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Is there a potential for increases in FDI for Central and Eastern European countries following EU accession?

By H. Görg and D. Greenaway

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Abstract

Gravity modelling has been used extensively in analysing trade flows but less so for cross-border investment. Recent theoretical work provides an underpinning for applications to FDI. In this paper we estimate a gravity model to evaluate the potential for increased FDI for a sample of Eastern European countries, following accession to the EU. Preliminary results suggest limited potential in manufacturing but greater scope in services.

JEL classification: F23

Keywords: Foreign direct investment, transition economies, gravity models

Outline

1. Introduction
2. Enlargement of the EU to the East
3. Modelling framework and data
4. Results from estimating the gravity model
5. Conclusions

Non-Technical Summary

Over a long period, gravity models have performed remarkably well in explaining bilateral trade flows. In recent years, use of this particular modelling framework has increased partly in response to the proliferation of regional trading arrangements, partly because of foundational work aimed at providing theoretical underpinnings. Among the applications in recent years has been the evaluation of potential trade effects from enlarging the EU to the east. Foundational work in recent years has also resulted in progress in understanding the determinants of cross-border investment flows. In particular, the knowledge capital model of the multinational enterprise has generated new insights, one of which is that gravity variables are likely to be important determinants.

In this paper we apply a gravity framework to evaluate FDI between a number of CEECs and the UK. Five of the six CEECs in our sample are candidate countries for EU accession and three may accede as early as 2004. Moreover, since the UK is the largest host to/source of FDI in the EU, investment flows between the UK and CEECs is an interesting case to take. Our results thus far suggest that: there is no evidence to support the proposition that the bilateral investment relationship between the UK and the CEECs is fundamentally different to that between the UK and other OECD or EU countries; second, there appears to be no noticeable difference between accession 'leaders' and laggards'; third, with regard to investment potential, manufacturing seems to have reached its 'normal' level by the end of the 1990s but our results point towards potential growth in services FDI.

1 Introduction

The speed of the collapse of central planning in central and eastern Europe and the former Soviet Union was one of the most startling political events of the second half of the twentieth century. No-one really knew how long the process of stabilisation and adjustment would take. What was clear, however, was that the international community would not just sit back and let it happen. Substantial resource transfers took place as well as extensive policy advice. The European Union was in the vanguard of this post-Communist reconstruction effort with both financial aid through programmes such as PHARE and policy initiatives such as the Europe Agreements. The latter not only elevated the central and east European countries (CEECs) to the apex of the Union's 'pyramid of privilege' but laid the foundations for progress towards eventual accession. By the middle of 1996, ten CEECs had applied for membership of the Union; in 1998 serious negotiations over entry began; and in December 2000 a formal Treaty commitment was made at the Nice Summit. The most recent Commission report on readiness for accession (in November 2001), concluded that as many as eight of the ten CEECs could join the EU before the end of 2004.

The drivers behind enlargement are partly political and partly economic. With regard to the former, both foreign policy imperatives and historical/cultural affinities between Members and aspirants are paramount. The economic driver is quite simply the hope and expectation that Membership will accelerate economic development in the CEECs stimulating convergence in living standards. The stimulus to this would be a more stable and predictable economic environment, more trade and more investment.

One aspect of the last of these is the focus of this paper. As well as stimulating domestic investment, accession might be expected to stimulate cross-border investment. Why? Because theory leads us to expect integration to stimulate FDI and because there is some evidence to link previous enlargements with a growth in FDI. Our evaluation of the prospects for growth in FDI is framed around the construction and estimation of a gravity model, an approach that has proved to be constructive in other contexts. Unfortunately, data constraints confine us to a subset of the CEECs and one of the existing EU member countries, namely the United Kingdom (UK). However, the UK is the largest source of and host to FDI within the

EU, and the quality of the datasets we use and robustness of our results compensate. We find that the results do not provide strong grounds for believing that manufacturing FDI will increase significantly following accession but services FDI might.

The remainder of the paper is organised as follows: in Section 2 we briefly review the details of the enlargement process, by way of providing context; Section 3 describes our modelling framework and data and Section 4 the results from estimating our model. Section 5 concludes.

2 Enlargement of the EU to the East

Enlargement is not a new phenomenon for the EU. Membership has increased from six to 15 via four previous enlargements (16 via five enlargements if one counts the reunification of the former German Democratic Republic with West Germany). In terms of scale, however, the Eastern enlargement will dwarf any previous single episode and offers greater adjustment challenges. As Table 1 shows, all previous enlargements have lowered average per capita GDP in the Union but none as significantly as this one. To a degree this has been recognised by the provision of pre-accession support via initiatives such as PHARE[1] and by earmarked accession funds in the Union's budget going forward. But the fact remains that not only are there more countries, there are more different and poorer countries.

Preferential access to the EU market for (most) manufactures was secured quite quickly via the conclusion of Europe Agreements. As we can see from Table 2, Agreements with Hungary and Poland were signed as early as December 1991, with the other six signing in the years up to the mid-1990s. These Agreements then came into force from early 1994 onwards. The Agreements set out an agenda/provisions for the progressive removal of trade barriers.

Table 2 also sets out the timeline on accession. Applications were made between March 1994 and June 1996 and a formal commitment made in the Treaty of Nice (2000). The criteria for accession were actually set out at the Copenhagen Summit in 1993, the key conditions being:

- stability of institutions guaranteeing democracy;

[1] The PHARE programme commenced in 1989 and initially channelled aid to Poland and Hungary. During the 1990s it was extended to a broader range of East European economies.

- rule of law and human rights;
- evidence of a functioning market economy;
- ability to take on obligations to political, economic and monetary union.

Until recently, it was felt that few of the CEECs would be in a position to satisfy these criteria before 2005 at the earliest, with most looking at potential accession by around 2008. Notwithstanding the relatively slow pace of negotiations on the *acquis communitaire*, which involves 12 sets of bilateral negotiations on 31 Chapters, the Commission recently pronounced that all except for Bulgaria and Romania could be ready to join by the end of 2004.

Theory predicts trade expansion with the CEECs and indeed between 1990 and 2000, their exports to the EU doubled from 5% to 10% of the total, whilst imports from the EU also doubled (from 7% to 14% of the total). Recent gravity modelling (e.g. Brenton 1999) and CGE modelling (e.g. Francois and Rombout 2000) predicts relatively modest further increases in EU-CEEC trade following accession, arguing that most adjustment has already taken place following the implementation of the Europe Agreements. It is, however, important to note that these do not make any allowances for potential changes in agricultural trade (agriculture was excluded from the Europe Agreements); potentially significant effects in product areas subject to NTBs and contingent protection (clothing, leather goods, automobiles, electrical machinery); and second order effects associated with income growth.

3 Modelling framework and data

Our focus is essentially on the linkage, if any, between economic integration and cross-border investment. Until recently, the theory underpinning the economics of cross-border investment did not offer clear priors on the links between integration and FDI, yet empirically there did seem to be an association. By contrast, customs union theory provided clearer predictions on potential links between regional integration and trade. These links have been investigated extensively within both a computable general equilibrium framework (CGE) and a gravity setting. Investigation using the latter framework has been especially vibrant over the last decade, partly due to the proliferation of the 'new regionalism', partly due to the fact

that the work of Deardorff (1998), Eaton and Kortum (2001) among others has embedded the gravity equation in more secure theoretical foundations.[2]

Intuitively, one would expect the gravitational forces of pull and resistance (generally proxied by market size and distance respectively) to be drivers of cross-border investment. This intuition has recently been given a firmer theoretical basis by the development of the so-called knowledge capital model of the multinational enterprise (see Markusen and Venables 1998, Markusen 1997, 1998 and Markusen et al 1996). The great attraction of the knowledge-capital model is that it provides a coherent framework for predicting the balance between affiliate sales and production in a world where both horizontal and vertical multinationals co-exist. From our standpoint, one key prediction is that FDI becomes more dominant relative to domestic production and trade as countries become more similar in terms of relative size and endowments. The model also yields predictions for trade costs. Where factor endowments between countries are relatively similar, higher trade costs result in more horizontal production (and higher affiliate sales). By contrast, where factor endowments are dissimilar, vertical production is stimulated (and lower affiliate sales).

The knowledge capital model has stimulated econometric work in a gravity type framework. Recent examples include Brainard (1997), Barrios, Görg and Strobl (2001), Carr, Markusen and Maskus (2001). All find support for gravity variables driving cross-border investment.

We also adopt this framework therefore to guide us on our empirical specification. As the relative size of countries appears important, levels of income in the host and home country are included, as are measures of skill endowments and, of course, distance between host and home to capture the importance of transportation and transaction costs between headquarters and foreign affiliate. Hence, our specification takes the following form:

$$fdi_{ijt} = \beta_0 + \beta_1 gdp_{it-1} + \beta_2 gdp_{jt-1} + \beta_3 gdppc_{it-1} + \beta_4 gdppc_{jt-1} + \beta_5 skill_{it-1} + \beta_6 skill_{jt-1} + \beta_7 dist_{ij} + \beta_8 lang_{ij} + v_t + e_{ijt} \quad (1)$$

[2] Examples of the application of the gravity model to CEEC trade flows can be found in Gros and Gonciarz (1996) and Nilsson (2000); a broader survey of the empirical literature on regionalism and

where *fdi* is the log FDI stock of source country *i* in host country *j*, *gdp* is log real GDP, *gdppc* is log real GDP per capita, *skill* is a measure of the log skill endowment of countries *i* and *j*, *dist* is the log distance between the source and host capital cities, *lang* is a dummy equal to 1 if the two countries share the same language, v_t is a full set of time dummies and e_{ijt} the error term.[3]

Our data relate to bilateral data for the UK, which is always either source or home country in the estimations. Data on UK inward and outward FDI stocks are available for the period 1996 to 2000 from the Office for National Statistics (ONS) *Business Monitor MA4: Foreign Direct Investment*. We can distinguish total FDI stocks as well as FDI stocks in manufacturing and services. We therefore utilise three different dependent variables: total FDI; manufacturing FDI; and services FDI. In particular, this allows us to investigate whether there are differences between manufacturing and services FDI.[4]

Data for the GDP and skill variables are taken from the World Bank's *World Development Indicators*.[5] We define the skill endowment as the enrolment ratio in tertiary education.[6] Data for the distance variable were obtained from *Jon Haveman's International Trade Data*.[7] The language dummy is equal to one if the partner country also has English as its first language. (A list of countries included in the analysis is available in the appendix.)

Before turning to estimations, we present some aggregate data to give an overview of the pattern of UK inward and outward FDI. The UK is both the second largest host and source country (after the US) in terms of FDI stocks world-wide (UN, 1999). As Figure 1 shows, its total investment position increased significantly between 1996 and 2000. In particular outward FDI stocks relative to GDP almost trebled, rising from 0.26% to 0.64% while inward FDI stocks almost doubled from

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gravity can be found in Greenaway and Milner (2002) and a review of theoretical underpinnings in Harrigan (2002).

[3] Note that the time dummies are included to control for common time effects. The distance measure also potentially captures other time invariant bilateral effects not included in the model.

4 The FDI data are in nominal £ values which are converted into constant 1995 values using the UK GDP deflator available from the ONS. Note that total FDI stocks consist of services, manufacturing and other industries, i.e., services plus manufacturing do not necessarily add to total FDI stocks.

[5] The GDP data are given in US$ at constant 1995 prices and are converted into £ using the £ to $ annual average exchange rate.

6 While other measures of skill endowments are potentially available from the *World Development Indicators* we chose this variable due to data availability. Using enrolment ratio in secondary education yields similar results in the regression analysis below.

7 available at http://www.macalester.edu/research/economics/PAGE/HAVEMAN/Trade.Resources/TradeData.html

0.18% to 0.31% over the same period. These figures clearly indicate that FDI, both inward and outward, has been increasingly important for the UK economy.[8]

[Figure 1 here]

Table 3 provides an overview of geographical distribution of this investment. It is immediately obvious that to date the CEECs only receive negligible amounts of UK outward investment whilst other EU countries and the US are the major hosts (as well as the most important home countries for UK inward FDI). This pattern is in line with the international evidence showing that most FDI is between developed countries (Lipsey, 2001) while the CEECs as a region still only receive relatively little inward FDI (Sinn and Weichenrieder, 1997).[9]

[Table 3 here]

Overall, UK outward and inward FDI has increasingly been in services rather than manufacturing, as Table 4 shows. In 1996, 43 percent of outward and 50 percent of inward FDI stocks were in services; these shares rose to 60 and 67 percent respectively in 2000. This pattern is even stronger when looking at UK FDI in and from other EU countries, where over 70 percent of inward and outward FDI stocks were in services. By contrast, the share of outward FDI in services in the CEECs was relatively low in 1996 to 1998 and only increased significantly in 1999. This suggests that CEECs have undergone a process of catch up with other developed countries in terms of the sectoral distribution of incoming UK FDI, which now appears largely concentrated in services industries. The small share of UK inward investment stemming from the CEECs also appears to be exclusively in services industries.

[Table 4 here]

4 Results from Estimating the Gravity Model

While the summary data thus far do not suggest that there has been a substantial increase in UK FDI into the CEECs we now investigate this issue in more detail by estimating the gravity model in equation (1). Doing so allows us to firstly estimate whether the FDI relationship between the UK and CEECs is significantly different from the pattern of bilateral FDI with other partner countries. Secondly, like

[8] The determinants of UK inward and outward FDI have been analysed by, e.g., Girma (2002) and Pain (1997, 1993). It is notable in this context that there has been little detailed analysis of the effects of UK outward investment on the domestic economy thus far, while the effects of inward investment in the UK have been extensively researched over the last decade (e.g., Girma and Görg, 2002a,b, Girma, Greenaway and Wakelin, 2001, Driffield, 2001). This is probably due to the unavailability of detailed micro level data on UK outward investment.

Hamilton and Winters (1992) we can use the model to predict what levels of FDI in the CEECs may be expected were they EU countries. To do so, we estimate the model using data on bilateral FDI between the UK and EU countries only. The parameters from this are then used to project the FDI relationship between the UK and CEECs as if they were EU Members. We can then interpret the difference between the predicted and observed levels as the un-exhausted potential for FDI.[10]

4.1 Comparing CEECs to other countries

For the gravity estimations we have data on bilateral FDI with six CEECs, namely, the Czech Republic, Hungary, Poland, Bulgaria, Romania and Russia. The first three attract the bulk of FDI in Central and Eastern Europe (Barrell and Holland, 2000) and are also in line to join the EU in the first round of enlargement. We therefore distinguish in our first regressions two groups of countries, one containing the first three countries, and the other, two laggards in terms of expected date of accession, and a useful benchmark (Russia).

We estimate equation (1) using random effects estimation to allow for the existence of time-invariant unobservable bilateral effects.[11] Lagrange multiplier tests for the existence of random effects, which are reported in Table 5, suggest that RE estimation is more appropriate than simple pooling of the data. Our initial regressions are estimations of equation (1) including a dummy CEEC equal to one if the partner country is one of the six listed above; the results of which are reported in Table 5. The coefficient on the dummy indicates whether the bilateral FDI relationships with these countries is fundamentally different to that of the base category, controlling for the effect of the other variables.

The model is firstly estimated using data for all countries in the sample, the results of which are presented in columns (1), (4) and (7) for total FDI, manufacturing FDI and services FDI respectively. Columns (2), (5) and (8) contain results for estimations using data on OECD countries and the CEECs only, while columns (3), (6) and (9) use only data on EU and CEECs. The first set of regressions thus indicates

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[9] See the appendix for the definition of CEECs for these summary statistics.

10 Egger (2002) refers to this as out-of-sample prediction approach and argues that it is much more appropriate than in-sample prediction as used by, for example, Baldwin (1994) and Nilsson (2000). While he claims that the out-of-sample approach is only sensible at the early stage of transformation of the CEECs we would contend that it is appropriate for our purposes where we attempt to determine what may happen if a CEEC were an EU country.

[11] Following Baltagi (1995) we may argue that the RE model is more appropriate than a fixed effects model as our set of countries does not represent the population of countries but can be regarded as a random draw of countries.

whether CEECs differ compared to all countries in the samples, the second set shows whether they are different compared to OECD countries; while the last set provides evidence as to whether they are different compared to EU countries only.

[Table 5 here]

Overall, one should note that the explanatory power of the models, as indicated by the R-squared is fairly high in all cases. The GDP variables all have positive coefficients, indicating that the larger the host and source countries, the larger are bilateral investments. The language dummy is also positive in all cases, indicating that English speaking countries enjoy higher bilateral investment stocks with the UK than other countries. This is in line with the idea that a common language reduces transaction costs and therefore stimulates FDI. The distance variable is negative in all specifications suggesting that the UK favours investment relations with nearby countries. Only the skill variables turn out to have mixed results. The skill endowment of the host has a consistently negative effect, i.e., inward FDI stocks in the countries included in the sample are higher the lower the countries' relative skill endowments. This may suggest that inward FDI is mainly driven by labour cost considerations, i.e., is predominantly vertical, rather than horizontal. The coefficients on the source country skill variable are mixed but mostly positive, indicating that, as one may expect, outward FDI is higher the better endowed the source country is with skilled labour.

Although there does not appear to be any difference in the direction of the impact on FDI in manufacturing or services, the magnitude of the effects appears different, however, as shown by the difference in the sizes of the coefficients (which can be interpreted as elasticities in the log specification of the model). The coefficients on the four GDP variables appear consistently larger in the services FDI regressions compared to manufacturing FDI, while the coefficients on the skill variables are consistently lower for services. This suggests that services FDI is much more related to the size of countries suggesting, perhaps, that as convergence occurs, services FDI will increase more than manufacturing. This interpretation is consistent with the summary statistics presented above which showed a shift in UK FDI (both inward and outward) towards services and out of manufacturing.

Turning to the coefficient on the CEEC dummy we find that, although it is negative in most cases it is never statistically significant. Hence there is no statistically significant evidence that the bilateral investment relationship between the

UK and the six CEECs is any different from that between the UK and all countries in the sample, or between the UK and other EU countries, controlling for the effect of the other covariates. This is in line with the findings by Brenton, DiMauro and Lücke (1999) who find that inward FDI stocks in CEECs do not appear to be different from other countries included in their gravity estimations.

To ascertain whether this result is due to the amalgamation of fairly advanced and less advanced CEECs we distinguish the two groups of CEECs described above and included two dummies: CEEC1 which is equal to one if the source or host country is either the Czech Republic, Hungary or Poland, and CEEC2 which is equal to one for Bulgaria, Romania and Russia. Results are given in Table 6. While the coefficients on the covariates are largely unchanged we also find that there appears to be not much difference between the coefficients on CEEC1 and CEEC2. The coefficients on the former are mostly negative but statistically insignificant. This is also true for total and manufacturing FDI in CEEC2. Interestingly, however, the coefficients for services FDI are consistently positive, although statistically insignificant for the CEEC2 dummy, providing some weak evidence that services FDI with the UK is higher than may be expected from the pattern between the UK and other countries.

[Table 6 here]

4.2 Predictions for CEECs if they were EU members

The evidence thus far does not provide much by way of convincing evidence that the pattern of FDI between the UK and the CEECs is different from the 'normal' pattern between the UK and other OECD and, indeed, other EU countries. It is therefore questionable whether one should expect any additional *net* impact from the CEECs joining the EU. Of course, the gravity model shows that if EU membership leads to any changes in GDP, GDP per capita or skill endowments (and one may expect such changes following accession) this would affect the relationship. What is far from clear, however, is whether there is an "accession effect" that would work even when holding those other variables constant.

This is a difficult issue to investigate but we do attempt a first step by estimating our gravity model for EU countries only and, based on the parameters from that, plug in values for the six individual CEEC countries and the UK. The predicted value may then be interpreted as the value the country would obtain if it were an EU member at present. We can then compare that with the actual value of FDI and, if this

observed value is substantially lower, may conclude that there is a potential for catch-up following accession (even holding the effects of the other covariates constant).

Egger (2002) has recently discussed the econometric issues related to using gravity models to predict trade potentials and they similarly apply to the prediction of FDI potential. Firstly, it is paramount that the estimates are consistent. Equation (1) includes time specific effects and, as above, we estimate the gravity model used for prediction using a random effects (RE) model. The RE model controls for time invariant bilateral effects which are assumed to be random. Secondly, the estimation should have high explanatory power and, as our results above indicated, this is the case for our gravity model. Thirdly, while previous studies predicting trade potential using this approach focused on point estimates of the predicted value, we take into account the standard error of the prediction and perform *t*-tests to check whether the predicted value equals the observed value at some reasonable level of statistical significance.

Table 7 presents the results of the random effects regressions of equation (1) using data for EU countries only.[12] Note that it was not possible to estimate the fully specified regression using data for services FDI with the RE estimator due to the small sample size. Hence, in column (3) we report estimations using pooled OLS allowing for unspecified serial correlation of the error term within, but not across bilateral groupings.

The fully specified regressions in columns (1) to (3) rely on relatively small sample sizes. Inspection of the data shows that this is mainly due to the unavailability of the skill variables. To overcome this we estimated an alternative regression on which to base the prediction. We use equation (1) but drop the skill variables, i.e., only include the GDP and distance variables. These results are reported columns (4) to (6) in Table 7. This increases sample size considerably but does not change the coefficients on the remaining variables to any great extent. Overall, the explanatory power of all regressions in Table 7 appears fairly high, in line with the regressions presented above.

[Table 7 here]

Using these regression estimates we calculate predicted values for UK FDI stocks in the six CEECs. We also calculate the standard error associated with the

[12] Lagrange Multiplier tests for the validity of random effects indicate that RE is preferred compared to pooled regression.

predicted value. Next, we perform a *t*-test for whether the predicted value equals the actually observed value of UK FDI in these countries. Since the *t*-statistic is calculated as

$$t = (\hat{y}_{pred} - y_{observed}) / se(\hat{y}_{pred}) \quad (2)$$

a positive *t*-statistic is evidence that the predicted value is higher than the observed value. Hence, if this *t*-statistic is positive and statistically significant (at some reasonable level of confidence) it provides evidence that the UK FDI stock the country could expect if it were an EU member is higher than the currently observed value.

Table 8 reports the *t*-statistics associated with the regression results in Table 7. Based on the predicted values from regressions of the fully specified equation (1) we find that for total FDI the predicted values are higher for all countries except Russia. These results seem driven by services FDI rather than manufacturing, however. Hence, while there may be potential for increasing UK FDI in the services sector for five out of the six countries, manufacturing investment seems to have reached its 'normal' level already. This is again in line with the overall pattern of UK FDI, which was mainly concentrated in manufacturing in CEECs and has only recently diversified into services. Our results also indicate that Russia seems to have reached its potential in both manufacturing and services already and that one may not expect any additional net effect from joining the EU. While it is frequently observed that the former Soviet Union countries attract only very little inward FDI (e.g., Meyer and Pind, 1999) it seems that substantial increases in such FDI can only be achieved via changes in the variables controlled for in the gravity model, most notably growth in GDP.

[Table 8 here]

The *t*-values calculated from predictions based on the set of regressions in columns (4) to (6) in Table 7 are also reported in columns (4) to (6) in Table 8. Note that now we do not find any statistically significant *t*-values for total and manufacturing FDI. We do, however, find positive and statistically significant *t*-values for Bulgaria, Poland and Romania in terms of services FDI. These countries may, thus, be expected to increase their inward services FDI stocks from the UK by becoming EU members, holding GDP and GDP per capita constant. There is no

evidence that the CEECs may benefit from increased manufacturing FDI from the UK, however.

Based on the RE results for services FDI (using the estimates from column (6)) we can construct 95 percent confidence intervals for the predicted value of FDI, which is done in Table 9. The point estimate of the predicted value for Bulgaria, for example, is inward FDI stocks of £ 2.5 million in 1997. The 95 percent confidence interval around this value ranges from 0.03 to 185.9, while the observed value for 1997 was £ 0.4 million. Hence, if Bulgaria had been an EU member in 1997, we may have expected its value of inward UK services FDI to have been in the range of 0.03 to 185.9 million with 95 percent certainty.

[Table 9 here]

5 Conclusions

Over a long period, gravity models have performed remarkably well in explaining bilateral trade flows. In recent years, use of this particular modelling framework has increased partly in response to the proliferation of regional trading arrangements, partly because of foundational work aimed at providing theoretical underpinnings. Among the applications in recent years has been the evaluation of potential trade effects from enlarging the EU to the east. Foundational work in recent years has also resulted in progress in understanding the determinants of cross-border investment flows. In particular, the knowledge capital model of the multinational enterprise has generated new insights, one of which is that gravity variables are likely to be important determinants.

In this paper we apply a gravity framework to evaluate FDI between a number of CEECs and the UK. Five of the six CEECs in our sample are candidate countries for EU accession and three may accede as early as 2004. Moreover, since the UK is the largest host to/source of FDI in the EU, investment flows between the UK and CEECs is an interesting case to take. Our results thus far suggest that: there is no evidence to support the proposition that the bilateral investment relationship between the UK and the CEECs is fundamentally different to that between the UK and other OECD or EU countries; second, there appears to be no noticeable difference between accession 'leaders' and laggards'; third, with regard to investment potential,

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Appendix

List of countries included in the econometric analysis:	Definition of Central and Eastern European Countries in the summary statistics:
AUSTRALIA	ALBANIA
AUSTRIA	BOSNIA AND HERZEGOVINA
BELGIUM/LUXEMBOURG	BULGARIA
BULGARIA	CROATIA
CANADA	CZECH REPUBLIC
CZECH REPUBLIC	ESTONIA
DENMARK	HUNGARY
FINLAND	LATVIA
FRANCE	LITHUANIA
GERMANY	FYR OF MACEDONIA
GREECE	POLAND
HONG KONG	ROMANIA
HUNGARY	RUSSIA
IRELAND	SERBIA AND MONTENEGRO
ITALY	SLOVAKIA
JAPAN	SLOVENIA
MALAYSIA	
MEXICO	
NETHERLANDS	
NEW ZEALAND	
NORWAY	
POLAND	
PORTUGAL	
ROMANIA	
RUSSIA	
SINGAPORE	
SOUTH AFRICA	
SOUTH KOREA	
SPAIN	
SWEDEN	
SWITZERLAND	
THAILAND	
UK	
USA	

Figure 1

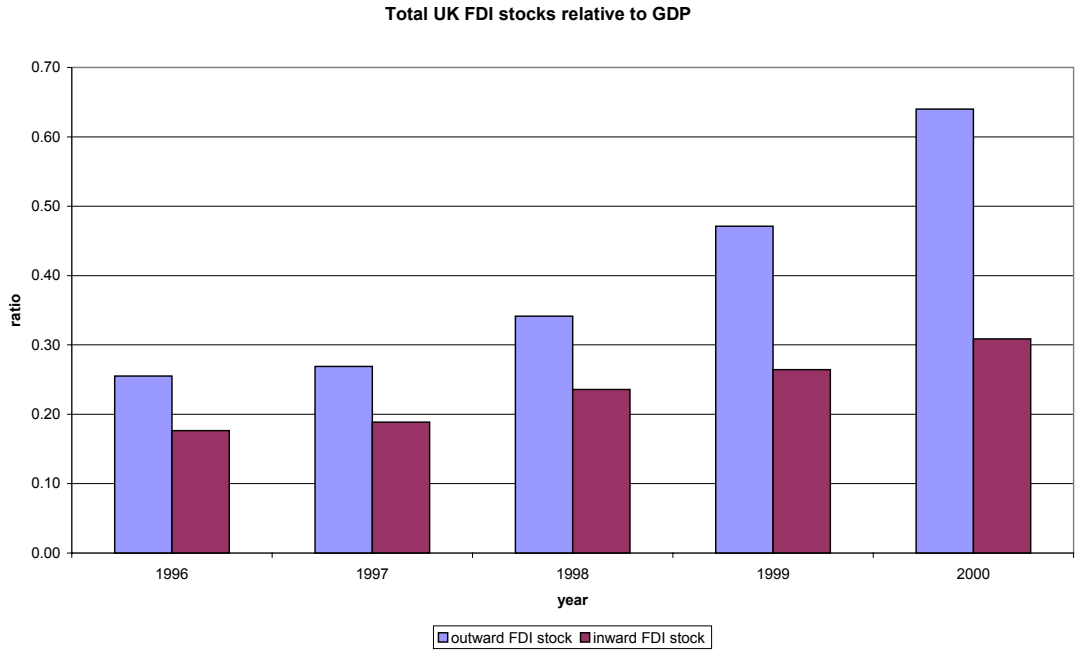
Total UK FDI stocks relative to GDP
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
ratio
1996
1997
1998
1999
2000
year
outward FDI stock
inward FDI stock

Table 1: Impact of Successive Enlargements of the EU

(based on 1995 data)	Increase in area	Increase in population	Increase in total GDP (in purchasing power parities)	Change in per capita GDP	Average per capita GDP (EM6 = 100)
EUR 9/EUR 6	31%	32%	29%	-3%	97
EUR 12/EUR 9	48%	22%	15%	-6%	91
CUR 15/EUR 12 including German unification	43%	11%	8%	-3%	89
EUR 26/EUR 15	34%	29%	9%	-16%	75

Table 2: Economies in Transition and the European Union

Country	Europe Agreement signed	Europe Agreement came into force	Official application for EU Membership	Expected Accession Date
Bulgaria	March 1993	February 1995	December 1995	?
Czech Republic	October 1993	February 1995	January 1996	2004
Estonia	June 1995	February 1998	November 1995	2004
Hungary	December 1991	February 1994	March 1994	2004
Latvia	June 1995	February 1998	October 1995	2004
Lithuania	June 1995	February 1998	December 1995	2004
Poland	December 1991	February 1994	April 1994	2004
Romania	February 1993	February 1995	June 1995	?
Slovakia	October 1993	February 1995	June 1995	2004
Slovenia	June 1996	February 1999	June 1996	2004

Source: From the European Union's web page (on 2nd September 2001) at http://europa.eu.int/comm/enlargement/intro/index.htm

Table 3: Geographical distribution of UK outward and inward FDI stocks

	outward FDI stocks			inward FDI stocks		
year	US	EU	CEECs	US	EU	CEECs
1996	25.3%	43.1%	0.4%	41.6%	32.5%	0.2%
1997	27.1%	42.2%	1.0%	45.9%	29.4%	..
1998	41.4%	33.0%	0.8%	46.1%	34.1%	0.2%
1999	43.9%	35.3%	0.4%	39.2%	45.0%	0.1%
2000	29.5%	54.3%	0.3%	34.4%	47.1%	..

Note: .. denotes data not available

Table 4: Sectoral distribution of UK FDI in EU and CEECs

		outward FDI		inward FDI	
		manufacturing	services	manufacturing	services
TOTAL	1996	41.78%	42.49%	29.15%	50.11%
	1997	37.30%	46.70%	29.91%	56.86%
	1998	32.74%	46.85%	29.84%	57.53%
	1999	33.70%	51.84%	26.57%	63.22%
	2000	26.36%	60.02%	23.82%	67.17%
EU	1996	43.37%	49.86%	26.31%	47.24%
	1997	39.42%	52.89%	34.53%	54.43%
	1998	34.46%	60.86%	26.09%	56.35%
	1999	46.43%	48.39%	18.24%	71.79%
	2000	24.69%	71.34%	16.08%	73.03%
CEECs	1996	43.72%	..	..	100.00%
	1997	26.11%	19.31%	..	..
	1998	28.46%	36.06%	..	..
	1999	33.78%	63.28%	..	100.00%
	2000	..	..	..	..

Note: .. denotes data not available

Table 5: Results of gravity model, CEEC dummy

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	total	total	total	manufacturing	manufacturing	manufacturing	services	services	services
distance	-0.108	-1.180	-0.514	-0.327	-1.098	-0.722	-0.215	-1.437	-0.769
	(0.156)	(0.387)**	(0.156)**	(0.176)+	(0.433)*	(0.190)**	(0.182)	(0.502)**	(0.262)**
language	1.416	1.186	2.376	1.452	0.965	1.992	2.137	0.000	3.985
	(0.418)**	(0.940)	(0.458)**	(0.450)**	(1.250)	(0.509)**	(0.491)**	(0.000)	(0.823)**
hgdprl	1.432	1.242	1.178	1.266	0.936	0.753	1.786	1.245	1.682
	(0.264)**	(0.616)*	(0.375)**	(0.317)**	(0.806)	(0.441)+	(0.263)**	(0.912)	(0.471)**
sgdprl	1.679	1.342	1.801	1.051	0.488	1.397	2.099	1.091	2.062
	(0.423)**	(0.747)+	(0.399)**	(0.944)	(2.097)	(0.819)+	(0.413)**	(1.187)	(0.452)**
hgdppcl	0.794	0.764	0.586	0.627	0.362	0.042	1.180	0.662	1.124
	(0.304)**	(0.631)	(0.409)	(0.327)+	(0.778)	(0.464)	(0.307)**	(1.093)	(0.506)*
sgdppcl	0.844	0.411	0.991	0.182	-0.438	0.357	1.154	0.055	1.191
	(0.423)*	(0.708)	(0.423)*	(0.909)	(1.860)	(0.792)	(0.445)**	(1.276)	(0.482)*
hskill	-0.930	-0.199	-0.321	-0.710	-0.258	-0.343	-1.166	-1.420	-1.544
	(0.443)*	(1.028)	(0.606)	(0.538)	(1.233)	(0.672)	(0.420)**	(1.212)	(0.761)*
sskill	0.748	1.606	0.106	0.001	2.213	0.177	-1.309	0.482	-1.884
	(0.820)	(1.558)	(0.858)	(1.221)	(2.233)	(1.054)	(1.146)	(1.796)	(1.117)+
ceec	-0.270	0.262	-0.163	-0.661	-0.692	-1.313	0.268	-0.143	0.343
	(0.644)	(1.391)	(0.843)	(0.679)	(1.577)	(0.918)	(0.684)	(2.247)	(1.006)
Constant	-56.187	-47.428	-50.566	-43.696	-37.292	-44.397	-58.372	-37.416	-47.384
	(7.475)**	(19.775)*	(9.383)**	(14.161)**	(39.431)	(13.004)**	(7.598)**	(24.210)	(12.588)**
Observations	130	59	93	80	42	60	67	31	48
LM test	46.39**	21.56**	35.30**	24.34**	11.26**	16.57**	10.71**	--	4.72*
R-squared	0.63	0.79	0.75	0.66	0.75	0.74	0.79	0.82	0.83

standard errors in parentheses, + statistically significant at 10%; * at 5%; ** at 1%
Time dummies included, LM test: Lagrange multiplier test for random effects
Columns (1), (4), (7): total sample; (2), (5), (8): EU and CEEC countries; (3), (6), (9): OECD and CEEC countries
column (8) is estimated using OLS allowing for clustering of error terms by bilateral grouping. RE was not possible due to small number of obs.

Table 6: Results of gravity model, CEEC1 and CEEC2 dummies

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	total	total	total	manufacturing	manufacturing	manufacturing	services	services	services
distance	-0.108	-1.193	-0.522	-0.326	-1.107	-0.739	-0.220	-1.508	-0.798
	(0.157)	(0.397)**	(0.157)**	(0.178)+	(0.447)*	(0.192)**	(0.183)	(0.504)**	(0.256)**
language	1.399	1.172	2.332	1.443	0.965	1.942	2.138	0.000	4.313
	(0.422)**	(0.961)	(0.464)**	(0.456)**	(1.285)	(0.516)**	(0.494)**	(0.000)	(0.826)**
hgdprl	1.399	1.094	1.058	1.237	0.798	0.573	1.843	1.707	1.913
	(0.275)**	(0.762)	(0.411)*	(0.333)**	(1.027)	(0.491)	(0.276)**	(1.083)	(0.480)**
sgdprl	1.602	1.194	1.654	1.036	0.451	1.338	2.235	1.407	2.396
	(0.455)**	(0.878)	(0.448)**	(0.955)	(2.157)	(0.826)	(0.456)**	(1.177)	(0.485)**
hgdppcl	0.751	0.601	0.445	0.592	0.205	-0.173	1.253	1.202	1.405
	(0.319)*	(0.800)	(0.454)	(0.349)+	(1.060)	(0.529)	(0.325)**	(1.267)	(0.522)**
sgdppcl	0.769	0.259	0.838	0.165	-0.485	0.280	1.290	0.446	1.549
	(0.454)+	(0.850)	(0.474)+	(0.920)	(1.921)	(0.801)	(0.486)**	(1.255)	(0.518)**
hskill	-0.869	0.017	-0.131	-0.655	-0.130	-0.139	-1.274	-4.655	-2.244
	(0.463)+	(1.193)	(0.661)	(0.569)	(1.371)	(0.715)	(0.448)**	(1.485)**	(0.857)**
sskill	0.762	1.628	0.077	-0.007	2.169	0.190	-1.239	0.441	-1.921
	(0.826)	(1.587)	(0.863)	(1.233)	(2.287)	(1.060)	(1.158)	(1.623)	(1.087)+
CEEC1	-0.028	0.275	0.030	-0.544	-0.760	-1.196	-0.130	-2.479	-0.488
	(0.827)	(1.419)	(0.887)	(0.786)	(1.650)	(0.933)	(0.879)	(1.670)	(1.104)
CEEC2	-0.546	-0.134	-0.647	-0.905	-1.077	-2.101	0.735	0.949	1.455
	(0.871)	(1.837)	(1.076)	(1.044)	(2.357)	(1.302)	(0.941)	(2.393)	(1.192)
Constant	-55.203	-44.758	-48.072	-43.427	-35.743	-42.776	-60.419	-31.877	-50.520
	(7.804)**	(21.750)*	(10.028)**	(14.331)**	(40.825)	(13.214)**	(8.148)**	(21.978)	(12.401)**
Observations	130	59	93	80	42	60	67	31	48
LM test	46.39**	21.34**	34.92**	24.38**	11.36**	16.16**	11.11**	--	4.67*
R-squared	0.63	0.79	0.75	0.66	0.75	0.74	0.79	0.85	0.84

standard errors in parentheses, + statistically significant at 10%; * at 5%; ** at 1%
Time dummies included, LM test: Lagrange multiplier test for random effects
Columns (1), (4), (7): total sample; (2), (5), (8): EU and CEEC countries; (3), (6), (9): OECD and CEEC countries
column (8) is estimated using OLS allowing for clustering of error terms by bilateral grouping. RE was not possible due to small number of obs.

Table 7: Regressions for predictions, EU countries only

	(1)	(2)	(3)	(4)	(5)	(6)
	total	manufact	services	total	manufact	services
distance	-1.485	-1.331	-1.912	-1.387	-1.346	-1.629
	(0.408)**	(0.577)*	(0.434)**	(0.366)**	(0.469)**	(0.411)**
language	0.360	0.094	0.000	0.861	0.214	1.303
	(1.109)	(1.699)	(0.000)	(0.866)	(1.195)	(1.149)
hgdprl	0.227	0.491	0.225	0.376	0.517	-0.095
	(0.862)	(1.344)	(0.851)	(0.731)	(0.933)	(0.790)
sgdprl	1.796	-0.086	2.300	2.318	-0.306	1.792
	(1.346)	(2.625)	(0.842)*	(0.749)**	(1.801)	(0.862)*
hgdppcl	0.018	0.136	0.059	0.127	0.247	-0.409
	(0.855)	(1.421)	(0.862)	(0.719)	(0.924)	(0.775)
sgdppcl	1.050	-0.779	1.672	1.511	-0.838	0.926
	(1.223)	(2.323)	(0.865)+	(0.732)*	(1.654)	(0.822)
hskill	-2.042	-1.219	-4.302			
	(1.695)	(2.463)	(1.837)*			
sskill	0.661	0.781	-1.286			
	(1.962)	(2.635)	(2.295)			
Constant	-20.999	-7.054	-6.944	-37.034	-2.867	-25.403
	(30.934)	(53.108)	(21.951)	(19.289)+	(33.933)	(21.400)
Observations	46	32	24	98	58	50
LM test	17.46**	8.55**	--	103.89**	29.38**	6.26*
R-squared	0.71	0.59	0.85	0.72	0.54	0.78

Standard errors in parentheses
LM test: Lagrange multiplier test for random effects
+ statistically significant at 10%; * at 5%; ** at 1%
column (3) is estimated using OLS allowing for clustering of error terms by bilateral grouping. RE was not possible due to small number of obs.
Time dummies included

Table 8: t-test of predicted value = actual value

		with skill variables			without skill variables		
host	year	total	manufacturing	services	total	manufacturing	services
		(1)	(2)	(3)	(4)	(5)	(6)
Bulgaria	1996	1.58			1.37		
	1997			1.90+			1.95+
	1998						
	1999				0.57		
Czech Republic	1996	2.02*	1.24	2.57*	1.23	1.18	1.34
	1997	1.33	0.92		0.25	0.66	
	1998				0.33		1.01
	1999				0.88		1.00
Hungary	1996	1.67+	0.80		0.77	0.49	
	1997	1.04	0.86		-0.07	0.58	
	1998				0.16		0.94
	1999				0.67	-0.37	
Poland	1996	1.78+	0.77	2.47*	0.98	0.43	1.71+
	1997	1.51	0.70		0.59	0.30	
	1998				0.35	0.17	
	1999				0.35	0.19	
Romania	1996	2.12*	0.96		1.41	0.76	
	1997	1.86+	1.02		1.16	0.88	
	1998				0.89		2.44*
	1999				0.48	0.10	
Russia	1996	0.47	0.16	0.53	0.21	-0.06	1.12
	1997	0.26	0.22	0.74	-0.11	-0.01	1.00
	1998				0.51	-0.47	1.23
	1999				0.55	0.02	

Notes: if t-statistic is positive, the predicted value is higher than the actual value.
+ statistically significant at 10%; * at 5%; ** at 1%

Table 9: 95 percent confidence intervals for predicted values of services FDI (in million £)

host	year	prediction	CI lower bound	CI upper bound	observed value
Bulgaria	1997	2.480	0.033	185.890	0.039
Poland	1996	4.914	0.280	86.125	0.438
Romania	1998	4.586	0.070	301.578	0.029