Patterns of foreign direct investment in poor countries

Hildegunn Kyvik Nordås

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Summary

This paper introduces endogenous adoption costs for productive assets in a Ramsey type growth model with international capital flows. There are two classes of productive assets: owner-specific and location-specific. Adoption costs are an increasing function of the level of technology embodied in the investor's owner-specific assets and a declining function of the host country's location-specific assets. In this setting the observed pattern of international capital flows is consistent with diminishing returns to capital. Further, our model predicts the sectoral allocation of investment and output observed in the South.

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1. Introduction*

Capital does flow from rich to poor countries, but both stocks and flows are highly concentrated in a few newly industrialized countries. This investment pattern seems to be at odds with the neoclassical growth model which exhibits diminishing returns to capital. The neoclassical model predicts that the return to capital is highest in relatively capital-poor countries, and as a consequence, capital should flow from rich to poor countries if it is internationally mobile. However, empirical evidence suggests that the rate of return to capital is not higher in capital-poor than in capital-rich countries (World Bank, 1989; Bardhan, 1996). This finding has induced a shift in research emphasis from imperfections in the international capital markets to analyses of what determines the rate of return to capital, usually in the context of endogenous growth models.

There are two main strands of endogenous growth models which are concerned with the low rate of return to capital in relatively capital-poor countries. Both concentrate on foreign direct investment (FDI), and both explain the coexistence of relative capital scarcity and low returns to capital by the complementarity between internationally mobile capital and another factor of production which is not internationally mobile. The first strand argues that the immobile, complementary factor of production is human capital (Uzawa, 1965; Lucas, 1988; 1990; 1993; Fafchamps, 1995; Barro,

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Mankiw and Sala-i-Martin, 1995; Stokey 1996). Poor countries are assumed to be in relatively short supply of human capital, and relatively meager flows of FDI follow.

The second strand argues that intermediate goods and services are non-tradable and complementary to capital. In this literature, productivity is determined by the degree of specialization, which in turn is determined by the extent of the market. Since small or poor countries have small markets, the degree of specialization is shallow, and the return to the primary factors of production is low as a consequence (Faini, 1984; Rodriguez-Clare, 1996). There is, however, little empirical evidence that intermediate goods and services are non-tradable. To the contrary, they constitute a significant and increasing share of world trade (WTO 1999). Moreover, small countries tend to have a similar input-output structure as larger countries, but the import share of intermediate goods and services is higher (Chenery et. al., 1986).

In this paper we build on the first strand by analyzing the impact of complementarities between classes of capital that differ with respect to international mobility. However, our model differs from previous research in four important ways. First, while previous papers typically assume that factors are either perfectly mobile between countries or they do not move across international boundaries at all, we wish to analyze the more general case with imperfect international capital flows.

Second, we reinterpret the two types of capital to represent owner-specific and location-specific capital. Owner-specific capital refers to assets which firms have acquired through diverting resources from productive activities and which have a higher return when employed in this particular firm than if employed elsewhere. Assets such as technology, work organization, managerial systems, firm-specific skills and made-to-measure machinery and equipment fall into this category. Location-specific capital refers to assets which can not easily be transported or transferred from one location to another, and which foreign investors consider exogenous when they take location decisions. The rule of law, contract enforcement – including intellectual property rights, the general level of education and infrastructure fall into the location-specific assets category. Some of these assets have characteristics of public goods and can be modeled as services from public investments.

By making the distinction between location-specific and owner-specific capital, we build on insights from industrial organization-based theories of FDI. This literature sees FDI as a strategic decision by individual companies on where to locate value-adding activities. Such decisions are driven by the urge to find the most efficient way of combining the firm's owner-specific assets with the host country's location-specific assets for each value-adding activity (Dunning, 1993; UNCTAD, 1998).[1] This behavior translates into a maximization problem, which is the micro-foundation for the model developed in this paper. Through this reinterpretation we are able to focus sharply on the capital mobility-dimension. In our context, human capital may well be owner-specific and internationally mobile, while physical capital assets may be internationally immobile.

[1] Even when location specific assets are combined with firm-specific assets of foreign companies, this does not necessarily result in FDI. Alternative arrangements are joint ventures, licensing or simply selling owner-specific assets to foreign firms. In addition to finding a profit maximizing combination of owner-specific and location-specific assets, there must also be benefits to combining these assets within the organization of a multinational firm. These aspects are discussed in Dunning (1993) and

Third, as a consequence of our reinterpretation of the two types of capital, we maintain labor as a separate factor of production. This is necessary because human capital can be assumed to be embodied in workers, while location-specific capital can not. Labor is assumed to be in fixed supply. Finally and most significantly, our model differs from former models regarding the nature of externalities related to location-specific capital accumulation. The externality in our model reduces the adoption cost of owner-specific capital. The existence of such adoption costs is indicated in several studies. De Long and Summers (1991) for example, find that the real relative cost of capital goods seems to be particularly high in developing countries. We argue that it is reasonable to assume that adoption costs increase with the degree of sophistication of the asset in which investment is made, and decline with the stock of location-specific assets in the host country, hence the externality. By combining adoption costs and differentiated owner-specific assets, we are able to analyze both the amount and the composition of FDI flowing to the South.

We show that in this setting, the observed international capital flows are consistent with decreasing marginal returns to capital. Further, our model predicts a composition of FDI compatible with the observation that poor countries receive FDI in technologically sophisticated activities. Thus, the model is consistent with the observation that even the poorest countries of the world are linked to the Internet and receive FDI in mobile telephone networks, although the relative price of such services are very high. The next section of the paper presents the model, while section 3 draws some policy implications and concludes.

Markusen (1995), the latter within a static modeling framework. The benefits of internalization are,

2. The model

A Ramsey-type growth model with two types of accumulated assets is developed. The two types of assets are owner-specific, denoted K, and location-specific, denoted G. Factor income can be spent on consumer goods or saved, while savings are invested in G or K, the latter at home or abroad. A world with a fixed common stock of technology in the form of n blueprints is presupposed. Each blueprint represents a technology which firms may transform into owner-specific assets. Such assets are ranked according to the amount of technology embodied in them. The aggregate stock of K in the economy is therefore given by:

$$K = \sum_{i}^{n} \lambda^{i} K_{i} \tag{1}$$

and is the sum of technology-adjusted assets defined by a quantity parameter K_i and a quality parameter, λ^i, $\lambda > 1$. A cost of transforming each blueprint into productive assets is incurred by firms and increases with the level of sophistication of the technology. Assume that quality 0 is a standardized asset that can be bought off the shelf. Next, the owner-specific assets are adopted to the location-specific assets in a particular country. The cost of doing so is assumed to decline with the per capita stock of location-specific assets in the host country. It is common in endogenous growth models to assume that productivity in individual firms depends on the total stock of capital rather than the per capita stock. The argument behind this is that capital accumulation induces the accumulation of knowledge that is non-rival and

however difficult to incorporate in a growth model, and we abstract from it here.

non-excludable. It is therefore the total stock rather than the per capita stock that matters for knowledge spillovers. Unfortunately, this yields a scale effect in the rate of growth, which appears to be at odds with empirical evidence.[2]

We argue that accumulation of location-specific assets such as a high level of education, good infrastructure and good institutions is subject to externalities that reduces the cost of adopting sophisticated technology to a particular location, but that there are congestion effects as well. In addition, location-specific assets include land and natural resources, which are clearly subject to congestion or diminishing returns. By making the adoption cost dependent on the *per capita* stock of location-specific assets we incorporate the congestion effect and avoid the scale effect on growth rates. The adoption cost function reads:

$$c_i = \tau \frac{\lambda^{i\beta}}{\left(G/L\right)^{(1-\alpha-\gamma)/\alpha}} \tag{2}$$

We restrict the parameter values such that $(1-\alpha-\gamma)/\alpha < 1$.[3] This ensures that the cost reduction effect of an additional unit of per capita location-specific assets is diminishing. Equation (2) has a proven empirical foundation when location-specific assets are limited to human capital. Several studies have included the log of initial GDP times the stock of human capital, represented by the level of education and the life expectancy, in growth regressions in order to capture the interaction between GDP and human capital. It is assumed that a higher level of human capital raises the ability

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[2] See for example Jones (1995) for a discussion.

[3] This implies that the share of factor income that accrues to "raw labor" is smaller than the share the accrues to owner-specific assets.

to absorb new technologies and therefore speeds up the convergence process. As expected, the interaction variable is found to be inversely related to real growth (Barro and Sala-i-Martin, 1995).

Equation (2) introduces adoption costs proportional to the complexity of the production process, and inversely proportional to the accumulated stock of location-specific assets per worker. By so doing it captures the empirical relationship found in Barro and Sala-i-Martin (1995), provided that our broader definition of location-specific assets has a similar effect as the more narrow definition of human capital. As a consequence of (2) and the fact that countries have different endowments of location-specific assets, adoption costs differ among countries. Adoption costs are assumed to be of the iceberg type which means that one unit of savings is transformed to $1/c_i < 1$ units of owner-specific assets of quality *i*. The stock of effective capital of quality *i* employed in the economy is therefore given by:

$$\hat{K}_i = K_i / c_i \qquad (3)$$

Firm *j* produces final goods subject to the production function:

$$Y_j = L_j^{1-\alpha-\gamma} G_j^{\gamma} \sum_i^n \left(\lambda^{i\beta} \hat{K}_{i,j}\right)^{\alpha} \qquad (4)$$

or in terms of output per worker:

$$y_j = g_j^{\gamma} \sum_{i=0}^{n} \left(\lambda^{i\beta} \hat{k}_{i,j} \right)^{\alpha} \tag{4'}$$

where Y is total output of final goods or factor income. With this specification, varieties of the owner-specific assets are not direct substitutes or complements to each other, but we note that location-specific assets and owner-specific assets are complementary. The formulation is similar to Grossman and Helpman (1992) and Barro and Sala-i-Martin (1995). We do not explain advances in technology, but take the number of ideas or blueprints as given. We follow the two previous papers and assume that for each asset, the state of the art version is adopted. We do, however, make the additional assumption that assets can be ranked according to productivity or quality. For example, if the accumulated investment in organizational assets and firm-specific knowledge are the same, the marginal productivity of investment in organizational assets may be higher than the marginal productivity of firm-specific knowledge.

The production function (4) exhibits constant returns to scale. Using (1) and (3), (4') can be written as:

$$y_j = \tau^{-\alpha} g_j^{\gamma} g^{1-\alpha-\gamma} \sum_{i=0}^{n} \left(\lambda^{i\beta} k_{i,j} \right)^{\alpha} \tag{5}$$

For each individual firm that takes g as a given parameter, the production function is still standard Cobb-Douglas with constant returns to scale in G_j, K_j, and L_j. Let us now turn to the investment-decision of firms. Assume that savings or financial assets are allocated among the countries of the world such that they earn the same rate of return everywhere. The stock of quality *i* invested and employed is thus determined by the profit maximization problem given the world market interest rate, which, applying (5) yields:

$$k_{i,j} = \left[\alpha\tau^{-\alpha} g_j^{\gamma} g^{1-\alpha-\gamma} \lambda^{i\beta\alpha} / (r+\delta)\right]^{1/(1-\alpha)} \quad (6)$$

Equation (6) yields the following distribution of investment on quality rungs of capital in firm j:

$$\begin{aligned} k_{0,j} &= \left[\alpha\tau^{-\alpha} g_j^{\gamma} g^{1-\alpha-\gamma} / (r+\delta)\right]^{1/(1-\alpha)} \\ k_{1,j} &= \left[\alpha\tau^{-\alpha} g_j^{\gamma} g^{1-\alpha-\gamma} \lambda^{\beta\alpha} / (r+\delta)\right]^{1/(1-\alpha)} = k_{0,j}\lambda^{\beta\alpha/(1-\alpha)} \\ k_{n,j} &= \left[\alpha\tau^{-\alpha} g_j^{\gamma} g^{1-\alpha-\gamma} \lambda^{n\beta\alpha} / (r+\delta)\right]^{1/(1-\alpha)} = k_{0,j}\lambda^{n\beta\alpha/(1-\alpha)} \end{aligned} \quad (7)$$

The distribution of investment on owner-specific assets is illustrated by figure 2.1.

Figure 2.1: Nominal and effective investment[4]

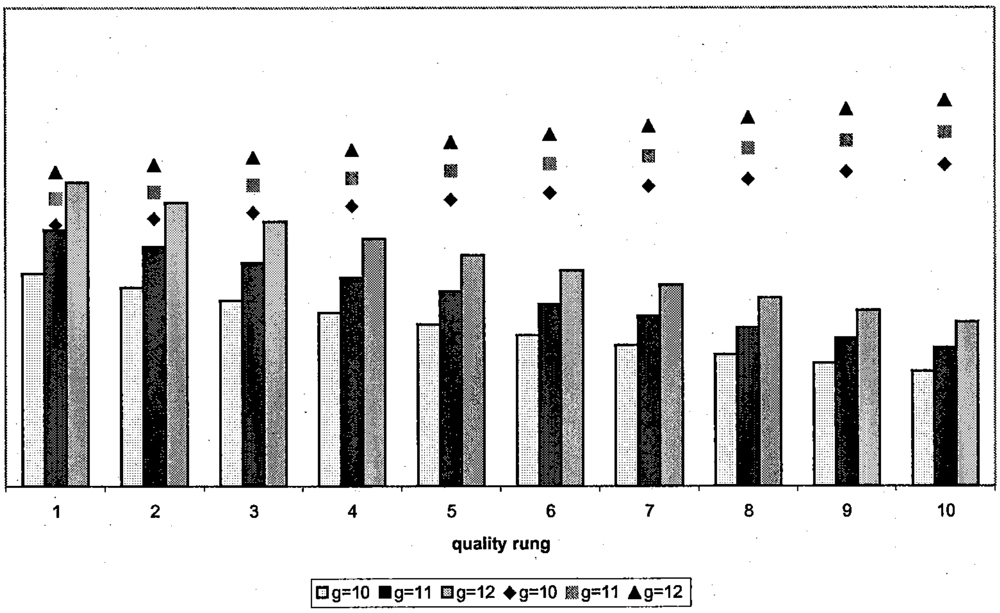

Figure 2.1 depicts the distribution of investment and employment of owner-specific assets for three levels of location-specific assets per worker. The points show the nominal investment levels while the bars show the effective investment, e.g., k_i and $\hat{k}_{i,j}$ respectively. For the parameters chosen, nominal investment increases with the quality of the asset, while the installed productive capital declines with quality. Thus, adoption costs drive a wedge between savings and investment, and this wedge increases with the quality of the asset. Note that the smaller the stock of location-specific assets employed by the firm, the smaller the total amount of nominal investment, and the larger is the proportion of nominal investment that is spent on adopting owner-specific assets to the production process in the company. However, the distribution of effective investment on the quality rungs in terms of percentages of total effective investment is the same whatever the level of location-specific assets.

[4] The figure is drawn for $\alpha = 0.2$, $\beta = 0.5$, $\gamma = 0.61$, $\lambda = 1.2$, $\tau = 11$, $\delta = 0.05$, $r = 0.05$.

We have now shown how savings that are invested by a company are transformed into owner-specific assets and adopted to the location-specific assets in a chosen location. This discussion relates to investment decisions in general, not necessarily *foreign* investment. In the next section we will analyze foreign investment within the framework of a growth model for an economy open to international capital flows. In order to do so, we need to interpret the model in terms of FDI and we need to aggregate the production function into one macro production function.

2.1 Equilibrium growth with capital mobility, market solution

In this section we derive the growth rate for a market economy open to international capital flows. Location-specific assets are now interpreted as the internationally immobile assets of a country, as indicated in the introductory section. Owner-specific assets are interpreted as the assets that multinational firms have acquired. These assets are internationally mobile, but subject to the adoption costs represented by equation (2). The equilibrium rate of return to nominal investment, e.g., the return to savings made available to the investors, must be equal to the world interest rate in this setting. The driving force for FDI is investment in location-specific assets. They are complementary to owner-specific assets such that changes in the stock of location-specific assets will result in inflows or outflows of owner-specific assets.

Production of final goods is assumed to be perfectly competitive, and consumers are assumed to have homothetic preferences. Then final output produced by firms can be aggregated into one composite consumption good, while the individual firms' constant returns to scale production function can be aggregated into one macro production function. The subscript j can be omitted from the production function (5). Combining (5) and (7) yields:

$$y = \tau^{-\alpha} g^{\gamma} g^{1-\alpha-\gamma} k_0^{\alpha} (1 + \hat{\lambda} + \hat{\lambda}^2 + ... + \hat{\lambda}^n)^{\alpha} \tag{8}$$

where $\hat{\lambda} = \lambda^{\beta\alpha/(1-\alpha)}$. We have split the location-specific asset into two entries in the production function; a direct input in the production of final goods and an indirect contribution that works through adoption costs. Individual investors do not take the latter into account when making investment decisions in a market economy, and the distinction is useful when the steady state growth path of the economy is derived. Note that the macro production function exhibits increasing returns to scale in L, G and K. The quality parameters constitute a geometrical series. The production function can therefore be written as:

$$y = \tau^{-\alpha} \left(\frac{1 - \hat{\lambda}^n}{1 - \hat{\lambda}} \right)^{\alpha} g^{\gamma} g^{(1-\alpha-\gamma)} k_o^{\alpha} \tag{9}$$

In this macroeconomic setting, the quality parameters can have the same interpretation as they had in section 2.1, representing different types of assets that are employed by all firms, and which can be ranked according to quality or productivity. An alternative interpretation is to see the aggregate consumer good as composed of a number of goods and services from an equal number of industries. Industries are ranked according to how sophisticated their technology is, and each technology matches a quality rung of owner-specific assets. As will be shown below, this interpretation has some interesting implications.

Factor income is consumed or saved according to consumers' utility maximization problem. Infinitely lived households maximize the standard constant intertemporal elasticity of substitution utility function:

$$u(c) = \int_t^{\infty} \frac{c^{1-\theta} - 1}{1-\theta} e^{-\rho t} dt \tag{10}$$

where c is consumption per household, ρ is the time preference rate and θ is the elasticity of marginal utility.

To make the analysis tractable, we assume that the constraint on capital mobility is binding such that all owner-specific assets are provided from foreign savings. The accumulation of location-specific assets, or the economy's budget constraint is then given by:

$$\dot{g} = (1-\alpha)y - c - \delta_g g \tag{11}$$

The share of factor income that accrue to foreign investors, α, is subtracted from total factor income. Let us now assume that each household supply one unit of labor inelastically and households can be represented by one representative worker who also provides savings for investment in location-specific assets. Finally, assume that the number of households is constant over time. Then the Hamiltonian representing the representative household's intertemporal optimization problem reads:

$$J = \frac{c^{1-\theta} - 1}{1-\theta} e^{-\rho t} + v\left[(1-\alpha)\tau^{-\alpha} \left(\frac{1-\hat{\lambda}^{n}}{1-\hat{\lambda}} \right)^{\alpha} g^{\gamma} g^{1-\alpha-\gamma} k_0^{\alpha} - c - \delta g \right]$$

The optimization problem facing the individual is to maximize J with respect to the first factor g. Maximization yields the familiar Euler equation:

$$\frac{\dot{c}}{c} = \frac{1}{\theta}\left[\gamma(1-\alpha)\tau^{-\alpha} \left(\frac{1-\hat{\lambda}^{n}}{1-\hat{\lambda}} \frac{k_0}{g} \right)^{\alpha} - \delta - \rho \right]$$

It can easily be shown that the first order conditions of the local and the foreign investors' profit maximization problem respectively yields $g / k_0 = \gamma(r+\delta) / \alpha(r_g + \delta_g)$. If savings are perfectly internationally mobile, the local interest rate must equal the world market interest rate. If the two types of assets have the same rate of depreciation, the ratio of accumulated nominal investment in owner-specific assets to accumulated stock of location-specific assets equals their relative share in total factor income. In the following we will assume that the depreciation rate is the same for both types of assets. Then we can use the condition that the $g/k_0 = \gamma/\alpha$, and the Euler equation yields the growth path of the economy:

$$\frac{\dot{c}}{c} = \frac{1}{\theta}\left[\gamma(1-\alpha)\tau^{-\alpha} \left(\frac{1-\hat{\lambda}^{n}}{1-\hat{\lambda}} \frac{\alpha}{\gamma} \right)^{\alpha} - \delta - \rho \right] \tag{12}$$

The model yields endogenous growth iff $\gamma(1-\alpha)\tau^{-\alpha}\left(\frac{1-\hat{\lambda}^{n}}{1-\hat{\lambda}}\frac{\alpha}{\gamma}\right)^{\alpha} > \delta+\rho$. Note that there is no scale effect. The growth rate is higher the smaller is the adoption cost parameter τ, the larger is the number of blueprints n, available to the economy and the larger is λ. It can be shown that in steady state the rate of growth of per capita consumption, output and the nominal capital stock is the same, see Barro and Sala-i-Martin (1995). Thus, in steady state, the flow of nominal FDI is a function of the growth rate of the economy, while the accumulated stock is a function of the stock of location-specific assets. Since individual investors do not take the externality into account, the market solution is most likely suboptimal. In order to obtain the optimal growth rate of the economy, we turn to a social planner who takes the externality into account when investment decisions are being made.

2.2 *The socially optimal growth rate*

In this section we derive the socially optimal growth rate for an economy open to international capital flows. We maintain the assumption that the constraint on international capital flows is binding such that all investment in owner-specific capital is financed from abroad. Given the nature of location-specific assets, it is reasonable to assume that governments are involved in such investments either through public investment or subsidized private investment. The local investor is therefore represented by a social planner who take the adoption cost externality into account when making the investment decision. The Hamiltonian in this case is:[5]

[5] The production function now takes the form of an AK-production function.

$$J = \frac{c^{1-\theta} - 1}{1-\theta} e^{-\rho t} + \nu \left[(1-\alpha)\tau^{-\alpha} \left(\frac{1-\hat{\lambda}^n}{1-\hat{\lambda}} \right)^{\alpha} g^{1-\alpha} k_0^{\alpha} - c - \delta g \right]$$

Optimization with respect to *g* yields the Euler equation:

$$\frac{\dot{c}}{c} = \frac{1}{\theta} \left[(1-\alpha)^2 \tau^{-\alpha} \left(\frac{1-\hat{\lambda}^n}{1-\hat{\lambda}} \frac{\alpha}{\gamma} \right)^{\alpha} - \delta - \rho \right] \tag{13}$$

The socially optimum growth rate is higher than the market solution, since $(1-\alpha)^2 > \gamma(1-\alpha)$ requires that 1 - α - γ> 0, which is always the case. This implies, as usual in this kind of growth models, that there is room for policy measures that improve growth performance compared to the market solution. We turn to such policy measures in section 3. But before we go into a policy discussion, let us recapture the findings on FDI in countries that are poor in location-specific assets.

In section 2 where we looked at investment decisions in a static setting, we found that investments in owner-specific assets in a particular location increases with the stock of location-specific assets. Further, the wedge between the nominal and the effective investment is wider the smaller the stock of location-specific assets per capita and the more sophisticated the asset. Applying equations (3) and (4), it turns out that the marginal product of the nominal and effective stock of each rung of owner-specific assets are related as follows:

$$MP\hat{k}_i = MPk_i c_i^{\alpha/(1-\alpha)} = (r + \delta) c_i^{\alpha/(1-\alpha)} \tag{14}$$

The rate of return to the effective capital stock is thus above the world market interest rate in capital-poor countries. Condition (14) reconciles our model with the observation that the return to savings does not differ much between countries in spite of the fact that developing countries are relatively poor in capital. In other worlds, the return to savings are not higher in capital-poor countries, but the returns to installed, productive capital is higher, as predicted by the neoclassical growth model. Since it is the rate of return to savings that matters to the international investor, capital will only trickle to poor countries if poor countries are also poor in location-specific assets. Nevertheless, from equations (12) and (13) it is clear that the steady state growth rate of the nominal stock of owner-specific capital is the same in all countries if the parameter values are the same in all countries. Again there is empirical evidence that the stock of FDI as a share of the total capital stock in poor countries is not significantly different from the equivalent ratio in rich countries (UNCTAD 1998). This does, however imply that poor countries will not catch up.

3. Policy implications and some empirical evidence

In the absence of a social planner, the government can introduce a subsidy in the market solution and thereby replicate the socially optimal solution. It can easily be shown that the adequate subsidy must be levied on investment in location-specific capital at the rate $(1-\alpha)/\gamma$. Policies for higher growth should in other words be directed towards stimulating the accumulation of location-specific assets, rather than designing investment incentives for foreign investors. When poor countries compete for FDI, this conclusion is reinforced. In such a situation investment incentives for foreign investors in the form of tax holidays and subsidies could lead to a "race to the bottom" in terms of resources available for domestic development. Investment in location-specific assets on the other hand, induces FDI and a "race to the top," since investors are attracted by assets that are often valuable in their own right in this case.

To summarize the findings of this paper, we have found that countries that are poor in location-specific assets have a low return to FDI and therefore receive meager inflows of FDI. Further, we have seen that the composition of FDI in terms of the quality of owner-specific assets are similar in rich and poor countries, but the wedge between nominal and effective investment is higher in poor countries, and more so the more sophisticated the assets. Finally, we have seen that the growth rate of the stock of FDI is similar in rich and poor countries.

If we interpret the macro production function as an aggregate of industries that can be ranked according to how sophisticated the assets employed in the production process, then our findings imply that the relative price of goods and services produced by high-technology industries are particularly high in developing countries. One piece of anecdotal evidence is provided: as a proxy of relative prices we look at one low-technology product and one high-technology product that are comparable and consumed in most countries of the world. We have chosen a loaf of bread and one minute of cell-phone conversation during office hours. We have only a few observations on this; in Norway one loaf of bread can buy about 7 minutes of cell-phone conversation, in Namibia about 2 minutes, South Africa about 1 minute and in Tanzania a loaf of bread can buy only 28 seconds of cell phone conversation.

Data on sectoral composition on FDI is scarce, and it is difficult to find comparable data for different countries. We therefore limit ourselves to reporting the sectoral composition of FDI in a few developing countries and compare them to the sectoral composition of mergers and acquisitions (M&A) on a global scale for 1998. The latter data are reported in Miyake and Thomsen (1999). M&A accounts for about 60 percent of FDI in all advanced countries, 80 percent of FDI in the United States and 85 percent in Australia. Data on M&A flows should therefore be reasonably representative for total FDI flows. Table 1 reports the percentage distribution of M&A on the top 20 industries.

Table 1: Mergers and acquisitions by industry, 1998

Industry	*Share of total value of M&A*
Oil and gas	14.0
Automotive	9.4
Banking and finance	9.3
Telecommunications	9.2
Paper products, printing and publishing	7.5
Utilities	7.3
Insurance	7.0
Business services	6.9
Chemicals	4.5
Retail	3.3
Food, drink and tobacco	2.8
Manufacturing, non-metallic products	2.0
Electrical and electronic engineering	1.8
Instrument engineering	1.3
Real estate	1.3
Wholesale distribution	1.2
Leisure	1.1
Manufacturing, metallic products	1.0
Hotels and catering	0.8
Mechanical engineering	0.8

Source: KPMG as reported in OECD 1999

Natural resource-intensive industries, service industries and capital-intensive and/or high-technology industries dominate this table.[6] The top 10 recipient industries of FDI in Mexico during the period 1994-97 and Thailand during the period 1995-97 largely reflect the structure presented in table 1, as can be seen from table 2.

Table 2: Sectoral composition of FDI in Mexico and Thailand

Mexico, industry	*Share of total FDI*	*Thailand, industry*	*Share of total FDI*
Automotive	9.5	Electrical appliances	52.6
Tobacco	6.6	Trade	26.0
Banking and finance	6.3	Real estate	25.5
Wholesale trade	5.8	Other services	5.8
Basic iron and steel	5.7	Other manufacturing	5.7
Communications	5.6	Chemicals	5.7
Beverages	5.6	Metals and non-metallic manufacturing	5.0
Retail trade	5.5	Construction	4.3
Electric machinery	5.4	Food and sugar	2.8
Electronic equipment	3.9	Textiles	1.6

Source: UNCTAD 1998

The shares for Thai industries add up to more than a 100 percent due to significant divestment in the petroleum product and the financial sectors. The figures are not directly comparable since the data from Thailand are given at a much more aggregate level than the Mexican data and the data in table 1. Note however, that all the top 10 receiving sectors in Mexico are also among the top 20 M&A sectors. The pattern of FDI in Thailand appears to be more concentrated in a few sectors; electrical appliances, trade and real estate. These sectors are all found among the top 20 M&A sectors and the top 10 Mexican recipients of FDI. Even in Ghana, the service sector is the most important recipient of FDI (71 percent) compared to 21 percent in manufacturing and 8 percent in agriculture (UNCTAD 1998). Our model thus appears to be largely consistent with observed FDI patterns.

[6] 1998 saw a wave of mergers and acquisitions in the oil and gas sector as a result of restructuring in that sector. 1998 is therefore somewhat biased due to some mega-deals in this sector.

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