



Could spillovers from multinationals affect the trade activities of local firms?

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ABSTRACT

This paper examines spillovers from foreign affiliates of multinationals on various margins of trade of local firms. We find that a larger foreign presence in the same region crowds out the trade activity of local firms, resulting in a reduction of the number of products imported and exported, as well as of the number of origins where imports are sourced from. Supply chain linkages with foreign affiliates are instead found to help local firms to diversify their exports and imports. Engagement in R&D activity allows local firms to mitigate some of the negative effects of the presence of foreign-owned firms in the same region, and enhances the local firms' gains arising through forward linkages.

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1. Introduction

This paper examines whether and to what extent the trade performance of local firms is affected by the activity of foreign affiliates of multinational enterprises (MNEs). There are a number of channels through which spillovers from foreign-owned firms to indigenous firms can take place: competition, learning effects, as well as supply chain linkages.¹ While most of the previous studies have focused on productivity spillovers, MNEs' activity could also impact on various margins of the trade activity of indigenous firms.

Early studies have examined spillovers from MNEs on the export entry decision of local firms, their export intensity, and survival rates. Aitken et al. (1997) and Greenaway et al. (2004) detect positive horizontal (in the same-sector) spillovers from MNEs on the probability that local firms export, while Kneller

(2007) find positive vertical spillovers² on the volume of exports of local firms. Swenson (2008) and Swenson and Chen (2014) find that information spillovers arising from proximity to MNEs in the same industry lead to more frequent, higher quality, and longer-lasting new trade transactions by local firms. Recent papers have also found effects on the quality of exported products. FDI inflows raise the quality of exports in low- and middle-income countries (Harding and Javorcik, 2012) and, at a micro-level, foreign input suppliers allow domestic firms to upgrade the quality of exported products (Ciani and Imbruno, 2017; Bajgar and Javorcik, 2020).

This paper uses detailed custom data matched with firm-level information for Ireland to study how MNEs' presence affects various margins of domestic firms' trade performance, and extends the above-mentioned literature in three ways. Firstly, we examine horizontal (intra-industry and intra-region) and vertical (inter-industry, via supply chain linkages) spillover effects on indigenous firms' product and market extensive margins, with respect to both exports and imports, as well as on their export and import intensity. Secondly, we account for the heterogeneous input sourcing of multinationals, constructing spillover indicators

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¹ There is a large literature on FDI spillovers to indigenous firms initiated by Caves (1974). Recent reviews of this literature include Görg and Strobl (2001), Görg and Greenaway (2004), Meyer and Sinani (2009), Havranek and Irsova (2011).

² Horizontal spillovers arise from the presence of MNEs in the same sector, or the same region as local firms. Vertical spillovers arise from linkages across sectors, with MNEs being either upstream or downstream of the local firms. More details on the types of spillovers will be provided below.

that vary with the home country of MNEs. Thirdly, we examine the role of the absorptive capacity of local firms, proxied by their R&D activity, on their ability to internalise trade spillover effects.

2. Data and empirical methodology

This analysis uses information from three datasets available from Ireland's Central Statistics Office (CSO). Annual data on merchandise exports and imports at firm-product-country level, including intra-EU (Intra-Stat) and extra-EU (Extra-Stat) trade transactions data collected monthly from all VAT registered traders and from administrative data. Annual firm-level balance sheet information is obtained from the Census of Industrial Production: the variables of interest include employment, value added, turnover, wages, and R&D expenditure. All data span over the 1996–2012 period.³ Finally, to construct spillover measures we use input–output data for Ireland and other 42 countries from the 2016 release of the World Input–Output Tables (WIOT).⁴

Our baseline estimating equation is:

$$\begin{aligned} \ln Y_{ijrt}^d = & \alpha_0 + \alpha_1 \text{Intra} - \text{industry}_{j,t-1} + \alpha_2 \text{Intra} - \text{region}_{r,t-1} \\ & + \alpha_3 \text{Forward}_{j,t-1} + \alpha_4 \text{Backward}_{j,t-1} + \alpha_5 Z_{ijrt-1}^d \\ & + \alpha_6 \Delta \text{Sales}_{jt} + \mu_i + \lambda_t + \varepsilon_{ijrt} \end{aligned} \quad (1)$$

Y_{ijrt}^d denotes a trade performance measure for a given firm i , in industry j , region r , at time t including: the number of products exported/imported per firm; the number of export destinations/import origins per firm; export/import intensity.

The key explanatory variables are four measures of spillovers constructed following Javorcik (2004): intra-industry and intra-region horizontal spillovers, forward and backward vertical spillovers across industries.⁵ The spillover measures are lagged by one year in estimation to alleviate reverse causality concerns, and to allow for the effect of MNEs' presence on the performance of local firms to phase-in.

We follow Barrios et al. (2011) and allow the input sourcing behaviour of foreign affiliates to be specific to the home country of the parent company. In the construction of the vertical spillover measures, we use the input–output table specific to each home country of the parent company of foreign affiliates, exploiting the information available in WIOT. Finally, to isolate more accurately the supply chain linkages between domestic and foreign-owned firms, we exclude imports⁶ from the calculation of input and output shares used in the construction of the vertical spillover measures, as done in previous studies (e.g. (Jude, 2016)).

In addition, we control for factors that are likely to affect firms' trade performance. Z_{ijrt-1}^d is a vector of firm characteristics including size (employees), productivity (real value added/employee) and human capital (wage per employee).⁷ We also control for within-industry competition through the Herfindahl–Hirschman index (HHI), and for industry-specific shocks which might affect the measures of spillovers proxied by the change in industry

³ The choice of the analysed period maximises the number of firm-year observations due to changes in the Central Statistics Office's rules for access to micro data files.

⁴ The latest 2016 release includes input–output tables for 43 countries and a table for the rest of the world over the period 2000–2014. <http://www.wiod.org/home>. Details about using the WIOT data base are provided by Timmer et al. (2015).

⁵ We present the description of these measures in the Appendix, as they are very common to the literature on FDI spillovers.

⁶ Hence only local production by Irish firms enter the calculation of the input or output shares.

⁷ These are lagged by one year with respect to the dependent variable to account for possible endogeneity concerns.

sales ΔSales_{jt} . μ_i and λ_t denote full sets of firm and year fixed effects. ε_{ijrt} is the error term.

While foreign affiliates could be a source of knowledge spillovers, the capability of local firms to absorb and internalise this knowledge is crucial (Cohen and Levinthal, 1989; Barrios et al., 2004, 2005; Girma and Görg, 2007a,b). To test for the role of firms' capacity in capturing spillovers from MNEs we augment the baseline model (Eq. (1)) with a binary firm-level R&D indicator⁸ interacted with the spillover variables.

3. Empirical results

3.1. Exporting activity

Table 1 presents results of spillovers from foreign affiliates of MNEs on the number of exported products and export destinations reached by local firms. In the same region, the presence of foreign affiliates has a negative impact on the number of products exported by Irish-owned firms. A 10 percentage (pp) points increase in the share of employment in foreign affiliates reduces the number of products exported by local firms by 2.2 per cent (column 2). In contrast to this negative effect, local firms supplying inputs to foreign affiliates in downstream industries (backward spillover) are found to benefit in terms of export product diversification: a 10 pp higher downstream presence of foreign affiliates increases the number of exported products by Irish firms by 3.4 per cent. Both these effects are not significantly different for local firms engaged in R&D activity. Our estimates also indicate that engagement in R&D does not affect directly the extensive margins of exports by local firms. Taken together these results could be explained by the fact that local firms spend less on R&D relative to MNEs⁹ and therefore their R&D activity is not sizeable enough to drive their exports through innovation and/or technology transfer.¹⁰ A further implication of the low scale of R&D activity by local firms is that the inputs they supply to MNEs are not particularly R&D-intensive.

Positive intra-industry spillovers are found for the number of foreign markets served by Irish firms (columns 5–8); while supply-chain linkages are found to matter for domestic firms purchasing inputs from MNEs, but only if the former are engaged in R&D activities.

In contrast to the effects on these extensive margins of exports, there is no evidence of any spillovers from foreign affiliates on the intensive margin of exports by local firms.¹¹

3.2. Importing activity

Table 2 reports estimates of spillovers from foreign affiliates on the extensive margin of imports of local firms. Similarly to exports, the presence of MNEs in the same region has a negative impact on the number of products imported by local firms, although this effect is dampened for firms doing R&D. The number of imported products by local firms increases through forward linkages, i.e. through a larger presence of MNEs upstream of local firms, with this effect being driven by R&D active firms.

Similar spillover effects are found for the number of import origins. While a larger presence of MNEs in the same region leads to a reduction in the number of import markets for local

⁸ This variable equals one for firms with R&D expenditures and zero otherwise.

⁹ Irish-owned firms account for 30% of business expenditures on R&D undertaken in Ireland.

¹⁰ For evidence on R&D as a driver of innovation and channel for technology transfer see for example Cohen and Levinthal (1989) and Griffith et al. (2004).

¹¹ These results are shown in Table A.1 in the Appendix.

Table 1

FDI spillovers on the number of exported products and export destinations.

Source: Authors' estimates based on data from Ireland's Central Statistics Office (CSO).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Number of exported products				Number of export destinations			
Intra-industry _(t-1)	-0.062 (0.081)	-0.047 (0.074)	-0.063 (0.088)	-0.050 (0.079)	0.150** (0.057)	0.138** (0.055)	0.145** (0.053)	0.135** (0.051)
Intra-region _(t-1)	-0.215*** (0.056)	-0.219*** (0.057)	-0.235*** (0.064)	-0.239*** (0.065)	-0.063 (0.069)	-0.063 (0.0697)	-0.049 (0.078)	-0.049 (0.078)
Forward _(t-1)		0.250 (0.582)		0.234 (0.644)		0.339 (0.463)		0.178 (0.493)
Backward-Home _(t-1)		0.335* (0.165)		0.279 (0.192)		0.373 (0.228)		0.292 (0.206)
R&D _(t-1)			-0.025 (0.040)	-0.024 (0.041)			-0.032 (0.025)	-0.024 (0.024)
R&D x Intra-industry _(t-1)			0.001 (0.079)	0.003 (0.082)			0.006 (0.049)	-0.006 (0.054)
R&D x Intra-region _(t-1)			0.055 (0.059)	0.0575 (0.059)			-0.034 (0.061)	-0.034 (0.061)
R&D x Forward _(t-1)				0.0426 (0.251)				0.379* (0.209)
R&D x Backward-Home _(t-1)				0.153 (0.199)				0.186 (0.196)
Sales growth and HHI _(t-1)	Y	Y	Y	Y	Y	Y	Y	Y
Firm controls _(t-1)	Y	Y	Y	Y	Y	Y	Y	Y
Firm fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
No. observations	11,722	11,722	11,722	11,722	11,685	11,685	11,685	11,685

Notes: Forward and backward spillover measures are computed excluding imports. Standard errors shown in parentheses are clustered at the 2-digit industry level. *, **, ***, denote significance at 10, 5, and 1 percent levels, respectively.

Table 2

FDI spillovers on the number of imported products and import origins.

Source: Authors' estimates based on data from Ireland's Central Statistics Office (CSO).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Number of imported products				Number of import origins			
Intra-industry _(t-1)	0.0430 (0.057)	0.0325 (0.057)	0.0313 (0.056)	0.0261 (0.056)	0.0529 (0.036)	0.0409 (0.036)	0.0376 (0.031)	0.0301 (0.032)
Intra-region _(t-1)	-0.164* (0.089)	-0.166* (0.088)	-0.194* (0.100)	-0.196* (0.0998)	-0.0858* (0.044)	-0.0887* (0.043)	-0.107** (0.047)	-0.109** (0.046)
Forward _(t-1)		0.937* (0.489)		0.644 (0.498)		1.052*** (0.297)		0.811** (0.296)
Backward-Home _(t-1)		-0.106 (0.155)		-0.129 (0.165)		0.132 (0.104)		0.113 (0.091)
R&D _(t-1)			-0.0534* (0.028)	-0.0444* (0.026)			-0.0653** (0.025)	-0.0583** (0.023)
R&D x Intra-industry _(t-1)			0.0299 (0.053)	0.00996 (0.053)			0.0429 (0.036)	0.0246 (0.034)
R&D x Intra-region _(t-1)			0.0893* (0.049)	0.0883* (0.049)			0.0593 (0.042)	0.0587 (0.043)
R&D x Forward _(t-1)				0.635** (0.282)				0.541** (0.198)
R&D x Backward-Home _(t-1)				0.0650 (0.118)				0.0549 (0.079)
Sales growth and HHI _(t-1)	Y	Y	Y	Y	Y	Y	Y	Y
Firm controls _(t-1)	Y	Y	Y	Y	Y	Y	Y	Y
Firm fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
No. observations	20,435	20,435	20,435	20,435	20,388	20,388	20,388	20,388

Notes: Forward and backward spillover measures are computed excluding imports. Standard errors shown in parentheses are clustered at the 2-digit industry level. *, **, ***, denote significance at 10, 5, and 1 percent levels, respectively.

firms, purchasing from foreign affiliates increases the number of markets local firms import from. R&D is found to magnify the local firms' gain arising along the value-chain.

The import intensity of domestic firms is not affected by the presence of MNEs (Table A.1 in Appendix), except for the local firms with R&D activity, whose import intensity is found to increase through a larger foreign presence in downstream industries.

4. Discussion and conclusions

The presence of MNEs has multiple effects on the trade margins of local firms. On one side, geographical proximity to MNEs induces local firms to concentrate their exports and imports on fewer products, and to import from fewer origins. This is likely to be the result of enhanced local competition, as demand for labour and other local factors can drive up operating costs for

Table A.1

FDI spillovers on export and import intensities.

Source: Authors' estimates based on data from Ireland's Central Statistics Office (CSO).

	(1) Export intensity	(2)	(3)	(4)	(5) Import intensity	(6)	(7)	(8)
Intra-industry _(t-1)	-0.0111 (0.0195)	-0.0217 (0.0202)	-0.0210 (0.0200)	-0.0301 (0.0205)	0.0325 (0.0202)	0.0254 (0.0200)	0.0345* (0.0207)	0.0273 (0.0203)
Intra-region _(t-1)	-0.0104 (0.0237)	-0.00971 (0.0237)	0.000854 (0.0302)	0.00188 (0.0304)	-0.0132 (0.0177)	-0.0126 (0.0175)	-0.0168 (0.0190)	-0.0162 (0.0188)
Forward _(t-1)		0.125 (0.223)		0.0574 (0.199)		0.126 (0.129)		0.140 (0.126)
Backward-Home _(t-1)		0.0329 (0.0799)		0.0413 (0.0771)		0.0557 (0.0559)		0.0341 (0.0570)
R&D _(t-1)			0.0011 (0.0105)	0.0042 (0.0099)			-0.0086 (0.0081)	-0.0084 (0.0077)
R&D x Intra-industry _(t-1)			0.0279 (0.0188)	0.0222 (0.0185)			-0.0042 (0.0156)	-0.0037 (0.0165)
R&D x Intra-region _(t-1)			-0.0267 (0.0201)	-0.0274 (0.0203)			0.0096 (0.0147)	0.0098 (0.0147)
R&D x Forward _(t-1)				0.147 (0.103)				-0.0301 (0.0798)
R&D x Backward-Home _(t-1)				-0.0398 (0.0537)				0.0780** (0.0336)
Sales growth and HHI _(t-1)	Y	Y	Y	Y	Y	Y	Y	Y
Firm controls _(t-1)	Y	Y	Y	Y	Y	Y	Y	Y
Firm fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
No. observations	11,716	11,716	11,716	11,716	20,428	20,428	20,428	20,428

Notes: Forward and backward spillover measures are computed excluding imports. Standard errors shown in parentheses are clustered at the sector level. *, **, ***, denote significance at 10, 5, and 1 percent levels, respectively.

firms in an area.¹² The local pro-competitive effect of MNEs can also be reflected in a re-allocation of activity within Irish firms towards producing and trading fewer products: this is akin to what has been found for multiproduct firms in response to the pro-competitive effect of trade shocks (Mayer et al., 2021).

On the other side, a larger presence of MNEs in the same sector and supply-chain linkages help local firms to diversify their exports and imports. Local exporters expand the range of destinations they serve as they learn from MNEs' activity in their sector: new trade links can result from information spillovers¹³ that lower the cost of expanding firms' trade networks. Along supply chains, being upstream to MNEs is likely to raise the efficiency of local firms (Gorodnichenko et al., 2014; for Ireland, Di Ubaldo et al., 2018), or MNEs might help their suppliers develop new products: in line with this, we find that supplying inputs to MNEs enables local firms to sell more of their own products abroad.

Being downstream to MNEs could also lead to efficiency gains through technology spillovers embedded in higher quality inputs. Our results suggest that buying inputs from MNEs gives Irish firms the capability to enter new export markets, import a larger number of products, and from a larger number of origins. This is consistent with evidence on the importance of access to foreign and/or high-quality inputs for firms' trade performance, as reported by Amiti and Konings (2007), Goldberg et al. (2010), Manova and Zhang (2012), and Bajgar and Javorcik (2020). In particular, the larger number of markets reached both as importers and exporters, suggests that buying from MNEs might introduce local firms into MNEs' international production networks.

R&D activity appears to be a conduit to either dampen (some of) the negative effects of MNEs' presence, or to enhance their positive effects on local firms' trade. While we find no effect

of engagement in R&D on spillovers through backward linkages, presumably due to the low R&D intensity of Irish firms and the possibility that MNEs might not source R&D-intensive inputs in Ireland, R&D activity is of particular relevance for spillovers through forward linkages, i.e. for absorbing knowledge from MNEs upstream and using it to diversify trade activities. These findings are consistent with the role of R&D as a channel for technology transfer (Cohen and Levinthal, 1989; Griffith et al., 2004). However, our research results suggest that to fully internalise knowledge spillovers from multinationals, local firms would require a more sizeable absorptive capacity beyond existing R&D capabilities. This hypothesis is consistent with previous evidence that knowledge spillovers from MNEs to local firms are more likely when the technology gap between the two groups of firms is not too large.¹⁴ We suggest that further research could shed light on this hypothesis.

Data availability

The data that has been used is confidential.

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¹⁴ See for example the meta-analysis by Havranek and Irsova (2011).

¹² Bournakis et al. (2022) find that MNEs' presence makes local firms to charge lower markups.

¹³ This finding is consistent with Swenson and Chen (2014), who find that more MNEs in the same-sector lead to an increase in new trade links for local Chinese firms. Worker mobility from MNEs to local firms is one of the main channels for knowledge transfer within sectors (Poole, 2013).

Appendix

Spillover Measures

Intra – industry $_{j,t-1} = Y_{j,t-1}^f / Y_{j,t-1}$ is the share of foreign affiliates' employment in total employment in industry j , at time $t - 1$.

Intra – region $_{r,t-1} = Y_{r,t-1}^f / Y_{r,t-1}$ is the share of foreign affiliates' employment in total employment in region r , at time $t - 1$.

Forward spillovers from foreign-owned suppliers in upstream industries to indigenous firms in downstream industries:

Forward $_{j,t-1} = \sum_l \delta_{lj} \text{Intra – industry}_{l,t-1}$, $l \neq j$, where δ_{lj} denotes the share of inputs of industry j purchased from industry l .

Backward spillovers from foreign-owned customers in downstream industries buying inputs from indigenous firms in upstream industries:

Backward $_{j,t-1} = \sum_l \gamma_{lj} \text{Intra – industry}_{l,t-1}$, $l \neq j$, where γ_{lj} denotes the share of output of industry j supplied to industry l .

Herfindahl Index

HHI_{jt-1} is the Herfindahl–Hirschman index in industry j at time $t - 1$ which controls for within industry competition. For each industry j , the HHI index is computed as follows:

$$HHI_{jt-1} = \sum_i^N s_{ijt-1}^2 \quad (\text{A.1})$$

s_{ijt-1}^2 denotes the market share of firm i at time $t - 1$ in industry j .

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