports to Africa have grown by more than 18% in the past five years.

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community. (However, care should also be taken so that developers do not compete or take over local government roles and responsibilities.)

The infrastructure being built by Chinese contractors is likely to have a direct positive impact on the people of Africa. Infrastructure development creates a virtuous cycle whereby improved infrastructure (say, better roads) facilitates trade, which in turn, has a direct positive impact on overall economic growth and leads to more infrastructure development. Additional direct benefits include expanded health facilities, reliable and widespread access to electricity, as well as proper roads, port development and improved water and sanitation facilities. The boom in infrastructure may help resolve the transportation barriers that have hampered African development in the past and fuel more rapid and cost-effective development within the region.

The Angola Mode seems to side-step one of the most common problems for the people of developing nations; namely, the risk that money and assets will fall into the hands of just a few people and/or a corrupt regime. However, this approach cannot eliminate the risk of civil uprising, war or terrorism. Another key risk is that natural resources will be rapidly or irresponsibly exploited leaving some of the nations worse off. Finally, if Chinese firms continue to rely on Chinese managers and skilled workers instead of developing local talent, the African nations may not be able to reap the full benefits of increased foreign investment (that is, the creation of local businesses and new jobs and the transfer of skills). However, on this last point, it should be noted that the cost of Chinese labour is climbing sharply, which, when coupled with the increasing sophistication of mobile workers, is beginning to erode the underlying cost advantage of Chinese contractors. A shortage of skilled workers would stand in the way of China's efforts to double its trade with Africa by 2010. Chan-Fishel and Lawson (2007) find that the relative developmental benefits of Chinese investment-for-resources swaps across a sample of Angola, Nigeria, Uganda, and Zimbabwe cannot be generalized and depend on the quality of the investment package offered, the level of governance in the host country, and the attitudes of the developer towards environmental and social safeguards and job creation.

In addition to becoming an engine for economic development for some sub-Saharan nations, increased trade between China and Africa has contributed to China's involvement as a key stakeholder in important global issues such as climate change. However, for traditional OECD donors it implies a reduction in their ability to exert influence

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over Africa. China's state-centric approach to overseas investment gives its companies a strong competitive advantage over companies from other nations. Scholars at think tanks, policy institutes, and development institutions around the globe are starting to seriously examine the global implications of China's foray into Africa (e.g. Tjønneland *et al.*, 2006; Gill *et al.*, 2007).

## 2.5 New geopolitical strategic investors: national oil companies<sup>17</sup>

As with other infrastructure investments, there is a tremendous need for investment in new energy exploration, production and distribution infrastructure to meet forecast global demand. Estimates of investment needs over the next 30 years reach \$2.2 trillion. National oil companies, which barely existed fifty years ago, have an important role to play in the development of energy and transportation infrastructure. Today, they control 70 to 80% of the world's proven oil and gas reserves, and in an environment of high oil prices, national oil companies find themselves flush with capital reserves.

The development of new fields is a highly capital intensive process, and because of their very different structures, objectives and costs of capital, national oil companies are, in many instances, out-competing independent international companies. For example, in Africa today, most of the bids for new oil fields are being won by national oil companies, particularly Chinese and Indian ones. A current study by Professor Thomas Heller details the behaviour, structure and strategic differentiation of national oil companies. The study, which organizes national oil companies by their type of organization and how they invest their money, found that they fall into three categories: bank, operator and commercial company structure. An example of a national company operating under a bank structure is the National Nigerian Petroleum Company, which does not carry out operations but simply collects money. Saudi Aramco is an example of a national company with an operator structure. This type of company operates exploration, production and refining facilities worldwide. Brazil's Petrobras, which is operated under a commercial company structure, has undertaken a process of international expansion and sells its expertise to other oil companies. The preliminary findings of the study are that the potential to drive commercial behaviour exists where there is a high level of

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<sup>17</sup> This section is based on research by Prof. Thomas Heller, Stanford Law School.

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regulatory capacity. Where regulatory capacity is low, the national oil company tends to be structured under a banking model.

National oil companies have evolved significantly since the 1960s and 1970s when the nationalization of oil and gas operations was the norm as the consequence of a natural outgrowth of statism, the rise of OPEC and the principal-agent problem. However, by 1995, as readily available reserves were depleted and commodity prices declined, national oil companies could no longer support large investment needs with dwindling returns. This led to a move toward commercialization and privatization to stay competitive and find new sources of capital. Today, sustained high prices have once again bolstered the national oil companies, and there is readily available funding for even greater activity.

In addition to their lower cost of capital, national oil companies are not under the same scrutiny as international companies and they do not need to make their operations as transparent. Also, in many cases, they do not exploit reserves with the same level of efficiency as the international oil companies; this has serious implications for global energy supply. The national oil companies may need to learn to manage assets as efficiently as the international oil companies. Reliable energy supply may well depend on a larger percentage of the national oil companies behaving in a truly commercial manner or forming alliances with commercial energy companies. However, despite plentiful reserves, many countries ban private investment in national oil companies.

Enlightened state oil companies recognize that by partnering with international oil companies they may shift some risk while taking full advantage of the expertise and resources that are available within many international oil companies (the experience of Qatar is worth exploring in this regard). This partnering can lead to tremendous profits for national oil companies as well as more efficient production of hydrocarbons. International oil companies are learning to make money as middlemen by taking on a share of the upside risk. The issue of punitive tax regimes must be addressed in order to encourage these relationships. By taking advantage of partnership arrangements with international oil companies, national oil companies have been able to increase their institutional knowledge and capabilities. This increase combined with the recent increases in oil prices over recent years argues in favour of shorter term arrangements from a national oil company perspective. As such, while it is likely that there will be new partnerships forged in the future, the relationships may be shorter in duration and more limited in scope. As

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the international oil companies are displaced, capital investment in new oil and gas infrastructure is expected to shift towards the national oil companies.

National oil companies also play a role in the development of alternative fuels and the infrastructure to support them. For example, Petrobras is playing an active role in the development of biofuels. However, it seems that the national companies that are able to achieve results in this area are those that, like Petrobras, behave as commercial entities. In the end, however, the development of alternative fuels is a policy issue. Larger national companies may have a role to play in influencing national policy in this area.

National oil companies are also able to take on projects that cannot be touched by international oil companies because of their sensitive nature. An example is the experience of Talisman in the Sudan (Kobrin, 2004).

In the near term, there is significant tension between developers of hydrocarbon deposits (whether such developers are national oil companies or international oil companies) and issues such as the environment, social responsibility and transparency. This is another area where national oil companies have an advantage, but also an area where they are vulnerable to criticism and now facing increasing pressure from NGOs and civil society (Wainberg and Foss, 2007). But perceptions can vary. The consensus view among the national oil companies in the Middle East – Abu Dhabi, Algeria, the Islamic Republic of Iran, Kuwait and Saudi Arabia – is that they provide strong societal benefits, such as skilled jobs for locals, and that it is the international oil companies who fail to deliver positive societal spillovers (Marcel, 2006).

### **3. The Equator Principles: new game rules**

The Equator Principles address the problem of the environmental and social impacts which large infrastructure and resource projects could have on local communities. They apply especially to projects in emerging countries that lack (or fail to enforce) strong environmental and social regulatory structures to minimize impacts. Experience has shown that when these impacts are not properly managed, the host community suffers, projects eventually fail, and banks face major financial and reputational risks. The Equator Principles are a framework for financial institutions to manage environmental and social issues in project finance. The principles are based on the environmental and social

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policies and guidelines of the International Finance Corporation (IFC). They are purely voluntary and each financial institution establishes its own implementation procedures.

Over the past two decades, commercial banks that participate in project finance transactions have incurred financial loss, damage to their reputations and shareholder activism as a result of organized campaigns by nongovernmental organizations (NGOs). Partly as a result of such pressure, banks have realized that they need to demonstrate leadership in sound environmental management and social responsibility.

In October 2002, ABN AMRO asked the IFC to convene a meeting to address these problems. As a result of the discussions, four banks (ABN AMRO, Barclays, Citigroup and WestLB) formed a working group to seek neutral, international and universally-accepted standards of social and environmental responsibility. Following extensive consultations with clients and NGOs, ten banks adopted the first version of the Equator Principles in June 2003. Today, the Equator Principles extend globally. There are 60 signatory institution (as of March 2008) including banks, export credit agencies, development agencies and insurance companies. This represents over 80% of the global project finance market and more banks are joining on a monthly basis. Increased emphasis is currently being placed on engaging developing country banks in Argentina, Brazil and South Africa. No major project is likely to be financed today without the application of the Equator Principles.

The Principles apply to project finance and advisory work on project finance in all industries for all projects with a total capital cost of \$10 million or more. The environmental risk categorization and industry standards apply globally. The performance standards apply to low- and middle-income countries. The Equator Principles have been revised – and will continue to be revised – to reflect changes in IFC policies and the implementation experience of the banks.

The Equator framework also includes a set of process steps to ensure appropriate application within the context of the project. These steps are the social and environmental assessment; development of an action plan; disclosure and community engagement; environmental covenants; and ongoing project monitoring.

The initial implementation of the Equator framework is not without challenges that must be overcome. Institutions that adopt the Equator Principles must first gain in-depth knowledge of the IFC policies and guidelines on which the Equator Principles are based. In

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addition, incorporating sustainability covenants into lending agreements might require some special consideration, despite the fact that many banks have codes of conduct covering environmental awareness. Many financial institutions work closely with their home-country international development banks on many transactions (for example, Japanese institutions cooperate with the Japan Bank for International Cooperation), which are likely to have their own guidelines for social and environmental due diligence. Thus, it could initially seem onerous to have to comply with both standards. There is also some degree of competition with other Equator Principle financial institutions in assessing each project, and setting standards for development of an assessment report and other documentation. Finally, financial institutions tend to have little prior experience in engaging with NGOs and need to establish a point of contact with them. Although they do present challenges, these issues are often successfully dealt with.

The benefits of the Equator Principles are multi-dimensional. In addition to improving environmental and social outcomes, they provide a global standard for project finance and save borrowers time and money by identifying and managing risks up-front. As a result, “loan-shopping” based on environmental and social criteria is reduced and banks are better able to reach a consensus in large loan syndications. There have also been some unexpected benefits of the application of the Equator Principles, including unprecedented cooperation among financial institutions and NGOs to promote best practices and the broader understanding and integration of transparency and sustainability into corporate business models. At many banks, the Equator Principles have led to an array of follow-on sustainability initiatives and, in some cases, even to the creation of a sustainability department.

There has been relatively little research on the role, diffusion and effects of the Equator Principles. The first definitive report on the Equator Principles noted that “The Equator Principles will be no more than a laudable aspiration unless the Equator Banks practice what they preach by refusing to finance projects that cause demonstrable and significant environmental or social harm” (Watchman, 2005). A follow-on report by the same author, written after the Equator Principles underwent a major set of revisions, presents a much more optimistic view: “The Equator Principles are not greenwash. They have revolutionized project finance and have been a force for good throughout the financial world” (Watchman, 2006). A study conducted at the London School of Economics identifies regional patterns in adoption of the Equator Principles, and argues that banks are more likely to adopt if they are

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located in jurisdictions where they face high-levels of NGO and advocacy group opposition and strong regulatory systems and if they routinely participate in large, highly-visible, cross-border project finance deals (Wright and Rwabizambuga, 2006).

## **4. Implications and new strategies**

This section provides an overview of the implications of the new trends in global infrastructure markets from the point of view of project sponsors, construction and engineering companies, pension funds, micro lenders and multilateral organizations. The viewpoints expressed are those of Roundtable participants who were asked to comment on the second day of the programme.

### **4.1 The project sponsor perspective**

The key lessons for project sponsors deal with relationships with local government entities. It is important that project sponsors be well aware and realistic about the political situation and dynamics in the host country. Similarly, it is vital to understand the cultural, institutional and regulatory environment, and how the government and the legal system actually work. Project sponsors should be particularly careful to work within the host country legal system. In order to avoid corruption, it is important to move slowly within the host national environment, allowing plenty of time to obtain local knowledge, vet local partners, and learn about local cognitive-cultural, normative and regulative institutions (Orr and Scott, 2008).

While infrastructure projects can provide great benefits to host countries, some project sponsors feel that it is difficult to engage in activities that yield social benefits without reducing the return to the private equity investors.

Host countries must take steps to encourage foreign investments in infrastructure. Qatar has done a good job of promoting foreign investments. In the 1990s, the country's leadership began opening up opportunities for production-sharing agreements; building the trust of buyers such as Japan and the Republic of Korea, whose main concern is security of supply; and providing support infrastructure such as liquefied natural gas ports. Qatar also provided credible financial incentives to investors. This was a significant turnaround from the situation in the 1980s when the country was almost bankrupt. Qatar understood that the government is not always the best developer or operator and that

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its role is to find the right partners. Today, Qatar's per capita GDP is \$50,000 per year and the country has an excellent education system. One of the lessons of this experience for the international oil companies is that those companies that supported Qatar in their time of need have been rewarded by the country's success.

## **4.2 The construction and engineering firm perspective**

Several trends currently affect infrastructure construction and engineering firms. Government emphasis is shifting from public to private sector infrastructure. This move has been reinforced by increased liquidity in the private sector. Private equity financing of projects (such as revamping the London underground) are a definite trend. However, regime changes and lack of policy and leadership consistency make project development very difficult. International construction is a business that deals with a tremendous amount of political, public and environmental risk in every country, including Europe and the United States. Thus, the key lessons for project sponsors regarding dealings with local governments also apply to contractors.

The problem in the United States is unique because it relates to the difficulty of dealing with the various state legislatures and legal systems. Political and regulatory fragmentation is emerging as a serious problem in the United States market. Indeed, the PPP market in the United States has been likened to dealing with 50 independent developing countries. Federal government efforts to provide a uniform approach to project structure and administration could contribute to creating a standard platform for the development of structures governing PPPs. Design-build PPP projects in the United States that involve turning over the asset to the state after the project is completed work well as long as there are no serious start-up delays. Most states are not comfortable with selling assets to the private sector and giving up control. Successful PPPs require that public and political support at the local, regional and national level be obtained well in advance of the initiation of the work. Environmental clearance should also be obtained well in advance to avoid problems and delays. It is important to apply the lessons learned in one project to other projects.

An important consideration for private contractors is to maintain financial market discipline in the selection of projects and ensure that marginal projects not go forward in times of booming economic activity. Indeed, unsuccessful, economically unviable or publicly-challenged projects can have a significant negative impact on the ability of

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economically sound projects to gain approval and financing. In addition, construction and engineering firms are concerned that too much private infrastructure fund investments are going into brownfield projects and too much emphasis is being placed on existing assets. Instead, infrastructure funds should stress greenfield development, a segment that is falling on the shoulders of contractors. While investment funds are interested in closing a deal in a few months, it can take three to five years to set up a complex greenfield project to be closed and financed with public and political support. It is important to establish a presence in a market and understand wage rates, equipment challenges and other such issues before starting to build. A chain of unsuccessful projects or very early exit by private funds due to impatience will not be good for the industry as a whole.

In the specific case of China, international contractors see Chinese contractors as both potential partners and competitors. While the Chinese contractors' share of international work is currently dwarfed by that of larger international contractors, the dynamic is rapidly changing. Chinese contractors, which are specializing in transport and basic civil infrastructure, are poised to become formidable competitors.

Compared to Chinese contractors, international construction companies have had a challenging time working in Africa. One of the difficulties that international companies face in dealing with African governments revolves around obtaining payment and fair treatment when costs grow outside the control of the firm. Another area in which China has an advantage involves its role as a major cost-effective supplier of goods and services. Big projects now require global sourcing and China is an important part of the supply chain (steel procurement is a key example). One of the biggest opportunities for Western contractors involves collaborating with Chinese suppliers. Productive collaboration to bring projects to fruition and a focus on how risks are managed and/or spread in a project are the wave of the future.

Sustainable development and social responsibility are a much clearer business dynamic for international contractors because their home governments demand compliance. The Chinese firms, in order to grow, will need to have a business model that converges with other international players. Safety is a huge baseline expectation that the Chinese firms have to demonstrate as part of their business model. Examples of industries where this is critical include nuclear power plant projects.

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### **4.3 The pension fund perspective**

Pension fund money is increasingly being attracted into public infrastructure through private infrastructure funds and direct investments by public pension funds, such as Ontario Teachers. Two key characteristics of pension funds could have an influence on the broader project finance market. Public pension funds are not only mindful about rates of return, but they are also extremely sensitive to constituents' interests as many have publicly elected boards. Some funds also have so-called permissible countries or permissible investment lists that take environmental, social and human rights issues into account when considering investments. One implication of this sensitivity to shareholder approval is that there could be a growing interest within the pension fund community in projects that are built on principles of sustainability such as the Equator Principles. Another characteristic of public pension funds is that they are quick to step forward and make their views known if they perceive misguided corporate management. As pension funds get more involved in infrastructure financing, this kind of shareholder expression may become more common and may result in more consistency and transparency in reporting.

### **4.4 The perspective of micro lenders**

It is well to keep in mind that infrastructure projects are not always multimillion dollar investments. The infrastructure needs of many poor communities do not require an electrical grid or large dam or irrigation project but low-cost treadle pumps and drip irrigation sets. Small-scale projects, which can have a significant developmental impact, can be financed through micro loans of \$100 to \$200. Interestingly, the rate of defaults on micro loans is less than that on AAA credits. The loans, which have a repayment rate of 98.9%, are made at market rates and the borrowers are principally women. The model is ideal because its implementation bypasses the state governmental structure, going directly to the people in need. The idea is not new: it was the concept under which the World Bank was originally set up. The key now is to find a match between appropriate financing systems and appropriate small-scale water treatment, irrigation, electricity generation and communications technologies. This is an area where the multilateral organizations and foundations, such as the Gates Foundation, could provide some meaningful support.

### **4.5 The perspective of multilateral institutions**

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As we have seen, there has been a shift in the field of players active in emerging markets infrastructure finance and delivery. As a result, the roles of the multilateral lending institutions are evolving and adapting to the changing industry structure. They are developing new products and different ways of supporting projects.

The pressures facing the multilaterals are varied. The growth of the local capital markets means that debt is being issued predominantly in local currency. Thus, as currency risk ceases to be a concern, multilateral support for currency inconvertibility is no longer necessary. Furthermore, there is now a great deal of pluralism in the approaches to development, including the activities of entities like the Gates and Soros Foundations. This creates added pressure for the traditional multilateral institutions because it provides new competition, developmental philosophies and benchmarks of performance.

China and India, which are major clients of the Asian Development Bank (ADB) and the World Bank, have become significant internal critics and forces for change within these institutions. While these institutions still have an important role to play, doing business with them has become costly and difficult. Thus, China and India are looking for changes in the degree of conditionality in bank lending. They also want to play an expanded role, particularly in the ADB where Japan and the United States dominate.

### *New directions at the ADB and the World Bank*

A recent report (the Eminent Persons Report) validates many of the discussions taking place at the ADB, highlighting the fact that its original role as a development bank channelling excess capital of developed countries into developing countries is no longer the role it should play. The report contends that the Asian Development Bank should narrow its focus to infrastructure and financial sector development, energy and the environment, regional integration, technology development and information and knowledge management.

Specifically, in terms of infrastructure, the report suggests that the ADB should broaden its scope to also include information and communications technology, and not focus solely on power, water and roads. In addition, it recommends that the institution place greater emphasis on its work in the areas of legal and regulatory reforms to promote PPPs. Instead of its traditional role as a lender to infrastructure projects, the report states that the Asian Development Bank should focus

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more on the creation of bankable projects and on providing venture capital. The report's emphasis on regional integration also has implications for infrastructure as it highlights the critical role of projects such as cross-national roads, ports and other infrastructure to facilitate trade. The ADB should also increase its focus on financial industry development by, as much as possible, financing projects in local currency, which would help to establish local capital markets

The report also suggests that the ADB find ways to channel Asia's \$3.1 trillion in foreign exchange reserves into regional investments instead of foreign treasury bonds as is currently the case. Internal discussions surrounding this issue involve the creation of a new institution that is not controlled by Japan and the United States. Another notion is to create a subsidiary of the Asian Development Bank (similar to the IFC) to invest these reserves. The report, however, favours the creation of designated funds within the ADB to meet this aim. Another suggestion is that the ADB make more and better use of credit enhancement facilities. The idea is to use ADB cofinancing to leverage more money into deals. This means a move away from trying to finance the biggest piece of the pie internally and limiting ADB exposure to projects. The latter could be done through a B loan program, similar to that of the IFC, or by providing more political risk guarantee covers or other credit enhancement. Finally, the report states that the Asian Development Bank should play a greater role in developing and expanding markets for trading carbon emissions, as well as increase its activities in financing energy efficiency and clean energy projects. (The ADB has already set up a number of technical assistance funds for this purpose and created its own carbon fund.)

The World Bank is also reacting to a changing environment and placing added emphasis on infrastructure lending, which has increased in the past few years. However, because many middle-income countries have access to financial markets, the World Bank's share of infrastructure lending has decreased compared to commercial sources. Consequently, lending to those countries is focusing more on public sector reform and social sectors. Yet, where the World Bank remains engaged in lending to infrastructure it emphasizes public sector infrastructure reform and greater efficiency. The World Bank is also stressing the development of appropriate frameworks for PPPs. Finally, it is focusing on very specific instruments in addition to lending, including credit enhancement for private sector projects. The goal is to use these instruments more, and with more leverage, in order to promote private participation in infrastructure.

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## *The future role of the multilateral development banks*

There are several areas where the multilateral institutions have an advantage over private lending institutions, including social and environmental management, political risk management, project development, serving as lifelines in times of crisis, venture financing for micro infrastructure, creating transparent legal and regulatory environments, designing collective institutions and debt relief.

- *Social and Environmental Management.* The multilaterals have a deep expertise in the management of environmental and social risks and they maintain an “honest broker” position that allows them to be objective in their initial assessments of those risks as well as in their monitoring.
- *Public-Private Interface Management.* The multilaterals have a role to play as a buffer between the public and private sectors. Their involvement in a transaction can help to keep host governments from abusing their powers (what the private sector refers to as “political risk”) and can help keep global investment banks, contractors and infrastructure operators from picking plums<sup>18</sup> (what the public sector refers to as “greed and profiteering”). There are a lot of projects in Asia that have excessive levels of political risk, which would not go forward without a B loan or a political risk guarantee from a multilateral. And conversely, there are many governments that are unable to fully utilize the capabilities of the private sector.
- *Project Development.* Their vast knowledge of the projects that could be developed in their member countries and the needs of those countries allows multilaterals to play a key role in short-listing and prioritizing winning projects and providing development support.
- *Lifelines in Times of Crisis.* Assistance from the multilateral lending institutions has been vital during times of economic crisis when other sources of financing become unavailable. They will continue to play a fundamental role in this area in the future.

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<sup>18</sup> In other work at The Collaboratory we have described a “theory of the plums”; this is the idea that private buyers of infrastructure concessions often have greater knowledge about the true value of the concessions than do government sellers and that private buyers are therefore in a position to pick “plums.” This draws on Akerloff’s “theory of the lemons”, which says that buyers (say, of used cars) get stuck with “lemons” because sellers exploit information asymmetries and superior knowledge. Although the direction is different, the mechanism is the same.

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- *Venture Financing of Micro infrastructure.* The World Bank and other international financial institutions have the potential to make early venture investments in micro infrastructure projects and help to scale up these solutions.
  - *Creating Transparent Legal and Regulatory Environments.* A very clear role for the multilaterals is in helping countries create enabling environments, implement reforms and create more transparent legal systems that promote private sector development.
  - *Designing Collective Institutions.* Another important role of the multilaterals is to design collective multinational institutions that function effectively and efficiently. For example, the deployment of carbon trading systems has been hampered by the self-interests of individual states, and multilaterals with a more global view may have a role to play.
  - *Debt Relief.* The multilateral institutions and the World Bank in particular, have an important role to play in resolving difficulties that are likely to arise over debt relief. Until now, issues of debt relief have been addressed by traditional donors in the context of the Paris Club. However, as new lenders enter the market (primarily China, Brazil, India, Kuwait, the Republic of Korea, the Russian Federation and Saudi Arabia) there is a need for a more global approach to debt relief. This is particularly important because Paris Club donors are going to be unwilling to restructure debts owed to them if debts owed to these new lenders are being repaid in full.

Some observers note that the future of these institutions largely depends upon whether they are prepared to accommodate the desire of the emerging superpowers (China, Brazil and India) to play a larger decision-making role within the institutions. If there is no accommodation, these large borrowers will go elsewhere and create alternative institutions that they believe are more responsive to their individual and collective needs. Whether or not this is doable, however, is a matter of debate. Other observers point to the long gestation period for a new global multilateral entity. Thus, it might be much more likely that the existing multinational entities will transform themselves and continue to evolve.

## **5. Conclusion and future research directions**

Renewed enthusiasm in emerging market infrastructure has attracted new sources of funding and driven infrastructure investment

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and development growth. Governments are placing emphasis on the development of infrastructure projects and because of the significant capital needed to meet growth objectives there is greater interest in private sector involvement and PPPs. New sources of funding are becoming available from public financial institutions in emerging countries. Traditional multilateral agencies are trying to re-establish their relevance and role in the midst of competition from new financial institutions in the emerging markets. The availability of local currency financing in many of the emerging markets is at an all time high.

The key lessons of these developments for project sponsors are those related to the relationship with local government entities. It is important that project sponsors be well aware and realistic about the political situation and dynamics in the host country. An important consideration for private contractors is to maintain commercial discipline in the selection of projects and ensure that marginal projects not go forward in times of booming economic activity. Pension fund money is increasingly being attracted into public infrastructure through private infrastructure funds and direct investments by public pension funds. As a result of the shift in the field of players, multilateral lending institutions are developing new products and different ways of supporting projects.

In addition to understanding current developments in the rapidly changing international environment for project finance and infrastructure investment, it is important to get a better feel for future developments in the sector. The discussions at the Roundtable meeting highlighted many remaining questions and point to matters of concern that require further study.

The first question concerns the characteristics of the market for international infrastructure in the future. As the markets continue their transition, it is important to ascertain which new players can be expected to dominate. Will it continue to be project sponsors from the West backed by their multilateral and bilateral institutions? Several ongoing developments (including the strengthening of local and regional sponsors in many emerging markets, the spread of local capital markets, and the rapid growth of export-import banks in emerging countries) may imply more diverse participation and the need to create new or different financing models.

Another issue that requires careful attention is the path that the traditional multilateral institutions may take following the current period of “soul-searching”. As many of these institutions reinvent themselves, it is important to figure out what the impact of their shifts in strategies

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and structures (which might be quite dramatic) will be on infrastructure project finance. Will the discussions currently underway lead to the establishment of new institutions?

The potential effects on social and environmental standards of the rise of ultra-competitive “South-South” players in many emerging countries should also be carefully scrutinized. Have the Equator Principles become a market standard for old and new entrants alike or could social and environmental standards suffer as a result of the entry of these new players? Are there further steps that can be taken to strengthen the Equator Principles and forestall negative social and environmental impacts?

Private infrastructure financing is a difficult sector and many project sponsors failed in the 1990s. It is important to focus on what the future might bring for the new private infrastructure funds. What factors can ensure that they will be successful? Will the market bifurcate with a segment focusing on greenfield projects?

Finally, careful analysis of the implications of China’s foray into Africa should be undertaken in order to forecast whether it will continue and, if so, how it might change. It is also important to ascertain what will happen when an African country defaults on its sovereign loans and the new players and the traditional OECD donors need to come to an agreement on debt relief. Indeed, it might be useful to consider potential solutions to such a problem.

To address some of these issues, The Collaboratory currently has five major studies underway and is contemplating several other areas of research (see appendix).

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## **APPENDIX**

### **New Research Directions at The Collaboratory**

The Collaboratory currently has five major studies underway. It is undertaking research on NGOs and governance to predict emergent political conflict in large infrastructure investment projects. The study

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will focus on explaining the opposition of international NGOs and local interest groups in a sample of 30 international water and pipeline projects. Water projects tend to involve local issues and conflicts, while pipelines tend to bring to the surface national and international conflicts involving transnational bodies. The Collaboratory is also in the midst of a study to help conceptualize the overall development plan for a new economic free trade zone in the Middle East. This research uses 4D CAD and GIS technology to visualize the coming together of all of the buildings and infrastructure in the zone over a multi-year period. A third report involves investment and trade relationships between China and Africa and will culminate in the publication of a book. A joint project with KPMG involves undertaking case studies of several United States PPP transactions to chronicle the history of infrastructure finance and development in the United States; and to help California design a new PPP coordination agency for infrastructure renewal. Finally, a fifth analysis underway involves how firms in the global infrastructure sector integrate and capture best practice as they work globally.

For the future, The Collaboratory is exploring the possibility of holding a series of roundtable meetings in China, India and the Middle East, involving business executives and government officials who have a deep understanding of infrastructure markets within their regions. The Roundtable on Emerging Markets' Infrastructure suggested the following areas of interest for future study:

- The environmental impacts and consequences of rapid urbanization in China;
- The impact of China's growth on the international capital markets, especially emerging markets, and the new financing structures and models for financing that are emerging;
- The PPP market, comparing the PPP models used in Australia, Canada, Chile, Spain and the United Kingdom and their applicability to the development of PPP programs in states in the United States;
- A quantification of the interest of national oil companies in investing in energy and non-energy infrastructure and the implications for contractors, law firms and other businesses that could participate in this market;
- A look over the horizon at the types of infrastructure that are likely to be developed over the next 10 to 15 years based on technological, demographic and other trends;

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- Micro infrastructure possibilities and options for combining such models with existing microfinance models to better reach the world's poor;
  - Creation of a developed country PPP project database similar to the PPI database categorized by sector, market, value, year of initiation, etc.;
  - An evaluation of trends in private infrastructure projects in the United States focusing on the late start of PPP structures in this country and the expectations of foreign developers;
  - A roundtable discussion addressing the infrastructure development challenge facing India; and
  - An ex-post examination of the lessons of the Asian financial crisis focusing on the steps that could be taken to mitigate the impact of future such episodes.

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# The role of technology and human capital in the EPZ life-cycle

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Karima Omar and William A. Stoever \*

This article proposes an alternative perspective for examining export processing zones (EPZs) by modifying the life-cycle approach. It highlights the two crucial aspects of a successful EPZ development, namely the nature of backward linkages and gradual integration into the rest of the host economy. It argues that successful EPZs can be a catalyst for structural transformation of the wider economy and discusses what policy measures are needed to achieve such outcome. The article concludes by identifying venues for future research.

**Key words:** export processing zones (EPZs), developing countries, foreign investment, technology, human capital, life cycle

## 1. Introduction

The utility of export processing zones (EPZs) as a development tool is based on the premise that they can help achieve three interrelated goals: enhancing foreign exchange earnings by promoting non-traditional exports; creating jobs and income; and generating technology transfers and spillovers (Warr, 1989).

Over the past 30 years, the success of a number of EPZs in developing countries to achieve these objectives has prompted other developing countries to turn to EPZs as a way of making their development strategies more outward-oriented. However, developing countries have had varied results with this strategy: some EPZs have emerged as dynamic engines of growth, while others have created little benefit and turned out to be net drains on government resources. Such contrasting outcomes demonstrate the need for further examination into the factors that determine the success or otherwise of such zones. This article proposes a comprehensive model of EPZs based on the life-cycle approach. In particular, it delineates two dimensions of dynamic development of EPZs, namely rising technology intensity of local inputs and increasing integration of the zones into the host economies.

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The organization of this article is as follows. The next section reviews the literature and discusses the arguments for and against the use of EPZs. Furthermore, it classifies the experiences of various EPZs – as reported in the literature – into four categories. Section three discusses the two crucial aspects of dynamic development through the examination of EPZs in a number of developing countries with a special attention to China’s Special Economic Zones (SEZs – China’s variation of EPZs). We argue that investment in human capital and technology upgrading is crucial for the success of EPZs. Section four argues that as EPZs mature and the capabilities of local suppliers develop, backward linkages are created and they may ultimately contribute to structural transformation of the host economies. Section five postulates three possible scenarios for EPZ development. Section six concludes the article by proposing venues for further research.

## 2. Literature review

The effectiveness of EPZs in developing countries has been debated for more than two decades. Among those supporting the use of EPZs, Haywood (2000), for example, asserted:

Indeed, the zone concept is so powerful, that more and more countries are recognizing a new paradigm of free zones. While the old free zone was often described as a static, labor-intensive, exploitative enclave, the new zone paradigm is a dynamic, investment-intensive, management-driven, enabling, and integrated economic development tool. (p. 1)

Similarly, Rhee and Belot (1990) identified EPZs as one of several possible factors helping developing countries to increase non-traditional exports. For Radelet (1999), the experience of the original four Asian Newly Industrializing Economies (NIEs)<sup>1</sup> provided empirical support for the argument since in their early years of industrialization, “manufactured exports did not expand rapidly in any country except through one of these facilities” (p. 12).

In contrast, other authors found EPZs ineffective for promoting economic development. Kaplinsky (1993), for instance, argued that by establishing EPZs that specialized in unskilled labour-intensive export processing, the Dominican Republic had experienced immiserizing

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<sup>1</sup> Newly Industrializing Economies. The four countries originally identified as NIEs were Hong Kong (China), the Republic of Korea, Singapore and Taiwan Province of China.

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growth. More recently, Moran (2002) observed that “EPZs and FTZs<sup>2</sup> have a very problematic record” (p. 17). Jayanthakumaran (2003) found that “EPZs generated only limited number of backward linkages to the host country’s economy” (p.53). Tekere (2000) also contended that:

... there are virtually no successful examples of EPZs in Africa other than Mauritius and that as second best development strategy, EPZs have become irrelevant and outlived their viability. (p. 38)

## 2.1 Economic analysis of EPZs

The diverse views on the effectiveness of EPZs reflect, to an extent, differences in the analytical framework employed. Madani (1999) identified three prominent schools of thought on the overall economic impact of EPZs: the neoclassical, the new growth and the life-cycle approach.

The *neo-classical school* criticized EPZs as creating inefficiencies that distort free-market mechanisms. Madani (1999) argued, for example, that:

... the creation of zones will increase inefficiency by distorting production away from its comparative advantage. The FDI flowing into the EPZ means that capital is imported while labor is withdrawn from the domestic sector to work on it. This will distort production away from its factor-based competitive efficiency. (p. 85)

An opposing view had earlier been expressed by Spinanger (1984), who saw this argument as built on the presupposition of full employment, when in fact most developing countries were characterized by severe unemployment and underemployment.

A variation on the neoclassical approach was to examine the effects of EPZs on the host economies through a cost-benefit analysis such as the one developed by Warr (1989) and extended by Jayanthakumaran (2003). This methodology compared the opportunity costs of establishing an EPZ with the levels of employment and foreign exchange earnings generated by the zone. Warr (1989) found that some EPZs’ earnings did not cover the costs of the investment in them and that the opportunity costs of such investments did not justify the concessions granted (tax and tariff breaks). Some zones may even have

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<sup>2</sup> Free Trade Zones

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had a negative net present value for the country. However, Johansson (1994) and other critics maintained that such cost-benefit analysis failed to take into account less-tangible or dynamic benefits, in particular those related to spillovers, such as demonstration effects.

A second school, the *new growth theory*, emphasizes the importance of knowledge creation. According to Cortright (2001):

New Growth Theory emphasizes that economic growth results from the increasing returns associated with new knowledge. ... Markets fail to produce enough knowledge because innovators cannot capture all of the gains associated with creating new knowledge. ... [The theory has] many implications for economic development policy. [It] underscores the importance of investing in new knowledge creation to sustain growth. Policy makers will need to pay careful attention to all the factors that provide incentives for knowledge creation (research and development, the education system, entrepreneurship) (p. 1)

Johansson (1994), one of the proponents of the new growth theory, applied the theory to the analysis of EPZs in developing countries. She emphasized the transitory nature of EPZs, the importance of spillovers from FDI into the local economy, and the centrality of backward linkages. She found three interrelated reasons as to how and why EPZs can contribute to the industrial development of a developing country:

First, domestic firms lack needed technical, marketing and managerial know-how, and FDI within the zones fills this gap. Second, domestic firms seldom have access to international distribution channels and need support from international or joint-venture companies. Finally, entry channels into international markets would be difficult without access to established foreign firms with wide international business dealings. (p. 390)

Extending this idea further, Baissac (2004) observed:

New Growth and Neo-institutionalism sought to reaffirm that social and political institutions had a key role to play in the market above their influence on the allocation and cost of labor and capital. The theories proposed that economies were not simply machines that spontaneously created or destroyed wealth, but were social constructions informed by knowledge. (p. 4).

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One implication of these arguments is that government has a role in promoting technological learning and development, possibly through the use of EPZs.

However, critics argued that the new growth theory relied too much on the establishment of backward linkages where none might exist or even potentially exist. Rhee and Belot (1990) maintained that the new growth theory was not supported by empirical evidence. Radelet (1999) argued that the failure to develop backward linkages was a result of the assembly-line nature of export-oriented production in a typical EPZ – firms import components for assembly and make few purchases from local suppliers. Moreover, the relatively low levels of technology used in typical EPZ operations, such as garment and shoe production, left little scope for technology transfer.

A third school proposes the life-cycle approach to analysing EPZs, which focuses on their dynamic nature and addresses how EPZs need to evolve over time as the host country's economy modernizes and liberalizes. Basile and Germidis (1984) proposed one of the first life-cycle models of EPZ development. Their model (summarized here) had four phases:

- provision of basic infrastructure and facilities, prompting an inflow of FDI;
- exports expand strongly, even while the rate of FDI inflow begins to slow;
- slower growth in exports and the replacement of small marginal businesses;
- disinvestment by foreign enterprises (pp. 60-61).

Schrank (2001) presented a life-cycle model of EPZ development that incorporated the critical roles of market size and previous national experiences with import-substitution industrialization. Haywood (2004) added:

Zones are changing. Before 1955, many of the zones focused on being real-estate developments. They created buildings, and a zone made them more attractive to lease. Between 1955 and 1975 zone management focused on marketing their zones. Today, leading zones like Jebel Ali<sup>3</sup> know that the focus of the zone in the future is going to be on service to the clients of the zone (p. 1).

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<sup>3</sup> Located in Dubai.

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None of the approaches outlined above gives adequate attention to the critical ingredients of success, namely human capital and technological development. While the new growth theory and the emerging life-cycle theory allude to the significance of these intangible factors, this study proposed a more holistic approach to analysing the EPZ life-cycle, highlighting the importance of these two factors as the facilitators of backward linkages and spillovers.

In order to contextualize the issue, we will first review the experience of EPZs in various developing countries.

## **2.2 Four categories of EPZs**

Various authors (e.g. Madani, 1999; Radelet, 1999; Schrank, 2001; Tekere, 2000) identified different types of EPZs. One way of organizing them for analytical purposes is to classify them into four categories.

The earliest EPZs tended to be enclaves that were largely isolated from the rest of the host economy. The arche type of such enclaves were those in extractive industries, many of which started when most of today's developing countries were colonies of the European powers.<sup>4</sup> A more recent manifestation of such enclaves is an export platform, which typically attracts foreign manufacturers seeking low-cost labour to produce labour-intensive goods, such as garments, shoes, toys and simple electrical and electronic appliances. The economies in which such EPZs were created tended to be relatively closed, highly regulated and relatively static, and hence the EPZs were largely isolated from the rest of the economy. Nonetheless, some of them were able to generate enough benefits to address political concerns over unemployment and foreign exchange reserves, and thus unwittingly helping to perpetuate the highly constrained nature of the economies. A World Bank discussion paper (1992), for example, observed:

A successful EPZ may just as easily conserve an inward oriented industrial structure in the host country if it generates enough export earnings and creates employment, thus prolonging the time period in which a country can pursue a protectionist policy.  
(p. 5)

According to this view, enclave EPZs could make only limited contributions to developing countries' economic development.

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<sup>4</sup> To a certain extent, the experience of enclave EPZs in this period shapes the attitude of developing countries toward FDI even today

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The second category of EPZs are those that acted as testing grounds that guided the direction of future economic liberalization, with EPZs in China and Mauritius as prime examples. Tekere (2000) observed:

Being special enclaves operating within a country, EPZs are expected to serve as indicators – giving guidance as to more trade liberalization or vice versa. In other words, a successful EPZ program, for example in terms of growth of exports, employment, technology transfer, and downstream effects, would signal the desirability and explosion of the trade liberalization program to cover the whole domestic economy, while non-successful EPZs may signal the reverse policy direction. (p. 37)

Radelet (2004) discerned a similar approach:

Governments ... examined markets from the perspective of the firm and attempted to eliminate obstacles that undermined firm competitiveness, such as license requirements, slow and corrupt customs administration, high tariff rates, and poor infrastructure. In most cases, they did not try to solve these problems for the whole economy at once, but rather created an enclave (e.g., through an EPZ) where at least some firms could be competitive, and then worked to see the enclave spread throughout the economy over time. (p. 6)

The third category of EPZs are those that functioned as part of a country's overall liberalization process, including freeing-up of macroeconomic, trade and exchange rate regimes. This approach is becoming more common as developing country governments increasingly adopt market-oriented development policies (Stoeber, 2001). The role of EPZs in this case is transitory. Thus, Madani (1999) observed:

As the economy opens up and a country develops its capacity for competitive industrial exports, EPZ exports and employment fall. In this light, EPZs have a specific life span, losing their significance as countries implement systematic reforms. (p. 17)

Crucial ingredients for such a transition process include the fostering of backward linkages and the initial provision of special incentives to local producers and suppliers, such as tariff reductions on imports for domestic exporters. Tekere (2000) noted:

A few studies have reported cases where some significant linkages were created, particularly where EPZ treatment was extended to firms outside EPZs. In each case customs authorities encourage

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domestic producers to supply the EPZs by giving them access to material inputs at duty-free prices. (p. 42)

Korea's Masan zone is a typical case of such an arrangement.<sup>5</sup> However, this model presupposes that the introduction of EPZs occurs concurrently with nation-wide economic reform – a pre-condition that was largely absent in the case of China where the creation of the SEZs, in fact, preceded more general institutional reform.

A fourth category may be seen as a failed version of the third, applicable to a large number of countries (many of them in Africa, and some in South Asia) which have nominally liberalized their economies but have failed to attract significant amounts of FDI. Their governments have created EPZs with the usual infrastructure and incentives, often at great costs to the national treasuries. But many of these EPZs have failed to attract export-generating firms due to poor location, inadequate support services and personnel, perceived political or economic instability, or burdensome administrative requirements. The result may well have been a net economic loss to the country establishing the zone. Schaffer *et al.* (2003), for example, found that:

Developing countries in South Asia have had marginal success with EPZs for a number of reasons. First, government policy had continued to shield vested interests, both political and economic. Domestic producers in oligopoly markets, including many of the businesses in South Asia, enjoy near monopoly power and influence over government policies that make imports uncompetitive and thereby continue to charge consumers higher prices. Other restrictions in the form of import duties and non-tariff barriers can also inhibit the development of EPZs (p. 16).

Furthermore, Tekere (2000) noted:

... considering the generous incentives provided which translate into huge costs for the host country and the modest benefits arising therefrom, most studies have concluded that EPZs are not a viable strategy for economic development. It would appear that the relatively successful cases are either islands or countries with coastlines. (p. 43)

It is evident that the nature of EPZs and the conditions surrounding them vary considerably. The instrumental role played by certain EPZs in

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<sup>5</sup> See, for example, Radelet (1999)

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successful economies suggests that the neoclassical approach does not fully take into account the impact such EPZs could have. At the same time, the existence of a large number of EPZs in the “failed” category raises question as to what factors determine the success or failure of EPZs. In the next section, we will turn to this question.

### **3. Towards an integrative life-cycle EPZ theory**

This section examines the factors that determine the relative dynamism or stasis of EPZs in the context of the life-cycle approach. It identifies and charts two dimensions of dynamic development:

1. Upgrading local inputs supplied to producers in the EPZ in terms of technological sophistication and value-added; and
2. Increasing integration of EPZs into the local economy.

#### **3.1. Local training and technology upgrading**

Typical EPZs start by attracting foreign producers seeking low-cost labour to produce labour-intensive products such as garments, textiles, apparel, toys and footwear. They may progress to industries with more advanced technology, such as electrical and electronic equipment. Often, almost all materials and components are imported at this stage, and local inputs are mostly limited to labour and its supporting facilities. Investors train local workers in the skills and knowledge necessary to operate basic equipment to perform the assembly operations. The early EPZs established in many Asian and Latin American countries were at this level two or three decades ago; some African countries’ zones may still be at this level today (Tekere, 2000).

The next step, involving more sophisticated local technology and creating more local value-added, is the assembly operation – with possibly some local sourcing of components – in, for example, the auto industry. The auto plants in the *maquiladoras* in northern Mexico moved into this stage during the 1980s. Another example of further progression is metals fabrication, which again represents a substantial advance in local technology and value-added. Increasing amounts of training and technology upgrading are necessary in order to move into production of these more sophisticated products.

An example of such technological upgrading occurring at EPZs is the Mactan Zone in the Philippines. Almost half of all EPZ firms in

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this zone were in the garment and textile industries in the 1980s. By the end of the 1990's, however, only 29 of 105 firms exported garments and similar goods; the remaining firms were engaged in metal fabrication or the production of electronics, automotive parts or software (Moran, 2002, p. 26). The same pattern is seen in Costa Rica's free trade zones, where in 1987, all of the 178 export firms were garment manufacturers; by the end of the 1990s, 21% of all firms were engaged in production of electronics, electrical equipment or metals fabrication, and 36% of all new investments in 2000 were in these products (National Free Zone Council, 2001, charts 20, 29, 39). Foreign investors typically provide training in the skills necessary to produce these products, sometimes supplemented by host-government training programmes.

Host governments can take an active role in upgrading the capabilities of local suppliers. Host governments cannot normally impose local-content and other burdensome requirements on EPZ plants because of the intense competition to attract investment. But host governments can create attractive conditions and incentives that make it cost-effective for foreign plants in EPZs to acquire parts and components from local suppliers.

Domestic technological capabilities are, of course, an important factor in determining the extent to which foreign investors are able to turn to local suppliers for inputs. It is easier for an investor to create and expand linkages to local suppliers if those suppliers already have competent and experienced personnel as well as modern equipment in place. Lall (2000) noted that:

Apart from primary resources, the most attractive immobile assets for export-oriented TNCs are now world-class infrastructure, skilled and productive labour, and an agglomeration of efficient suppliers, competitors, support institutions and services. (p. 4).

Similarly, Lall and Narula (2004) found:

Capabilities in the host country context matter for the magnitude and intensity of technological upgrading. ... Wider technology gaps between domestic and foreign-owned activities tend to lead to less backward linkages and to lower technological content in the inputs sourced locally. (p. 457)

Blomström and Kokko (2003) argued that positive FDI spillovers were less likely in countries/industries in which the gap between the technologies of domestic and foreign enterprises is large and the absorptive capacity of local enterprises is low.

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In order to reduce the risks and costs to foreign investors, more forward-thinking developing country governments have made substantial investment in skills training and technology upgrading for their workforce. Ruane and Uğur (2006), in a comparative study, found:

... evidence of convergence between productivity levels of TNCs and local enterprises in Singaporean manufacturing, whereas in Ireland the differences persist. This is consistent with the greater pro-activity of Singaporean policy in terms of developing local enterprises and their relationships with TNCs. (p. 106)

The Singaporean government agency for implementing such policy was the Skills Development Fund of the Economic Development Board. In Malaysia, the Penang Skills Development Center filled this crucial role, as did the Satellite Relations Program in Taiwan Province of China and the Investment Board in Costa Rica. In some cases, the skills development centres were established at the recommendation of foreign firms; Moran (2002, p. 41) gives the example of Intel Corporation in Costa Rica that sought the establishment of such technical-training programmes.

Moran (2002) postulated stages whereby domestic companies progress from Original Equipment Manufacturing (OEM) to Original Design Manufacturing (ODM) and finally to Own Brand Manufacturing (OBM). As the local firms move along this progression, they become more capable of implementing their own training and generating their own technology and thus become less dependent on foreign suppliers. Moran saw the Asian NIEs of Hong Kong (China), the Republic of Korea, Singapore and Taiwan Province of China as having progressed through these stages. He concluded, “[t]he potential for local firms to follow this path all the way to the end is likely to depend on the level of technology and sophistication and the pace of change in each individual industry” (p. 134).

At the macro level, Moran (2002) identified a number of economic and legal policies that make it possible for local suppliers to flourish:

- creating a stable macroeconomic environment with low inflation rates for locally-owned businesses to operate in;
- reducing or eliminating impediments to operations of local firms through lowering import tariffs and allowing them access to adequate infrastructure; and

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- enlarging the supply of both capital and skilled labour (workers, technicians, engineers, and managers) available to local firms. (p. 129)

China provides a particularly noteworthy example of such progression. It began establishing SEZs in coastal areas in the late 1970s. The first was the Shenzhen SEZ, established in 1978 in a seacoast town in the province of Guangdong, where 20,000 inhabitants had previously been largely engaged in agriculture and fishing. Over the next two decades, the province's industry went through a remarkable transition from agriculture to labour-intensive and then more technologically intensive manufacturing. The experience of the Shenzhen SEZ can be seen as having gone through three stages of development.

In the first stage between 1980 and 1982, the authorities implemented programmes for the development of energy, transportation and telecommunication systems. In addition, government reforms within the SEZ administration cut down bureaucracy and new regulations were introduced to protect the interests of foreign investors (Xie, 2000, p. 5).

The second stage, roughly 1982 to 1990 (the “processing and assembly and compensation trade” stage), focused on the development of light labour-intensive industries. During this stage, SEZ administrators maintained a constant flow of unskilled and semi-skilled workers into the zone, and foreign firms in the zone gave them sufficient training to operate the equipment efficiently. Xie (2000) noted:

... the ability of FDI to perform successfully in large domestic Chinese and export markets, however, was dependent upon how effectively foreign investors could transfer their technological capability. Technological learning in processing and assembly enterprises was significant...and [they] accumulated manufacturing experience to the extent of being able to design their own products. (p. 7)

The SEZ administrators and government officials, recognizing the essential role of technology in the development of EPZs, developed policies such as the “science and technology development plan” and the “strategy of science and technology development” to help draw engineers and technicians from other parts of the country to the SEZ. Moreover, instead of just offering fiscal incentives to foreign investors, the SEZ administration introduced policies to protect intellectual property rights in order to reduce the risk associated with technology-intensive foreign investment. Thus, the Shenzhen incentive package was designed specifically to attract high-technology investment.

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The third stage, the technology-intensive stage, began in the early 1990s. Xie (2000) noted:

... the Shenzhen SEZ is becoming a center for high-technology industries. In 1998, high-tech industries accounted for nearly 40% of industrial output within Shenzhen. High-tech industries rather than labour-intensive industries now support Shenzhen's dynamic economy. (p. 2)

Xie considered this dynamism to be the result partly of deliberate government policies to upgrade the region's supply of human capital and technological capability and partly of natural tendencies that occur in the EPZ cycle. Thus, "[In Shenzhen] because of the rising costs of production factories (land, labour, etc.), and competition from other low-cost regions, manufacturing must gradually shift into technology-intensive industries" (p. 10).

The success stories of EPZs in China, the Republic of Korea, Malaysia, Singapore, and Taiwan Province of China are similar in that local government and private investments in human capital facilitated spillovers and backward linkages that helped transform fledgling local firms from suppliers of simple parts into OEMs and finally OBMs. Moran (2002) noted "This process combined teaching and coaching on the part of the foreign purchasers with imitation, catch-up, and incremental innovation on the part of indigenous producers" (p. 134). The development of local suppliers began, in each case, with liberal EPZ regimes that did *not* impose requirements for minimum domestic content or joint ventures with local firms. Instead, EPZ administrators provided individually-tailored directories identifying prospective domestic suppliers, but they left it up to the foreign firms to decide whether and how much local sourcing to do. They, thus, created an environment in which backward linkages could enhance foreign investors' competitiveness rather than diminish it. The host governments' roles gradually evolved into providing "screening mechanism[s]" whereby foreign firms could "identify potential suppliers who can then with state assistance follow investor recommendations for technology upgrades" (Moran, 2002, p. 132).

### **3.2 Integration of EPZs into the domestic economy**

The degree of integration of EPZs into the domestic economy is largely determined by the decisions taken by the host country government; they are policy-oriented and administrative in nature. One

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of the major decisions is whether, and at what pace, local firms should be allowed to move into the zones in order to benefit from the same advantages that foreign investors enjoy. A related decision is whether and when to allow the sale of EPZ-produced goods in the domestic economy. Although these decisions will ideally be based on rational assessments of the country's readiness to integrate EPZs into the domestic economy, in practice, they are often based on political considerations as much as economic ones.

EPZs that progress into the more advanced stages create various benefits for the wider economy. Moran (2002, citing McKendrick *et al.*, 2000) noted the following externalities:

... the movement of workers and managers among firms; the nearly instantaneous matching of machinery purchases and imitation of successful production and quality-control procedures by proximate rival companies; the accumulated knowledge that suppliers with multiple clients could apply to new orders; and the coaching that foreign investors provided to assist local producers in expanding their exports. (p. 132)

Each of these externalities contributes to the breaking down of the barriers between the zone and the rest of the host economy. Each is also accelerated as the host country increases the training and technological capabilities of its workers. The experience of China provides an illustrative example. Following the early success of Shenzhen, the government established four more coastal SEZs in 1979 and, later, the Hainan Island SEZ in 1984 and Pu Dong SEZ of Shanghai in 1991. Over the next few years, it designated fourteen coastal cities as open cities for foreign investment. The proliferation of SEZs and open cities gradually blurred the lines between the zones/open cities and the rest of the country.

Moran (2002) noted the special case of small but progressive island economies, commenting that "Authorities in both Singapore and Hong Kong essentially turned each country in its entirety into a single integrated EPZ" (p. 125). The same was true to some degree in Mauritius, although its EPZ industries have not progressed beyond the stage of carrying out the assembly work on imported components (Tekere, 2000).

In less successful examples, such as Egypt, Ghana, India and Tunisia, the governments failed to provide the institutional support to foster backward linkages and more liberal environments and thus inhibited their EPZs from moving further along the EPZ trajectory

(Madani, 1999; Radelet, 1999; Tekere, 2000). They did not encourage domestic producers to move into the zones either and, in some cases, actively prohibited them from doing so. As a result, extensive backward linkages failed to develop, and these EPZs remained stagnated as isolated enclaves.

Technology upgrading and integration into the host economy as discussed in this section tend to take place in parallel, as seen in the experiences of the Asian NIEs and China. This concomitance is not inevitable, however; EPZs in India, Pakistan and other countries remained quite isolated from their respective host countries despite the increasing sophistication of the products they produced and exported (Schaffer *et al.*, 2003, p. 16).

In cases where EPZs successfully evolved with regard to these two aspects, there is evidence that they played a catalytic role in transforming the wider host economy. The next section will review the experience of such successful economies.

#### 4. EPZs as catalysts for structural transformation

Successful development of EPZs may actually help promote structural transformation of the host economy. Indications that such a transformation is taking place may be found in various statistical measures of the host economy. Thus, table 1 shows the shift in production in EPZs of Taiwan Province of China from labour-intensive to technology-intensive products over three time periods. Not surprisingly, the proportion of plants producing labour-intensive products declined from 74% in the period 1965–1973 to 50.4% in the period 1984–1994, while

**Table 1. Shift from labour-intensive to technology-intensive production in EPZs of Taiwan Province of China**

% of Industrial Infrastructure	Labour Intensive Industry			Technology Intensive Industry		
	Plant %	Worker %	Turnover %	Plant %	Worker %	Turnover %
First Phase (1965-73)	74 %	52%	40%	26%	48%	60%
Second Phase (1974-83)	60%	39%	30%	40%	61%	70%
Third Phase (1984-94)	50.4%	25.5%	12.6%	49.6%	74.5%	87.4%

Source: Taiwan Province of China, Ministry of Economic Affairs (1996).

the proportion of workers producing technology-intensive products increased from 48% in the period 1965–1973 to 74.5% in the period 1984–1994. Evidence suggests that this is a reflection of the similar restructuring of the host economy as a whole.

Table 2 illustrates a different aspect of economic restructuring, showing the drop in EPZ employment in three economies in which zones had once been significant sources of jobs. It dropped 42% in Taiwan Province of China, the one of the three economies which had made the greatest strides in industrialization. The drop in Costa Rica (over a different, shorter time period) was 40%, while in Mauritius, it was only 8.5%, consistent with the fact that Mauritius remained the most dependent on low-cost, cheap-labour exports. In a variation on this theme, table 3 shows EPZ employment as a percentage of eight different countries' total industrial employment around 1990, arranged in order of increasing percentage EPZ employment. As a generalization, economies with the lowest percentages have made the greatest strides toward economic restructuring. For example, EPZs accounted for only 0.4% of the Republic of Korea's industrial employment, while they accounted for 86% of Guatemala's industrial employment, consistent

**Table 2. Decline in EPZ employment in selected economies**

Country	1987	1996	2000-2003
Taiwan Province of China	95,000	55,169	
Costa Rica	---	57,000 (1996-2000)	34,000
Mauritius	87,905	80,466	

**Sources:** Moran (2002), Taiwan Province of China, Ministry of Economic Affairs (1996), "Economic Overview of the EPZ Sector in Mauritius," [www.itcilo.it/english/actrav](http://www.itcilo.it/english/actrav)

**Table 3. EPZ employment and industrial employment, c. 1990**

Country	EPZ Employment	Industrial Employment	% EPZ Employment
Republic of Korea	20,000	4,198,000	0.4%
Thailand	12,000	2,191,800	0.5%
Taiwan Province of China	70,700	3,420,000	2%
Costa Rica	6,000	137,420	4%
Senegal	1,200	20,188	6%
Jamaica	15,000	136,100	11%
Dominican Republic	115,000	157,576	72%
Guatemala	89,000	103,300	86%

Source: World Bank, ILO, Schrank (2001) .

with the fact that the Republic of Korea has advanced much further along the technology and industrialization trajectory. These findings are consistent with Madani's (1999) observation that:

As the economy opens up and a country develops its capacity for competitive industrial exports, EPZ exports and employment fall. In this light, EPZs have a specific life span, losing their significance as countries implement systematic reforms. (p. 17)

Table 4 shows the cycle of export growth rates as countries' GNP per capita increases.

The export growth rate of lower middle-income countries with EPZs was 72%, while that of similar countries without EPZs was only 1%. The growth in exports of upper-middle-income countries with EPZs was 66%, while that of similar countries without EPZs was 33%. By contrast, the export growth rate of high-income countries with EPZs was 28%, while that of similar countries without EPZs was 45%. These figures are consistent with the view that EPZs have been particularly important in increasing exports in developing countries in the earlier stages of their development and that they decline in importance as those countries develop and their economies become more integrated. Further support for this argument is found in Xie's (2000) observation that:

**Table 4. Export growth from countries with and without EPZs**

<i>Number of Countries/ GNP level (GNP per capita)</i>	<i>With/Without EPZs</i>	<i>Growth Rate of Total Exports to EU and US 1993-1996</i>
<i>High GNP (Over US \$ 9385)</i>		
28	With	28%
22	Without	45%
<i>Upper Middle GNP (US \$ 3035-9384)</i>		
15	With	62%
28	Without	33%
<i>Lower Middle GNP (US \$ 765-3034)</i>		
37	With	72%
30	Without	1%
<i>Low GNP (Below US \$ 765)</i>		
	With	59%

Source: Haywood (2000).

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... from 1974 to 1979, exports from Masan SEZ represented 4% of South Korea's total exports. However, at present, the contribution of these zones in terms of exports and industrial output appears far less impressive because the country has caught up with the firms within the SEZ's. (p. 2)

Certain structural transformations may also take place within a country's EPZs as its economy develops and diversifies. Xie (2000) noted:

Rapid growth, technological learning, and the absorption of new technology combined can alter relative factor endowments in an SEZ, which in turn changes the prices of the factors of production as well as those of basic and intermediate inputs. (p. 2)

In Taiwan Province of China, for example, several factors led to the declining importance of EPZs:

A decrease in customs duties, shortage of labor, appreciation of [the] Taiwan dollar, incentives shrinkage compared to outside zones, and the formation of regional economic organizations made the comparative advantage of the zone disappear (Ministry of Economic Affairs, 1996, p. 81).

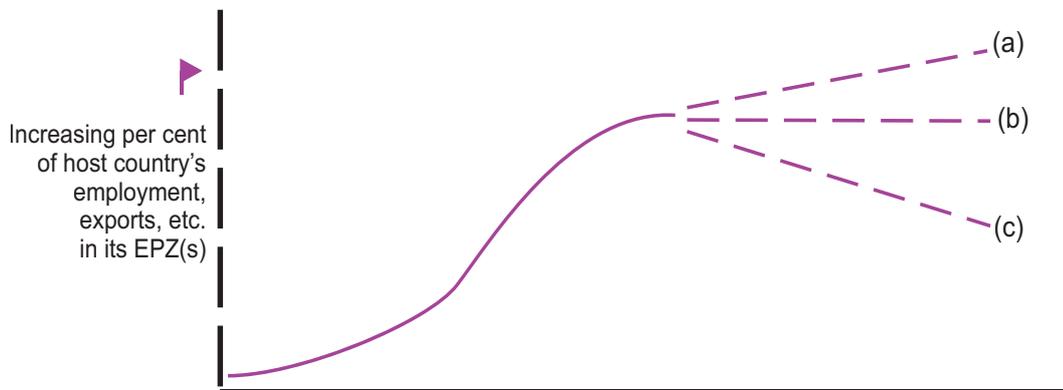
These observations indicate that as EPZs draw in higher-skill, technologically-based investments and become more integrated with the local business environment, the need for them to have special characteristics and privileges begins to wane. Successful EPZs help create the conditions that gradually render themselves irrelevant. They essentially work themselves out of job.

## **5. Postulating three scenarios for EPZ progressions**

The preceding examination of EPZs expands the life-cycle theory of industrial policy and zone development so as to include the critical role of technology upgrading and human capital development. While most EPZs are capable of generating foreign exchange earnings and employment, relatively few have been able to graduate into more mature stages of the EPZ life-cycle without significant investment in local suppliers. Schrank (2001) concluded "All in all, the life cycle is premised upon the maturation of host-country infant industries" (p. 225). Skills development funds, vendor development, satellite relations and a focus on education have all been vehicles of local investment in human capital that have led to technology upgrading and thus have helped promote the EPZ objective of creating backward linkages.

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**Figure 1. Three Scenarios for EPZ progressions**



Three scenarios for EPZ progressions can be postulated as depicted in figure 1. In all three, it is assumed that the EPZ has initially been successful in attracting some foreign investors and generating some jobs and exports. Thus, in its early stages, it accounts for an increasing percentage of the country's employment, exports, foreign exchange earnings, training of workers in new skills and in some other relevant indicators.<sup>6</sup> However, after the initial success, the possible trajectories may diverge.

*Scenario (a):* The EPZ's exports, employment, and other activities continue to increase, but the sophistication and technology of the products produced and exported does not increase. The Dominican Republic's EPZs are an example of this scenario (Jenkins *et al.*, 1998; Schrank, 2001, pp. 227–228).

*Scenario (b):* The EPZ may have had some initial success but has failed to continue growing or attracting new plants. It has made limited progress along the life cycle trajectory but is not upgrading the sophistication of the processes it employs or the products it produces. It has attracted a modest number of foreign investors, is exporting a certain amount, and is earning some foreign exchange, but its producers have not developed extensive networks of local suppliers and have not significantly integrated into the host economy. Tunisia (Madani, 1999, p. 17) and Guatemala (Jenkins *et al.*, 1998) would be examples of this scenario.

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<sup>6</sup> Note that the absolute amounts of these benefits may be small relative to the country's entire productive capacity (especially in the case of a large country such as India) even though their percentages are increasing.

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*Scenario (c)*: This is the most intriguing progression, because it could indicate either (i) the EPZ has been unsuccessful; it has failed to attract and keep enough foreign investors, and employment, exports, foreign exchange earnings and value added in the zone have declined over time; or (ii) the zone has been highly successful, so that the share of employment in, and of exports from, the EPZ has decreased because the zone is becoming integrated into the general economy and/or jobs and exports in the wider economy have increased at a faster rate than in the zone. Examples of the former scenario include EPZs in Kenya, Egypt and Ghana and the Philippines' early experiment with the Bataan zone. The latter scenario is, of course, the most desirable, because it would indicate that the EPZ has progressed farthest along the life cycle while the economy as a whole has been successful enough to allow the government to dismantle most of the barriers between the zone and the wider economy.

These scenarios are consistent with the argument that EPZs do not in and of themselves lead to the structural transformations that developing countries seek, but they can be a significant factor in a developing country development strategy when managed right. This article has argued that investments in human resources development and technology upgrading are necessary to support the emergence of local suppliers and thus stimulate EPZs to move further along the life cycle trajectories.

However, EPZs should be seen as interim steps in the process of more general economic liberalization. Most such zones are small economic units compared to the overall host economy. The government cannot expect a few small EPZs to be the drivers for wholesale economic restructuring. In cases where the creation and expansion of EPZs did appear to be forerunners of the more general economic restructuring, the zones were, in effect, allowed to grow in size and importance, or at least, the regulatory regimes governing the zones were expanded to include more and more enterprises and geographic areas in the host economy. In China, for example, SEZs were relatively large geographic areas/economic units, and the government subsequently created numerous similar zones. In Hong Kong (China), Singapore and Mauritius, EPZs were allowed to expand to the point where they essentially incorporated the whole economy,<sup>7</sup> while in Costa Rica, the Republic of Korea, the Philippine, Taiwan Province of China and other countries, the barriers

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<sup>7</sup> All of these examples involved countries with significant coastlines and easy access to international shipping. Further research may reveal ways in which EPZs may be structured so as to provide similar benefits to landlocked countries.

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between the zones and the host economies became increasingly permeable over time. In every successful case, the government and other local agencies took positive steps to ensure that the necessary human capital and technical capabilities would be available to support the expansion and upgrading of production in the zones and thereby into the wider economies.

## **6. Further research**

The primary objective of this study was to identify the factors that have helped to make certain EPZs successful. We have argued that technological upgrading and integration into the host economy are the key in this regard. Thus, “success” has to mean more than just that investment has flown into the zone and that jobs created, products exported and local value-added have increased. It must also reflect a deepening of the zones’ linkages with the host economy and of the technological sophistication of the inputs purchased by companies in the zones from local suppliers.

Our analysis is largely based on existing studies in the literature. However, more research, especially data-gathering effort, is clearly needed. The question then arises as to what kind of data are needed to further our understanding of EPZs. Quantitative data can reveal indicators such as the value of investment in EPZs, the industries in which the investments are made, the number and types of employment created, and the value of exports from the zones. However, this type of data would not reveal much about the linkages between foreign investors’ plants in the EPZs and local suppliers, let alone about the advancement of technology and human capital in the host economy.

More meaningful to the type of analysis carried out in this article would be data on the nature and quality of parts and components provided by local suppliers to the foreign affiliates in the zones. If the amount and value of such locally sourced inputs increased over time, this would be some indication that the linkages between the zones and the host economy were strengthening. If the variety and technical sophistication of the local inputs rose, this would suggest that the zones had contributed to the development of the country’s technological capabilities. It would also be an indication that the barriers between the zones and the host country could be lowered so that the zones could be more integrated into the host economy.

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Unfortunately, however, such extensive data on the nature of local inputs are not widely published, if they have even been compiled. For example, the Government of Kenya has published a table entitled “Key EPZ performance indicators: 2002-2006”, which includes statistics on local purchases, local salaries and other domestic expenditures by companies in its EPZs.<sup>8</sup> However, it does not contain any information about the nature or composition of those local purchases, and certainly nothing about the level of technological sophistication or the quality of human-resource inputs into the components that were obtained locally. Furthermore, even if the data described above could be assembled, they would not reveal much about the *causes* of success of some EPZs and the failure of others.

Identifying the policy decisions, implementation procedures and other factors that have contributed to the success or failure of EPZs must ultimately rest on qualitative information, likely to be in the form of written reports and interviews. This approach could be expanded into in-depth case studies of particular countries’ experiences with EPZs.

The authors have been fortunate, however, to gather some first-hand information on Viet Nam’s experience with EPZs.<sup>9</sup> The country created 64 EPZs – at least one for each province – during the early 1990s as part of its programme of *doi moi* (“renovation,” or liberalization of the economy). No statistics were available to show the nature or quantity of locally sourced inputs, but one interviewee observed that the large majority of foreign companies imported most sophisticated components for their products, and even the domestically owned companies often sought foreign parts and components. Moreover, most of the zones remained fenced off, and access to them was restricted, making them even more isolated from the rest of the economy. The rationale for this was to protect the investors, but the result was to lessen the interactions between the investors and prospective local suppliers. The government failed to implement programmes for training adequate numbers of local workers or for upgrading the capability of local suppliers.<sup>10</sup> Hence the

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<sup>8</sup> Government of Kenya, Ministry of Trade and Industry, Export Processing zones Authority, official website ([www.epzkenya.com/epzsinkenya/php](http://www.epzkenya.com/epzsinkenya/php))

<sup>9</sup> Information was gathered at a conference organized by Seton Hall University and UNITAR in Hiroshima, Japan, in 2006. The authors also had an interview with Mr. Nguyen Manh Hung, the Foreign Investment Agency of the Ministry of Planning and Investment, Hanoi, Vietnam.

<sup>10</sup> United States Department of State, Investment Climate Statement – Vietnam <http://www.state.gov/e/eb/ifd/2005/42198.htm>

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amount of human resource development and technology transfer to local suppliers was limited.

This brief summary is only a suggestion of the kind of information that need to be gathered from interviews and similar first-hand collection of information on developing countries' policies and experiences regarding EPZs.

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# BOOK REVIEWS

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## Managing the Global Supply Chain

Tage Skjott-Larsen, Philip B. Schary, Juliana H. Mikkola  
and Herbert Kotzab

(Gyilling, Copenhagen Business School Press, 2007), 459  
pages, third edition

Supply chains are continually subjected to forces, internal and external, that are in constant states of flux. Managing a supply chain is therefore a demanding activity that requires a thorough understanding of the concepts and mechanisms that underpin the operation of the supply chain and the factors that influence its performance. In a global environment, these factors are many, often interrelated and beyond the reach of most organizations to influence or control. Knowing what these factors are and understanding how they are likely to impact on the strategic and operational decisions that must be made while managing the global supply chain is critical.

This text sets out to provide a systemic understanding of all the essential facets of the supply chain and its management in the global environment. To accomplish this, the design and operation of the supply chain is presented as a management process that embraces the activities of all the supply chain agents (p.19). Consequentially the primary focus of the text is on managing inter-organizational relationships to facilitate the development of a customer orientated, value driven, supply network. A supply chain model derived from value chain principles provides a common reference point throughout the book, which is organized in three sections covering concepts, processes and management issues.

The first section provides a useful introduction to general supply chain concepts. Chapter two introduces the notion of value creation as a changeable characteristic that demands a responsive supply chain. Focusing on physical flows, activity shifting is presented to illustrate the contribution organizational and structural design can make to supply chain performance. Chapter three provides a particularly interesting, albeit theoretical, discussion on the contribution of network theory to our understanding of how inter-organizational relationships should be managed. The comparison of transaction cost analysis (TCA) with the development of trust through the network approach as a means of protecting organizational interests is useful. Sharing information is critical to the management of relationships, and Information Technology (IT) is an important facilitator in this regard. Chapter four provides a clear and

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contemporary treatment of the ways in which IT can be used to inform the decision making process and mitigate uncertainty in the supply chain.

With the foundations laid, the second section considers the integration and coordination of inter-organizational activities. Chapters five and six provide good overviews of the approaches and techniques being used in distribution and production although elements of the latter chapter would benefit from a tighter supply chain focus and more detailed explanations, e.g. noting that “with increasing outsourcing activities and globalization the role of quality management systems has to be redefined” (p. 180) without further elaboration is inadequate. Chapter seven considers product development and the role of design in outsourcing and value recovery decisions. Chapter 8 reviews the evolving strategic role of purchasing, buyer-supplier relationships and the use of purchase portfolio models to identify purchasing strategies. Transportation and logistics options are examined in chapter nine and, whilst the discussion is limited to the EU, the chapter provides an informed insight into the drivers and issues affecting the distribution of product in a global context. The principal supply chain configurations for value recovery are evaluated in chapter 10 and discussed in the context of the emerging sustainability agenda. This is a welcome addition to the text although a separate chapter dedicated to this topic, possibly under managerial issues, might have been more appropriate.

The third section opens with the statement: “measuring supply chain performance is most often treated as a non-core activity” (p. 313). A glance through any number of supply chain texts will confirm the truth of this statement. Chapter 11 explains the relationship between measurement and management and critically evaluates several performance measurement frameworks. This is done in sufficient detail to provide an understanding of the issues, while the theoretical support cited will assist those wishing to examine the topic in detail. An unusually theoretical approach to strategy development is adopted in chapter 12, which emphasizes the external issues rather than the internal problem of aligning functional objectives. Consequentially, a useful complementary perspective to the conventional view of strategy development is provided. “Models are essential for planning the supply chain” (pp. 372) and understanding the basis of models and their limitations is an important step in understanding their contribution to the decision making process. Chapter 13 describes how a variety of supply chain scenarios can be modelled using quantitative techniques. This is done effectively and in a manner that should be accessible to

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a wide readership. Finally a comprehensive, although not particularly insightful, treatment of the factors influencing the globalization of the supply chain activity completes the section.

Minor criticisms apart, this text is well written and complex ideas are presented logically and in an accessible style. Discussions are thoroughly and appropriately grounded while not being over burdened with citations; a comprehensive list of references is included at the back of the book. The inclusion of vignettes as illustrative cases is a useful device which grounds the exposition in the real world. However, presentation is somewhat dated compared with other texts prepared specifically for the educational market. Moreover, its tendency towards the theoretical limits its value to those interested in implementing ideas and applying techniques. But this is clearly not the intended readership. The level of existing understanding assumed and supporting theory used throughout the book makes *Managing the Global Supply Chain* an ideal text for those requiring a more complete treatment of supply chain issues and seeking direction for narrower detailed study in specific areas.

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# **Transnational Corporations and Local firms in Developing Countries – Linkages and Upgrading**

Michael W. Hansen and Henrik Schaumburg-Müller,  
editors

(Frederiksberg, Copenhagen Business School Press,  
2006), 404 pages

The role of transnational corporations (TNCs) in developing host countries continues to strengthen, as international investment flows have increased steadily over the past two decades. World foreign direct investment (FDI) flows reached \$1,306 billion in 2006, of which \$379 billion was directed to developing countries, rising from \$283 billion in 2004 (UNCTAD, 2007). TNCs' impact can be differentiated between its impact on growth (Fortanier, 2007) and on economic development through direct and indirect effects (UNCTAD, 1999). In the context of globalization where knowledge and technology provide the essence of firms' core resources, governments pay particular attention to TNCs' technological spillovers and other indirect effects as potentially powerful means of gaining competitiveness for locally owned firms (Lall, 2002; Castellani and Zanfei, 2006). TNCs in developing economies tend to possess superior technological and managerial advantages. Indigenous firms can enhance their own capabilities faster when they gain access to such TNCs' advantages through vertical (especially through backward linkages as shown by Giroud and Mirza, 2006) and/or horizontal linkages (Scott-Kennel and Enderwick, 2004). Capability enhancement is not an automatic process, firstly because the potential to learn rests upon the absorptive capacity of local firms, and secondly because the extent and depth of linkages may not always be sufficiently high to generate real long term benefit for the host economy (Görg and Greenaway, 2003). The creation of inter-firm relationships (or linkages creation) remains at the heart of the debate on TNCs' impact in host developing economies (UNCTAD, 2001).

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In their edited volume, Hansen and Schaumburg-Müller focus on this very crucial issue of linkages and upgrading potential. Their study concentrates on Danish TNCs in five host developing economies (Ghana, India, Malaysia, South Africa and Viet Nam) and two industries (the automotive and garments industries). The volume comprises 13 chapters, with six contributors. It makes a useful contribution to the literature on TNCs' linkages in developing economies and, in particular, adds to the understanding and knowledge of Danish TNCs' activities in developing countries. The strength of the volume is to adopt a common methodology in terms of data collection,<sup>1</sup> and yet allow flexibility for individual contributors to focus on a topic of importance for the country or industry studied. This interesting approach provides sufficient commonalities across chapters for a useful comparison of cases, together with additional analysis on selected linkage-related issues, such as donor intervention, cross-cultural linkages or aid dependency. This work will appeal to three different groups of readers: firstly, to all researchers and students interested in the impact of TNCs on host economies; secondly, to policy makers in developed home and developing host countries; and thirdly, to managers in both TNCs and locally-owned firms in developing countries.

Part I provides the overall introduction, presenting the analytical, conceptual and theoretical framework that underpins the study. In chapter 1, the editors present the conceptual framework and relevant definitions. TNCs' impacts are differentiated between impacts on local firms and impact on industries, pointing to both positive and negative effects of cross-border linkages. Three groups of actors are considered: TNCs, governments and local firms (each presenting their own strategies and set of capabilities). Factors related to these actors are discussed to explain how linkages vary depending on the context. Three sets of research questions are derived from the conceptual framework. First, what are linkages, how are they organized and structured, and what are the processes through which linkages are fostered and implemented? Second, how can cross-border linkages create competitive advantage for developing country firms, and how do they impact overall industrial and economic development? Third, what are the factors that drive some firms and industries to foster strong cross-border linkages, while others fail to do so? Chapter 2 carefully reviews related streams of literature, drawing

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<sup>1</sup> Data were collected using two methods: a survey (with a final sample of 90 firms) and case studies (45 Danish investment in five countries explored through on-site interviews together with interviews with 30 local partners).

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upon the development and the international business perspectives on linkages. The development perspective enables the reader to contrast the developmental consequences of cross-border linkages, while the international business perspective adds to the understanding of how firms grow, increase profitability and enhance competitiveness as a result of forming linkages.

Parts II and III present the main empirical findings and are organized around case studies of Danish firms' linkages in five developing economies, Ghana, India, Malaysia, South Africa and Viet Nam, and in two industries, the automotive and garments industries. Chapter 3 consists of an overview of the survey results. A total of 346 Danish projects and 86 responses to the survey are analysed, presenting firm characteristics, the nature of linkages, means of upgrading and upgrading effects and the role of government. Chapters 4 to 8 are country cases, and enable the contributors to depict specific circumstances behind linkage development in a single country-setting. The choice of countries was made to allow comparison of linkage experiences depending on the level of economic development, the development strategy adopted by the country and the contrast between linkages resulting from government and aid programmes and those of a commercial nature. Additional primary information collected in individual countries is integrated into the analysis to offer a rich discussion on context-specific issues, together with a brief summary of the policies adopted by governments. Chapters 9 and 10 provide an industry-focused approach to examining the issue. The analysis is based on a small sample, but nonetheless brings insights on how local suppliers upgrade capabilities (in India, Malaysia and South Africa), and on the challenges faced by newcomers in the garments industry of Ghana, Malaysia and Viet Nam that strive to establish links to and be integrated into the global value chain.

In Part IV, chapters 11 to 13 summarize the key findings of the book, discuss policy implications and reflect on existing theoretical literature. These chapters bring together country and industry cases. First, an overview of linkages is put forward in terms of scope, structure and content as well as in terms of the development and upgrading effect, drawing upon the factors shaping linkages (chapter 11). Policy makers will find chapter 12 of particular interest. The authors discuss various policies that support linkage creation, linking the development strategy that is crucial for emerging economies to firm development policies and the integration of TNCs. As pointed out, Malaysia is the only country with systems in place to promote TNCs' linkages, suggesting that there is

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room for improvement in other economies. Chapter 13 ends the volume with theoretical reflections and perspectives. Different theories need to be combined to fully comprehend TNC linkages. This chapter is a step towards greater integration of the existing literature.

One does agree with the authors on the fact that the realization of cross-border developmental linkages is not yet taking place on a large scale in many developing countries (chapter 12, p. 338), even in hosts with substantial stock of FDI and efficient policy systems such as Malaysia (Giroud, 2007; Iguchi, 2008). Developing economies present distinct challenges related to entrepreneurial and capabilities development for local firms. Hence, governments ought not only to develop efficient FDI promotion strategies, but also to coordinate those with economic development objectives and industrial development policies. Linkages potential is related to local firms' existing proprietary knowledge, governance mode and absorptive capacity (as demonstrated in table 13.2 on page 361). TNCs could also become more aware of the multi-dimensional upgrading potential of their activities with local firms. Hansen and Schaumburg-Müller's volume will help firms, Danish ones in particular, to understand the broader upgrading potential of their activities in developing economies.

Building upon the Danish focus, the authors are able to identify the importance of state aid from the home country in encouraging TNCs linkages. The Danish International Development Assistance (DANIDA) allocates funds to support Danish investment, the establishment of joint ventures and technology collaborations between Danish firms and local firms in host countries (the PS programme), and export to developing countries. Based on the survey, the authors find that 60% of the 86 projects receive aid money (chapter 3, p. 69), with Ghana, Viet Nam and South Africa benefiting most from the PS programme. Accordingly, chapters 4 and 8 focus on donor intervention and aid dependency in Ghana and Viet Nam respectively. This reliance on state raises the question as to why existing studies on linkages have paid so little attention to the role of government in the *home country* of TNCs in linkages creation. This volume itself, arguably, could strengthen this angle in its summary chapters, particularly in chapters 12 and 13.

To conclude, the volume as a whole makes a notable contribution to the existing knowledge on TNCs, linkages creation, local firms upgrading potential, economic development and the role of governments

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in fostering inter-firm relationships. The contributors integrate several theoretical streams and offer insights on the activities of Danish TNCs. It makes excellent reading for managers, academics and policy makers.

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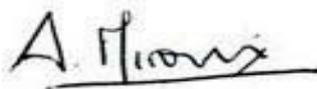
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