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Jozef Konings

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Jozef Konings, Katholieke Universiteit Leuven and CEPR

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Centre for Economic Policy Research
90–98 Goswell Rd, London EC1V 7RR, UK
Tel: (44 20) 7878 2900, Fax: (44 20) 7878 2999
Email: cepr@cepr.org, Website: www.cepr.org

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ABSTRACT

The Effects of Foreign direct investment on Domestic Firms: Evidence from Firm Level Panel Data in Emerging Economies*

This paper uses firm level panel data to investigate empirically the effects of foreign direct investment (FDI) on the productivity performance of domestic firms in three emerging economies of Central and Eastern Europe – Bulgaria, Romania and Poland. To this end, a unique firm level panel data set is used with detailed information on foreign ownership at the firm level. Two main questions are addressed: 1). Do foreign firms perform better than their domestic counterparts? 2). Do foreign firms generate spillovers to domestic firms?

The estimation technique in this paper takes potential endogeneity of ownership, spillovers and other factors into account by estimating a fixed effects model using instrumental variables in the general methods of moment technique for panel data.

It is found that foreign firms perform better than firms without foreign participation only in Poland. Moreover, for all three countries studied no evidence is found of positive spillovers to domestic firms on average. In contrast, on average there are negative spillovers to domestic firms in Bulgaria and Romania, while there are no spillovers to domestic firms in Poland. This suggests a negative competition effect that dominates a positive technology effect.

JEL Classification: 052, D24, F14 and P31
Keywords: emerging countries, foreign investment, panel data and spillovers

Jozef Konings
LICOS
Economics Department
Katholieke Universiteit Leuven
De Beriostraat 34
3000 Leuven
BELGIUM
Tel: (32 16) 326 589
Fax: (32 16) 326 599
Email: jozef.konings@econ.kuleuven.ac.be

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NON-TECHNICAL SUMMARY

The collapse of communism in Central and Eastern Europe and the emergence of a market economy has led to a large inflow of foreign direct investment (FDI) in the region during the last decade and in particular since the mid 90s. Given the enormous increase in foreign investment, these countries provide an ideal natural experiment for measuring the impact of incoming foreign investment on performance. In particular, this paper uses firm level panel data to investigate empirically the effects of FDI on the productivity performance of domestic firms in three emerging economies of Central and Eastern Europe – Bulgaria, Romania and Poland.

To this end, a unique data set is used with detailed information on foreign ownership at the firm level. Two main questions are addressed: 1). Do foreign firms perform better than their domestic counterparts? 2). Do foreign firms generate spillovers to domestic firms?

There are various reasons why many policy-makers believe FDI is beneficial to their country. The first reason is that there is the need for strategic restructuring in firms in the emerging countries. Most firms in the emerging economies of the former Soviet block were characterized by obsolete machinery and outdated production methods. To compete in a market environment, firms had to improve their efficiency by engaging in strategic restructuring, i.e. updating the equipment and production process. Foreign firms have the technological know-how and finance necessary to update the equipment and bring about such strategic restructuring. Foreign participation in domestic firms has the additional benefit that it can impose efficient corporate governance on privatized firms – often privatized to insider workers/managers, who might block restructuring. A second important reason why foreign investors are invited to emerging countries rests on the belief that they generate positive externalities to the domestic firms through a transfer of know-how and technology. Such spillovers can occur through various channels: the introduction of new products and production processes by foreign firms may benefit domestic firms through the accelerated diffusion of new technology. This could occur through labour turnover or through imitation or other channels. One other channel works through the equilibrating mechanism in the market when liberalization, here the opening up of Central and Eastern Europe to the rest of the world, is implemented.

The positive externalities generated by foreign investors, however, may vanish if the increased competition from foreign firms leads to a reduction in the production of the domestic firm, which may lead to an increase in the average costs of production. In this case a negative competition effect may dominate a positive technological spillover effect. In this paper, the net effect is studied.

It is found that foreign firms perform better than firms without foreign participation only in Poland. In Bulgaria and Romania, no robust evidence is found of a positive foreign ownership effect. This may be due to the fact that it takes time for firms to restructure and that the effects of restructuring on productivity performance only appear after a few years. Since Bulgaria and Romania are less advanced in the transition process compared to Poland this may be a plausible explanation.

Moreover, for all three countries studied here, no evidence was found of positive spillovers to domestic firms on average. In contrast, on average there are negative spillovers to domestic firms in Bulgaria and Romania, while there are no spillovers to domestic firms in Poland. This suggests a negative competition effect that dominates a positive technology effect.

I. Introduction

This paper uses firm level panel data to investigate empirically the effects of foreign direct investment (FDI) on the productivity performance of domestic firms in three emerging economies of Central and Eastern Europe, Bulgaria, Romania and Poland. The collapse of communism in Central and Eastern Europe and the emergence of a market economy has led to a large inflow of FDI in the region during the last decade and in particular since the mid 90's. Figure 1 shows the evolution of FDI since 1991 for the three countries that I study in this paper, where the level of FDI is normalized to 1 in 1991. By 1998 there was almost 10 fold increase in FDI in Bulgaria compared to 1991, for Romania and Poland there was even a 50 and 60 fold increase in FDI by 1998.

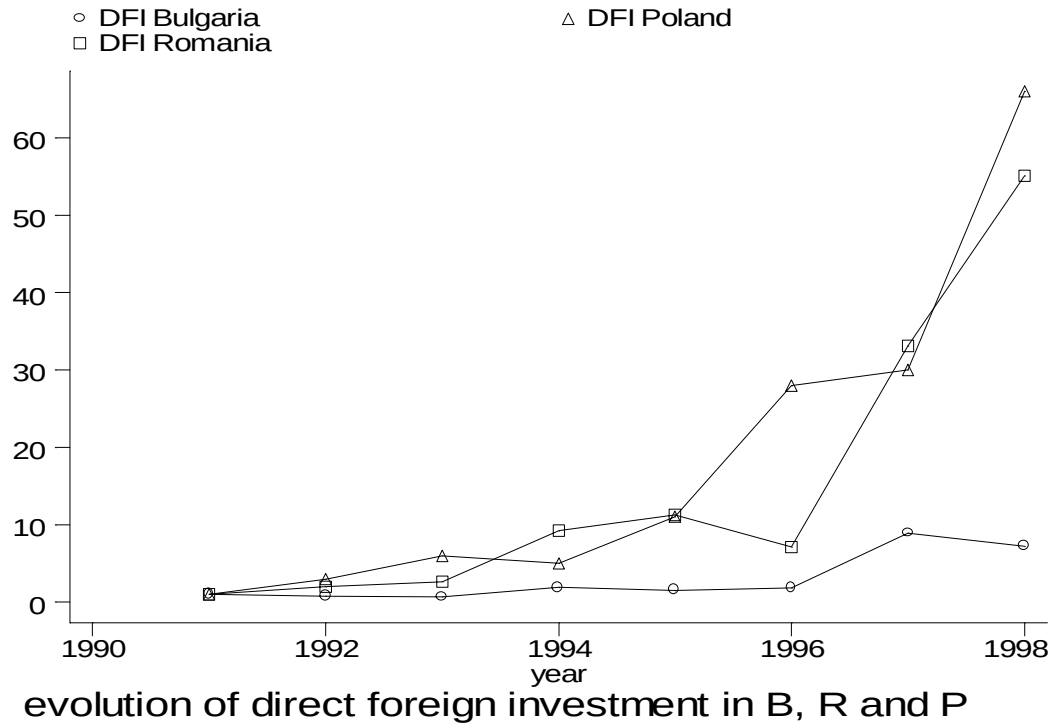

Figure 1 (source: author's calculations based on EBRD (2000))

Policy makers in the emerging economies were faced with a collapsing state sector and a slowly growing private sector. With financial markets and commercial banking virtually absent, they encouraged foreign investors to take part in the privatization process or to invest in their countries. Given the enormous increase in foreign investment in these countries as illustrated in figure 1, these countries provide an ideal natural experiment for measuring the impact of incoming foreign investment on performance.

There are various reasons why many policy makers believe FDI is beneficial to their country. A first reason is the need for strategic restructuring in firms in the emerging countries[1]. Most firms in the emerging economies of the former Soviet block were characterised by obsolete machinery and outdated production methods. To compete in a market environment, firms had to improve their efficiency by engaging in strategic restructuring, i.e. updating the equipment and production process (e.g. Irina Grossfeld and Gérard Roland, 1996). Foreign firms have the technological know-how and finance necessary to update the equipment and bring about such strategic restructuring. Foreign participation in domestic firms has the additional benefit that it can impose an efficient corporate governance in privatized firms, often privatized to insider workers/managers, who might block restructuring (Olivier Blanchard, 1997, pp.77-88).

Klaus Wallner (1998) shows theoretically that especially in the emerging countries, characterized by soft budget constraints, foreign investment is welcomed to achieve such strategic restructuring as the presence of foreign investors gives governments incentives to reduce subsidies to firms because otherwise a part of the

[1] Strategic restructuring refers to improving the long run viability and efficiency of a firm.

subsidy may disappear in ‘foreign pockets’. Hence, the hardening of budget constraints increases effort by managers to restructure more.

A second important reason why foreign investors are invited to emerging countries rests on the believe that they generate positive externalities to the domestic firms through a transfer of know-how and technology. Such spillovers can occur through various channels. David J. Teece (1977) argues that the introduction of new products and production processes by foreign firms may benefit domestic firms through the accelerated diffusion of new technology. This could occur through labour turnover or through imitation or other channels. One other channel works through the equilibrating mechanism in the market when liberalization, here the opening up of Central and Eastern Europe to the rest of the world, is implemented.

A number of recent theoretical papers show that the degree to which domestic firms may benefit from such spillovers depends on the “absorptive capacity” of domestic firms. Franseca Sanna-Randacio (1999) and D. Leahy and Peter Neary (1999) show that FDI always leads to an increase in the productivity of the investing firm, however, FDI increases the host country’s productivity only if the degree of the technological spillover is high enough. The latter is more likely achieved in sectors characterized by intensive R&D or by firms which have a sufficient amount of knowledge to start with.

This has been suggested in earlier empirical work. Ari Kokko (1994) and Borensztein, De Gregorio and Lee (1998) give evidence which suggests that positive FDI spillovers to local firms are only generated if the technology gap between the foreign firm and the domestic one is not too large and if there exists a minimum threshold of human capital in the host country.

The technological spillovers thus lead to positive effects on domestic firms, however, there may exist a competition effect which works in the opposite direction. Foreign entry disturbs the existing market equilibrium and could force domestic firms to produce less output which pushes them up their average cost curves, at least if average cost curves are downward sloping, which would be the case if production involves a substantial fixed cost. This argument has been developed by Brian J. Aitken and Ann E. Harrison (1999). Which effect dominates depends on the stength of the technological spillover effect (and the absorptive capacity of firms) versus the competition effect.

In this paper I analyse a number of questions: First, I test whether foreign owned subsidiaries in transition economies perform better than their domestically owned counterparts. Second, I test whether there exist 'spillovers' to domestic firms. I will look at the 'net spillover' effect, i.e. the sum of the technological spillover and the competition effect. In addition, I will make a distinction between sectoral and regional spillovers. I also test whether foreign firms benefit from the presence of other foreign firms in their sector or region.

I use a unique panel data set of over 5000 firms in Bulgaria, Romania and Poland for the years 1993-97[2]. Together these countries cover more than 70 million people and hence these economies are an important part of the Central and Eastern European Economies. Bulgaria and Romania are lagging behind Poland in the transition towards a market economy. While all three countries have experienced a substantial collapse in output at the start of transition, only Poland has reached GDP levels comparable to the pre-transition years and has positive growth rates. Both Bulgaria and Romania experienced a short period of positive growth in the mid 90's,

[2] except for Romania data run from 1994 onwards.

however, output has collapsed again in Bulgaria since 1995 and in Romania since 1997.

Because I use panel data I am able to track the same firm over time and hence I am able to control for unobserved firm level fixed effects, like for example the quality of the firm. Hence, as in Aitken and Harrison (1999) I am able to control for the potential endogeneity of foreign ownership and spillovers . Moreover, I will use the general methods of moments technique to estimate panel data as introduced by Arellano and Bond (1991) which allows me to construct instruments for potentially endogenous explanatory variables. This may be important if productivity shocks affect the levels of the input variables in a production function or if they affect spillovers. In that case fixed effects alone cannot properly control for the endogeneity. Furthermore, this technique allows me to estimate dynamic equations in a consistent way.

The next section describes the data and econometric approach, section III gives the results and section IV is a concluding one.

II. Data and Econometric Approach

Data

The data set that is used provides information on 2321 firms in Bulgaria between 1993-97, 3844 firms in Romania between 1994-87 and 262 firms in Poland over the period 1993-1997. Due to a lot of missing observations on some of the input factors needed in the estimation, the total available number of firms for the estimation in Poland is much lower than in Bulgaria and Romania. The data are unbalanced panel data, however, attrition is likely to be random due to imperfect reporting, rather

than exit of firms. The data consists of the company accounts of all incorporated firms in both the manufacturing and the non-manufacturing sectors satisfying at least one of the following criteria: number of employees greater than 100, total assets and operating revenues exceeding 16 million and 8 million USD, respectively. They are retrieved from annual company accounts published by the Creditreform Bulgaria OOD and by the Romanian Chamber of Commerce and Industry[3].

Foreign firms are defined as firms where a positive fraction of the shares is owned by a foreign investor in 1997. In the sample, around 10% of the firms have a foreign investor in 1997. For those firms with a foreign partner, the average fraction of shares held by foreign investors is 61%, 59% and 73% for Bulgaria, Romania and Poland respectively. Thus if a domestic firm has a foreign investor, on average, the foreign investor has a majority stake.

Econometric Approach and Measurement Issues

I follow Brian Aitken and Ann Harrison (1999) and estimate a log-linear production function at the firm level to test whether (1) foreign firms perform better than domestic ones, (2) there exist spillovers from FDI to local production. In particular, the following specification is the starting point of my analysis:

$$y_{it} = \alpha_i + \alpha_1 n_{it} + \alpha_2 k_{it} + \alpha_3 m_{it} + \alpha_4 \eta_t + \alpha_5 DFI_i + \alpha_6 DFI_i XT_i + \alpha_7 Spill_{jt} + \varepsilon_{it} \quad (1)$$

[3] Data are available on the Amadeus CD-ROM (Dec. 1998), a Pan European financial database, provided by Bureau van Dijk Electronic Publishing SA.

where subscript i stands for firm i, subscript t for year t, *y* is log output, *n* is the log employment, *k* is the log of capital and *m* is the log of material inputs. Output is measured as sales at the firm level deflated by an aggregate price index. Sector level price indices were not available on a consistent basis for the countries studied here, so an aggregate producer price index was used for Romania and Poland, an aggregate consumer price index for Bulgaria as there was no reliable producer price index available for Bulgaria. These price indices were taken from the EBRD annual transition report (EBRD, 2000). The capital stock is proxied by the book value of tangible fixed assets in the firm, deflated by an aggregate price index. Finally, material inputs are proxied by material costs have also been deflated by an aggregate price index.

To capture possible common aggregate shocks in production, like technological progress or some other unobserved time varying factors I include time effects, η. The fraction of shares held by a foreign investor is denoted by *FDI*. It can be noted that this variable has no time subscript, t, which is due to the fact that we only observe ownership in the year 1997. I also interact foreign ownership with the time trend to capture the fact that the effect of foreign ownership might affect both the level and the growth in productivity. This might be the case if it takes some time for foreign know-how to spillover to the local firm. Finally, *Spill* measures the sector level spillovers that arise from foreign investors. I proxy it by the share of output accounted for by foreign firms in total output at the 2-digit NACE sector level[4]. I will also report results in which both sectoral and regional spillovers are taken into account. The latter are measured as the fraction of output produced by foreign firms in total output of a particular region. Finally, ε, is a white noise error term.

[4] NACE is the standard European sector classification, which is comparable to the SIC classification.

Table 1 provides summary statistics on the variables that were used in the regression analysis. It can be noted that on average real sales are collapsing in Bulgaria which is consistent with the macro economic decline in GDP since 1995. In contrast, average real sales in Romania are growing rapidly, which is consistent with the fast growth rates in GDP noted since the mid 90's (until 1997, after which output collapsed again). In Poland average real sales are growing at a more modest rate, but the initial 'catch up' took place earlier since transition started earlier in Poland. In absolute terms, the average growth in employment is always lower than the average growth in sales, which confirms the observed aggregate stylized fact that the adjustment in employment is much slower than the adjustment in output. From the summary statistics it can also be noted that the average spillover effect is around 10%, however this may vary substantially between sectors.

In equation (1), there is an unobservable fixed effect, α_i, which captures firm specific heterogeneity. Such an unobservable fixed effect is potentially correlated with the other explanatory variables. If it is not controlled for in the estimation, then inconsistent estimates due to an omitted variable bias result. One way of controlling for these fixed effects is by first differencing equation (1). At the same time, it is a way to control for potential endogeneity of foreign ownership, i.e. foreign investors might only acquire shares in the better firms. If I categorise firms in 'good' versus 'bad' firms then the unobserved fixed effect captures this and hence it is possible to avoid an endogeneity bias. First differencing equation (1) yields

$$\Delta y_{it} = \alpha_1 \Delta n_{it} + \alpha_2 \Delta k_{it} + \alpha_3 \Delta m_{it} + \alpha_4 \Delta \eta_t + \alpha_6 DFI_i + \alpha_7 \Delta spill_{jt} + \Delta \varepsilon_{it} \qquad (2)$$

The above modelling strategy allows me to test whether foreign firms perform better and whether spillovers are present. However, equation (2) does not allow me to test whether foreign firms benefit in a different way from spillovers than domestic firms. It may be possible that foreign firms benefit from other foreign firms in their sector, while domestic firms do not as in Aitken and Harrison (1999). For this reason I will include an interaction term in equation (2), where I interact foreign ownership with spillovers.

There is, however, a further econometric concern. An estimation by OLS of equation (2) may still lead to inconsistent estimates. This would be the case if productivity shocks have an effect on the input factors employed in the firm. Alternatively, productivity shocks may have an effect on spillovers, which would lead to an endogeneity of the spillovers. Furthermore, equation (2) is a static equation, allowing for some dynamic adjustment in output (in case of the presence of adjustment costs) would imply that equation (2) needs to be estimated with a lagged dependent variable which leads to further endogeneity problems.

To avoid inconsistent estimates I therefore estimate equation (2) using the General Methods of Moments technique (GMM) with Instrumental Variables as developed by Arellano and Bond (1991) for estimating dynamic panel data. The advantage of this method over other commonly used panel data estimation techniques lies in its efficient use of the number of instruments generated for the endogenous explanatory variables. For instance, in equation (2), valid instruments for the differenced employment in the year 97 is the level of employment in the year 95 since this is not correlated with the differenced error term in 1997. Table 2 shows in a

systematic way how the number of instruments increases as the panel progresses. In 1995 a valid instrument for a first differenced endogenous explanatory variable is its level in 1993, in 1996 valid instruments for the same variable includes its level in 1993 and its level in 1994 and so on. So as the panel progresses an increasing number of instruments becomes available which increases the efficiency of the estimation. In order to test the validity of instruments a Sargan test of instrument validity is computed and is asymptotically $\chi 2$ distributed. In addition, since the equation is estimated in first differenced form, the equation will show first-order serial correlation. However, what matters is the absence of second order serial correlation if the error term in the levels equation (1) is white noise. Therefore a test of second order serial correlation is reported and is asymptotically N(0,1) distributed.

III. Results

Tables 3, 4 and 5 show the results for Bulgaria, Romania and Poland respectively. I show both OLS estimates and GMM IV estimates for equation (2). Since the equation is estimated in first-differences I also control for unobserved fixed effects.

Starting with Bulgaria, the OLS estimates in column (1) of table 3 show no statistically significant effect of foreign ownership on performance. This may come across as a surprising result, however, in the context of transition economies it has been shown that privatised firms do not perform better than state owned enterprises, because it may take time before restructuring feeds through on firm performance (e.g. Konings, 1997; Faggio and Konings, 1999). There is however a statistically significant negative spillover effect of foreign firms on domestic ones, which suggests

that a competition effect is dominating a technological spillover effect. The interaction term, foreign X spillover, suggests that foreign firms benefit from the presence of other foreign firms in the sector. However, this equation does not take into account the potential endogeneity of spillovers and of the other input factors.

In the second column I therefore instrument all the input factors as well as the spillover effect using the moment restrictions suggested by the GMM technique (Arellano and Bond, 1991). A number of interesting results emerge. First, there still exist negative spillovers from FDI to domestic firms. The coefficient that is estimated with spillovers is equal to –0.67. Thus, a sector that has an increase in spillovers from 0 to 10% would experience a decline in total factor productivity of 6.7% on average. This suggests that the competition effect is dominating, which means that domestic firms, due to the increased competition from foreign firms in their sector, are pushed up their average cost curves due to a reduction in output they can produce. This would hold in case domestic firms have a declining average cost curve, i.e. in the presence of increasing returns to scale. Based on the estimates of the coefficients of the input factors, this hypothesis seems to be plausible. The sum of the coefficients of the input factors is larger than 1 which suggests increasing returns to scale in production or a declining average cost curve. Note, also that the coefficient on capital is low and statistically not significant at conventional levels. In the context of transition economies this is not surprising as most firms are characterised by outdated equipment and a lack of investment in new equipment, which decreases the marginal productivity of capital.

A second result, which is the same as in the OLS estimation, is that foreign firms do not outperform domestic ones. Finally, the interaction effect between foreign ownership and spillovers is no longer statistically significant, albeit still positive.

These IV results suggest that endogeneity may have been important in driving some of the results in the OLS regression. The Sargan test and the second order serial correlation test in collumn (2) all indicate that the model is correctly specified. The fact that there is no second order serial correlation suggests that there is no further dynamics to be specified in the model.

The third column tests whether regional spillovers may matter. As argued by Aitken and Harrison (1999) there may be reasons to expect that any benefits to domestic firms from foreign ivestment would be received first by their neighbors before they diffuse to other domestic firms. One mechanism through which this may occur is through job mobility. Workers who worked with a multinational that leave the firm to work in a domestic one are more likely to move to another firm within the same region. Job reallocation in transition countries (and elsewhere) occurs primarily within regions rather than across regions (e.g. Faggio and Konings, 1999). I measure regional spillovers as the fraction of output produced by foreign firms in a given region in the total output produced by a given region. The results in column (3), however, show no statistically significant effect of regional spillovers to domestic firms in Bulgaria. Since Bulgaria is a small open economy regional effects are presumably less important in terms of competition, rather the entire Bulgarian market is more likely to be the appropriate market to consider.

The results for Romania are reported in table 4 and are very similar to the results for Bulgaria, except that there is some hidden dynamics which needs to be taken into account. In column (1) the OLS results suggest that foreign firms outperform domestic ones, that domestic firms experience positive spillovers and that foreign firms do not benefit from other foreign firms in their sector that much as domestic ones. However, the second order serial correlation test suggests that the

model is not correctly specified in terms of the dynamics. In addition, there may also be an endogeneity problem related to some of the explanatory variables.

In column (2) of table 4 I therefore report the results using instruments for the input factors and for the spillovers. The results of column (2) show no statistically significant effects of spillovers and foreign ownership. However, again the diagnostics suggest that the model is misspecified, i.e. the Sargan test of instrument validity and the second order serial correlation test reject the model specification. Column (3) therefore estimates a dynamic model, including the lagged dependent variable as one of the regressors. Since the model is estimated in first differences, the lagged dependent variable is also endogenous and therefore needs to be instrumented too, using all available moment restrictions from t-2 backwards. In column (3) the Sargan test accepts the model specification, the second order serial correlation test could no longer be computed since one time observation is lost due to the lagged dependent variable and the fact that the data for Romania only go from 1994 onwards, rather than 1993. However, since the lagged dependent variable is statistically significant, it is likely that this controls for the initial problem of second order serial correlation. The results indicate that spillovers from foreign firms to domestic ones are negative. The results in column (3) suggest that once properly controlled for the dynamics in the model, again the same negative spillover effects show up. The interaction effect between foreign firms and spillovers is no longer statistically significant, just like foreign ownership in itself is no longer statistically significant. This is consistent with the empirical literature that has shown that privatisation did not lead to better firm performance and that it may take some time before firms start to engage in restructuring.

Finally, in column (4) I test for the presence of regional spillovers. As in Bulgaria, I find no statistically significant effect of regional spillovers on domestic firms.

Table 5 shows the results for Poland. Since I lost a lot of observations in the estimation due to missing data on material costs, the Polish sample is much smaller than the one used for Bulgaria and Romania, so the results for Poland need to be read with caution. The first column gives the OLS results. I find a statistically significant effect of foreign ownership on firm productivity performance. This contrasts with Bulgaria and Romania where I found no effect of foreign ownership. In the case of Poland, however, it may make sense that foreign firms outperform domestic ones since Poland is in a more advanced stage of development towards a market economy. If it takes time for firms to restructure then one may expect that in less developed countries, such as Bulgaria and Romania, foreign firms do not outperform domestic ones, while in the more advanced ones, such as Poland, the restructuring effects have come through which is reflected in the positive effect of foreign ownership. In column (1) I find no statistically significant effect of spillovers.

In column (2) I report the GMM IV estimates. The same results hold as in the OLS case, i.e. foreign firms outperform domestic ones or to put it differently, a firm that would change its ownership structure from 0% foreign participation to 100% foreign participation, total factor productivity would increase by approximately 20%. This result confirms the hypothesis that foreign firms or joint ventures have some superior knowledge and/or technology which allows them to be more efficient than their domestic counterparts. It is also consistent with the idea that foreign firms induce restructuring at the firm level which leads to higher productivity (Wallner, 1998).

Again I find no statistically significant effect of spillovers. This may be due to the fact that the "technological" positive externality and the negative competition effect cancel eachother out, or, it may be due to the fact that there are no increasing returns to scale which would imply that there is no declining average cost curve. The latter makes sense, based on the estimates of the coefficients of the input factors. Rather decreasing returns to scale seem to hold on average, with the only statistically significant input factor being material costs. This is plausible as most firms in transition countries are still characterised by over-manning levels and an outdated capital stock. Moreover, since transition has started earlier in Poland than in Romania and Bulgaria, the initial increase in competitive pressure at the start of transition was experienced at an earlier stage, such that the competition effect in the case of Poland is likely to be much lower than in the case of Bulgaria and Romania.

Finally, in column (3) I also test for the presence of regional spillovers. However, the only significant effect I find is the material costs of production. Also foreign ownership is no longer statistically significant at conventional levels. This is most likely due to multicollinearity of the data, given that only 262 observations are used in the estimation. For this reason I estimated the equation again, but leaving out the interaction terms between foreign ownership and spillovers. In column (4) the results are reported and show that as before foreign firms do better than domestic ones. In addition, I find evidence of negative regional spillovers, albeit only significant at the 10% level, but still no evidence of spillovers at the sectoral level.

IV. **Conclusion**

This paper studied the effects of foreign direct investment on the performance of firms in three emerging market economies, Bulgaria, Romania and Poland. Two main questions were addressed. First, do foreign firms perform better than their domestic competitors and second, does foreign investment generate 'spillovers' to local firms?

I find evidence that foreign firms do not perform better than domestic ones, except in Poland, the more advanced transition economy. This suggests that it may take time for ownership effects to have an effect on performance, due to lags in restructuring. In addition, I find no evidence of positive spillovers, but rather negative or no spillovers of foreign investment to domestic firms. This is rationalised through a competition effect that dominates a technological spillover effect in Bulgaria and Romania, which would hold under the assumption of increasing returns to scale (declining average cost curves). The competition effect may dominate the technology effect if the technology gap is too large, which would be the case in less advanced countries such as Bulgaria and Romania.

The results in this paper suggest that in the early stages of transition, the stages Bulgaria and Romania are in, the increased competition from FDI dominates technological spillovers to domestic firms. It suggests that inefficient firms will loose market share due to foreign competition, which in the long run should increase the overall efficiency of an economy. In the latter stages, when domestic firms have engaged in substantial restructuring and market competition has been established, the dominating competition effect seems to vanish. Whether in the longer run

technological spillover effects start dominating, leading to positive spillovers is a topic for future research when more years of data will become available.

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Table 1: Summary Statistics (means of the sample)

	Bulgaria	Romania	Poland
sectoral spillover	0.09	0.13	0.15
regional spillover	0.10	0.11	0.12
sales growth	-0.27	0.47	0.07
employment growth	-0.039	-0.042	-0.01
capital growth	-0.287	0.10	0.03
material growth	-0.25	0.50	0.03

Table 2 : Available instruments in GMM technique

	Endogenous explanatory variable	Available instruments
1997	Δx_{i97}	x_{i95}, x_{i94}, x_{i93}
1996	Δx_{i96}	x_{i94}, x_{i93}
1995	Δx_{i95}	x_{i93}

Note: x refers to any of the explanatory variables that is treated as endogenous.

Table 3: Results for Bulgaria
Dependent variable: y

independent variables:	OLS	IV	IV
n	0.127* (0.038)	0.538* (0.175)	0.560* (0.187)
k	0.047* (0.011)	0.012 (0.038)	0.018 (0.039)
m	0.626* (0.023)	0.720* (0.072)	0.738* (0.075)
FDI	-0.03 (0.026)	-0.112 (0.113)	-0.176 (0.136)
sector spill	-0.206* (0.091)	-0.670* (0.360)	-0.678* (0.371)
FDI x sector spill	3.528* (1.473)	6.199 (12.184)	5.225 (12.40)
Region spill	-	-	-0.175 (0.206)
FDI x region spill	-	-	5.061 (5.825)
Sargan Test	-	31.18 (df=31)	30.1 (df=29)
SOC test	0.248	-0.103	-0.025
number of observations	4,662	4,662	4,662

Notes: (i) all equations include time dummies, (ii) heteroscedastic consistent standard errors in brackets, (iii) * denotes significant at the 5% level, ** at the 10% level, (iv) instruments include some or all available moment restrictions of the endogenous explanatory variables as well as region dummies.

Table 4: Results for Romania
Dependent variable: y

independent variables:	OLS	IV	IV	IV
yt-1	-	-	0.138* (0.034)	0.144* (0.035)
n	0.134* (0.017)	0.245* (0.073)	0.106* (0.06)	0.094** (0.063)
k	0.081* (0.011)	0.04** (0.026)	0.043* (0.02)	0.043* (0.02)
m	0.604* (0.017)	0.660* (0.036)	0.411* (0.04)	0.421* (0.044)
FDI	0.01* (0.002)	0.04 (0.003)	0.001 (0.02)	0.128 (0.17)
sector spill	0.201* (0.083)	0.436 (0.459)	-1.101* (0.528)	-0.934** (0.579)
FDI x sector spill	-32.52* (12.1)	-8.937 (12.07)	-21.06 (66.92)	-14.8 (72.5)
Region spill	-	-	-	0.063 (0.128)
FDI x region spill	-	-	-	-2.93 (4.18)
Sargan Test	-	15.14 (df=6)	60.3 (df=45)	59.27 (df=43)
SOC test	-3.708	-3.872	-	-
number of observations	10,955	10,955	7,111	7,111

Notes: as in table 3

Table 5: Results for Poland
Dependent variable: y

independent variables:	OLS	IV	IV	IV
n	0.01 (0.14)	0.022 (0.121)	0.062 (0.108)	0.03 (0.11)
k	0.017 (0.03)	0.017 (0.087)	0.059 (0.083)	0.06 (0.067)
m	0.429* (0.081)	0.487* (0.129)	0.613* (0.094)	0.527* (0.079)
FDI	0.178* (0.08)	0.215* (0.097)	0.13 (0.11)	0.145* (0.062)
sector spill	-0.253 (0.324)	0.174 (0.790)	-0.191 (0.689)	-0.172 (0.721)
FDI x sector spill	1.14 (2.162)	3.175 (4.835)	-1.84 (8.34)	-
Region spill	-	-	-0.377 (0.327)	-0.48** (0.301)
FDI x region spill	-	-	1.77 (10.84)	-
Sargan Test	-	12.77 (df=16)	19.03 (df=20)	16.92 (df=21)
SOC test	0.171	0.536	0.07	0.391
number of observations	340	340	340	340

Notes: as in table 3