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Spillovers from foreign firms through worker mobility: An empirical investigation*

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Abstract: While there has been a large empirical literature on productivity spillovers from multinationals this literature treats the channels through which these spillover effects work as a black box. The innovation of this paper is to investigate whether spillovers occur via worker mobility. We use data on whether or not the owner of a domestic firm has previous experience in a multinational, and relate this information to firm level productivity. Our results suggest that firms which are run by owners that worked for multinationals in the same industry immediately prior to opening up their own firm are more productive than other domestic firms.

Keywords: Foreign direct investment, spillovers, worker mobility, training

JEL classification: F21, F23, J61

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I Introduction

Over the last decades, foreign direct investment (FDI) has become increasingly important in the world economy. Developing countries, in particular, have witnessed significant increases in the importance of FDI, with inward FDI rising from about 4 percent of GDP in 1980 to almost 16 percent in 1996 for this group of countries (UN 1998). This has gone hand-in-hand with a shift in emphasis among policymakers towards actively attracting FDI. Many host countries are now encouraging the inflow of FDI by providing generous investment and/or tax incentives. While the expected potential benefits include employment creation, capital formation and export promotion, one of the most frequently given reasons to attract FDI is the prospect of acquiring new technology which may spill over to the host country and allow domestic firms to improve their performance. This may be a particularly important potential mechanism for developing countries to catch-up to the industrialised world.

More specifically, multinational companies are expected to have access to some sort of firm specific asset, manifesting itself as a superior knowledge base, production technology, or marketing and management technique (Markusen, 2002, Caves, 1996). By inviting multinationals into the country, host country governments expect that at least some of this firm specific asset will be transferred to domestic firms, thus enabling them to improve their performance in terms of productivity, skills, or export performance. This knowledge transfer can be either voluntary through technology transfer arrangements or involuntary through knowledge spillovers.

A large micro-economic literature has developed over the last three decades or so concerning itself with such knowledge, or productivity spillovers.[1] These are assumed to occur through three main channels. First, there are "demonstration effects", i.e., domestic firms learn through imitation from multinationals. Second, there is a "competition effect" whereby domestic firms face competition from more productive multinationals and have to improve their own performance to compete successfully. Third, spillovers may occur through movement of labour, whereby workers trained by or working in multinationals decide to leave and join an existing or open up a new domestic firm, taking with them some or all of the firm specific knowledge of the multinational.

Many empirical studies have set out to measure the magnitude of productivity spillovers at the micro level for both developing and developed countries (e.g., Kokko, 1994; Aitken and Harrison, 1999; Blomström and Sjöholm, 1999; Keller and Yeaple, 2003, Smarzynska-Javorcik, 2004).[2] However, the evidence is mixed. For example, Aitken and Harrison (1999) using plant level panel data for Venezuela find no evidence for productivity improvements in host country firms due to foreign presence. In fact, they find that some firms even experience negative effects from FDI in the same industry. By contrast, Keller and Yeaple (2003) using firm level data for the US find that domestic firms are able to benefit from intra-industry FDI. Furthermore, Smarzynska-Javorcik (2004) shows that domestic firms in Lithuania benefit from vertical (inter-industry) rather than horizontal (intra-industry) spillovers from multinationals. These mixed results have been explained as reflecting different firm and country characteristics (Lipsey and Sjöholm,

1 See Görg and Greenaway (2004) and Blomström and Kokko (1998) for reviews of that literature.

2 There are also a number of papers which try to assess the macro effect of FDI on GDP growth, see, for example, Balasubramanyam et al. (1996), Borensztein et al. (1998) and Alfaro et al. (2004). These studies find positive growth effects for a certain group of countries.

2005) in the different data sets used, or as being due to different estimation techniques employed (Görg and Strobl, 2001).

One of the drawbacks of these studies is that they treat the specific mechanisms by which the spillovers are supposed to occur as a "black box". As such they usually regress total factor or labour productivity of domestic firms on a number of covariates, including a measure of the extent of multinational presence in an industry. A positive and statistically significant coefficient on that variable is then interpreted to indicate the existence of positive productivity spillovers.

While empirical studies do, by and large, not examine the mechanisms through which spillovers may occur, the recent theoretical literature has focussed on one particular channel, namely the movement of workers from foreign to domestic firms (Fosfuri et al., 2001, Glass and Saggi, 2002). There have been, to the best of our knowledge, no empirical studies examining the effect of worker movements for the performance of domestic firms. The novelty of our paper is, therefore, to present a detailed analysis of this issue at the empirical level. Worker movements may be particularly important in developing countries, as these are usually skilled labour scarce and there is therefore a large potential for domestic workers to receive training and experience in multinational companies. The acquired knowledge can then, of course, increase the knowledge stock in domestic firms if workers from foreign firms join them.

We have access to detailed firm level data for a sample of manufacturing firms in Ghana which allow us to tackle the issue at hand. Specifically, we have information available on whether or not the entrepreneur, i.e. the owner or chairman, of the domestic firms in the sample worked for a foreign multinational before joining or setting up his/her

own domestic firm and we can determine whether this experience was gained in the same or in other industries. Furthermore, the data allows us to identify whether or not he/she received training by a multinational firm at any point during the sample period. Thus, while the data do not provide information on all workers in a firm, they do relate to the entrepreneur, the main decision maker whose influence is particularly important for firm performance. Using these data, we investigate whether domestic firms which have entrepreneurs with foreign training and/or experience have a productivity advantage compared to other firms.[3]

Our econometric results show that firms whose entrepreneur worked in multinationals in the same industry are more productive than other domestic firms. No such evidence is found for firms run by entrepreneurs who worked for multinationals in other industries. This suggests that some of the multinationals' knowledge is industry specific and cannot be transferred to firms in other industries. Also, explicit training received by multinationals does not appear to affect the firm's performance.

The remainder of the paper is structured as follows. Section 2 briefly discusses why we may expect spillovers through movements of workers. Section 3 presents the dataset while Section 4 contains the results of the econometric estimations. Section 5 summarises our findings and concludes.

[3] One should note that we treat the decision of the entrepreneur to move from a foreign to a domestic firm as exogenous. This related literature argues that employees may decide to become entrepreneurs if the expected earnings are higher than the expected wage if remaining in paid employment. See, for example, Evans and Jovanovic (1989) and Evans and Leighton (1989).

II Spillovers through worker mobility

Spillovers can arise when workers receive training or accumulate experience working for multinationals, and then move to domestic firms or set up their own enterprise. When moving, they may take with them some of the knowledge they have acquired in the multinational which can be usefully employed in the domestic firm and help improve its performance. This channel for spillovers has recently been investigated theoretically by Fosfuri et al. (2001) who examine the conditions under which such spillovers occur. Moreover, Glass and Saggi (2002) also provide a formal representation of the movement of trained workers from multinationals to domestic firms as a channel for spillovers.

Empirical work in this area is, however, scarce. There is some evidence that multinationals are important providers of training activities in developing countries (ILO, 1981; Lindsey, 1986). Also, some studies found that in a comparison of domestic firms and multinationals, the latter provide more training than the former. Gershenberg (1987) provides such evidence from a survey of 72 managers in manufacturing firms in Kenya.[4] He also finds some evidence for movements of managers from multinationals to domestic firms.[5] Djankov and Hoekman (1999) analyse enterprise level panel data for the Czech Republic. In their summary statistics they show that multinationals provide higher levels of training than domestic firms.

Sousa (2001) appears to provide the most comprehensive analysis of training activities of multinationals. Using detailed data on workplaces in the UK he finds that multinationals are more likely to provide training, and also provide higher intensities of

4 This finding is only true in a comparison of multinationals and purely domestic private firms. Multinationals do not appear to provide more training than joint ventures or publicly owned Kenyan companies.

training than domestic firms, controlling for a number of workplace and sector specific characteristics. Using a matched firm and worker level dataset for Ghanaian manufacturing firms, Görg, Strobl and Walsh (2002) find that workers who work for and receive training in foreign firms experience more rapid wage growth than workers being trained in domestic firms. This is consistent with their theoretical model which shows that training provided by foreign firms is more productive than that of domestic firms and, hence, workers trained in foreign firms have steeper wage profiles.

The aforementioned studies hint at the potential for spillovers through the movement of highly trained and experienced workers from multinationals to domestic firms. There are also some empirical studies that show that inward FDI increases wages paid by domestic firms (e.g, Aitken et al, 1996, Girma et al., 2001, Lipsey and Sjöholm, 2004). Under certain assumptions such findings may be interpreted as providing indirect evidence for spillovers through labour mobility, leading to higher wages in domestic firms. However, there is to the best of our knowledge no study to date that attempts to determine whether the domestic firms that receive the new workers actually benefit from spillovers.

III Description of the data

The data used in this paper are drawn from a firm level survey of manufacturing firms in Ghana. The survey is part of the *Regional Programme for Enterprise Development* (RPED), a larger data collection effort for a number of African countries, organised initially

[5] Pack (2001) similarly points out that there is evidence for Taiwan that managers from multinationals leave to set up their own business.

by the World Bank.[6] The data consist of five waves of an annual sample of Ghanaian manufacturing firms in the food processing, bakeries, textiles and garments, wood products, furniture, metal and machinery sectors, covering the years 1991-1997.[7] These sectors together comprise about 70 per cent of total manufacturing employment in Ghana.[8] As is standard for most firm level panel data the dataset includes, amongst other things, information such as the level of output, total expenditures on wages, the replacement value of the capital stock, the level of value added, and the level of employment.[9]

In order to measure spillovers through worker mobility one would, in an ideal world, like to have data on the history of all workers in firms to be able to trace whether they have had any work experience in or have been trained by multinational companies before joining the current firm. Using such data one would then be able to determine whether employing such workers leads to the firm being more technology intensive, using better technology and, ultimately, being more efficient and productive. Unsurprisingly, neither our data nor data for other countries that we are aware of provide such information.

However, the Ghana data does provide specific information on characteristics of the owners/chairmen (also referred to as entrepreneurs) of private domestic firms which allows us to investigate whether domestic firms benefit from their entrepreneur having received training or gained work experience in a foreign firm. Specifically, one is able to identify

[6] The collection of the data for Ghana was carried out by a team from the Centre for the Study of African Economies (CSAE), University of Oxford, the University of Ghana, Legon and the Ghana Statistical Office and was funded by the Overseas Development Administration in the UK.
[7] The last two waves were conducted two years apart collecting information for the prior year retrospectively.
[8] An initial sample of 200 firms was drawn from the 1987 Ghana Census of Manufacturing Activities, stratified by size, sector and location. It should be noted that in the sampling, large firms were oversampled. When firms closed down over the period they were replaced with firms in the same size, sector and location category.
[9] Nominal values are deflated using sectoral output price deflators.

three distinct types of previous contact with foreign firms: First, whether the owner/chairman has received any explicit training by foreign firms in the past. Second, whether the owners immediate previous experience was working with a foreign firm within the same industry as the industry of their current firm or, third, whether the owner worked for a foreign firm in some other industry. Furthermore, we are able to ascertain whether the owners have had any previous experience working in the same industry in general.[10] For our purposes we are interested in investigating whether training and/or experience in a foreign firm by the owner/chairman affects firm level productivity, and create zero-one type dummy variables to indicate this.

Finally, the RPED data also includes information on the schooling of the owner/chairman. In some waves one has information on the age at which the individual left school and what qualification he/she achieved, whereas in others only information on the former is available. Where possible we use information on both of these to construct years of schooling. We explicitly use this variable to proxy for the level of human capital, excluding foreign training and experience, of the individual in question.

The data set includes information on a total of 278 domestic manufacturing firms. Dropping observations with missing values for output, capital, material inputs, employment, or for indicators of foreign experience/training, we are left with data on 228 firms. Of these, 32 have owners with training or work experience gained in foreign firms. In particular, the owners of 12 firms have immediate prior experience working in foreign firms in the same industry, 9 have immediate prior experience working with foreign firms

[10] These questions are re-asked if the firm changes ownership/chairmanship. Given that the information on actual employment by a foreign employer only pertains to the experience immediately prior to becoming owner/chairman of the firm questioned, we are unable to identify those that may have worked for a foreign firm, although not immediately prior to becoming the owner/chairman of their current firm.

in different industries, and 13 received training provided by foreign firms. Only two have owners that both worked for and received training from a foreign multinational.

Table 1 reports some summary statistics on the percentages of firms with owners with foreign training / experience (FT/E) compared to firms with owners without FT/E. The first column shows the distribution of firms with FT/E across manufacturing sectors, the second shows the equivalent sectoral distribution for firms without FT/E. One should note that firms with owners with FT/E are more prevalent in the furniture and metals sectors, which are arguably the most technology intensive (broad) sectoral categories. The third column presents the share of firms in a sector with FT/E relative to the total number of firms in the sector. Again, this indicates the importance of the metals and furniture sectors where 18.6 and 20.4 percent of firms, respectively, are run by entrepreneurs with FT/E.

[Table 1 here]

Some further summary statistics over the entire period, 1991-1997, for domestic firms by the incidence of FT/E are provided in Table 2. These are: total factor productivity (*tfp*),[11] output (*q*), value added (*vad*), total employment (*l*), capital per worker (*k/l*), and material inputs per worker (*m/l*). All variables are expressed in logs. First of all, one should note that there is substantial variation in the data as indicated by the standard deviations. As can also be seen, domestic firms owned or run by entrepreneurs with experience and/or training from foreign firms are significantly larger, in terms of output, value added or employment than other domestic firms. Furthermore, they are also more intensive in both capital and labour usage and have higher total factor productivity. These differences are all statistically significant at the 1 per cent level.

[Table 2 here]

These descriptive statistics provide preliminary evidence supportive of the idea that managers who moved from multinationals to domestic firms run firms that are "better" than others. This may be indicative of these individuals bringing some of the knowledge from their previous experience with them which then "spills over" to the new firm. The figures are, of course, averages over fairly heterogeneous firms and the summary statistics may be confounding the effects of different sector, firm or owner characteristics. We turn therefore to an econometric analysis in order to disentangle the effect of foreign experience/training from other variables impacting on firm productivity.

IV Econometric Analysis

In order to investigate more precisely the existence of spillovers through the movement of individuals from foreign multinationals to domestic firms we model econometrically the effect of entrepreneurs' characteristics on firm level productivity. In order to do so we start off with a Cobb-Douglas type production function (similar to, for example, Aitken and Harrison, 1999 and Smarzynska-Javorcik, 2004) written in log values as

$$y_{it} = \beta_0 + \beta_1 k_{it} + \beta_2 l_{it} + u_i + e_{it} \qquad (1)$$

where y is the log of value added (calculated as total output minus materials) for firm i and k and l are log values of capital and labour inputs. u_i is an unobserved firm specific time invariant effect that may impact on total factor productivity (such as unobserved managerial ability, or industrial sector) and e_{it} is the remaining white noise error term. We use this to obtain estimates of the factor elasticities and derive (log) total

[11] See Section 4 for a description of how TFP is calculated.

factor productivity (TFP) as the firm and period specific residual ($u_i + e_{it}$) using a fixed effects estimator. In order to take account of heterogeneity across sectors we estimate equation (1) for each of the industries available in our sample separately.[12]

Using these TFP estimates we then proceed to examine the effect of entrepreneurs' characteristics on productivity by estimating a regression[13]

$$tfp_{it} = \gamma_0 + \gamma_1 FT_i + \gamma_2 FE_{ij} + \gamma_3 FE_{ih} + \gamma_4 s_i + \gamma_5 E_{ij} + \gamma_6 D_j + \gamma_7 T_t + v_{it} \qquad (2)$$

where *tfp* is the log value of total factor productivity derived from equation (1), D_j and T_t are full sets of industry and time dummies respectively, and v_{it} is a white noise error term. The first three variables are the dummy variables included to capture any spillovers arising from work experience or training received by multinationals. FT_i is equal to one if the owner received training by a multinational. FE_{ij} is a dummy equal to one if the owner of the firm had gained experience working for a multinational within the same industry j prior to starting in the present firm. FE_{ih} is equal to one if previous experience was gained in a multinational in a different industry $h \neq j$. If all or part of the knowledge accumulated by workers is industry specific one would expect that experience gained in multinationals in the same industry would allow the entrepreneur to improve the performance of the domestic firm, while this effect would be less if experience were gained outside the industry.

We also include two available proxies for the entrepreneur's ability, namely, years of schooling (s_i) and a dummy equal to one if he/she has had any previous experience in the

[12] Estimates of these are provided in the appendix. As can be seen, the individual coefficients on the inputs seem reasonable. Nevertheless, differences across sectors demonstrate that it is important to take sectoral heterogeneity into account when considering TFP measures.

[13] Given the time invariant nature of our foreign firm experience/training indicator variables the estimation of an augmented production function, incorporating the independent variables from equation (2) in equation (1) would not have been possible using a fixed effects estimator.

same industry (E_{ij}). If we did not include these variables our analysis would be subject to a number of criticisms: first, foreign firms may be more likely to hire or provide training to more skilled workers as they may already have better and more human capital. In that case, our foreign experience / training variables may only be indicating that the entrepreneur is of higher ability. In other words, while foreign experience or training may seem to increase productivity, this may only be due to the owner being better educated and/or more able *a priori*. Also, it may be the case that better (i.e, more productive) firms can attract better managers. In that case, again, the observed relationship between foreign experience and productivity growth may not be due to a causal relationship between the two variables if we did not control for entrepreneurs' ability. Furthermore, without including E_{ij} one may argue that FE_{ij} only picks up the effect of experience gained in the industry *per se,* but does not represent an effect particular to experience gained in foreign firms. Of course, these two variables are only imperfect but we would regard them as reasonable proxies to address these issues.[14]

Table 3 presents the results of estimating different specifications of equation (2). Columns (1) to (3) use TFP as the dependent variable. In the initial regression in column (1) we distinguish training received, and experience gained in foreign firms. In column (2) we distinguish the latter into experience gained in foreign firms in the same industry (FE_{ij}), and experience gained in foreign firms in other industries (FE_{ih}). From these regressions we find that FE_{ij} has a positive effect on firm level productivity but that the coefficient on

[14] Due to data limitations we are not able to include any other variables for owners' ability. However, we take comfort from the fact that years of schooling is widely used in the labour economics literature to proxy individuals' ability; see Willis (1987) for a review of empirical estimates of the human capital earnings function.

this is statistically insignificant. FT and FE_{ih} return negative coefficients, by contrast. We will return to a possible explanation for this result below.

In column (3) we interact the schooling variable with the three foreign experience / training variables (FT, FE_{ij}, FE_{ih}) as well as the dummy to capture general industry experience (E_{ij}). This allows us to capture the effect that more skilled employees may benefit differently from foreign experience / training or general industry experience than less skilled individuals. The inclusion of the interaction terms leads to some interesting changes in the significance of the spillovers variables. For within industry experience (FE_{ij}) we now find a positive and statistically significant coefficient suggesting that owners who gained experience in multinationals in the same industry indeed run more productive firms. Thus, this provides evidence supportive of the idea that there are spillovers through worker movements, where the domestic entrepreneurs bring with them knowledge accumulated in the multinationals which can be usefully applied in the domestic firm. The negative coefficient on the interaction term also suggests that the least skilled entrepreneurs (in terms of years of schooling) can gain more from having experience in multinationals. Hence, prior human capital and training received by foreign firms are not necessarily complements. Entrepreneurs' individual human capital may benefit most from additional learning in multinationals compared to well educated domestic entrepreneurs who may gain only little additional knowledge. Specifically, the point estimates of the coefficient on the interaction term suggest that the positive effect from experience gained in foreign firms vanishes for individuals with more than 11 years of schooling.[15]

[15] The mean value of schooling is 10.8, with a median of 10. This also explains why FE_{ij} is not significantly different from zero in column (2), as the mean/median value is close to the value of s for which the effect of FE_{ij} is equal to zero.

There is also still evidence that gaining experience in multinationals outside their own industry has a negative effect on productivity. Again, however, we find that this effect is lower the more skilled the entrepreneur. One possible explanation for this is that the knowledge obtained in multinationals is largely industry specific and can not be easily transferred to businesses in different industries. It appears that, at least in the short run, these entrepreneurs run firms that are less productive than the average domestic firms. This may, perhaps, be due to their having to spend time building up or improving their industry specific knowledge and/or because the skills acquired in foreign firms may be even more industry specific than those acquired in domestic firms. However, another, not mutually exclusive explanation is that work experience in foreign firms in other sectors is likely to be negatively correlated with the degree of general experience in the same industry. If the dummy for general industry experience (E_{ij}) and its interaction with schooling are unable to capture all of the differences in the degree of same industry experience then the lack of such experience may in part be picked up by FE_{ih}.

The coefficient on training provided by multinationals is now positive with a negative interaction term, although both coefficients are statistically insignificant. This suggests that training does not appear to be an important channel for spillovers.

In terms of the other two control variables included, years of schooling on its own shows consistently positive coefficients in all specifications, which suggests that more able individuals run more productive firms, as expected. Previous experience in the industry is positively related to TFP in column (3), although the negative interaction term indicates that experience is less valuable for more skilled entrepreneurs.

Although TFP is arguably the most appropriate measure to capture knowledge spillovers resulting from labour mobility, it is also insightful to examine other proxies of firm performance. Thus columns (4) to (6) display results for estimations similar to the ones reported before but where we use log values of labour productivity (value added per employee), total output and total value added, respectively, as dependent variables. In terms of total output and total value added the results are remarkably similar to the TFP estimations in column (3), both in terms of statistical significance levels and the magnitude of the coefficients. In contrast, there are some differences in terms of the labour productivity estimation. Specifically, training in foreign multinationals now has a statistically significant positive effect on firm performance, although this decreases with the level of schooling of the entrepreneur, as indicated by the significantly negative interaction term. We also now find that foreign firm experience in other sectors has no statistically significant effect. Nevertheless, our previous result of a significant positive, although decreasing with schooling, impact of experience in a foreign firm in the same industry still holds for the labour productivity estimation.

[Table 3 here]

But does the positive effect of experience gained in foreign firms in the same industry just reflect the fact that highly productive firms attract entrepreneurs that have gained experience in multinationals in the same industry? These firms may provide a highly attractive environment in which to work for the new entrepreneur. In that case the spillovers dummies would, of course, be endogenous. This criticism, however, would not apply if these domestic firms were established by the owners and did not have a history of existence before the owner joined. Fortunately, from our dataset we can determine whether

an owner established a firm himself and whether the business has been run by the owners' family. Focusing on these two groups of firms should allow us to avoid possible bias arising from productive firms attracting experienced high ability entrepreneurs.

Table 4, therefore, presents results of estimating the same specifications as in Table 3 using data only for firms if they were founded by the current owner or if they were run by the owners' family before he/she took over ownership. Reassuringly, the results for TFP remain very similar to the results presented in Table 3 in terms of magnitude and statistical significance, the only difference being that the impact of experience in foreign firms in other industries is no longer statistically significant. In terms of the other performance measures, one, importantly, finds that all results for TFP hold. The only exception is that for labour productivity there is no longer a positive impact of training in foreign firms. This suggests that the positive effect of training on labour productivity reported in Table 3 is not robust to ensuring that entrepreneurs are not just being hired by more productive firms.

[Table 4 here]

Taken together, our analysis presents consistent evidence that domestic firms which are run by entrepreneurs who gained experience working for multinationals in the same industry before running their own firms, are more productive than other firms.[16] This effect, however, diminishes for more skilled (in terms of years of schooling) entrepreneurs. This may be interpreted as a sign that the entrepreneurs accumulate knowledge working for

[16] We also carried out a number of further robustness checks. First, we dropped the foreign training variable as it did not provide a consistently significant effect across alternative specifications. We also ran regressions excluding the schooling variable, as well as excluding jointly the schooling variable and the dummy variable capturing general industry experience. These regressions were also estimated only on the sample of firms that were founded by the current owner or were run by the owners' family. The results suggest the robustness of our previous findings. Results are not reported here to save space, but can be obtained from the authors upon request.

multinationals which can be usefully employed in the new domestic firm in the same industry.[17] The fact that there is no consistent positive effect if the entrepreneur gained his/her experience in multinationals in a different industry suggests that the knowledge obtained in multinationals is largely industry specific and can therefore not be easily transferred to businesses in different industries. In some specifications there is indeed evidence that these entrepreneurs run firms that are less productive than the average domestic firms, although this is not robust to different specifications. One explanation for such negative results may perhaps be that they have to spend time building up or improving their industry specific knowledge since the skills acquired in foreign firms may be even more industry specific than those acquired in domestic firms.[18]

While these results concerning experience gained in foreign firms provide some evidence that there are spillovers from worker mobility, there is no consistent evidence to suggest that firms also benefit if their owners receive only training in multinationals. As the training variable only captures explicit training provided by multinationals it may, however, be the case that we are not able to measure adequately other types of more informal acquisitions of human capital and/or that explicit training only constitutes a small proportion of total human capital acquired in a foreign owned firm.

[17] Thus, our findings provide a counterbalance to Smarzynska-Javorcik (2004) who argues and provides evidence for Lithuania that domestic firms only benefit from inter-industry but not from intra-industry spillovers from multinationals.

[18] However, another possible and not mutually exclusive explanation is that our proxy for own industry experience, a simple zero-one type dummy variable, is not fully capturing the impact of own industry experience, so that the proxy for experience in a multinational in other industries is in part capturing the lack of own industry experience.

V Conclusions

While there has been a large empirical literature on productivity spillovers from foreign to domestic firms it treats the channels through which these spillover effects work as a black box. Some theoretical work has recently stressed the importance of the movement of workers from foreign to domestic firms as a channel for spillovers. However, there is to date no empirical study which investigates this issue in detail. We attempt to fill this gap in the literature with this paper.

While our results focus only on one possible mechanism for spillovers through worker movements, namely, the movement of the owner/chairman of the firm, they suggest that firms which are run by owners that worked for multinationals in the same industry immediately prior to opening up their own firm have higher productivity levels than other firms. This implies that these entrepreneurs bring with them some of the knowledge accumulated in the multinational which can be usefully employed in the new domestic firm. In contrast, we do not find any consistent positive effects on firm performance if the owner had experience in multinationals in other industries, or received only training by multinationals.

Our analysis treats the decision of the entrepreneur to move from a foreign to a domestic firm as exogenous. In a sense this is quite limiting and it may therefore be of interest to endogenise this by specifying and estimating an equation that describes the decision. This is, however, beyond the scope of the current paper but provides an interesting avenue for future research.

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Table 1:
Percentages of firms with and without Foreign Training/Experience

	Sectoral distribution of firms		Firms with FT/E
	with FT/E	without FT/E	as % of total
Food processing	6.3	11.7	8.0
Bakeries	0.0	11.2	0.0
Textiles	18.8	24.5	11.1
Wood products	9.4	8.2	15.8
Furniture	31.3	19.9	20.4
Metals and machinery	34.4	24.5	18.6
Total	100.0	100.0	14.0
Total number of firms	32	196	

Table 2:
Summary Statistics by Ownership with and without Foreign Training/Experience
mean and standard deviation

	Without		With		
	mean	std.dev.	mean	std.dev.	diff.
log(tfp)	-0.389	1.548	0.296	1.698	***
log(q)	10.989	2.410	13.064	2.654	***
log(vad)	9.690	2.537	11.770	2.688	***
log(l)	2.642	1.205	3.871	1.469	***
log(k/l)	7.812	2.044	9.309	2.245	***
log(m/l)	7.748	1.890	8.516	1.924	***

difference statistically significant at * 10%; ** significant at 5%; *** significant at 1%

Table 3:
Basic regression results

	(1)	(2)	(3)	(4)	(5)	(6)
	tfp	tfp	tfp	lab. prod.	output	value add.
FT_i	-0.606	-0.725	0.437	2.239	-1.042	-0.436
	(0.314)*	(0.323)**	(1.540)	(1.343)*	(1.772)	(1.700)
FE_i	0.163					
	(0.744)					
FE_{ij}		0.665	4.977	4.885	6.408	6.072
		(0.834)	(2.285)**	(2.494)*	(2.509)**	(2.564)**
FE_{ih}		-1.915	-1.374	-0.490	-1.816	-2.417
		(0.980)*	(0.681)**	(0.688)	(1.016)*	(1.160)**
$FT_i * s_i$			-0.101	-0.253	0.020	-0.024
			(0.138)	(0.120)**	(0.151)	(0.143)
$FE_{ij} * s_i$			-0.430	-0.448	-0.555	-0.531
			(0.226)*	(0.246)*	(0.241)**	(0.251)**
$FE_{ih} * s_i$			0.122	-0.009	0.128	0.151
			(0.057)**	(0.057)	(0.082)	(0.091)
s_i	0.068	0.061	0.204	0.181	0.247	0.261
	(0.025)***	(0.025)**	(0.049)***	(0.040)***	(0.075)***	(0.085)***
E_{ij}	-0.391	-0.486	1.582	1.129	1.712	1.721
	(0.281)	(0.285)*	(0.703)**	(0.630)*	(1.056)	(1.209)
$E_{ij} * s_i$			-0.171	-0.122	-0.202	-0.196
			(0.055)***	(0.046)***	(0.085)**	(0.094)**
Constant	-1.341	-1.252	-2.781	5.151	8.588	8.539
	(0.329)***	(0.329)***	(0.621)***	(0.694)***	(1.049)***	(1.158)***
Observations	725	725	725	751	763	751
R-squared	0.13	0.14	0.21	0.39	0.41	0.42

Robust standard errors in parentheses, clustered around firm identifier
* statistically significant at 10%; ** significant at 5%; *** significant at 1%
Regressions include sectoral and time dummies

Table 4:
Alternative regression results for firms established by owner or family

	(1)	(2)	(3)	(4)	(5)	(6)
	tfp	tfp	tfp	lab. prod.	output	value add.
FT_i	-0.559	-0.673	0.351	2.068	-1.123	-0.542
	(0.308)*	(0.323)**	(1.465)	(1.305)	(1.675)	(1.602)
FE_i	0.123					
	(0.770)					
FE_{ij}		0.589	5.058	5.033	6.393	6.071
		(0.897)	(2.445)**	(2.528)**	(2.761)**	(2.841)**
FE_{ih}		-1.737	-0.984	-0.256	-1.147	-1.634
		(0.952)*	(0.775)	(0.846)	(1.141)	(1.276)
$FT_i * s_i$			-0.089	-0.236	0.036	-0.005
			(0.130)	(0.114)**	(0.143)	(0.133)
$FE_{ij} * s_i$			-0.447	-0.461	-0.570	-0.550
			(0.239)*	(0.248)*	(0.262)**	(0.274)**
$FE_{ih} * s_i$			0.097	-0.023	0.086	0.100
			(0.064)	(0.070)	(0.091)	(0.099)
s_i	0.075	0.068	0.219	0.192	0.270	0.286
	(0.025)***	(0.025)***	(0.051)***	(0.042)***	(0.080)***	(0.091)***
E_{ij}	-0.262	-0.364	1.842	1.329	2.138	2.195
	(0.274)	(0.282)	(0.725)**	(0.646)**	(1.113)*	(1.278)*
$E_{ij} * s_i$			-0.181	-0.130	-0.219	-0.215
			(0.057)***	(0.048)***	(0.090)**	(0.100)**
Constant	-2.311	-1.908	-3.687	4.914	9.163	7.765
	(0.641)***	(0.512)***	(0.775)***	(0.846)***	(1.137)***	(1.269)***
Observations	697	697	697	721	731	721
R-squared	0.13	0.14	0.21	0.41	0.42	0.43

Robust standard errors in parentheses, clustered around firm identifier
* statistically significant at 10%; ** significant at 5%; *** significant at 1%
Regressions include sectoral and time dummies

Appendix:
TFP estimation results

	(1)	(2)	(3)	(4)	(5)	(6)
	Food processing	Bakeries	Textiles	Wood products	Furniture	Metals and machinery
k	0.182	0.101	0.323	0.118	0.125	0.123
	(0.122)	(0.123)	(0.103)***	(0.070)*	(0.076)	(0.064)*
l	0.818	0.310	0.483	0.552	0.243	0.571
	(0.227)***	(0.253)	(0.164)***	(0.291)*	(0.190)	(0.199)***
Constant	7.380	9.113	5.909	10.011	8.961	8.391
	(1.747)***	(1.305)***	(0.920)***	(1.748)***	(1.083)***	(1.054)***
Observations	156	115	269	94	237	310
Number of firms	33	22	56	22	50	72
R-squared	0.34	0.76	0.56	0.29	0.24	0.18

Fixed effect estimation, standard errors in parentheses
* statistically significant at 10%; ** significant at 5%; *** significant at 1%
Regressions include time dummies