

FDI and local productivity



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The debate concerning the impact that attracting inward investment can have on local productivity has raged for some 30 years. The essential reason for this is that there was a juxtaposition between “cost per job” estimates regarding the benefits of seeking to attract inward investment through subsidy, and the firm-based academic literature that analysed firm internationalisation in terms of the new technology or knowledge that often accompanies foreign direct investment. Cynically, one may argue that the emphasis that was placed on determining the productivity growth effects of inward investment was an attempt to justify such subsidies, even when cost per job calculations were unfavourable, but both the policy-based and academic literature represents increasingly detailed attempts to determine the nature of the wider economic benefits of attracting inward investment.

Background

Policy makers and academics have long been interested in the links between foreign direct investment (FDI) and local economic development, with an extensive, although still inconclusive, literature as its result. Such interest likely stems from the many channels through which FDI could stimulate local economic growth and productivity. Foreign investors may have a more direct impact on the local economies in which they invest, as they could for example raise employment or pay a wage premium. Most academic attention, however, has been going towards understanding spillover effects, the more indirect consequences of investment that flows into a host economy. Such a surplus of attention might be explained by possible multiplier effects that could allow local economies to upgrade in a more durable manner, as foreign investors bring knowledge and technologies with them, from which a more sizeable number of local companies could benefit. Whether technology, knowledge, or R&D spillovers materialize largely depends on the type of investments made, and more importantly, on the type of linkages established with local firms.

Linkages are seen as the main channel through which local firms access the knowledge and technologies that foreign investors bring with them. Such linkages take different shapes and are established when foreign investors seek partnerships with local firms, for example using them as distributors or suppliers. Linkages are divided in different categories, with some considered horizontal and others vertical in nature. Moreover, scholars further distinguish between forward and backward vertical linkages. Such vertical linkages are primarily established in buyer-supplier relationships, where foreign investors source intermediate outputs through backward linkages, and deliver their inputs to other firms down the value chain through forward linkages. Horizontal linkages are less studied, and include the connections made with other firms in the local economy other than through buyer-supplier relationships, possibly because interactions with the foreign investors are more infrequent and less profound. Although policy makers and academic scholars may have focused on the positive development potential embodied in FDI, the findings are not as conclusive in supporting that view. Linkages may be shallow in nature, or local firms may lack the necessary absorptive capacity to take advantage from technology or knowledge spillovers.

What does the evidence suggest about a location's ability to attract inward investment and the extent to which it drives productivity growth?

Inward foreign direct investment represents an important channel for knowledge and technology spillovers, driven by the managerial and technological capabilities of multinational enterprises (MNEs). Several transmission mechanisms have been theorised, such as competition, demonstration and imitation, labour turnover, backward and forward linkages, as well as intra-industry and inter-industry channels. Both low- and high-income economies can benefit from FDI spillovers, but through different channels. In the former, demonstration effects may create greater spillovers, while in advanced economies spillovers may be generated from more complex interactions between foreign and local firms, through competition mechanisms.

SOTA studies have analysed the phenomenon looking at the effects of foreign presence - measured by number of foreign companies, number of their employees, and the amount of financial resources invested in the host country - on local performance, in terms of productivity, productivity growth and innovative performance of indigenous firms, mainly focusing on a specific country and adopting a firm-level or a more aggregated-level (region or industry) approach. Despite the numerous empirical and meta-analysis studies on the impact of foreign MNEs on local firms, results are still mixed, as well as the moderating factors affecting the extent and magnitude of such spillovers. Two main sources of heterogeneity have been identified: (1) firm-level (both from domestic and foreign firms), and (2) host-country level characteristics.

Firm Heterogeneity

The investigation of firm heterogeneity has been dedicated mainly to foreign firm

characteristics. The effects from spillovers can be moderated by the MNE's country of origin and its ownership stake in local affiliates, as well as by the motivations behind the investment decision and the business activity involved. Whereas, the analysis of differences in domestic firms has been focused mainly on the level of absorptive capacity to 'absorb' the knowledge from the MNEs (measured by R&D expenditures, productivity and human capital of local firms). However, other characteristics can play a role, for example the degree of internationalization of local firms: more internationalized domestic firms, focused on global markets, and firms that are part of multinational groups are less incentivized to interact with other MNEs, since these already have access to superior knowledge.

Host-country heterogeneity

Well-established local institutions provide a transparent regulatory regime and property rights protection, efficient infrastructure, adequate access to finance, high-quality human resources, supportive policies and resources, reducing the transaction costs of business operations. High-quality institutions can positively affect the extent and size of FDI spillovers, protecting the interest of foreign firms and their returns from FDI, encouraging a stronger interaction with local firms and affecting the ownership control on affiliates. However, evidence highlights strong productivity disparities across sub-national locations within a country, potentially caused by the heterogeneity in local endowments and sub-regional institutional diversity, stimulating a micro-geography approach in the investigation of determinants and effects.

Moreover, the geography and spatial proximity between firms (domestic and foreign) can play a role in the extent and size of FDI spillovers as well. Domestic firms may benefit more from the proximity to surrounding foreign firms thanks to face-to-face and inter-organizational interactions, that can facilitate knowledge transfer and transmission, and other channels (labour market and suppliers) that tend to be more localised. However, these gains can be different due to host country's level of development, firm size and its prior productivity level, horizontal and vertical linkages, as well as the sector involved in the foreign investment (e.g. manufacturing vs. services). Indeed, spatial decay effects in FDI spillovers can be less strong in the service sectors, where temporary proximity mechanisms can substitute the need of permanent geographical proximity.

Summary and evidence gaps

The academic literature on the productivity effects of inward investment has been hampered by imperfect models and imperfect data. A critique of the most common approaches is provided in detail in Driffield and Jindra (2012) and Narula and Driffield (2012). In principle, one is seeking to make a multistage process, where the multinational firm engages in FDI and accompanying technology transfer. The firm by definition has an interest in limiting spillovers, but may have a vested interest in engaging in more formal types of knowledge transfer, providing

knowledge or technology that will improve the quality or competitiveness of suppliers for example. Equally, firms may respond to inward investment by either seeking to collaborate, or compete, both of which may lead to increases in productivity, though through different mechanisms, and finally inward investment also has labour market effects, increasing the demand for skilled workers such that local firms experience pressures on wages. The so called “spillovers” literature effectively captures the net of all of these effects with a single equation. While the results from such an approach are informative in terms of answering the question “does inward investment increase productivity”, it is less successful in addressing the question of “why”. In order to do this, one needs a series of partial responses, examining both intra-firm and inter-firm knowledge transfer, labour market effects, and the distinctions outlined above between inter- and intra-industry and local / national effects.

Taking all of this together, the literature does suggest that the impact of inward investment on host country productivity is positive, but that the reasons for this are as much concerned with re-allocation of resources to more productive activities, and the competition that inward investment engenders, as they are with “pure spillover” effects.

What this means for localities

Taken together, the academic studies illustrate that the mechanisms by which inward investment can generate productivity growth in the host location are by no means straightforward. Perhaps the three most important factors are:

1. The motivation for firms to undertake FDI. Characterising for simplicity firms who are motivated to bring activity to a location in order to sell there, are internationalising through technological and other forms of firm specific advantage, and they bring some of that with them.
2. Connectivity between inward investors and local firms. Whether this is through buyer-supplier relationships or other less formal mechanisms, inward investment can generate significant learning effects in the host country. A key role for local policy is to foster these, particularly in terms of addressing blockages such as skill shortages, or access to capital in the local SME sector that may hinder their ability to for example become suppliers.
3. Absorptive capacity. The better able host country firms are to assimilate new technology, the better able they are to assimilate spillovers.

Taking these in turn, investment promotion agencies should pay more attention to the first, why their region may be attractive to inward investors, and what sort of investment they may attract. In turn, how they can help the inward investment become more embedded in the local economy. Here, there is often a trade off between for example employment and productivity – inward investors that generate large numbers of jobs may be in lower value added activity, compared with investments in for example biotech that create fewer jobs¹. Local policy then

¹ For an example of this type of analysis, for the West Midlands of England see Driffield and Kim (2018)

needs to emphasise linkages and connectivity, encouraging local sourcing, and focussing for example on local labour or capital markets that may hinder this. Finally, working with universities and other R&D facilities locally to encourage collaboration between higher education, inward investors and local companies on innovation.

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Table 1 – Evidence concerning FDI and host country productivity growth.

Study	Data	Locations considered	Variables included	Principal empirical results:
Meyer K., & Sinani E. (2009)	Meta-analysis from previous literature (66 papers), over the period 2000-2005		GDP per capita, tertiary education, R&D expenditures, patenting, Economic freedom, transparency, trade openness	The size of FDI spillover depends on host country conditions (and development), as well as home country specificities, types of FDI inflows, MNEs' motivations, and the absorptive capacities of domestic firms.
Driffield N., & Love J.H. (2007)	Industry-level data, from ONS and STAN (OECD)	United Kingdom	Total factor productivity in the domestic sector. Taxonomy of FDI motives based on the difference in R&D expenditures and costs of labour in the industry between source and host country.	FDI motivated by technology-based ownership advantage generate greater positive spillovers, due to the superior technological advantages and capabilities of the MNEs over the domestic sector.
Barrios et al. (2004)	Irish Economy Expenditure survey (IEE), the Spanish Encuesta Sobre Estrategias Empresariales (ESEE), and the Greek Business Information and Consulting Database (ICAP) Directory	Greece, Ireland and Spain	Labour productivity as dependent variable. Foreign presence as the share of employment of foreign-owned firms within a sector. Absorptive capacity (whether a firm has R&D investments and/or exports)	Positive spillovers from FDI in Ireland arise only for firms with some level of technological ability to absorb spillovers, because these can benefit from multinationals operating in their sector.
Ruane F. and Ugur A. (2005)	Irish Census of Industrial Production	Ireland	Labour productivity of Irish-owned manufacturing plants, as dependent variable. Capital intensity and labour quality at firm level. Foreign presence is measured by the share of employment of foreign-owned firms in the sector. Domestically-owned employment as a control.	No evidences of FDI spillovers on local labour productivity, when the standard measure of MNE's employment as a percentage of total employment is used. Weak evidences of productivity spillovers appear when a measure of foreign presence as the employment in foreign companies in the relevant sector (at the 2- and 4-digit NACE levels) is employed.
Barrios et al. (2011)	Irish Economy Expenditure Survey (IEE), input-output table for Ireland and from the OECD database.	Ireland	Traditionally, backward spillovers are measured through input-output table of the host country. A new measure based on input-output table for the home country of multinationals is used.	When the traditional measure of backward linkages is employed, no statistically significant effects are found. Instead, positive backward spillover effects from FDI to domestic firms are found with the measure based on input-output table for the MNE's home country, because the extent of local input sourcing behaviour may differ between domestic and foreign firms, also due to MNEs different production technology
Barry, F., Görg, H., & Strobl, E. (2005).	Irish Economy Expenditure Survey	Ireland	Average wage paid in the domestic firms and labour productivity (as dependent variable). Presence of FDI measured as the percentage of employment in foreign-owned firms in a sector. Controls: labour productivity, firm size, employment growth.	The foreign presence has a negative effect on wages and productivity in domestic-exporting firms due to labour-market crowding out by foreign firms (especially for skilled workers). Instead, there are no effects on wages and productivity in domestic non-exporting firm, because firms need some level of absorptive capacity to benefit from FDI, and domestic non-exporting firms are the less productive and with lower investments in R&D.
Hafner K. A. (2014)	Total Economy Database, World Development Indicators, Industrial Property Statistics Publication B Part I (WIPO, 2001), Economic Outlook Database (OECD, 2011).	Greece, Ireland, Portugal and Spain	Measure of spillover effects through patent-, trade- and FDI-related technology diffusion channels.	In the case of Ireland, the study finds greater positive effects on the local productivity through the trade channel, the trade relationships with other 32 OECD countries, rather than the FDI and patents channels. Trade-related spillovers.
Javorcik, B.S., & Spatareanu M. (2005)	Enterprise surveys in Latvia and the Czech Republic, combined with Amadeus data for Czech firms	Latvia and Czech Republic	Perceptions of local firms associated with the foreign entry in the same industry (horizontal linkages)	Both negative and positive effects are associated with the foreign entry in the same industry: negative, increased level of competition, loss of market share, loss of employees to multinationals, worse access to credit; positive, learning new technologies from MNEs and new marketing techniques through demonstration effects, knowledge brought by workers trained by MNEs.
Sasidharan, S., & Kathuria, V. (2011)	Firm-level data, Prowess from CMIE.	India	Industry-specific factors (e.g. inflow of foreign investment to the industry, degree of competition). Firm-specific factors (e.g. size, vertical integration, foreign affiliation technology import).	R&D investments in the economy are influenced by the foreign presence: domestic firms have to invest in R&D for competing with foreign firms. Majority ownership of the parent and R&D activity of local subsidiaries are found as substitutes, because majority-owned local firms have access to parent's technology, disincentivizing R&D investments.
Morrissey O. (2012)	Case study	Sub-Saharan Africa		Linkages between foreign and indigenous firms (through employment, demand for inputs from local suppliers and supply of inputs to local producers) imply that there are foreign firms to learn from (generating spillover effects). Manufacturing FDI could provide the strongest linkages, while FDI in the resource extraction sectors, utilities, tourism and hotels, can generate few linkages to domestic firms and few spillover opportunities.
Görg et al. (2011)	Grants administered by the Irish Industrial Development Agency (IDA); Irish Economy Expenditure (IEE) survey	Ireland	Measure of linkages as the ratio of materials and/or components sourced locally from MNEs' affiliates over total inputs. Grants ratio, defined as the value of grants received relative to the annual turnover of the plant; firm characteristics: size, age, MNE's home country, firm productivity, exports.	The study investigates the effects of governments' grants in the creation of backward linkages between foreign and domestic firms. While European and US multinationals seem insensitive, MNEs from the Rest of World present a significantly positive effect of grants on backward linkages. The suggestion is to avoid a "one-size-fits-all" policy.
Pineli A., Narula R. and Belderbos R. (2019)	Groningen Growth and Development Centre; fDi Markets; World Development Indicators	28 developing countries	Employment in the modern sector, working age population, FDI stock, manufacturing, non-manufacturing and traditional sector ratio in FDI. Modern sectors: mining, manufacturing, utilities, construction, transport, storage and communication, finance, insurance, real estate and business services.	Positive association between FDI and employment structural change, with a strong heterogeneity across countries. At initial stages of country's development, a higher concentration of FDI in manufacturing is more strongly associated with structural change, while a higher concentration of FDI in the non-manufacturing modern

				sector in later stages of development.
Qu et al. (2015)	World Bank Enterprise Survey (WBES) 2012, NERI Marketization Index 2011 and the China Statistics Yearbook 2011–2012.	China, at regional level	FDI measured as the lagged fixed assets invested by foreign firms. A set of measures of institutional quality (the ratio of R&D expenditure by governments to the total R&D expenditure of a region; regional legal institutions index; number of universities in a province; regional financial institutions).	Regional (sub-national) institutions moderate FDI spillover effects on new product and process innovation of local firms.
Javorcik, B. S., & Spatareanu, M. (2011)	Firm-level data from Amadeus (Bureau van Dijk) and Romanian Chamber of Commerce and Industry for the date of foreign entry.	Romania	Total factor productivity. MNEs presence in same sector and downstream sectors, by region (EU, USA, Asia) of origin. Industry competition with a Herfindahl index; transport costs.	FDI inflows from distant countries of origin are associated with higher positive vertical spillovers, because with the increasing in the distance and the absence of preferential trade agreements between home and host countries, companies have a greater incentive to source intermediate inputs and create a greater commitment with local companies.
Blalock, G. & Simon, D. (2009)	Budan Pusat Statistik (BPS), Central Bureau of Statistics	India	Two measure of absorptive capacity measured: R&D expenditures, and human capital (the percentage of employees with high school or higher degrees) of domestic firms. A measure of current production capabilities (local firm prior productivity). Both measures are interacted with FDI (at industry, and region level).	Firms with a greater prior productivity benefit less from downstream FDI. However, firms with a greater absorptive capacity can acquire and exploit more technology from FDI.
Bournakis et al. (2018)	Regional TFP (from ONS), combined with firm-level data (from Fame Bureau van Dijk database)	United Kingdom	Regional total factor productivity (TFP). R&D expenditures and intangible assets for domestic and foreign-owned companies. Control for local absorptive capacity, MNEs country of origin.	Both foreign and domestic firms can affect regional growth. However, R&D expenditures of MNEs have a greater positive effect on regional TFP, as well as intangible assets per worker. The situation can change when a control for the MNE's country of origin is included.
Crescenzi et al. (2015)	Annual Inquiry into Foreign Direct Investment and firm-level data from Annual Respondent Database (ONS). Fifth Community Innovation Survey (Eurostat)	United Kingdom	Innovation performance as outcome. Inward FDI (investment flow), and local firm characteristics (absorptive capacity, productivity, firm size, degree of internationalization)	While absorptive capacity and technology gap of domestic firms are crucial to explain differences in gains from FDI spillovers, local firms more internationalized and part of MNEs group can benefit less in the interaction with MNEs, especially in the same industry.
Barrios et al. (2006)	Forfás Employment Survey and Irish Economy Expenditure Survey	Ireland, at county level	Productivity (TFP) of local firms, as dependent variable. Foreign presence as the number of foreign firms in the county in each sector, combined with the index of coagglomeration (CEG) developed by Ellison and Glaeser (1997).	The study investigates the spatial dimensions in FDI spillovers. Result suggest that coagglomeration between foreign and domestic plants generates positive spillovers: a one standard deviation change in foreign presence generate a rise varying between 3% and 6% in productivity and 1.7% and 4.3% in employment depending on the measure of foreign presence used.
Kyburz S., & Nguyen H.Q. (2016)	Firm-level data from Vietnam Enterprise Survey	Vietnam, at smallest administrative unit, ward (mean size of 8.21 km ²)	FDI measured as the number of foreign invested firms within a circle around each firm at different radii (2, 5, 10, 20, 50 km)	Positive spillover effects on TFP growth of domestic firms from foreign firms in a close geographical proximity (within radii of 2 to 10 km), stronger in case of horizontal spillover (within-industry), and for small and relatively unproductive domestic firms.
Mariotti et al. (2015)	Firm-level data from AIDA Bureau van Dijk database and Reprint-Politecnico di Milano	Italy, at local labour area (LLA) level.	FDI measured as the number of foreign firms in manufacturing and service sectors.	Productivity spillovers from FDI in service sectors are stronger than from manufacturing sectors. Geographical proximity is more important in manufacturing sectors rather than in services, where temporary proximity mechanisms (periodic meetings, short visits and project teams) operate.

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