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ABSTRACT

Much Ado About Nothing? Do Domestic Firms Really Benefit from Foreign Investment?*

Many governments offer significant inducements to attract inward investment, motivated by the expectation of spillover benefits. This Paper begins by reviewing possible sources of spillovers. It then provides a comprehensive evaluation of the empirical evidence on productivity, wages and exports spillovers in developing, developed and transitional economies. Although theory can identify a range of possible spillover channels, robust empirical support for positive spillovers is hard to find. The reasons for this are explored and the Paper concludes with a review of policy aspects.

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Much Ado About Nothing?

Do Domestic Firms Really Benefit from Foreign Direct Investment?

1. Introduction

Of all the drivers of globalisation, armslength trade, migration of workers and cross border investment, the last is probably the most visible. This presumably explains why public anxiety about globalisation often manifests itself as hostility towards multinationals. From an economic standpoint, cross-border investment may also be, at the margin, the most important manifestation of globalisation. Annual flows of FDI now exceed \$700 billion and the total stock exceeds \$6 billion. Over the last decade FDI flows have grown at least twice as fast as trade.

As with arms-length trade, the FDI environment is policy distorted but has gradually been becoming more liberalised. Thus, in 1998, of 145 regulatory changes made by 60 countries, 94% created more favourable conditions for FDI (UN 1999). In many cases intervention has extended beyond creating a more liberal environment, to providing substantial public subventions. For example, Head (1998) reports that the government of Alabama paid the equivalent of \$150,000 per employee to Mercedes for locating its new plant in the state in 1994. Across the Atlantic, the British Government provided an estimated \$30,000 and \$50,000 per employee to attract Samsung and Siemens respectively to the North East of England in the late 1990s (Girma, Greenaway and Wakelin 2001). Some countries also provide tax incentives. For example, Ireland offers a corporate tax rate of 10 percent to all manufacturing firms locating in the country.

There seems to be a widely held assumption that foreign firms more than ‘pay their way’ through benefits that spill over to the host economy, resulting in productivity growth, or export growth being higher than otherwise. Looking at three case studies (Ford and General Motors in Brazil, Intel in Costa Rica) Hanson (2000) concludes that there is in fact little evidence for spillovers from these projects on domestic firms. This paper takes a wider view and examines the evidence for intra-industry productivity spillovers in both theory and empirical analyses.¹ In Section 2 we begin by asking what guidance theory can give, on two counts: first, what are the possible channels for transmission of spillover benefits; second, are host country

¹ Apart from such spillovers there may also be other potentially positive effects of FDI on the host economy. For example, multinationals, through creating backward and forward linkages with domestic firms may foster the entry and development of domestic suppliers and final goods producing firms, see Görg and Strobl (2002a,b) for such analyses for the Republic of Ireland.

characteristics likely to make a difference to the extent or speed with which spillovers occur? Section 3 examines the empirical evidence on spillovers in developed, developing and transitional economies. In Section 4 we focus on policy: should governments intervene? If so, what policies should they use? Does policy make any difference? Finally, Section 5 concludes.

2. What Does Theory Tell Us?

2.1 Context

There is a well developed literature which tries to explain why multinational enterprises (MNEs) set up overseas rather than export directly and/or licence their product/technology. The most persuasive explanations are those that emphasise the co-existence of proprietary knowledge of some form and market failures in protecting that knowledge. Thus the firm internalises certain transactions to protect its brand/technology/ marketing advantages. This literature has been extensively surveyed (see Caves, 1996 and Markusen, 1995) and we take these motives as given. In particular, we take as given the existence of some kind of firm specific asset, usually some kind of technological advantage.² The first question is then, having chosen a particular location how might any advantages spill over to the local economy via firms in the same industry? Having identified potential transmission channels, we then need to ascertain whether particular host economy characteristics will make a specific host more or less likely to benefit from spillovers.

2.2 Spillover Channels

When a firm sets up a plant overseas, or acquires a foreign plant, it does so in the expectation of realising a higher rate of return than a given domestic firm with an equivalent investment. The source of the higher return is the technological advantage alluded to above. Whatever its source, the only way in which indigenous firms can gain from external benefits is if some form of *indirect* technology transfer takes place - MNEs will not hand over the source of their advantage voluntarily. The theoretical literature identifies four channels through which the host might boost its productivity via spillovers, as set out in Table 1: imitation; skills acquisition; competition; exports.

[Table 1 here]

Imitation is the classic transmission mechanism for new products and processes. A mechanism commonly alluded to in the theoretical literature on ‘North-South’ technology transfer is reverse engineering (e.g. Das, 1987; Wang and Blomström,

² Note that ‘technological advantage’ should be interpreted broadly to include innovative management and organisational processes as well as new production methods and technologies.

1992). Its scope depends on product/process complexity, with simple manufactures and processes easier to imitate than more complex ones. The same principle applies to managerial/organisational innovations, though in principle, at any rate, these are easier to imitate. Imitation is, of course, not the same as replication and it would be surprising if the rents accruing to MNEs were entirely dissipated by the process. However, *any* upgrading to local technology deriving from imitation could result in a spillover, with consequent benefits for the productivity of local firms.

Adoption of new technology can also occur through *acquisition of human capital*. Even when the locational pull for MNE investment is low wages they nevertheless tend to demand relatively skilled labour in the host country. Generally they will invest in training and in the absence of slavery, it is impossible to lock-in such resources completely.³ As a result, the movement of labour from MNEs to existing firms, or to start new firms can generate productivity improvement via two mechanisms. First, a direct spillover to complementary workers; second, workers that move may carry with them knowledge of new technology or new management techniques. Some argue that this is the most important channel for spillovers; Haaker (1999) and Fosfuri, Motta and Ronde (2001), for instance. Moreover, some empirical work supports this, eg. ILO (1981), Chen (1983) Djankov and Hoekmann (1999).

Many models of spillovers emphasise the role of *competition* (Wang and Blomström, 1992; Glass and Saggi, 2001). Unless an incoming firm is offered monopoly status, it will produce in competition with indigenous firms. Even if the latter are unable to imitate the MNE's technology/production processes, they are of course under pressure to use existing technology more efficiently, yielding productivity gains. Greater competition leading to a reduction in X-inefficiency is analogous to one of the standard gains from armslength trade and is frequently identified as one of the major sources of gain.⁴ In addition, of course, competition may increase the speed of adoption of new technology or the speed with which it is imitated.

A further indirect source of productivity gain might be via *export spillovers*. Crudely, domestic firms learn how to export from multinationals (see Aitken, Hanson and Harrison, 1997, Barrios, Görg and Strobl, 2001b and Greenaway, Sousa and Wakelin, 2002). Exporting generally involves fixed costs in the form of establishing distribution networks, creating transport infrastructure, learning about consumers' tastes, regulatory arrangements and so on in overseas markets. MNEs will generally

³ It is interesting to note that this inability to protect investment in human capital fully has long been seen as an argument for infant industry protection as a response to potential first mover disadvantages (see Baldwin 1968).

⁴ For instance, the Cecchini Report on the benefits of completing the Single Market in Europe identified such pro-competitive effects as the single most important source of gain.

establish already armed with such information and will often exploit it to export from the new host. Through collaboration, or more likely imitation, domestic firms can learn how to penetrate export markets. There is a growing literature that links exporting and productivity. Recent work for example on the US, Germany and UK suggests that productivity levels of exporting firms are higher than non-exporting firms and, in the case of the UK, that productivity growth may also be higher for indigenous exporters.⁵

2.3 Host Country Characteristics and Spillovers

The literature on the determinants of FDI emphasises locational characteristics as important factors in the multinationals' decisions on where to invest (e.g., Wheeler and Mody, 1992, Brainard, 1997, Barrios, Görg and Strobl, 2001a). But this is a different issue entirely, relating to features of the host economy which attract inward investment in the first instance. Our focus is the issue of whether there are locational characteristics which affect the speed of adoption of new technology/ spillover of productivity gains.

A pioneering contribution is Findlay (1978) who emphasised the importance of *relative backwardness* and *contagion*. The former refers to the distance between two economies in terms of development. Findlay's model suggests that the greater this distance, the greater the backlog of available opportunities to exploit in the less advanced economy, the greater the pressure for change and therefore the more rapidly new technology is imitated/adopted. Moreover, speed of adoption is also a function of contagion, or the extent to which the activities of the foreign firm pervades the local economy. Thus, if the MNE quickly establishes upstream and downstream networks, technology transfer will be more rapid.

Contagion has in recent years attracted a great deal of attention from economists, particularly in relation to financial markets (see Edwards 2000). Contagion in the spillover context is intuitively plausible – supply and distribution chains are obvious mechanisms for gaining exposure to and familiarity with new technology. The notion of relative backwardness as a driver of, rather than impediment to, technology transfer is more controversial. Findlay's model is essentially demand side driven, with the pressure for adoption deriving from pent up demand.

Glass and Saggi (1998) also see a role for technological distance between the host and home country, but a different one to Findlay. That technology gap signals something to the MNE about *absorptive capacity*. The bigger it is, the less likely the host is to have the human capital, physical infrastructure and distribution networks to support

⁵ See Bernard and Jensen (1999), Bernard and Wagner (1997) and Girma, Greenaway and Kneller (2002).

inward investment. This influences not only the decision to invest but also what kind of technology to transfer. Specifically, the bigger the gap the lower the quality of technology transferred and the lower the potential for spillovers. This seems more plausible than Findlay's notion of a lack of absorptive capacity being the driver. Clearly technological distance will be directly related to the potential gains from spillovers but it is also likely to be inversely related to the probability that indigenous firms are actually able to access them.

2.4 Summary

Economic theory gives some guidance in terms of what to expect where cross-border investment and spillovers are concerned. In general, MNEs have firm specific advantages which might be related to the production methods they use, the way they organise their activities, the way they market their products/services and so on. Once they have set up a subsidiary, they may be unable to prevent some of the benefits of these advantages from spilling over to indigenous firms via imitation, labour mobility, competition or local firms learning to export. Such spillovers have the potential to raise productivity and their exploitation might be related to the structural characteristics of the host economy, in particular absorptive capacity.

3. What Does the Evidence Tell Us?

3.1 Overview

The empirical literature was pioneered by Caves (1974) and Globerman (1979) using data for Australia and Canada, respectively. Since then, their empirical models have been extended and refined. Most econometric analyses of spillovers are undertaken in a framework in which labour productivity or total factor productivity of domestic firms is regressed on a range of independent variables. To measure intra-sectoral spillovers from multinationals a variable is included which proxies the extent of foreign firms' penetration, usually calculated as the share of employment or sales in multinationals over total industry employment/sales in a given sector.⁶ If the regression analysis yields a positive and statistically significant coefficient on the foreign presence variable, this is taken as evidence that spillovers have occurred from MNEs to domestic firms.⁷ Most studies use either the contemporaneous level of

⁶ In a recent paper, Castellani and Zanfei (2002) argue that one should use the *absolute* level of foreign activity in the sector, rather than the *proportion* of foreign relative to total activity, since using a ratio imposes the restriction that changes of the same magnitude in foreign and aggregate activities within a sector have no effect on the dependent variable. While this is an interesting (econometric) argument it is not clear what the economic rationale for using absolute rather than relative FDI penetration would be.

⁷ Kugler (2001) and Görg and Strobl (2000) present different ways of examining productivity spillovers. Kugler (2001) uses cointegration techniques to determine whether or not a relationship

foreign penetration, or relatively short lags (most commonly a one year lag) as their explanatory variables. If anything therefore, these studies usually measure short run effects of foreign presence on domestic productivity.⁸

[Table 2 here]

Table 2 sets out details of 35 studies of productivity spillovers in manufacturing industries in developing, developed and transition economies.⁹ Those of Aitken and Harrison (1999), Damijan, Majcen, Knell and Rojec (2001), Djankov and Hoekman (2000), Konings (2001) and Zukowska-Gagelmann (2002) find some evidence of *negative* effects of the presence of multinationals on domestic firms on aggregate. These papers use firm level panel data for manufacturing industries in Venezuela, eight CEECs, the Czech Republic, and Bulgaria, Poland and Romania, respectively. It is interesting to note that most studies for transition economies find negative results. Thirteen of the studies do not find *any* statistically significant effects, on average, of multinationals on domestic productivity while seventeen papers report statistically significant positive effects.¹⁰

Note, however, that all but three of those reporting positive spillovers use cross sectional data which may lead to biased results, as argued by Görg and Strobl (2001). They argue that panels, using firm level data are the most appropriate estimating framework for two reasons. Firstly, panel data studies allow us to investigate the development of domestic firms' productivity over a longer time period, rather than relying on one data point. Secondly, they allow us to investigate spillovers after controlling for other factors. Cross sectional data, in particular if they are aggregated at the sectoral level, fail to control for time-invariant differences in productivity across sectors which might be correlated with, but not caused by, foreign presence.

exists between capital accumulation by MNEs and domestic productivity in a sector. If there is such a relationship this is taken as evidence for productivity spillovers. This estimation framework allows him to distinguish between intra-industry and inter-industry spillovers. Using industry-level panel data for ten Colombian manufacturing sectors for the period 1974 to 1998 he finds widespread evidence for inter-industry linkages. However, only in one sector (machinery equipment) is there evidence of intra-industry spillovers. Görg and Strobl (2000) postulate that, if domestic firms benefit from spillovers from MNEs they are able to produce more efficiently, i.e., at lower costs which will, *ceteris paribus*, increase their probability of survival. Using firm-level panel data for Ireland for 1973 to 1996, they present empirical results that the presence of foreign firms increases firms' probability of survival in Irish manufacturing industries, which they take as evidence for the existence of spillovers. The present paper focuses on papers of productivity studies.

⁸ Haskel et al. (2001) include lags up to t-3. However, even that may be considered short-run in the context of measuring the effect of FDI on productivity, which involves adjustments that may evolve over a long time period.

⁹ Given the surge in papers on productivity spillovers recently it is likely that this survey misses out on papers, in particular most recent ones which are not published yet.

¹⁰ The magnitude of the coefficients, which indicates the strengths of the spillovers, also differs across studies. Görg and Strobl (2001) attempt to explain the differences in magnitude, using characteristics of the studies (data, variables used, countries covered, etc.) as explanatory variables.

Thus coefficients on cross-section estimates are likely to be biased. For example, if productivity in the electronics sector is higher than, say, the food sector, multinationals may be attracted into the former. In a cross section, one would find a positive and statistically significant relationship between the level of foreign investment and productivity, consistent with spillovers, even though foreign investment did not cause high levels of productivity but rather was attracted by them.

Taking this into consideration, the evidence on productivity spillovers is even bleaker. There are only three papers employing panel data which find some positive evidence in the aggregate; Liu, Siler, Wang and Wei (2000) and Haskel, Pereira and Slaughter (2001) for the UK and Damijan *et al.* (2001) for Romania. Liu *et al.*, however, uses industry level data that aggregates over heterogeneous firms, which may lead to biased results.¹¹ This leaves two studies using appropriate data and estimation techniques which report positive evidence for aggregate spillovers. All other studies using panel data find either negative or no statistically significant effects.

3.2 How can we explain negative or neutral effects?

Various explanations have been put forward to explain negative results. For example, foreign firms could reduce productivity of domestic firms through competition effects, as pointed out by Aitken and Harrison (1999) and Konings (2001). They may have lower marginal costs than a domestic competitor and can attract demand away from domestic firms. This will force domestic firms to reduce production and move up their average cost curve. Of course in Section 2 we showed how competition may actually be one of the channels through which *positive* spillovers are transmitted. This is not necessarily inconsistent with the above – there may be negative competition effects on some firms in the short run, while other firms may increase efficiency due to increased competition in the short as well as in the long run. Evidence for positive effects of competition are found by Kokko (1996) for Mexico and Driffield (1999) for the UK.

Other explanations for a failure to find any evidence for positive spillovers in the short run include: lags in the process of domestic firms' learning from multinationals; MNEs guard their firm specific advantages closely to prevent leakages to domestic firms; positive spillovers only affect a certain group of firms and aggregate studies, underestimate the true significance of such effects.

3.3 Absorptive Capacity

¹¹ This has been pointed out by, for example, Dunne, Roberts and Samuelson (1989) for the case of measuring the growth performance of manufacturing plants in the US.

Kokko (1994) advances the idea that spillovers depend on the complexity of the technology transferred by multinationals, and the technology gap between domestic firms and MNEs. Using cross-section industry level data for Mexico he finds no evidence for spillovers in industries where multinationals use highly complex technologies (as proxied by either large payments on patents or high capital intensity). A large technology gap *per se* does not appear to hinder technology spillovers on average, although industries with large gaps and a high foreign presence experience lower spillovers than others.¹² Expanding on Kokko (1994), Kokko, Tansini and Zejan (1996) hypothesise that domestic firms can only benefit if the technology gap is not too wide so that domestic firms can absorb the knowledge available from the multinational.¹³ Thus domestic firms using very backward production technology and low skilled workers may be unable to learn from multinationals. Using a cross-section of firm-level data for Uruguay, Kokko *et al* find evidence for productivity spillovers to domestic firms with moderate technology gaps, (measured as the difference between the firm's labour productivity and the average labour productivity in foreign firms) but not for firms which use considerably lower levels of technology.¹⁴

Girma, Greenaway and Wakelin (2001) use firm-level panel data to examine productivity spillovers in UK manufacturing. They find no evidence for spillovers on average, i.e., under the assumption that spillovers are homogeneous across different types of domestic firms. There is, however, evidence for spillovers to firms with a low difference between the firm's productivity level and the industry frontier productivity level (termed "technology gap"). Firms with a technology gap of 10 per cent or less appear to increase productivity with increasing foreign presence, while firms with higher gaps seem to suffer reductions in productivity. Girma (2002) and Girma and Görg (2002) extend their analysis of the role of absorptive capacity. The former paper uses recently developed threshold regression techniques to quantify the significance of absorptive capacity. Girma and Görg (2002) also allow for different effects of FDI on establishments located at different quantiles of the productivity distribution by using conditional quantile regression techniques. Both papers find support for the hypothesis that only firms with some level of absorptive capacity benefit from productivity spillovers.

¹² Kokko argues that these industries show many of the characteristics of being "enclaves" where multinationals have little interaction with domestic firms and, hence, there is little scope for spillovers.

¹³ This argument is thus similar to the point made in the theoretical literature by Glass and Saggi (1998) as reviewed above.

¹⁴ By contrast, Sjöholm (1999a) finds that, in cross-sectional data for Indonesian manufacturing firms, productivity spillovers from foreign to domestic firms are larger the larger the technology gap (also defined in terms of differences in labour productivity) between those groups of firms and the higher the degree of competition in the industry.

Barrios and Strobl (2002) also find little evidence for any spillovers from MNEs in their firm level panel for Spanish manufacturing. There is only evidence for positive spillovers from foreign presence to domestic exporters but not to non-exporters, which they interpret as evidence that absorptive capacity matters. They argue that exporting firms are more exposed to international competition and therefore likely to use higher technologies and are more likely to benefit from positive spillovers than non-exporters. Kinoshita (2001) also finds no evidence for any spillover effects on average in firm level panel data for the Czech Republic. However, there are positive spillovers for local firms that are R&D intensive. He interprets this as evidence that absorptive capacity is important.

Damijan *et al* (2001) also define absorptive capacity in terms of local firms' R&D activities. In their firm level panel for a number of Central and Eastern European transition economies they fail to detect evidence for productivity spillovers affecting the average firm. Taking into account absorptive capacity, through interacting the foreign presence variable with a firm's R&D expenditure, yields some differences in results. For the Czech Republic and Poland, there is now evidence for negative spillovers, positive spillovers for Romania and no evidence for all other countries.

3.4 Regional Dimensions

Domestic firms that are located near to multinationals may also be more likely to benefit than other firms. For example, Audretsch (1998) argues that geographical proximity is necessary to facilitate knowledge spillovers as "*knowledge is vague, difficult to codify, and often only serendipitously recognized*" (p. 21). Therefore transmission costs are assumed to increase with distance. The geographic dimension has been investigated in a number of studies. Calculating proxies for foreign presence at the regional level and using cross-sectional data for Indonesia Sjöholm (1999b) fails to find evidence for a regional component. Aitken and Harrison (1999) using firm level panel data for Venezuela also fail to find positive spillovers from the presence of multinationals in a region on domestic firms in the same region, though they find negative spillovers from multinationals located in the same sector in any region in the country. Girma and Wakelin (2000) find evidence for positive spillovers from FDI located in the same region and sector as domestic firms in the UK. However, they are only significant for firms that have a low technology gap *vis-à-vis* multinationals. Girma and Wakelin (2001) using a different estimation technique and data set find evidence to support this earlier finding.¹⁵

¹⁵ Moreover, they qualify their earlier results through the new evidence which shows that the nationality of the FDI may also affect whether or not spillovers take place. In fact, their results suggest that spillovers are strongest from Japanese FDI while there do not appear to be any positive effects on

In a further study using plant-level data for the UK, Harris and Robinson (2001) examine the evidence by estimating productivity equations for twenty manufacturing sectors separately. They include three measures of spillovers, foreign presence in the sector (measured as the proportion of capital in the industry owned by foreign firms), foreign presence in the region (either in the same or other sectors) and foreign presence in upstream and downstream industries. The first is intended to capture “traditional” intra-industry spillovers, the second the regional dimension, and the third inter-industry spillovers. Their results suggest that inter-industry spillovers are much more prevalent than either of the other two. None of the three is always positive, however and there is evidence of negative spillovers in many of the sectors.

3.5 Wages Spillovers

If there are positive productivity spillovers to domestic firms and if some of this is due to increasing labour productivity, domestic firms will pay higher wages. Another field of empirical research focuses on this.¹⁶ Productivity spillovers are not the only channel for such so-called wage spillovers, however. Multinationals often pay higher wages, even after controlling for size and other firm and sectoral characteristics (Aitken, Harrison and Lipsey, 1996; Girma *et al.*, 2001, Lipsey and Sjöholm, 2001). This is attributed to the MNEs’ ownership of firm specific assets implying that they use higher levels of technology than domestic firms. If multinationals and domestic firms use similar types of labour, domestic firms have to pay higher wages to attract workers. Wage spillovers can also be negative however, if there are negative productivity spillovers from multinationals.

Like empirical work on productivity, identifying wage spillovers usually involves estimating the determinants of wages in domestic firms and including a measure of foreign presence (eg. share of employment in multinationals) as a covariate.

[Table 3 here]

Table 3 sets out details of studies on wages spillovers. Aitken *et al* (1996) use industry level (four digit) data for manufacturing industries for 1984 to 1990 (Mexico), 1977 to 1989 (Venezuela) and 1987 (US).¹⁷ While they find positive

domestic productivity from US investment. This is attributed to the latter being of generally older vintage using older more established production techniques than Japanese firms.

¹⁶ A related yet different issue is whether foreign direct investment contributes to the shift in labour demand towards skilled labour in the host country; see, for example, Feenstra and Hanson (1997), Figini and Görg (1999) and Blonigen and Slaughter (2001) for empirical analyses for Mexico, Ireland and the US, respectively.

¹⁷ While they have plant level data available for Mexico and Venezuela these are aggregated up in order to make them comparable to the US data where only industry level data are available. However, they reestimate their empirical models using the plant level data for the two countries and results are very similar to those obtained using industry level data.

effects in the US, their findings suggest that there are negative effects in the first two countries.¹⁸ As with productivity spillovers, the result for the US should be treated with caution as it is obtained using cross sectional data. Lipsey and Sjöholm (2001) study the same effect for the Indonesian manufacturing sector using plant level data for 1996 and find that higher foreign presence in a sector leads to higher wages in domestic firms in the same sector. However, this again uses cross section data. Girma *et al.* (2001) use firm level panel data for UK manufacturing for the period 1991 to 1996. They find that, on average there is no effect of multinationals in a sector on the wage *level* in domestic firms but there is some weak evidence of a negative effect on wage *growth*.

3.6 Export Spillovers

A third strand in the literature focuses on whether multinationals dissipate their knowledge of global markets to domestic firms and hence enable them to become more successful exporters. Domestic firms can be affected through three main channels (see Greenaway, Sousa and Wakelin, 2002). First, if multinationals have better access to information about foreign markets this can spill over through multinationals' export activities. Second, there are demonstration effects whereby domestic firms can learn the multinationals' superior production or management techniques, which in turn enable them to compete more successfully on export markets. Third, competition between domestic firms and multinationals on both home and foreign markets can induce domestic firms to improve their export performance.

Work completed thus far is summarised in Table 4. Aitken, Hanson and Harrison (1997) estimate a probit model and include a proxy for export information externalities, namely the export activity by multinationals in the industry and region.¹⁹ The model is estimated using plant level data for Mexican manufacturing industries for 1986 and 1989. They find that export activities of MNEs in a sector have positive effects on the probability of whether a firm in the same sector, either foreign or domestic, is an exporter.

[Table 4 here]

Using firm level panel data for the UK for 1992 to 1996, Greenaway *et al.* (2002) also investigate whether spillovers affect a firm's probability of exporting but extend the analysis to examining what affects a firm's export ratio. They estimate a two-step Heckman selection model which, in the first step estimates the probability of

¹⁸ These two specifications include sectoral dummies which control for unobserved sector specific effects.

¹⁹ This variable is calculated as "the share of state-industry MNE exports in national industry exports, relative to the state share of national manufacturing exports" (Aitken et al, 1997, p. 117).

exporting and, in the second, estimates the factors that affect a firm's export ratio. They include in both steps three measures of multinational presence to capture the three spillover channels discussed above. Their results suggest that MNEs' exports have a positive effect on a domestic firm's probability of being an exporter but do not impact on their export ratio. On the other hand, R&D spillovers from multinationals to domestic firms and the presence of MNEs in the sector positively affect both the decision to export and the choice of export ratio. Thus, export information externalities appear to matter only for the decision of whether or not to export. This may not come as a surprise as these externalities can be expected to aid domestic firms in overcoming the sunk costs of exporting which should affect their probability of exporting but not their export ratio.

Barrios, Görg and Strobl (2001b) also focus on export information externalities versus demonstration effects through R&D spillovers. Using firm level panel data for Spanish manufacturing for 1990 to 1998 they estimate a probit model to explain why firms export and a tobit model to estimate what determines the firms export ratio. They find no evidence for any effects of either R&D activity or export activity by multinationals in a sector on the probability that domestic firms export, although they find spillovers from both types of activity on other foreign-owned firms. The tobit estimations, however, indicate that there is evidence for positive effects of multinationals' R&D activity on domestic firms' export ratios, while they again fail to detect any spillovers from MNEs export activities on domestic firms. Other foreign firms, again, benefit from both types of spillovers in terms of their export ratios as well. In an extension Barrios *et al.* discover that R&D spillovers only increase domestic firms' exports to other EU/OECD countries. Thus domestic firms learn from multinationals to increase their exports to other developed countries which are generally markets with a superior technological capability.

Kokko *et al* (2001) investigate the decision to export by domestic firms in Uruguay using cross-sectional firm level data for 1998. They include only a simple measure of MNE presence (not export activity) in terms of the output share of MNEs in an industry and it is, thus, not clear which channel leads to spillovers. However, they distinguish between MNE presence in import-substituting and export-orientated industries and find that there is only evidence for spillovers from the latter group of multinationals. This suggests that the trade regime within which multinationals operate may determine their potential for generating positive export spillovers.²⁰

3.7 Summary

²⁰ Recall, however, that in the same paper Kokko *et al.* find that domestic firms benefit from productivity spillovers only from import-substituting multinationals (although this result was obtained using cross sectional data and may therefore be biased).

As we have seen, there is an extensive array of empirical studies that have searched for intra-industry spillovers of various forms. Most of this work has relied upon cross-section methods. With the growing availability of longitudinal data at the plant and firm level, however, more analysts are using panel techniques. This is a helpful development for two reasons: first because the plant/firm is the most appropriate level of scrutiny; second, there are several methodological shortcomings associated with applying cross-section techniques to this issue.

Most work fails to find positive spillovers, with some even reporting negative spillovers on aggregate. Evidence on wages and export spillovers is also mixed. Studies that further disaggregate data find, however, that there is some evidence that absorptive capacity or proximity of multinationals are important. This suggests that, if anything, spillovers do not affect all firms equally but that only certain firms, i.e., those with high levels of absorptive capacity and/or located close to multinationals, are able to benefit from spillovers.

4. Is There a Role for Policy?

4.1 Context

In general, FDI would be seen by most governments as having the potential to impact on TFP to a greater extent than an equivalent amount of indigenous investment. This would be taken as axiomatic in developing and transitional economies and, depending on the origin of the MNE, in at least some developed countries. Add to this potential spillovers from MNEs to domestic firms which are believed to raise their productivity, thereby yielding a second growth bonus, and it becomes clear why attracting inward investment figures prominently in the policy priorities of so many governments. This leads naturally to three questions: Can active policy intervention influence the level and composition of inward investment? Can particular policies maximise the potential for spillovers, both in terms of encouraging multinationals to transfer technologies, and improving the absorptive capacity of domestic firms? Do targeted policies yield net benefits?

4.2 Policy, Level and Composition of FDI

The role of policy in influencing the level and composition of FDI has been reviewed extensively (see, for example, Balasubramanyam and Salisu 2001, Pain 2000 and Hanson 2001). Most work relates to developing countries probably because, in general, policy has been more active, though a growing volume of research relates to

industrialised countries, where of course most FDI originates and is located. The key points that seem to emerge from this work are:

- i) Trade policy is relevant. In general, economies with more open trade regimes have done better at attracting FDI and benefiting from it than countries with inward oriented regimes, (see Balasubramanyam, Salisu and Sapsford, 1996).
- ii) While there is some evidence that investment incentives can affect the location choice of multinationals the effect appears to be small (Coughlin, Terza and Arromdee, 1991; Head, Ries and Swenson, 2001). Head et al. (2001) even argue that competition between host governments may render incentives ineffective as they offset each other. Also, this form of competition for FDI may have impacted on the distribution of incentives and is highly likely to have redistributed income from host countries to FDIs, (Haaland and Wooton, 1999).
- iii) Trade related investment measures (TRIMs), like local content requirements and minimum export requirements, are often introduced as a device to recapture some of the rents which accrue to MNEs. Although they can have positive welfare effects on the host country, the evidence does not point to major effects on levels of inward investment in developing countries (see Greenaway, 1992).
- iv) The quality of local infrastructure is vitally important, in particular communication and transportation facilities, both in attracting initial investments and in sustaining clusters (Coughlin et al., 1991; Coughlin and Segev, 2000).
- v) Availability of relatively skilled labour is an important magnet (Coughlin and Segen, 2000) as well as a key driver of agglomeration (Ottaviano and Puga, 1998). It has also been argued that host countries are more likely to benefit from spillovers if they have a large supply of skilled labour (Keller, 1996) and domestic firms have a high level of technological capacity (Glass and Saggi, 1998).

Overall the evidence seems to suggest that, in general, intervention should be targeted largely at providing a supportive economic environment. More specifically, this flags up the role for education and training policies aimed at upgrading general skills; technology policies aimed at developing clusters; public investment policies aimed at developing efficient and reliable transportation and communication networks.

4.3 Policy and Spillovers

The evidence on spillovers reported in Section 3 is not encouraging in that it suggests that whether one takes developing, developed or transitional economies, little evidence in support of positive spillovers has been reported. This could be due to (one or more of) a number of factors. First, despite theoretical arguments pointing to their existence, they may simply be unimportant in reality. In practice, MNEs may be

effective at ensuring firm specific assets and advantages do not spill over. A second possibility is that spillovers exist and are some part of the 'residual' which appears in all growth equations, but we have simply failed to develop the statistical methods and/or do not have the datasets to identify them. As we saw earlier, Görg and Strobl (2001) have shown that there are convincing methodological reasons for mistrusting much of the evidence reported so far. Furthermore, there may be much heterogeneity in spillovers and aggregate studies may therefore fail to detect them. Moreover, the lack of good quality, comprehensive firm/plant level datasets is a serious impediment to research and it is at this level that we should be searching for evidence.

If we take the most 'optimistic' view, i.e. that spillovers are impacting but we simply do not have fine enough measurement instruments to identify them, we can ask the question: are there policies governments can implement to maximise the prospects of extracting benefits from MNEs? In addressing this issue, we first of all need to distinguish between general and specific policies. The former refer to policies designed to change the environment within which multinationals operate. These include industrial policy, infrastructure development, the orientation of trade policy, exchange rate policy and so on. These we have already mentioned above, since there is evidence to suggest that they are related to the *overall* level of inward investment into an economy over a given period of time. We mention them again here because they may turn out to be the most effective devices for raising the probability of positive spillovers. If, for example, absorptive capacity is the critical driver, education and training policy is likely to be key to facilitating spillovers.

As for specific policies, many TRIMs are targeted at encouraging spillovers. Table 5 sets out an illustrative list of input and output TRIMs and their intended effects. Local content requirements, which are widely used, are intended to raise the share of local value added in subsidiary production and in the process encourage upstream development, with the intention of stimulating inter-industry spillovers. As we saw earlier, one could argue that spillovers are more likely if there is some local ownership, which is what local equity requirements are geared to achieve. Local hiring targets/expatriate quotas are intended to raise the share of total employment accounted for locally, with a view to encouraging spillovers through the transfer of human capital. R and D and technology transfer requirements are intended to have MNEs commit to some minimum level of R and D expenditures and/or transfer technology to local firms.²¹

²¹ Until the Uruguay Round, TRIMs were either legal or extra-legal and as a consequence proliferated. The Uruguay Round Agreements proscribed the use of a number of instruments as well as laying out a range of reporting requirements. In addition, they placed an obligation to phase out certain TRIMs

[Table 5 here]

The economics of TRIMs is not straightforward. In general they are second best measures. For example, analytically a local content requirement is equivalent to an input tariff, though the latter is more efficient. What little work has so far been completed on TRIMs has failed to establish a direct link between their presence and the transfer of useful technologies, (see Blomström et al. 1994, Greenaway 1992). This appears to be because many of the measures are difficult to specify precisely and difficult to monitor. But it is also because the more general policies referred to above are in practise rather more important.

5 Conclusions

FDI is a key driver of economic growth and economic development. Most governments regard attracting it as a priority, particularly in developing and transitional economies. It is given such emphasis not just because it boosts capital formation but because it has the potential to enhance the quality of the capital stock. The reason for this is that in general multinationals are assumed to bring with them best practice or, as a minimum, better practice technology and management. Moreover, it is possible, perhaps even probable, that a given MNE will not be able to protect its superior technology/management fully and prevent some elements being absorbed by indigenous firms. If spillovers occur, they provide an external benefit from FDI, one that governments are hoping to secure when they offer inducements.

We have reviewed the theoretical reasons why spillovers may occur, then surveyed the empirical evidence of their presence. Theory does point to reasons why one might expect them to arise, but finding robust empirical evidence to support their existence is more difficult. In fact, supporting evidence is limited. Conceivably, this indicates that they are in fact illusory in that MNEs are effective in protecting their assets. The other possibility is that we are looking in the wrong place and with the wrong microscope. With regard to the former, as we have seen, a great many studies are at the industry/sector rather than the firm/plant level where we should be focusing. With the growing availability of firm and plant level survey information, this is improving. With regard to methodology, most studies are cross section when what is required is a panel based analysis. Since the stock of serious research on disaggregated data with both cross-section and longitudinal variation is still somewhat limited, the message is

(those which violate Articles III and XI of the GATT), with local content requirements being the most prominent. The key issue from the standpoint of this paper is whether they work.

clear: more systematic research is needed. More discriminating work is also required, analysis which probes whether form of entry (greenfield or acquisition), ownership characteristics, corporate governance, absorptive capacity of domestic firms and so on matter.

The consensus from the literature on policy is so far also clear: 'general' policies aimed at altering the fundamentals are more important than specific policies geared to particular investments. The latter seem to affect primarily the distribution of rents. On the one hand, governments compete in offering investment incentives and in the process dissipate rents to MNEs. On the other hand, they then use (at least some) TRIMs to try to reclaim some of those rents. Both econometric evidence and survey/case study work suggests that in general the characteristics of the economic environment are much more important: infrastructure, local labour market conditions, reliability of communications systems and so on, as well as the overall macroeconomic and trade policy climate. That, of course, does not mean that selective interventions will cease to be extensively deployed. Governments will no doubt continue to see opportunities for targeted measures and MNEs will stand willing to accept them. This too is therefore an area for potential future work. We know very little about the comparative impact of alternative instruments.

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Table 1: Spillover Channels

Driver	Sources of Productivity Gain
Imitation	<ul style="list-style-type: none">• Adoption of new production methods.• Adoption of new management practices.
Competition	<ul style="list-style-type: none">• Reduction in X-inefficiency.• Faster adoption of new technology.
Human Capital	<ul style="list-style-type: none">• Increased productivity of complementary labour.• Tacit knowledge
Exports	<ul style="list-style-type: none">• Scale economies.• Exposure to technology frontier.

Table 2: Papers on productivity spillovers

	Author(s)	Country	Year	Data	Aggregation	Result
	<i>Developing Countries</i>					
1	Blomström & Persson (1983)	Mexico	1970	cs	industry	+
2	Blomström (1986)	Mexico	1970/1975	cs	industry	+
3	Blomström & Wolff (1994)	Mexico	1970/1975	cs	industry	+
4	Kokko (1994)	Mexico	1970	cs	industry	+
5	Kokko (1996)	Mexico	1970	cs	industry	+
6	Haddad & Harrison (1993)	Morocco	1985-1989	panel	firm & ind.	?
7	Kokko et al. (1996)	Uruguay	1990	cs	firm	?
8	Blomström & Sjöholm (1999)	Indonesia	1991	cs	firm	+
9	Sjöholm (1999a)	Indonesia	1980-1991	cs	firm	+
10	Sjöholm (1999b)	Indonesia	1980-1991	cs	firm	+
11	Chuang & Lin (1999)	Taiwan	1991	cs	firm	+
12	Aitken & Harrison (1999)	Venezuela	1976-1989	panel	firm	-
13	Kathuria (2000)	India	1976-1989	panel	firm	?
14	Kokko et al (2001)	Uruguay	1988	cs	firm	?
15	Kugler (2001)	Colombia	1974-1998	panel	industry	?
	<i>Developed Countries</i>					
16	Caves (1974)	Australia	1966	cs	industry	+
17	Globerman (1979)	Canada	1972	cs	industry	+
18	Liu et al. (2000)	UK	1991-1995	panel	industry	+
19	Driffield (2001)	UK	1989-1992	cs	industry	+
20	Girma et al. (2001)	UK	1991-1996	panel	firm	?
21	Girma and Wakelin (2001a)	UK	1988-1996	Panel	Firm	?
22	Girma and Wakelin (2001b)	UK	1980-1992	panel	firm	?
23	Harris and Robinson (2001)	UK	1974-1995	panel	firm	?
24	Haskel et al. (2001)	UK	1973-1992	panel	firm	+/?
25	Girma (2002)	UK	1989-1999	panel	firm	?
26	Girma and Görg (2002)	UK	1980-1992	panel	firm	?
27	Ruane and Ugur (2001)	Ireland	1991-1998	panel	firm	+
28	Barrios and Strobl (2002)	Spain	1990-1994	panel	firm	?
29	Dimelis and Louri (2002)	Greece	1997	cs	firm	+
	<i>Transition Countries</i>					
30	Djankov & Hoekman (2000)	Czech Republic	1993-1996	panel	firm	-
31	Kinoshita (2001)	Czech Republic	1995-1998	Panel	firm	?

32	Bosco (2001)	Hungary	1993-1997	Panel	Firm	?
33	Konings (2001)	Bulgaria	1993-1997	panel	firm	-
		Poland	1994-1997			?
		Romania	1993-1997			-
34	Damijan et al (2001)	Bulgaria, Czech Republic, Estonia, Hungary, Poland, Romania, Slovakia, Slovenia	1994-1998	Panel	Firm	? or -, + only for RO
35	Zukowska-Gagelmann (2002)	Poland	1993-1997	panel	firm	-

Notes:

(i) Data: CS denotes cross-sectional data, while Panel denotes use of combined cross-sectional time-series data in the respective analysis

(ii) Aggregation: Use of either Industry of Firm level data in the analysis

(iii) Result: Regression analysis finds a + positive and statistically significant, - negative and statistically significant, ? mixed results or statistically insignificant sign on the foreign presence variable.

Table 3: Papers on wage spillovers

	Author(s)	Country	Year	Data	Aggregation	Result
1	Aitken et al (1996)	Mexico	1984-1990	Panel	Industry	-
		Venezuela	1977-1989	Panel	Industry	-
		US	1987	cs	industry	+
2	Girma et al (2001)	UK	1991-1996	Panel	Firm	?
3	Sjöholm and Lipsey (2001)	Indonesia	1996	cs	firm	+

Notes: See Table 2

Table 4: Papers on export spillovers

	Author(s)	Country	Year	Data	Aggregation	Result
1	Aitken et al (1997)	Mexico	1986/1989	cs	firm	+
2	Sousa et al (2000)	UK	1992-1996	Panel	firm	+
3	Barrios et al (2001b)	Spain	1990-1998	panel	firm	?
3	Kokko et al (2001)	Uruguay	1998	cs	Firm	?

Notes: See Table 2

Table 5: TRIMs Targeted at Spillovers

Instrument	Intended effect
<i>Input TRIMs</i>	
Local content requirements	Specify that some proportion of value added or intermediate inputs is locally sourced.
Local equity participation	Specifies that some proportion of the equity must be held locally.
Local hiring targets	Ensure specified employment targets are hit.
Expatriate quotas	Specify a maximum number of expatriate staff.
National participation in management	Specifies that certain staff must be nationals or sets a schedule for the 'indigenisation' of the management.
R&D requirements	Commit multinationals to investment in research and development.
Technology transfer	Commits multinationals to local use of specified foreign technology.
<i>Output TRIMs</i>	
Export controls	Specify that certain products may not be exported.
Licensing requirements	Oblige the investor to license production of output in the host country.
Technology transfer	Commits multinationals to a specified embodied technology.

Source: derived from Greenaway (1992).