Multinational Business Review

TAKING STOCK OF FIRM-LEVEL AND COUNTRY-LEVEL BENEFITS FROM FOREIGN DIRECT INVESTMENT

Journal:	*Multinational Business Review*
Manuscript ID	MBR-02-2018-0011.R1
Manuscript Type:	Research Paper
Keywords:	foreign direct investment, firm-to-firm effects, overall effects, meta-regression-analysis, aggregate productivity

1. INTRODUCTION

Foreign direct investment (FDI) is one of globalization's key aspects (Rodrik, 2011; Baldwin, 2016). Considerable time and effort have been devoted to an understanding of the rationale and mechanisms through which the benefits of FDI take root (Dunning, 1993; Rugman and Verbeke, 2003; Rugman, 1981; Cantwell, 1989). This scholarship has provided a strong theoretical expectation that FDI will have a positive impact via spillover effects on the host economy (Caves, 1996; Borensztein *et al.*, 1998; Khanna and Palepu, 2010). However, research about FDI initially concentrated on advanced economies, which have historically acted as both senders and recipients (Rugman, 1981; Markusen and Venables, 1999). But in fact, the participation of emerging countries in total worldwide FDI has risen substantially since the early 1990s (see e.g. Wright *et al.*, 2005; Peng *et al.*, 2008). Developing countries have recently attracted between one third and half of global FDI inflows and up to 35% of outward investment also (UNCTAD 2017). It is less clear whether the spillovers from FDI to the host economy will be positive in emerging markets when institutions are weaker (Carney *et al.*, 2018) or when the investing firm is an emerging market multinational firm (Cuervo-Cazurra and Genc, 2008; Ramamurty, 2012)

Research about the social benefits of FDI led to the expectation that the gains would be easily identified empirically. However, consistent evidence about these positive effects have proved elusive, and this has been especially true for emerging economies (see for example Haddad and Harrison (1993) as against Haskell *et al.* (2007)). A consensus has therefore begun to emerge arguing that when considering emerging countries, the effects of foreign direct investment on economic performance are *conditional;* they depend upon host economy factors. An early example of this line of reasoning was the World Bank Development Report 2001, which stressed the role of absorptive capacities (see also Aitken and Harrison, 1999; Alfaro *et al.*, 2004). The *overall effect* of FDI on national economic performance in emerging economies are

therefore argued to depend upon whether recipient countries have attained minimum levels of human capital, financial and institutional development, while the *firm-to-firm effects*, are seen as conditional upon the type of linkages (with backward linkages, or vertical spillovers, that is, links between the firm and its suppliers, dominating over forward and sectoral linkages, or horizontal spillovers. For example, Borensztein *et al.* (1998) show that the effect of FDI on emerging economies is conditional on recipient countries reaching minimum levels of human capital. Alfaro *et al.* (2004) interpret these thresholds in terms of minimum levels of financial development, while De Santis and Lührmann (2009) highlight the role of institutions. At the firm-to firm level, Javorcik (2004) shows that backward linkages are the main transmission channel for the benefits of FDI.

In this paper, we combine the country and enterprise level evidence together in a meta-regression analysis to evaluate the evidence about FDI spillovers in emerging economies. The empirical literature on the relationship between FDI and economic growth, domestic investment and productivity documents the effects on host countries, both firm-to-firm and overall. At the firm-level, the impact of FDI has typically been identified by analysing firm productivity and performance from foreign to domestic competitors (horizontal spillovers) or suppliers (vertical spillovers) (Aitken and Harrison, 1999; Borensztein *et al*., 1998; De Mello, 1997). Overall or macro level analyses give a cross-country perspective. The latter encounter potential methodological problems in terms of, for instance, endogeneity and omitted variable bias while firm-to-firm level evidence, usually restricted to a single country, tends to address such problems more effectively. Even so, studies focusing on the firm-to-firm effect often have less to say in

terms of the aggregate impact of FDI. We devote attention to both bodies of evidence[1]. Thus, our empirical work covers *both* the firm level and the overall economy-wide evidence, because while the former throws light on private returns and localized firm-to-firm effects (*f2f effects*), the latter reveals important features of social returns and the net effects of FDI inflows (*overall effects*).

This paper employs meta-regression-analysis (MRA) techniques, a novel empirical methodology for summarizing and distilling the lessons from a given body of econometric evidence (e.g. Liu *et al.*, 2014; Steel and Taras, 2010). Our approach matches the MAER-NET reporting guidelines (Stanley *et al.*, 2013).[2] For this exercise, we hand-collected unique data covering 565 micro (or firm-to-firm) and 551 macro (or overall) level estimates of the effects of FDI on overall and firm-to-firm performance in emerging markets from 104 and 71 empirical primary studies, respectively. We construct variables covering 13 features of these econometric estimations with respect to, among other things, various characteristics of sampling and methodology.

This paper extends the literature in a number of ways. First, we focus on the impact of spillovers from FDI in emerging markets. Second, we analyse "overall" and "firm-to-firm" FDI effects jointly creating a unique new data set to implement that empirical strategy. Furthermore, our analysis is based upon a substantially larger number of papers than previous meta-analyses and surveys on FDI to emerging markets. In consequence, we are able to exploit a wider set of moderator variables and controls. Finally, we rely upon a sophisticated empirical model allowing the studies to be a random sample from the universe of all possible studies and hence assuming that there are real differences (which we test for) between all studies in the magnitude of the

[1] Productivity based approaches include, for example, labour productivity or total factor productivity and output based include sales, operating revenue turnover or value added. We did not collect any paper on innovation-based performance.

[2] For a full account of MAER-NET reporting guidelines see the Appendix.

effects.

Our main findings are as follows. Firstly, concerning impact of FDI on emerging host economies, we find that these are often positive, especially when overall effects are considered. Thus, we find that while 44 percent of *f2f* estimates are positive and statistically significant, 44 percent are insignificant, and 12 percent are negative and significant (see Figure 1a and 1b). Thus, if one considers only the micro-evidence, the conclusion is very open. However, 50 percent of the *overall* effect estimates are positive and statistically significant, 39 percent are insignificant, and only 11 percent are negative and significant (see Figure 2); the weight of the evidence is slightly stronger when one considers the macro effects. Moreover, the quantitative impact of overall effects is much greater: in these studies, the *overall* spillover effects are typically at least six times larger than the *f2f* ones.

(Figure 1a and 1b about here)

(Figure 2 about here)

The second set of results concern the reasons for the observed variation in the estimated effects of FDI. We show that the choice of statistical method and specification are more important factors in macro studies and less so in micro. This is because the latter often uses more sophisticated empirical modelling. There is evidence that empirical specifications controlling for panel unobserved heterogeneity report significantly smaller effects of FDI (both for *overall* and *f2f* studies), and the same applies to those studies that consider the interaction of FDI with, for example, R&D expenditures, trade openness, human capital, and financial openness (in macro studies).

Thirdly, we find that the FDI spillover effects are heterogeneous over time and countries, even when controlling for the choice of statistical method and specification. Finally, while available data provide stronger support for differentiating the effect of FDI on growth across

levels of development rather than in terms of geographic regions, we observe that there remains a surprising lack of FDI data for poorer countries.[3] One would expect that FDI would be an area for which there would be reliable quantitative evidence on developing countries[4], but that does not yet seem to be the case.

Our evidence suggests that the main lesson from the literature, namely that the spillover effects of FDI are conditional on countries having reached certain thresholds with respect to human capital and financial/institutional development, contrasts with the finding that the effects are larger for countries below such critical thresholds (Cohen and Levinthal, 1990; Acemoglu *et al.*, 2006). We propose that the gap between private and social returns, albeit still largely missing in most of the current academic and policy discussions, may provide an explanation. Private returns to FDI are higher in low-income countries, but because of institutional deficiencies, infrastructure problems, pervasive rent-seeking and/or generalized lack of competition, the benefits from these investments projects are highly localized. This wedge between the overall and *f2f* effects is important for the dynamics and distribution of the benefits from globalization but has received, as our analysis demonstrates, scant attention in the FDI literature so far. Our results parallel findings of other streams of literature, for instance that on the private vs. social return of R&D. Griliches (1992), building upon the findings of Minasian (1969), points out that when "R&D spill-overs are present, their magnitude may be quite large, and social rates of return remain significantly above private rates". More recent studies (see e.g. Jones and Williams, 1998; Griffith *et al.*, 2003; Hall *et al.*, 2010) concur in judging that R&D studies might underestimate R&D return (i.e. lower bound estimates), when there is no role for the "assimilation of others'

[3] The conventional wisdom about foreign direct investment in low-income countries (LICs) is that the little FDI these countries receive is often concentrated in the natural resources sector, thus explaining its perceived limited development impact. For example, see Asiedu (2006); Buckley *et al.* (2007); Spencer (2008); Robinson *et al.* (2006).
[4] See Demena and van Bergeijk (2016) for micro studies.

discoveries" (what we refer to below as "absorptive capacity")[5] above and beyond the innovation direct channel effect.

In the following section, we summarise the relevant FDI spillover and meta-regression analysis literatures before presenting our data set in the third section. Section 4 discusses the methodology and section 5 reports our main results. Section 6 concludes.

.

2. THE EXTERNAL BENEFITS AND COSTS OF FOREIGN DIRECT INVESTMENT

The purpose of this section is to provide a brief overview of the literature solely based on some of the most widely cited papers and to discuss the most important applications of meta-analysis to FDI spillovers.

Why should we expect FDI to have a positive impact on economic performance in emerging markets? There is an extensive theoretical and empirical literature which addresses this question (Blomström and Kokko, 1998; Meyer and Sinani, 2009). FDI is thought of as a direct, debt-free way of adding to the capital stock of the host economy; an important source of finance especially in emerging markets where capital is relatively scarcer (Eichengreen and Kohl, 1998; Holland *et al.*, 2000; Navaretti and Venables, 2004). Thus, FDI provides gross fixed capital formation without the need for domestic savings, and this can fuel economic growth and development, both directly and indirectly. The direct mechanisms work through the resulting increases in output and employment (Alfaro *et al.*, 2010). Spillover effects can include that these new jobs are more productive (Gorg and Strobl, 2001; Driffield and Love, 2007) and that the production by foreign firms may provide access to up-to-date industrial technology (Spencer, 2008) as well as giving domestic competitors greater access and exposure to international

[5] For excellent surveys of the early literature on the private versus public return of R&D see Hall (1996) and David *et al.* (2000).

markets (Bernard and Jensen, 1999). These effects may be especially important in emerging markets because of technology gaps with developed economies and may also explain investment in strategic technological assets by emerging market multinationals (Li *et al.*, 2010; Zhang *et al.*, 2010). Many of these gains may be driven by employee mobility (Liu *et al.*, 2010) as well as demonstration effects by which, for example, foreign entrants show the host country's domestic firms the value of new management and export techniques (Cheung and Lin, 2004).

However, there may also be some non-negligible costs of FDI for the host economy (Buckley *et al.*, 2007; Spencer, 2008). Competition from foreign firms with superior technology and scale can drive domestic producers out of business, leading to greater market concentration and abuses of market power as well as employment losses (Aitken and Harrison, 1999; Li *et al.*, 2013). High rates of profits repatriation coupled with low rates of reinvestment can also dampen the long run benefits of FDI (Borensztein *et al.*, 1998; de Mello, 1997; Alfaro *et al*., 2004). If FDI is concentrated in sectors with limited linkages to the rest of the economy, such as natural resources, then one should also expect smaller benefits (Asiedu, 2006; Buckley *et al.*, 2007; Robinson *et al.*, 2006).

What are the main findings from the macro/country and micro/firm bodies of empirical evidence? The macro evidence typically identifies no or relatively modest first-order overall effects of FDI on performance, which increase once conditionalities or thresholds are taken into account, especially for emerging markets. Thus, Borenzstein *et al.* (1998) argue that only countries with sufficiently educated work forces are able to capture the benefits from FDI. De Mello (1997, 1999) identifies a different threshold: FDI significantly affects performance only in those countries in which we observe a strong complementarity between domestic and foreign capital. Alfaro *et al.* (2004) argue that the benefits of FDI can better be seized in those countries that have reached a certain level of financial development, because this helps potential suppliers

of the foreign firm to develop. These conditionalities can be summarized in terms of country levels of absorptive capacity (Cohen and Levinthal, 1990); the levels of capabilities and skills in an economy, which facilitate learning from others.

The enterprise *f2f*-evidence on the effects of FDI on economic performance in emerging markets reaches similar conclusions (Meyer and Sinani, 2009; Spencer, 2008), though a positive impact is sometimes identified when specific types of effects are considered. Thus for horizontal linkages, the sign and significance of effects has been found to depend on a series of conditions such as overall economic development, employment and working conditions, and the potential for technology transfer to domestic firms (Meyer and Sinani, 2009; Liu *et al.*, 2010; Li *et al.*, 2013). At the inter-industry (*vertical*) level, Javorcik (2004) identifies unambiguously positive productivity spillovers from FDI through contacts between foreign affiliates and their local suppliers. Bridging results on *overall* and *f2f* effects, Blalock and Gertler (2008) report that FDI benefits are conditional on firms having acquired certain capabilities in three areas: human capital, research and development and distance to the technological frontier.

The main lesson from this brief review, however, is the critical role of conditionality in determining the impact of FDI on emerging economy host economies: firms, sectors, or countries that are below certain "thresholds" (either in terms of human capital, financial development or institutional quality) are less likely to benefit from FDI, *overall* and *f2f*. One implication that have not been carefully studied so far is that in lower income countries, in which many of these minimum critical levels are less likely to have been reached, the effects of FDI on performance should be more difficult to identify or should be weaker than elsewhere.

2.1 Meta- regression analysis (MRA) on FDI spillovers

In the first MRA study of FDI, Gorg and Strobl (2001) started from the weakness of

"selected" literature reviews which led them to adopt a "systematic" assessment of the empirical evidence. Their work paved the way to a better understanding of the sometimes-contradictory empirical research on productivity spillovers by recognizing that findings were sensitive to the data and the methods employed in each study[6].

Focusing on the *f2f* evidence, Meyer and Sinani (2009) analysed the occurrence of spillover effects along the "Economic Development" dimension by identifying an inverted "U" relationship: low-income countries tend to benefit from spillovers due to the 'low similarity' and high potential 'demonstration' effect of FDI; middle-income countries are disadvantaged due to the direct competition of foreign firms and the limited capacity to react and improve accordingly; and high-income countries can benefit from FDI *via* dynamic competition, being the local firms capable and used to react to aggressive competition.[7]

Iamsiraroj and Ulubasoglu (2015) use MRA to analyse finding about overall effects and find a positive but economically limited effect of FDI on growth. Wooster and Diebel (2010) consider only developing countries and exploit 32 firm level studies. They stress the higher spillover effects in Asian countries (e.g. vis-à-vis Latin American economies), but also the risk of model misspecification. Demena and van Bergeijk (2016), analysing 31 developing countries in 69 studies, highlight the presence of publication bias and model misspecification.

Finally, Havrenek and Irsova (2010, 2011), Irsova and Havrenek (2013) and Bruno and Cipollina (2017) analysed more recent *f2f* evidence about vertical and horizontal spillovers in a large sample (around 1000 observations) in order to improve the statistical properties of the empirical evidence, the latter paper also addressing model uncertainty using Bayesian methods.

[6] Crespo and Fontoura (2007) did not undertake a formal statistical analysis but summarized the literature on FDI spillovers. They concluded that "absorptive capacities of domestic firms and regions" are key elements in order to benefit from MNEs' spillovers.

[7] Bruno and Cipollina (2017) focus on the low vs. high income countries divide within the EU as far as FDI spillover effects are concerned. Mebratie and van Bergeijk (2013) focus on developing countries and emerging markets.

3. DATA

Our point of departure is that cross-country and firm level studies of FDI spillovers should be treated as complementary and therefore analysed in a unified context. They both focus on the effects of foreign investment albeit at different levels of aggregation. They are therefore both included in our systematic review which comprises a comprehensive meta-regression analysis of the two existing literature*s*. Scholars have stressed the conditions under which FDI enhances productivity (f2f level) and growth (overall level) along different dimensions. We build upon the expanding meta-analysis literature on FDI, but as noted above this has so far concentrated either on the macro or on the micro literatures separately. Here we focus on the overall and *f2f* evidence jointly and incorporate less developed economies into our analysis.

3.1 The selection of the variables from the quantitative FDI studies

Following Stanley (2001), Stanley (2005), Stanley and Jarrell (1989), and Stanley and Doucouliagos (2013), we exploit the meta-regression analysis methodology, by collecting each and every coefficient on the independent variable for FDI presence in different studies, these being either micro or macro, and all the associated characteristics (e.g. t-value, standard error, degrees of freedom, etc.). The actual data point, the single unit of observation, of our database(s) is precisely this coefficient of a single estimated equation. We aim at describing how it is distributed around its mean value; how the heterogeneity around this mean can be explained by specific determinants and how to characterise those determinants. To throw light on the varied patterns of the estimated effects (coefficients) of FDI on economic performance, our methodology has to identify and measure a range of variables that reflect different potential reasons for that effect's heterogeneity and thus help to resolve conflicting explanations. These

explanatory variables are divided into three categories: variables about the characteristics of the study (e.g. citations per year); variables concerning estimator, period analysed, panel vs. cross section methodology, linear vs. not-linear specification, etc.; and finally time and country dummies controls. As common in the Meta-Regression literature (Stanley and Doucouliagos, 2010), we control for "publication bias" by including the standard error of the estimated coefficient (or its variance as a robustness check) among the determinants. Section 4 discusses this procedure in detail.

The database initially assembled contains information on moderator variables for all selected papers at the micro and macro levels separately. Whenever a paper estimates different relationships (say one equation on the direct impact of FDI on firm's growth and one equation on the impact of FDI on firm's productivity) we coded both (or more) equations. Some studies also include as independent variables different measures of FDI, for example a dummy for foreign presence as well as measures of foreign firm penetration in the market (e.g. a measure of horizontal spillovers).[8]

We classified all papers found within Google Scholar, Scopus and "Publish or Perish" and we cross-checked the list of articles with the articles used by previous meta-analyses. The few papers used by other meta-analyses but not found through our searches were then added to our dataset.

The dataset of estimates of the *overall* (macro) effect of FDI is composed of 551 observations from 71 papers, published between 1973 and 2010[9]. The period analysed in these papers ranges from 1940 to 2008. The countries analysed in the selected papers are developing

[8] We have an average of 5.4 estimates per paper in the whole micro sample (565/104). In the macro data, we have an average of 7.7 estimates per paper (551/71).

[9] Note that 50% of the studies were published or released after 2003. For example, Morrisey (2012), a very good example of FDI spillovers in Africa, is not included in our sample because published after 2010.

countries or mixed developing/developed countries, if the latter are included in the same cross-country study and cannot be separated. Overall, 67% of the estimates are for developing countries and 33% for mixed cases.

The *f2f* (micro) dataset is composed of 565 observations from 104 papers, published between 1983 and 2010.[10] The period analysed in these papers ranges from 1965 to 2007 and the countries are middle and low-income countries according to the World Bank definition. These are in principle countries for which the key thresholds or "conditionalities" identified in the literature have not yet been reached. Many of the observations in the sample (189) pertain to China and the data used are either cross-sectional or panel. All selected papers contain one or more equations, which estimate the direct or indirect effect of FDI[11] on one of the following variables: a measure of firm efficiency (such as TFP), firm output, value-added, or labour productivity. This effect may be measured as a dummy variable for foreign presence or as the percentage of foreign presence in the domestic firm[12].

3.2 Funnel Plots: A birds' eye view of the FDI-growth relationship

In this section, we present "funnel plots" comparing the partial correlation coefficients and their precision, based on the information drawn from our datasets. The partial correlation coefficient (PCC) is defined as $\frac{t}{\sqrt{(t^2+df)}}$ with "t" being the t-statistic of each estimated effect collected from a single regression of FDI presence on economic performance (either at the firm level or macro), "df" being the degrees of freedom, and the precision variable axis is computed as the inverse of

[10] 50% of the studies are published or released after 2007. There are no papers published before 1983.
[11] The direct effect of foreign firms is defined as the impact of foreign ownership on the performance of acquired firms. The indirect effect is defined as the foreign firm spillover on domestic firms, and this may be vertical (forwards or backwards inter-sectoral) or horizontal (intra-sectoral).
[12] For full details and summary statistics on the search criteria, see the online appendix.

the standard error of the partial correlation coefficient, $\frac{1}{se_{PCC}} = 1/\left[\frac{1}{\sqrt{(t^2+df)}}\right] = \sqrt{(t^2+df)}$.

The funnel plot (Stanley and Doucouliagos, 2010) provides a pictorial representation of the average effect of the relationship under investigation and it shows the dispersion around this average effect. This bird's eye view of our variable of interest (the dependent variable) in each study *vis-à-vis* its precision entails a preliminary but informative assessment of both the existence and strength of the relationship between FDI and economic performance.

In Figures 3 and 4, the partial correlation coefficient variable is reported on the horizontal axis and its precision on the vertical one. Overall, we tentatively infer that the net effect measured in macro studies is larger than the effect measured in micro studies. This would support an interpretation stressing the gap between the social and private returns of FDI. Furthermore, from a preliminary review of the "non-symmetry" of the funnel plots in Figures 3 and 4, one can tentatively detect signs of potential publication bias. All these preliminary inferences will be empirically investigated in section 4.

(Figure 3 about here)

(Figure 4 about here)

4. METHODOLOGY

4.1 Meta-Regression Analysis: Regressions using the firm-level/micro (f2f) database

We first focus on our firm-to-firm data set. We focus on the partial correlation coefficient due to the fact that it allows a direct comparison between the micro (*f2f*) and the macro (*overall*) results, being unit-less.

Following the MRA guidelines (Stanley *et al.*, 2013), we first estimate a standard OLS benchmark model. Then, we move to a Weighted Least Square model (WLS) where the weights

are the squared precision of the estimates, i.e. the squared inverse of the standard errors, $\left(\frac{1}{se_{PCC}}\right)^2 = \left\{1/\left[\frac{1}{\sqrt{(t^2+df)}}\right]\right\}^2 = (t^2 + df)$. In applying this weighting, the estimates with higher precision have a higher 'stake' in the overall estimation model.

OLS and WLS: $$r_{ij}^{f2f} = \beta_0 + \varepsilon_{ij} \quad (1)$$

where r_{ij} is the partial correlation coefficient (PCC) for the "jth" *f2f* estimate in the "ith" micro paper, β_0 is the estimated average effect of FDI on productivity, ε_{ij} is the idiosyncratic (paper-estimate specific) sampling error.[13]

Following Gorg and Strobl (2001), Doucouliagos and Stanley (2009) and Stanley and Doucouliagos (2013) we investigate publication selection bias using the two tests "Funnel Asymmetry Test – Precision Effect test" (FAT-PET) and "Precision-Effect Estimate with Standard Error" (PEESE)[14]:

FAT-PET-MRA: $$r_{ij}^{f2f} = \beta_0 + se_{PCC} + \varepsilon_{ij} \quad (2)$$

PEESE-MRA: $$r_{ij}^{f2f} = \beta_0 + var_{PCC} + \varepsilon_{ij} \quad (3)$$

4.2 Meta Regression Analysis: regressions using macro (overall) database

We use the same framework for the macro (*overall*) effects:

OLS and WLS: $$r_{ij}^{overall} = \beta_0 + \varepsilon_{ij} \quad (4)$$

where r_{ij} is the partial correlation coefficient for the "jth" *overall* estimation in the "ith" macro paper, β_0 is the average effect and ε_{ij} is the idiosyncratic (paper-estimate specific) sampling error. Likewise, we test for publication bias using the FAT-PET and PEESE models:

[13] We correct for robust standard errors clustered at the level of the papers, i.e. we do take into account that more than one estimate come from the same paper and this might induce the errors not to be independent.
[14] For a technical account of the statistical properties of the FAT-PET vis-à-vis PEESE see Stanley and Doucouliagos (2013) and the online appendix.

FAT-PET-MRA: $$r_{ij}^{overall} = \beta_0 + se_{PCC} + \varepsilon_{ij} \quad (5)$$

PEESE-MRA: $$r_{ij}^{overall} = \beta_0 + var_{PCC} + \varepsilon_{ij} \quad (6)$$

4.3 Meta Regression Analysis: regressions using a joint database

An important novelty of this paper stems from the estimation using a *joint* micro-macro database. In other words, we harmonize the information contained in the two separate sources of information and create a 1116 observations database based on 175 different papers in order to estimate the impact of FDI on economic performance *jointly* at the *f2f* (micro) and *overall* (macro) level. This empirical modelling is new and therefore unique to the literature and represents one of the largest joint MRA database and analysis on the FDI-economic performance relationship.

OLS and WLS: $$r_{ij}^{joint} = \beta_0 + \varepsilon_{ij} \quad (7)$$

where r_{ij} is the partial correlation coefficient for the "jth" joint estimation in the "ith" paper, both micro and macro, β_0 is the average effect and ε_{ij} is the idiosyncratic (paper-estimate specific) sampling error. We test for publication bias by using the standard error of the partial correlation coefficient and its variance within the FAT-PET and PEESE models as in the disjoint regressions:

FAT-PET-MRA: $$r_{ij}^{joint} = \beta_0 + se_{PCC} + \varepsilon_{ij} \quad (8)$$

PEESE-MRA: $$r_{ij}^{joint} = \beta_0 + var_{PCC} + \varepsilon_{ij} \quad (9)$$

This empirical modelling strategy allows us to estimate a regression where both the level of development and level of impact (*f2f* vis-à-vis *overall*) can be jointly taken into account, by adding a dummy variable for the *overall* effect (omitted category the *f2f*) and a dummy variable for Low Income Countries (the omitted category is Mixed databases):

OLS and WLS: $$r_{ij}^{joint} = \beta_0 + D_{overall} + D_{low\_income} + \varepsilon_{ij} \quad (10)$$

FAT-PET-MRA: $$r_{ij}^{joint} = \beta_0 + se_{PCC} + D_{overall} + D_{low\_income} + \varepsilon_{ij} \quad (11)$$

PEESE-MRA: $$r_{ij}^{joint} = \beta_0 + var_{PCC} + D_{overall} + D_{low\_income} + \varepsilon_{ij} \quad (12)$$

5. RESULTS

The results of our benchmark regressions excluding any control for the *f2f* and *overall* effects of FDI are reported in Table 1, while those from the regression on the *joint* mean are presented in Table 2.

(Table 1 about here)

(Table 2 about here)

In our case, the average *effect size* of FDI on growth is statistically significant and its magnitude is 0.085*** in the baseline OLS regression (column 1 table 2), when measured as partial correlation coefficient for the entire sample, i.e. a face value *small* effect. Yet, we do regard this as very important and non-trivial result for at least five reasons: firstly, it shows a statistically significant positive effect of FDI on overall economic growth; secondly, when we control for precision of the estimates, the effect remains positive and significant (0.009***, column 2, table 2); thirdly, controlling for publication bias (columns 3 and 4 in table 2) a positive and significant coefficient remains; fourthly, there is a clear gap between the *f2f* and *overall* effects, this based on the macro dummy estimates 0.045** (columns 5 to 8); and, finally, no apparent effect is registered by the level of development. This suggests that the effect of FDI on economic performance is *less conditional* than is often proposed.

6. CONCLUSIONS

Are inflows of foreign direct investment (FDI) beneficial in terms of improving enterprise performance and sustaining economic growth? This paper answers this question using meta-regression analysis techniques for distilling the lessons from vast bodies of empirical evidence that examine the same issues but yet have not been previously analysed together. For this exercise, a unique hand-collected data set was constructed yielding 565 estimates of the micro firm-to-firm (*f2f*) and 551 estimates of the macro (*overall*) effects of FDI on performance, from 104 different *f2f* and 71 *overall* studies. We also quantified various keys characteristics and features covering sampling, design, and methodological differences across studies and estimates. This is the first paper to the best of our knowledge embedding *f2f* and *overall* data in the same MRA analysis and estimating their joint impact. In order to accomplish this, we introduced new ways of distilling the information on a growing and bigger literature.

Our main findings suggest that a large proportion of the variation of the effect of FDI across studies can be accounted by measurement and sampling characteristics, the type of FDI-performance relationship analysed, control sets in the original estimates, econometric methodology, and publication bias. We find that there is a statistically significant positive effect of FDI at the firm-to-firm level, but this is of a relatively small magnitude compared with the country level effects. Indeed, we find that the latter are on average six times larger. Those studies which control for absorptive capacity (such as R&D or human capital, financial development and quality of institutions) and those that further investigate these effects by, for example, examining the interaction of these absorptive capacities and FDI, tend to report significantly smaller effects of FDI on growth. This suggests absorptive capacity is a key mechanism mediating the effects of FDI on performance.

Inconsistencies between *f2f* and *overall* effects in the literature may arise because the sum of the former (vertical plus horizontal spillovers) does not equal the latter. First order spillover

effects, down the supply chain for example, may lead to further horizontal spillovers that are not accurately identified through the estimates of intra-industry effects, because domestic firms may replicate the behaviour of downstream suppliers to foreign subsidiaries. Similarly, technologies or managerial competencies may spillover between industries unrelated through the supply chain. Thus, one might expect *f2f* spillovers to understate *overall* FDI effects, which is what we have found.

What is the main implication for future research from our findings? Our study highlights an important and understudied paradox. How to reconcile the main lesson from the literature (namely, that the FDI effect emerges only once countries have crossed specific thresholds) with our finding that these effects are larger for countries further below those same thresholds and, in addition, that these firm-level are substantially smaller than these country-level effects? Considerations of the gap between private and social returns may provide the key and, we believe, should be a main focus of future research.

REFERENCES

Acemoglu, D., Aghion P., Zilibotti, F. (2006), "Distance to Frontier, Selection, and Economic Growth", *Journal of the European Economic Association*, Vol. 4 No. 1, pp. 37–74.

Aitken, B.J. and Harrison, A.E. (1999), "Do Domestic Firms Benefit from FDI? Evidence from Venezuela", *American Economic Review*, Vol. 89, pp. 605–618.

Alfaro, L., Chanda A., Kalemli-Ozcan S. and Sayek S. (2010), "Does Foreign Direct Investment promote growth? Exploring the role of financial markets on linkages.", *Journal of Development Economics*, Vol. 91 No. 2, pp. 242-256.

Alfaro, L., Chanda, A., Kalemli-Ozcan, S. and Sayek, S. (2004), "FDI and economic growth: the role of local financial markets", *Journal of International Economics*, Vol. 64 No. 1, pp. 89–112.

Asiedu, E. (2006), "Foreign Direct Investment in Africa: The Role of Natural Resources, Market Size, Government Policy, Institutions and Political Instability", *The World Economy*, Vol. 29 No. 1, pp. 63–77.

Baldwin, R. (2016), *The Great Convergence,* Cambridge, Belknap Press of Harvard University Press, Harvard, MA.

Bernard, A. and Jensen, J.B. (1999), "Exceptional exporter performance: Cause, effect, or both?", *Journal of International Economics,* Vol. 47 No. 1, pp. 1-25.

Blalock, G. and Gertler, P.J. (2008), "Welfare Gains from Foreign Direct Investment through Technology Transfer to Local Suppliers", *Journal of International Economics*, Vol. 74 No. 2, pp. 402-421.

Blomström, M. and Kokko, A. (1998), "Multinational corporations and spillovers", *Journal of Economic Surveys*, Vol. 12, pp. 247-277.

Borensztein, E., De Gregorio J. and Lee, J. (1998), "How does Foreign Direct Investment Affect Economic Growth?", *Journal of International Economics,* Vol. 45 No. 1, pp. 115-135.

Bruno, R.L. and Cipollina, M. (2017), "A Meta-Analysis of the indirect impact of Foreign Direct Investment in Old and New EU Member States: Understanding Productivity Spillovers", *The World Economy*, December.

Buckley, P.J., Clegg, L.J., Cross, A.R., Liu, X., Voss, H. and Zheng, P. (2007), "The Determinants of Chinese outward foreign direct investment", *Journal of International Business Studies,* Vol. 38, pp. 499-518.

Buckley, P.J., Clegg, J. and Wang, C. (2007), "Is the relationship between inward FDI and spillovers effects linear? An empirical Examination of the case of China", *Journal of International Business Studies*, Vol. 38 No. 4, pp. 447-459.

Cantwell, J. (1989), *Technological Innovation and Multinational Corporations*, Blackwell, Oxford.

Carney, M., Estrin, S., Liang, X. and Shapiro, D. (2018), "National institutional systems, foreign ownership and firm performance: The case of understudied countries", mimeo.

Caves, R.E. (1996), *Multinational Enterprise and Economic Analysis*, Second Edition, Cambridge University Press, Cambridge.

Cheung, K. and Lin, P. (2004), "Spillover effects of FDI on innovation in China: Evidence from the provincial level", *China Economic Review,* Vol. 15, pp. 25–44.

Christensen, G. and Miguel, E. (2016), "Transparency, Reproducibility, and the Credibility of Economics Research", *NBER Working Paper*, No. 22989.

Cohen, M.W. and Levinthal, D.L. (1990), "Absorptive capacity: a new perspective on learning and innovation", *Administrative Science Quarterly*, Vol. 35, pp. 128-152.

Crespo, N. and Fontoura, M.P. (2007), "Determinant factors of FDI spillovers: What do we really know?", *World Development*, Vol. 35 No. 3, pp. 410-425.

Cuervo-Cazurra, A. and Genc, M. (2008), "Transforming disadvantages into advantages: developing-country MNEs in the least developed countries", J*ournal of International Business Studies*, Vol. 39 No. 6, pp. 957-979.

David, P.A., Hall, B. and Toole, A.A. (2000), "Is public R&D a complement or substitute for private R&D? A review of the econometric evidence", *Research Policy*, Vol. 29, pp. 497–529.

De Mello, L.R. (1997), "Foreign Direct Investment in developing countries and growth: a selective survey", *Journal of Development Studies,* Vol. 34 No. 1, pp. 1-34.

De Mello, L.R. (1999), "Foreign direct investment-led growth: evidence from time series and panel data", *Oxford Economic Papers*, Vol. 51, pp. 133–151.

Demena, B.A. and van Bergeijk, P.A.G. (2016), "A Meta-Analysis of FDI and Productivity Spillovers in Developing Countries", *Journal of Economic Surveys*, Vol. 31 No. 2, pp. 1-26.

De Santis, R.A. and Lührmann, M. (2009), "On the determinants of net international portfolio flows: A global perspective," *Journal of International Money and Finance*, Vol. 28, pp. 880-901.

Doucouliagos, H. and Stanley, T.D. (2009), "Publication Selection Bias in Minimum-Wage Research? A Meta-Regression Analysis", *British Journal of Industrial Relations*, Vol. 47 No. 2, pp. 406-428.

Driffield, N. and Love H. J. (2007), "Linking FDI motivation and host economy productivity effects: conceptual and empirical analysis", *Journal of International Business Studies*, Vol. 38, pp. 460-473.

Dunning, J.H. (1993), *Multinational enterprises and the global economy*, Addison-Wesley, Wokingham.

Eichengreen, B. and Kohl, R. (1998), "The External Sector, the State and Development in Eastern Europe", *CEPR Discussion Papers*, No. 1904.

Gorg, H. and Strobl, E. (2001), "Multinational Companies and Productivity Spillovers: A Meta-analysis with a test for publication bias", *Economic Journal,* Vol. 111 No. 475, pp. 723-739.

Griliches, Z. (1992), "The search for R&D spillovers", *Scandinavian Journal of Economics*, Vol. 94 (Supplement), pp. 29–47.

Griffith, R., Redding, S. and Van Reenen, J. (2003), "R & D and absorptive capacity: Theory and empirical evidence", *Scandinavian Journal of Economics*, Vol. 105 No. 1, pp. 99–118.

Haddad, M. and Harrison, A. (1993), "Are there positive spillovers from FDI? Evidence from panel data for Morocco", *Journal of Development Economics*, Vol. 42, pp. 51-74.

Hall, B. H. (1996), "The private and social returns to research and development", in Smith, B., Barfield, C. (Eds.), *Technology, Ž: R&D and the Economy*, AEI-Brookings Institution, Washington, DC.

Hall B.H., Mairesse J. and Mohnen P. (2010), "Measuring the returns to R&D", *Handbook of the Economics of Innovation*, Vol. 2 No. 1, pp. 1033-1082.

Haskell, J, Pereira, S. and Slaughter, M. (2007), "Does Inward Investment Boost the Productivity of Domestic Firms?", *Review of Economics and Statistics*, Vol. 89 No. 3, pp. 482-496.

Havrenek, T. and Irsova, Z. (2010), "Meta-Analysis of Intra-Industry FDI Spillovers: Updated Evidence", *Czech Journal of Economics and Finance*, Vol. 60 No. 2, pp. 151-174.

Havrenek, T. and Irsova, Z. (2011), "Estimating Vertical Spillovers from FDI: Why Results Vary and What the True effect is", *Journal of International Economics*, Vol. 85 No. 2, pp. 234-244.

Holland, D., Sass, M., Benacek, V. and Gronicki, M. (2000), "The determinants and impact of FDI in Central and Eastern Europe: a comparison of survey and econometric evidence", *Transnational Corporations*, Vol. 9 No. 3, pp. 163-213.

Iamsiraroj, S. and Ulubasoglu, M.A. (2015), "Foreign Direct Investment and Economic Growth: A Real Relationship or Wishful Thinking?", *Journal of Economic Modelling*, Vol. 51, pp. 200-213.

Irsova, Z. and Havrenek, T. (2013), "Determinants of horizontal spillovers from FDI: evidence from a large meta-analysis", *World Development,* Vol. 42, pp. 1–15.

Javorcik, B.S. (2004), "Does foreign direct investment increase the productivity of domestic firms? In search of spillovers through backward linkages", *American Economic Review*, Vol. 94 No. 3, pp. 605-627.

Jones, C.I. and Williams, J.C. (1998), "Measuring the Social Return to R & D", *The Quarterly Journal of Economics*, Vol. 113 No. 4, pp. 1119-1135.

Khanna, T. and Palepu, K.G. (2010), *Winning in emerging markets: A road map for strategy and execution*, Harvard Business Press, Harvard, MA.

Li, J., Chen, D. and Shapiro, D.M. (2010), "Product innovations in emerging economies: The role of foreign knowledge access channels and internal efforts in Chinese firms", *Management and Organization Review***,** Vol. 6 No. 2, pp. 243-266.

Li, J., Chen, D. and Shapiro, D.M. (2013), "FDI Spillovers at the National and Subnational Level: The Impact on Product Innovation by Chinese Firms", *Management and Organization Review***,** Vol. 9 No. 3, pp. 413-435.

Liu, X., Lu, J., Filatotchev, I., Buck, T. and Wright, M. (2010), "Returnee entrepreneurs, knowledge spillovers and innovation in high-tech firms in emerging economies", *Journal of International Business Studies,* Vol. 41 No. 7, pp. 1183-1197.

Liu, X., Vredenburg, H. and Steel, P. (2014), "A Meta-analysis of Factors Leading to Management Control in International Joint Ventures", *Journal of International Management*, Vol. 20, pp. 219-236.

Markusen, J., and Venables, A.J. (1999), "Foreign direct investment as a catalyst for industrial development", *European Economic Review*, Vol. 43, pp. 335-338.

Mebratie, A.D. and van Bergeijk, P.A.G. (2013), "Firm heterogeneity and development: a meta-analysis of FDI productivity spillovers", *The Journal of International Trade and Economic Development*, Vol. 22 No. 1, pp. 53–74.

Meyer, K. and Sinani, E. (2009), "When and Where does foreign direct investment generate positive spillovers? A meta-analysis", *Journal of International Business Studies*, Vol. 40, pp. 1075-1094.

Minasian, J. R. (1969), "Research and development, production functions, and rates of return", *American Economic Review*, Vol. 59 No. 2, pp. 80–85.

Morrisey, O. (2012), "FDI in Sub-Saharan Africa: Few Linkages, Fewer Spillovers", *The European Journal of Development Research*, Vol. 24 No. 1, pp. 26–31.

Navaretti, B. and Venables, A. (2004), *Multinationals and the world economy*, Princeton University Press, Princeton.

Peng, M.W., Wang, D.Y. and Jiang, Y. (2008), "An institution-based view of international business strategy: A focus on emerging economies", *Journal of International Business Studies*, Vol. 39 No. 5, pp. 920-936.

Ramamurti, R. (2012), "What is really different about emerging market multinationals?", *Global Strategy Journal*, Vol. 2 No. 1, pp. 41-47.

Robinson, J.A., Torvik, R. and Verdier, T. (2006), "Political Foundations of the Resource Curse", *Journal of Development Economics*, Vol. 79, pp. 447-468.

Rodrik, D. (2011), *The Globalization Paradox,* Oxford University Press, Oxford.

Rugman, A.M. (1981), *Inside the Multinationals: Economics of Internal Markets*, Columbia University Press, New York, NY.

Rugman, A. and Verbeke, A. (2003), "Extending the theory of the multinational enterprise: internalization and strategic management perspectives", *Journal of International Business Studies*, Vol. 34, pp. 125 -137.

Spencer, J.W. (2008), "The Impact of multinational enterprise strategy on indigenous enterprises: horizontal spillovers and crowding out effect in developing countries", *Academy of Management Review,* Vol. 33 No. 2, pp. 341-361.

Stanley T. D. (2001), "Wheat From Chaff: Meta-Analysis as Quantitative Literature Review," *Journal of Economic Perspectives*, Vol. 15 No. 3, pp.131–50.

Stanley, T. D. (2005), "Beyond Publication Bias," *Journal of Economic Surveys*, Vol. 19 No. 3, pp. 309–345.

Stanley, T.D. and Doucouliagos, H. (2010), "Picture this: a Simple Graph that Reveals Much Ado Research", *Journal of Economic Surveys*, Vol. 24 No. 1, pp. 170–191.

Stanley, T.D. and Doucouliagos, H. (2013), "Meta-Regression approximations to reduce publication bias", *Research Synthesis Methods*, Vol. 5, pp. 60-78.

Stanley, T.D., Doucouliagos, H., Giles, M., Heckemeyer, J. H., Johnston, R. J., Laroche, P., Nelson, J. P., Paldam, M., Poot, J., Pugh, G., Rosenberger, R. S. and Rost, K. (2013), "Meta-Analysis of Economics Research Reporting Guidelines", *Journal of Economic Surveys*, Vol. 27, pp. 390–394.

Stanley, T.D. and Jarrell, S.B. (1989), "Meta-regression analysis: a quantitative method of literature surveys", *Journal of Economic Surveys*, Vol. 3, pp. 161-170.

Steel, P. and Taras, V. (2010), "Culture as a consequence: A multi-level multivariate meta-analysis of the effects of individual and country characteristics on work-related cultural values", *Journal of International Management*, Vol. 16, pp. 211-233.

UNCTAD (2017) *World Investment Report 2017*. UNCTAD, New York and Geneva.

Wooster, R.B. and Diebel, D. (2010), "Productivity Spillovers from Foreign Direct Investment in Developing Countries: A Meta Regression Analysis", *Review of Development Economics*, Vol. 14 No. 3, pp. 640-655.

Wright, M., Filatotchev, I., Hoskisson, R., and Peng, M. (2005), "Strategy research in emerging economies: Challenging the conventional wisdom", *Journal of Management Studies,* Vol. 42, pp. 1-34.

Zhang, Y., Li, H., Li, Y. and Zhou, L.A. (2010), "FDI spillovers in an emerging market: The role of foreign firms' country origin diversity and domestic firms' absorptive capacity", *Strategic Management Journal,* Vol. 31 No. 9, pp. 969-989.

Figure 1a *Firm-to-firm* MICRO effects

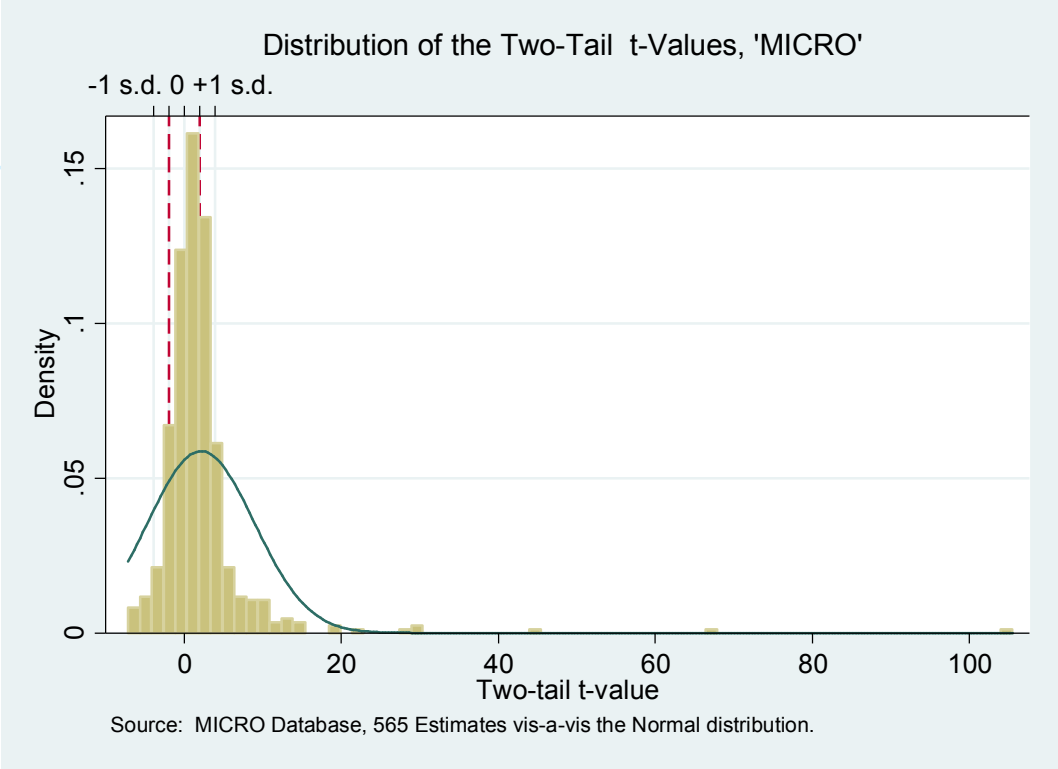


Figure 1b *Firm-to-firm* MICRO effects (excluding $t \geq 10$)

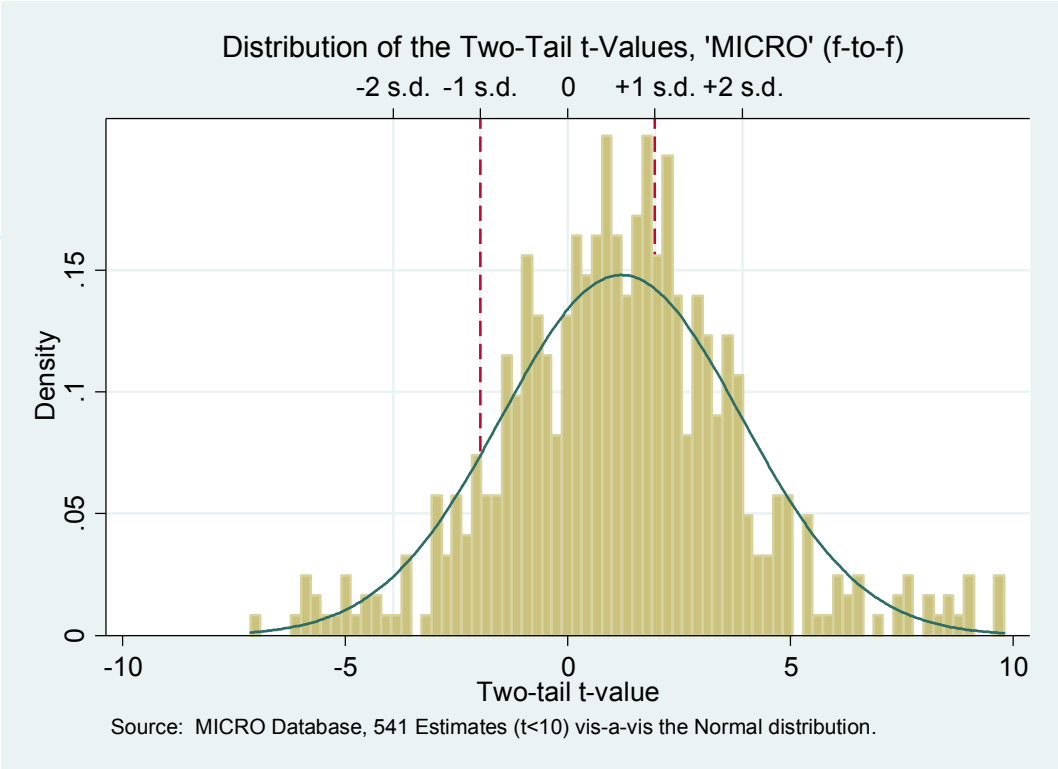
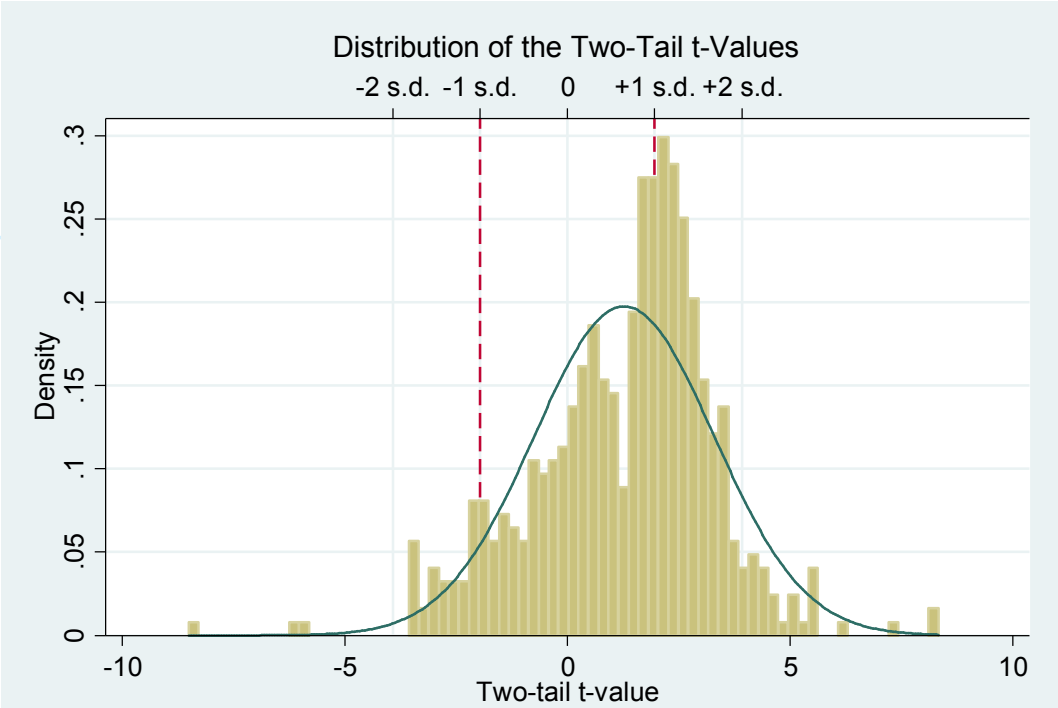


Figure 2 *Overall* MACRO effects



Source: MACRO Database, 551 Estimates vis-a-vis the Normal distribution.

Figure 3 Funnel Graph *Firm-to-firm* MICRO partial correlation (horizontal axis) vs. precision

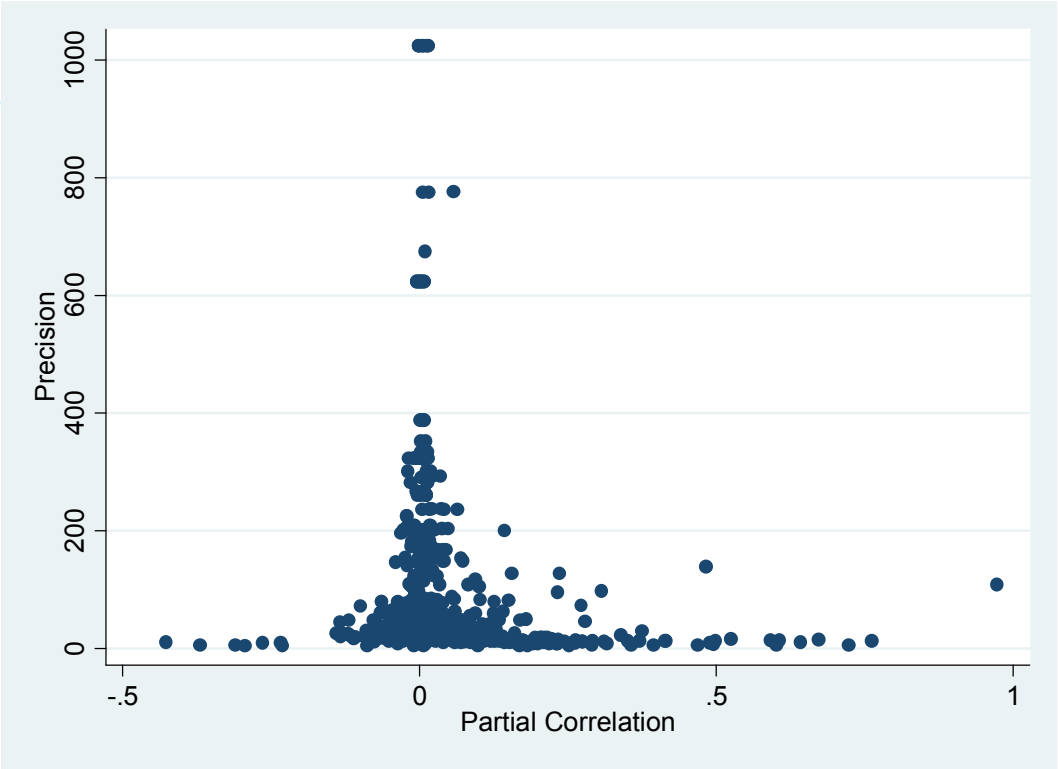


Figure 4 Funnel Graph *Overall* Macro partial correlation (horizontal axis) vs. precision

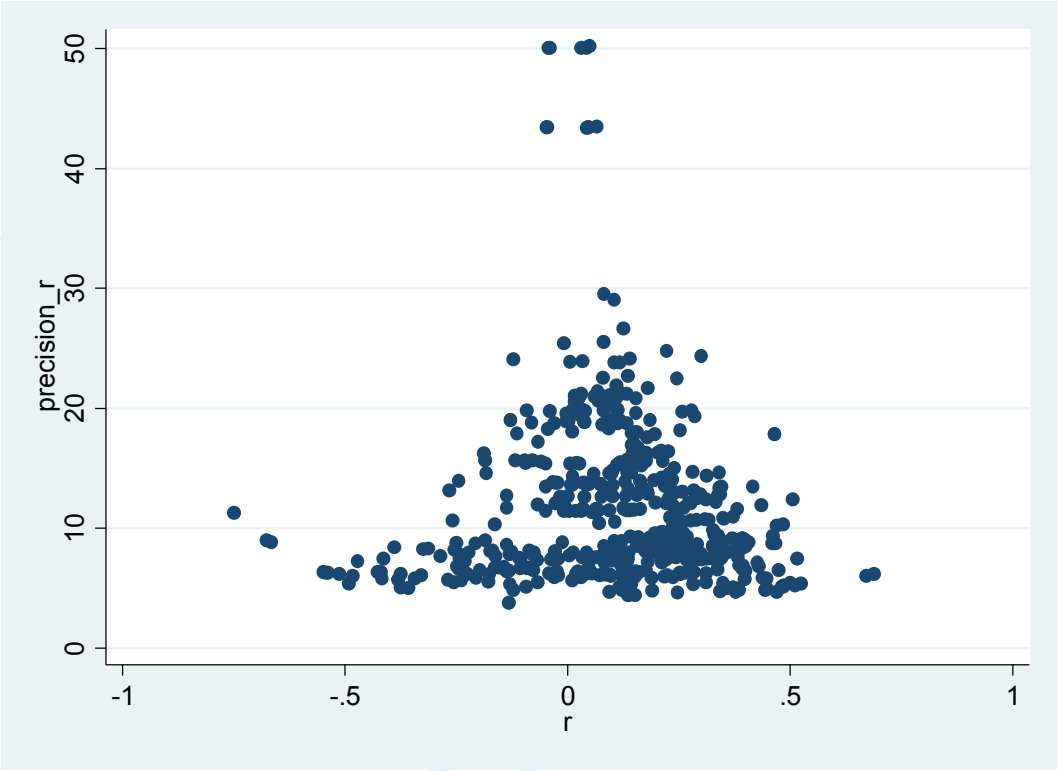


Table 1 Baseline MRA, MICRO vs. MACRO

	MICRO (a)				MACRO (b)			
	OLS	WLS	FAT-PET	PEESE	OLS	WLS	FAT-PET	PEESE
S.E. (Partial Correlation Coefficient)			1.535***				0.924**	
			0.394				0.392	
Variance (Partial Correlation Coefficient)				14.927***				3.598
				5.376				2.282
Constant (true effect)	0.051***	0.009***	0.005**	0.008***	0.119***	0.089***	0.033	0.071***
	0.011	0.002	0.002	0.002	0.019	0.02	0.029	0.023
Observations	565	565	565	565	551	551	551	551
R-squared	0.000	0.000	0.033	0.013	0.000	0.000	0.054	0.026
N. Cluster	104	104	104	104	71	71	71	71

Robust standard errors in parentheses, "***" p<0.01, "**" p<0.05, "*" p<0.1

Table 2 Baseline MRA, JOINT

	JOINT (c)							
	OLS	WLS	FAT-PET	PEESE	OLS	WLS	FAT-PET	PEESE
S.E. (Partial Correlation Coefficient)			1.367***				1.358***	
			0.194				0.297	
Variance (Partial Correlation Coefficient)				9.414***				6.473***
				1.689				1.971
MACRO dummy					0.038	0.078***	0.000	0.045**
					0.03	0.021	0.02	0.019
LOW income Dummy					0.059*	0.004	0.001	0.004
					0.031	0.009	0.008	0.009
Constant (true effect)	0.085***	0.009***	0.005***	0.009***	0.041***	0.008***	0.005**	0.008***
	0.012	0.002	0.002	0.002	0.009	0.002	0.002	0.002
Observations	1,116	1,116	1,116	1,116	1,116	1,116	1,116	1,116
R-squared	0.000	0.000	0.056	0.027	0.057	0.025	0.056	0.033
N. Cluster	175	175	175	175	175	175	175	175

Robust standard errors in parentheses, "***" p<0.01, "**" p<0.05, "*" p<0.1

Appendix

In this appendix we turn to exploring a more fine-grained specification of the baseline mode presented in the main paper to capture the wide heterogeneity of impacts of FDI on the economies represented in our MRA database by conducting a thorough battery of robustness-checks in section A1. Then we list the Firm-to-firm level studies included in the MRA and their summary statistics in section A2, next we list the Macro-Overall studies and their summary statistics in section A3. The summary statistics of the joint database are presented in section A4. Finally, section A5 presents a detailed step by step account on how the two databases have been constructed for replicability purposes.

On-line appendix A1: Robustness Checks

As suggested in the paper, we believe that at least three *key* dimensions mediate the meta-regression analysis of the impact of FDI on economic performance: namely, the characteristics of the papers/estimates; of the countries; and of time effects. To address these issues, we re-estimate the MRA on the characteristics of papers only (Table A1.1); the country dummies only (Table A1.2); and year dummies only (Table A1.3). In the latter case, the year is identified as the median year of the time-frame of the sample for a specific country. Finally, and most importantly, we use all three controls simultaneously to ensure we do not ignore important correlations among our controls (Table A1.4). Thus, we proceed step by step in order to strengthen our methodological choices, specifically by introducing each set of controls separately for *f2f*, *overall* and *joint* and then testing them all together in a horse-race. The characteristics of the various studies might be an important explanation for the quality of the empirical modelling (misspecification) and therefore the potential bias of the results; country effects could be associated with fundamental differences in *absorptive* capacities; and time effects might gauge the changing impact of FDI through time, which

could also be due to dynamic absorptive capacities. The four models estimated in the baseline model in the paper are also used in this appendix (OLS, WLS, FAT-PET, PEESE). These are specified as follow for the micro (*f2f*) database:[1]

OLS and WLS: $$r_{ij}^{f2f} = \beta_0 + Z_{ij} + Dum(Country) + Dummy(Year) + \varepsilon_{ij} \quad (13)$$

FAT-MRA: $$r_{ij}^{f2f} = \beta_0 + Z_{ij} + Dum(Country) + Dum(Year) + se_{PCC} + \varepsilon_{ij} \quad (14)$$

PEESE-MRA: $$r_{ij}^{f2f} = \beta_0 + Z_{ij} + Dum(Country) + Dum(Year) + var_{PCC} + \varepsilon_{ij} \quad (15)$$

where r_{ij} is the partial correlation coefficient for the "jth" *f2f* estimation in the "ith" micro paper, β_0 the average effect, Z_{ij} the papers/estimates' characteristics, *Dummy(Country)* the dummies for the countries, *Dummy(Year)* the year dummies and ε_{ij} the idiosyncratic (paper-estimate specific) sampling error.[2] We run equivalent models for the macro (*overall*) database though excluding the country dummies.

Finally, the *joint* database is estimated according to the following models with all controls:

OLS and WLS: $$r_{ij}^{JOINT} = \beta_0 + Z_{ij} + Dum(Country) + Dummy(Year) + \varepsilon_{ij} \quad (16)$$

FAT-MRA: $$r_{ij}^{JOINT} = \beta_0 + Z_{ij} + Dummy(Country) + Dummy(Year) + se_{PCC} + \varepsilon_{ij} \quad (17)$$

PEESE-MRA: $$r_{ij}^{JOINT} = \beta_0 + Z_{ij} + Dummy(Country) + Dummy(Year) + var_{PCC} + \varepsilon_{ij} \quad (18)$$

Table A1.1 (both panels a & b) compares the micro *f2f* and macro *overall* effects when controlling for papers/estimates' characteristics. Three main observations are in order. First, the macro spillover effect measured by the constant "true" effect is as expected positive and significant and is always of an order of magnitude higher than the micro effect. Furthermore,

[1] For consistency purpose we continue the numeration of the equations from the main paper.
[2] We correct for robust standard error clustered at the level of the papers, i.e. we do take into account that more than one estimates come from the same paper and this might induce the errors not to be independent.

publication bias is only present in the *f2f*, but not in the *overall* regressions (statistically significant coefficients on the *standard error* as well as the *variance*). Finally, the controls have a substantial role in explaining the variability of the estimates in the *f2f*, but in the exploring *overall* effects only the non-linear FDI-growth specification indicates genuine heterogeneity. The results pertaining the joint database, Table A1.1 (panel c), reveal that the constant 'true' effect has a positive and significant impact and indicate the presence of publication bias. This implies that in order to avoid biases one should control for certain characteristics of each study, namely citations (proxy of quality), panel model estimation, control of capital or capital per worker, control for R & D, and control for endogeneity.

(Table A1.1 about here)

We now turn to the regressions with countries dummies. Table A1.2 indicates that there is no significant support for the view that the FDI spillover effect is the same for all countries (micro). The joint database regression can serve to gauge an important measure, the distance (gap) between the *f2f* and *overall* impact of FDI on the host economy. The rationale for this regression is as follows: in the joint database, the omitted category is the macro impact (by construction, rather than being country specific) and therefore each country dummy on the right hand in section (c) should measure the impact *above and beyond* the macro effect embedded in the constant. With only two exceptions, in our preferred model PEESE (column 8), the micro impact is lower than the macro. Note that we need to control for publication bias when looking at the joint data, because the coefficients of FAT-PET S.E. and PEESE variance are significantly different from zero.

(Table A1.2 about here)

The next set of controls we add are the time dummies, shown in Table A1.3, which highlights the existence of temporal variability in the micro, macro and joint databases. This is a key temporal dimension, which it would not be appropriate to omit in an MRA study.

However, it is not possible from these results to identify a clear trend.

(Table A1.3 about here)

Finally, in Table A1.4 we examine our full set of controls in one unique empirical setting, the so-called *horserace*. Why should this be important? It is a statistically powerful way to nullify the omitted variable bias risk, while at the same time considering the full set of correlations between covariates. From Table A1.4, we learn that the impact of FDI, when controlling for estimates characteristics, time and country dummies, is still positive and significant; a finding which holds regardless of the type of effect and whether the analysis considers country- or firm-level dimensions. We also learn that, while the role of the characteristics of studies is not so important, country and time effects have a significant role in explaining the heterogeneity in FDI impact. These results also suggest that the effects of FDI are positive and identifiable even among poorer countries, i.e. even among countries that one should expect are some distance below the range of thresholds often recognized in the literature. Hence, our results bring into question whether FDI effects are as "conditional" as often thought. Last, but not least, our findings indicate that one reason for this may lie in the difference between the country and the firm-level effects (or the private and social returns). A possible explanation for the apparent importance assigned to thresholds in the literature is that in poorer countries the gap between these effects (or in other words the wedge between the private and social returns) is much larger than in richer countries. This is a novel interpretation of the problem, allowed for by our methodological contribution and results, which shifts the debate and raises new and important policy implications and future research questions.

(Table A1.4 about here)

Summing up, the use of the MRA estimation procedure we develop allows us to rule out many of the possible channels of bias on the nexus between FDI and productivity, such as

publication bias (Christensen and Miguel, 2016), estimates/papers characteristics such as misspecification (e.g. quality of estimation modelling), countries and time fixed effects. Our investigation has not, however, brought into question the existence of a positive relationship between FDI and economic performance; namely the potential role of FDI to spur productivity both at the micro (f2f) and macro (overall) levels.

On-line Appendix A2: List of MICRO/Firm-to-firm (f-to-f) Studies Used in the Meta-Analysis and Summary Statistics

1. Abraham, F., Konings, J., Slootmaekers, V. (2010) "FDI spillovers in the Chinese 1manufacturing sector" *Economics of Transition* 18 (1), pp. 143-182
2. Aitken, B.J. and Harrison, A.E. (1999) "Do domestic firms benefit from direct foreign investment? Evidence from Venezuela" *American Economic Review*, Vol. 89, No. 3 (June 1999), pp. 605-618
3. Altomonte, C., Pennings, E. (2009) "Domestic plant productivity and incremental spillovers from foreign direct investment" *Journal of International Business Studies* 40 (7), pp. 1131-1148"
4. Akhawayn, A. and Bouoiyour, J. (2003) "Labour productivity, technological gap and spillovers: Evidence from Moroccan manufacturing industries" WPCATT, University of Pau,
5. Akimova, I., Schwodiauer, (2004) "Ownership structure, corporate governance, and enterprise performance: Empirical results for Ukraine" *International Advances in Economic Research* 10 (1), pp. 28-42"
6. Akulava, M. (2008) "The Impact of FDI on Sectors' Performance Evidence from Ukraine" EERC MA Thesis,
7. Aslanoglu, E. (2000) "Spillover Effects of Foreign Direct Investments on Turkish Manufacturing Industry" *Journal of International Development* 12, pp. 111-1130
8. Athukorala, P and Tien, TQ (2009) "Foreign direct investment in industrial transition: the experience of Vietnam" - Departmental Working Papers
9. Banga, R. (2006) "The export-diversifying impact of Japanese and US foreign direct investments in the Indian manufacturing sector", *Journal of International Business Studies,* 37, 558-568
10. Björk, I (2005)"Spillover effects of FDI in the manufacturing sector in Chile", School of economics and management, Lund University, Master thesis

11. Blalock G, Gertler PJ (2008): "Welfare Gains from Foreign Direct Investment through Technology Transfer to Local Suppliers", *Journal of International Economics* 74(2): pp. 402-421.
12. Blalock, G., Gertler, P.J. (2009) "How firm capabilities affect who benefits from foreign technology" *Journal of Development Economics* 90 (2), pp. 192-199
13. Blalock, G., Simon, D.H (2009) "Do all firms benefit equally from downstream FDI the moderating effect of local suppliers' capabilities on productivity gains" *Journal of International Business Studies* 40 (7), pp. 1095-1112
14. Blomström, M. (1986) "Foreign investment and productive efficiency: the case of Mexico" - *The Journal of Industrial Economics*, Vol. 35, No. 1 (Sep. 1986), pp. 97-110
15. Blomström, M. and Persson (1983) "Foreign investment and spillover efficiency in an underdeveloped economy: Evidence from the Mexican manufacturing industry" *World Development*, Vol. 11, No. 6,
16. Blomström, M., Sjöholm, F. (1999) "Technology transfer and spillovers: Does local participation with multinationals matter?" *European Economic Review* 43 (4-6), pp. 915-923
17. Blomström M, Wolff E N (1994) "Multinational Corporations and Productivity Convergence in Mexico." In: Baumol WJ, Nelson RR, Wolff EN (Eds.): Convergence of Productivity: Cross National Studies and Historical Evidence. Oxford University Press, pp. 263–283.
18. Buckley, P.J., Clegg, J., Wang, C. (2002) "The impact of inward FDI on the performance of Chinese manufacturing firms" *Journal of International Business Studies* 33 (4), pp. 637-655
19. Buckley, P.J., Clegg, J., Wang, C. (2006) "Inward FDI and host country productivity: Evidence from China's electronics industry" *Transnational Corporations* 15 (1), pp. 13-37
20. Buckley, PJ Clegg, J Wang, C. (2007)"Is the relationship between inward FDI and spillover effects linear? An empirical examination of the case of China", *Journal of International Business Studies*, Volume 38, Number 3, pp. 447-459(13)
21. Buckley, P.J., Wang, C., Clegg, J. (2007) "The impact of foreign ownership, local ownership and industry characteristics on spillover benefits from foreign direct investment in China" *International Business Review* 16 (2), pp. 142-158
22. Bwalya, SM. (2006) "Foreign direct investment and technology spillovers: Evidence from panel data analysis of manufacturing firms in Zambia" *Journal of Development Economics*, Volume 81, No. 2, pages 514-526
23. Chang, SJ., Chung, J. Xu, D. (2007)"FDI and technology spillovers in China", Center for Economic Institutions, CEI Working Paper Series, No.7
24. Chen, T., Kokko, A. and Tingvall, PG. (2010) "FDI And Spillovers In China: Non-Linearity And Absorptive Capacity", CERC Working Paper 12.
25. Chuang, Y.-C., Hsu, P.-F. (2004) "FDI, trade and spillover efficiency: Evidence from China's manufacturing sector" *Applied Economics* 36 (10), pp. 1103-1115

26. Chudnovsky, D., Lopez, A., Rossi, G. (2008) "Foreign direct investment spillovers and the absorptive capabilities of domestic firms in the Argentine manufacturing sector (1992-2001)" *Journal of Development Studies* 44 (5), pp. 645-677.
27. Damijan, J. P., Knell, M., Majcen, B. and Rojec, M. (2003) "The role of FDI, R&D accumulation and trade in transferring technology to transition countries: evidence from firm panel data for eight transition countries" *Economic systems*, Volume 27, Issue 2, June 2003, Pages 189-204
28. Fan, X. (1999) "How spillovers from FDI differ between China's state and collective firms" *Most* 9 (1), pp. 35-48
29. Fan, C.S., Hu, Y. (2007) "Foreign direct investment and indigenous technological efforts: Evidence from China" *Economics Letters* 96 (2), pp. 253-258
30. Feinberg, S.E., Majumdar, S.K. (2001) "Technology spillovers from foreign direct investment in the Indian pharmaceutical industry" *Journal of International Business Studies* 32 (3), pp. 421-437
31. Fernandes, A.M. Paunov, C. (2008) "Services FDI and Manufacturing Productivity Growth: Evidence for Chile" World Bank Policy Research Working Paper No. 4730
32. Frydman, R., Gray, C., Hessel, M., Rapaczynski, A. (1999) "When Does Privatization Work? The Impact of Private Ownership on Corporate Performance in the Transition Economies". The Quarterly Journal of Economics, MIT Press, vol. 114(4), pages 1153-1191.
33. Girma, S. and Gong, Y. (2008) "FDI, linkages and the efficiency of state-owned enterprises in China", *Journal of Development Studies,* Volume 44, Issue 5 May 2008 , pages 728 - 749
34. Gorodnichenko, Yuriy, Jan Svejnar, Katherine Terrell "When Does FDI Have Positive Spillovers? Evidence from 17 Emerging Market Economies" IZA DP No. 3079, September 2007
35. Haddad, AE Harrison (1993) "Are there positive spillovers from direct foreign investment? Evidence from panel data for Morocco" *Journal of development Economics*, Vol. 42, No. 1, pages 51-74
36. Hu, A.G.Z., Jefferson, G.H. (2002) "FDI impact and spillover: Evidence from China's electronic and textile industries" *World Economy* 25 (8), pp. 1063-1076
37. Huang Jr, T. (2004) "Spillovers from Taiwan, Hong Kong, and Macau Investment and from Other Foreign Investment in Chinese Industries" *Contemporary Economic Policy Volume* 22, Issue 1, January 2004, Pages: 13-25
38. Huang, C., Sharif, N. (2009) "Manufacturing dynamics and spillovers: The case of Guangdong Province and Hong Kong, Macau, and Taiwan (HKMT)" *Research Policy* 38 (5), pp. 813-828

39. Javorcik, B.S. (2004) "Does foreign direct investment increase the productivity of domestic firms? in search of spillovers through backward linkages" *American Economic Review* 94 (3), pp. 605-627
40. Javorcik, B. and Spatareanu, M. (2005) "Disentangling FDI Spillover Effects: What do Firm Perception Tell Us?", in T. H. Moran, E. Graham and M. Blomstrom (eds.) Does Foreign Direct Investment Promote Development?, Washington: Institute for International Economics.
41. Javorcik, BS. and Spatareanu, N. (2008) "To share or not to share: Does local participation matter for spillovers from foreign direct investment?" *Journal of Development Economics*, Volume 85, Issues 1-2, February 2008, pages 194-217
42. Javorcik, B.S., Spatareanu, M. (2010) "Does it matter where you come from? Vertical spillovers from foreign direct investment and the origin of investors "*Journal of Development Economics, article in Press*
43. Jensen, C. (2004) "Localized spillovers in the Polish food industry: The role of FDI in the development process?" *Regional Studies* 38 (5), pp. 535-550
44. Jordaan, A. (2005) "Determinants of FDI-induced externalities: New empirical evidence for Mexican manufacturing industries" *World Development*, Volume 33, Issue 12, December 2005, Pages 2103-2118
45. Jordaan, J.A. (2008) "Intra- and Inter-Industry Externalities from Foreign Direct Investment in the Mexican Manufacturing Sector: New Evidence from Mexican Regions" *World Development* 36 (12), pp. 2838-2854
46. Kadochnikov, S. Vorobev, P. Davidson, N. and Olemskaya, E (2006) "Effects of Regional FDI Concentration on Enterprise Performance in Russia" Ural State University Working Paper
47. Kathuria, V. (2000) "Productivity spillovers from technology transfer to Indian manufacturing firms" *Journal of International Development* 12 (3), pp. 343-369
48. Kathuria, V. (2001) "Foreign firms, technology transfer and knowledge spillovers to Indian manufacturing firms: a stochastic frontier analysis" *Applied Economics* 33 (2), pp. 625-642
49. Kathuria, V. (2002) "Liberalisation, FDI, and productivity spillovers - An analysis of Indian manufacturing firms" *Oxford Economic Papers* 54 (4), pp. 688-718
50. Kathuria, V. (2010) "Does the technology gap influence spillovers? A post-liberalization analysis of Indian manufacturing industries" *Oxford Development Studies* 38 (2), pp. 146-170
51. Khalifah, N.A., Adam, R (2009) "Productivity spillovers from FDI in Malaysian manufacturing: Evidence from micro-panel data" *Asian Economic Journal* 23 (2), pp. 143-167
52. Khawar M (2003): "Productivity and foreign direct investment – evidence from Mexico." Journal of Economic Studies, 30(1):66–76

53. Kien, P.X. (2008) " The impact of foreign direct investment on the labour productivity in host countries: the case of Vietnam " Working Paper 0814, Vietnam Development Forum October 2008
54. Kohpaiboon, A. (2006) "Foreign direct investment and technology spillover: A cross-industry analysis of Thai manufacturing" *World Development* 34 (3), pp. 541-556
55. Kolesnikova, I. And Tochitskaya, I. (2008) "Impact of FDI on Trade and Technology Transfer in Belarus: Empirical Evidence and Policy Implications", IPM Research Center
56. Kokko, A. (1994) "Technology, market characteristics, and spillovers" *Journal of Development Economics*, Volume 43, Issue 2, April, Pages 279-293
57. Kokko, A. (1996) "Productivity spillovers from competition between local firms and foreign affiliates" *Journal of International Development*, Volume 8, Issue 4, July, pp. 517-530
58. Kokko A, Zejan M, Tansini R (1996) "Local technological capability and productivity spillovers from FDI in the Uruguayan manufacturing sector." *Journal of Development Studies*, 32, pp.602–611
59. Kokko, A., Zejan, M. And Tansini, R. (2001) "Trade regimes and spillover effects of FDI: Evidence from Uruguay" *Review of World Economics*, Volume 137, Number 1, 124-149
60. Konings, J. (2001) "The Effects of Foreign Direct Investment on Domestic Firms: Evidence from Firm Level Panel Data in Emerging Economies", *Economics of Transition,* Volume 9, Issue 3, November, pp.619-633
61. Kosteas, V.D. (2008) "Foreign direct investment and productivity spillovers: A quantile analysis" *International Economic Journal* 22 (1), pp. 25-41
62. Le, R Pomphrey (2008) "Technology Spillovers from Foreign Direct Investment in Vietnam: Horizontal or Vertical Spillovers?" Working paper Series, Vietnam Development Forum
63. Li, X., Liu, X., Parker, D. (2001) "Foreign direct investment and productivity spillovers in the Chinese manufacturing sector" *Economic Systems* 25 (4), pp. 305-321
64. Lin, P., Liu, Z., Zhang, Y. (2009) "Do Chinese domestic firms benefit from FDI inflow? Evidence of horizontal and vertical spillovers" *China Economic Review,* 20 (4), pp. 677-691
65. Liu, Z. (2002) "FDI and technology spillover: evidence from China"', *Journal of Comparative Economics,* Volume 30, Issue 3, September, Pages 579-602
66. Liu, Z. (2008) "Foreign direct investment and technology spillovers: Theory and evidence", *Journal of Development Economics,* 85 (1-2), pp. 176-193
67. Liu, X., Wang, C., Wei, Y. (2009) "Do local manufacturing firms benefit from transactional linkages with multinational enterprises in China" *Journal of International Business Studies,* 40 (7), pp. 1113-1130
68. Liu, X. and Wang, C. (2003) "Does foreign direct investment facilitate technological progress? evidence from Chinese industries" *Research Policy*, Volume 32, Issue 6, June, pp. 945-953

69. Lutz, S. and Talavera, O. (2004) "Do Ukrainian Firms Benefit from FDI?" *Economics of Planning*, Volume 37, Number 2, pp. 77-98
70. Managi, S., Bwalya, S.M. (2010) "Foreign direct investment and technology spillovers in sub-Saharan Africa" *Applied Economics Letters,* 17 (6), pp. 605-608
71. Marcin, K. (2008) "How does FDI inflow affect productivity of domestic firms? The role of horizontal and vertical spillovers, absorptive capacity and competition" *Journal of International Trade and Economic Development* 17 (1), pp. 155-173
72. Marin, A., Bell, M. (2006) 'Technology spillovers from Foreign Direct Investment (FDI): The active role of MNC subsidiaries in Argentina in the 1990s' *Journal of Development Studies* 42 (4), pp. 678-697 2006
73. Marin, A. And Narula, R. (2003)"FDI spillovers, absorptive capacities and human capital development: evidence from Argentina", MERIT Research Memorandum
74. Marin, A. And Narula, R. (2005)"Exploring the relationship between direct and indirect spillovers from FDI in Argentina" MERIT Research Memoranda
75. Melentieva, N. (2000) "FDI in Russia: the effect of foreign ownership on productivity" New Economic School, Master Thesis
76. Merlevede, B. and Schoors, K. (2006) "FDI and the Consequences Towards more complete capture of spillover effects" Gent University Working Papers of Faculty of Economics N. 372
77. Merlevede, B. and Schoors, K. (2009) "Openness, competition, technology and FDI spillovers: Evidence From Romania" Working Paper Department of Economics and CERISE, Centre for Russian International Socio-Political and Economic Studies, Ghent University
78. Muchie, M. and Al-Suyuti, NA. (2009) "A Firm-Level Analysis of Technological Externality of Foreign Direct Investment in South Africa" - African Journal of Science, Technology, Innovation and Development, Vol.1, N.1, pp. 76-102
79. Nguyen, AN. And Nguyen, T. (2008) "Foreign direct investment in Vietnam: Is there any evidence of technological spillover effects" Development and Policies Research Center (DEPOCEN), Working Paper 18
80. Osada, H. (1994) "Trade liberalization and FDI incentives in Indonesia: the impact on industrial productivity" *Developing Economies* 32 (4), pp. 479-491
81. Qiu, B., Yang, S., Xin, P., Kirkulak, B. (2009) "FDI technology spillover and the productivity growth of China's manufacturing sector" *Frontiers of Economics in China* 4 (2), pp. 209-227
82. Ran, J., Voon, JP and Li, G. (2007) "How does FDI affect China? Evidence from industries and provinces" - *Journal of Comparative Economics*, Volume 35, Issue 4, December, Pages 774-799
83. Rybalka, O. (2001) "Foreign direct investment and economic development of transition countries. The case of Ukraine", Master Thesis, National University, Kiev-Mohyla Academy

84. Sarkar, S. "Impact of Inward FDI on Host Country- The case of India" Working Paper, School of Management and Labour Studies
85. Sarkar, S., Lai, Y.-C. (2009) "Foreign direct investment, spillovers and output dispersion - The case of India" *International Journal of Information and Management Sciences* 20 (4), pp. 491-503
86. Sjöholm, F. (1999) "Technology gap, competition and spillovers from direct foreign investment: evidence from establishment" *Journal of Development Studies*, Volume 36, Issue 1 October, pp. 53 - 73
87. Sjöholm, F. (1999) "Productivity growth in Indonesia: the role of regional characteristics and direct foreign investment" *Economic Development and Cultural Change*, Vol. 47, No. 3, April, pp. 559-584
88. Suyanto, Salim, R.A., Bloch, H. (2009) "Does Foreign Direct Investment Lead to Productivity Spillovers? Firm Level Evidence from Indonesia" *World Development* 37 (12), pp. 1861-1876
89. Takii, S. (2005) "Productivity spillovers and characteristics of foreign multinational plants in Indonesian manufacturing 1990-1995" *Journal of Development Economics* 76 (2), pp. 521-542
90. Tian, X (2007)"Accounting for sources of FDI technology spillovers: evidence from China", *Journal of International Business Studies,* Volume 38, Number 1, pp. 147-159
91. Todo, Y., Miyamoto, K. (2006) "Knowledge spillovers from foreign direct investment and the role of local R&D activities: Evidence from Indonesia" *Economic Development and Cultural Change* 55 (1), pp. 173-200
92. Todo, Y., Zhang, W., Zhou, L.-A. (2009) "Knowledge spillovers from FDI in China: The role of educated labour in multinational enterprises" *Journal of Asian Economics* 20 (6), pp. 626-639,
93. Torlak, E. (2004) "Foreign Direct Investment, Technology Transfer, and Productivity Growth in Transition Countries Empirical Evidence from Panel Data" Center for European, Governance and Economic Development Research, University of Goettingen, Working Paper 26
94. Thuy LT (2005): Technological Spillovers from Foreign Direct Investment: the case of Vietnam. University of Tokio, Graduate School of Economics, Working paper.
95. Van Thanh and Hoang, P.T. (2010) "Productivity Spillovers from Foreign Direct Investment: The Case of Vietnam" - Central Institute for Economic Management (CIEM)
96. Villegas-Sanchez, C. (2008) " FDI Spillovers and the Role of Local Financial Markets: Evidence from Mexico" European University Institute, Mimeo
97. Vu, T.B., Gangnes, B., Noy, I. (2008) "Is foreign direct investment good for growth? Evidence from sectoral analysis of China and Vietnam" *Journal of the Asia Pacific Economy* 13 (4), pp. 542-56

98. Waldkirch, A., Ofosu, A. (2010) "Foreign Presence, Spillovers, and Productivity: Evidence from Ghana" *World Development* 38 (8), pp. 1114-1126"

99. Wang, C., Yu, L. (2007), "Do spillover benefits grow with rising foreign direct investment? An empirical examination of the case of China" *Applied Economics* 39 (3), pp. 397-405

100. Wei, Y. And Liu, X. (2003) "Productivity spillovers among OECD, diaspora and indigenous firms in Chinese manufacturing" Lancaster University Management School, Economics Department, Working Paper 000059

101. Wei, Y., Liu, X. (2006) "Productivity spillovers from R and D, exports and FDI in China's manufacturing sector", *Journal of International Business Studies* 37 (4), pp. 544-557

102. Yaşar, M., Paul, C.J.M. (2007) "International linkages and productivity at the plant level: Foreign direct investment, exports, imports and licensing" *Journal of International Economics,* 71 (2), pp. 373-388

103. Yaşar, M., Paul, C.J.M. (2009) "Size and foreign ownership effects on productivity and efficiency: An analysis of Turkish motor vehicle and parts plants" *Review of Development Economics*, 13 (4), pp. 576-591

104. Yudaeva, K., Kozlov, K., Melentieva, N., Ponomareva, N. (2003) "Does foreign ownership matter? The Russian experience" *Economics of Transition* 11 (3), pp. 383-409

MICRO data Summary Statistics.

Variable	*Obs*	*Mean*	*Std. Dev.*	*Min*	*Max*
Partial Correlation Coefficient	565	0.051	0.132	-0.427	0.974
SE (Partial Correlation Coefficient)	565	0.033	0.042	0.001	0.224
Variance (Partial Correlation Coefficient)	565	0.003	0.007	0.000	0.050
Number of citations per year	565	12.421	24.537	0.000	148.450
Panel Model (Y/N)	565	0.515	0.500	0	1
Human Capital Control (Y/N)	565	0.342	0.475	0	1
Capital/Capital per Worker Control (Y/N)	565	0.742	0.438	0	1
Trade/Export Control (Y/N)	565	0.265	0.442	0	1
Research and Development Control (Y/N)	565	0.145	0.353	0	1
FDI Specification not Linear (Y/N)	565	0.402	0.491	0	1
Endogeneity robust Specification (Y/N)	565	0.347	0.476	0	1
Fixed Effect Specification (Y/N)	565	0.508	0.500	0	1

On-line Appendix A3: List of MACRO/Overall Cross Countries Studies Used in the Meta-Analysis and summary statistics

1. Ahn, S. and J-W. Lee (2007) Integration and growth in East Asia, *Monetary and Economic Studies*, December (Special Edition), 131–154.
2. M. Ayhan Kose, Eswar S. Prasad, Marco E. Terrones (2009) Does openness to international financial flows raise productivity growth?, *Journal of International Money and Finance*, vol. 28(4), 554-580, June.
3. Alfaro, L., A. Chanda, S. Kalemli-Ozcan and S. Sayek (2004) FDI and economic growth: the role of local financial markets, *Journal of International Economics,* 64(1), 89–112.
4. Alfaro, L. and Kalemli-Ozcan S. and Sayek, S. (2009) FDI, productivity and financial development, *The World Economy*, 32: 111–135
5. Balasubramanyam, V.N., M. Salisu and D. Sapford (1996) Foreign direct investment and growth in EP and IS countries, *The Economic Journal*, 106(434), 92–105.
6. Balasubramanyam, V.N., M. Salisu and D. Sapford (1999) Foreign direct investment as an engine of growth, *The Journal of International Trade and Economic Development*, 8(1), 27–40.
7. Basu P. and A. Guariglia (2007) Foreign direct investment, inequality, and growth, *Journal of Macroeconomics*, 29, 824–839.
8. Bengoa M. and B. Sanchez-Robles (2003) Foreign direct investment, economic freedom and growth: new evidence from Latin America, *European Journal of Political Economy*, 19(3), 529–545.
9. Bengoa M. and B. Sanchez-Robles (2005) Policy shocks as a source of endogenous growth, *Journal of Policy Modeling*, 27, 249–261.
10. Berthélemy, J-C. and S. Démurger (2000) Foreign direct investment and economic growth: Theory and application to China, *Review of Development Economics*, 4(2), 140–155.
11. Bhandari, R., G. Pradhan, D. Dhakal, and K. Upadhyaya (2007) Foreign aid, FDI and economic growth in East European countries, *Economics Bulletin*, 6(13), 1–9.
12. Borensztein E., J. De Gregorio and J-W. Lee (1998) How does foreign direct investment affect economic growth?, *Journal of International Economics*, 45, 115–135.
13. Bornschier, V., C. Chase-Dunn and R. Rubinson (1978) Cross-national evidence of the effects of foreign investment and aid on economic growth and inequality: A survey of findings and reanalysis, *The American Journal of Sociology*, 84(3), 651–683.
14. Buckley, P.J., J. Clegg, C. Wang and A.R. Cross (2002) FDI, regional differences and economic growth: panel data evidence from China, *Transnational Corporations,* 11(1), 1–28.

15. Burke, P.J. and F.Z. Ahmadi-Esfahani (2006) Aid and growth: A study of South East Asia, *Journal of Asian Economics*, 17, 350–362.
16. Campos, N.F. and Y. Kinoshita (2002) Foreign Direct Investment as technology transferred: Some panel evidence from the transition economies, *The Manchester School*, 70(3), 398–419.
17. Chen, J. and B.M. Fleisher (1996) Regional income inequality and economic growth in China, *Journal of Comparative Economics*, 22, 141–164.
18. Chen, Z., M. Lu, and J. Yan (2006) Reform, interaction of policies, and economic growth: Evidence from provincial panel data, *Frontier of Economics in China*, 1, 48–68.
19. Choe, J.I. (2003) Do foreign direct investment and gross domestic investment promote economic growth?, *Review of Development Economics,* 7(1), 44–57.
20. Collins, S.M. (2004) International financial integration and growth in developing countries: Issues and implications for Africa, *Journal of African Economies*, 13(2), ii55-ii94.
21. Dabla-Norris, E., Honda, J, Lahreche, A. and Verdier, G. (2010) FDI Flows to Low-Income Countries: Global Drivers and Growth Implications, IMF WP/10/132
22. De Gregorio, J. (1992) Economic growth in Latin America, *Journal of Development Economics*, 39, 59–84.
23. De Mello, L.R.(1999) Foreign direct investment-led growth: evidence from time series and panel data, *Oxford Economic Papers*, 51, 133–151.
24. DeSoysa, I.D. and J.R. Oneal (1999) Boon or bane? Reassessing the productivity of foreign direct investment, *American Sociological Review*, 64(5), 766–782.
25. De Vita, G. and K.S. Kyaw (2007) Growth effects of FDI and portfolio investment flows to developing countries: a disaggregated analysis by income levels, *Applied Economics Letters*, 1–7.
26. Dixon, W.J. and T. Boswell (1996) Dependency, disarticulation, and denominator effects: Another look at foreign capital penetration, *The American Journal of Sociology*, 102(2), 543–562.
27. Durham, J.B. (2004) Absorptive capacity and the effects of foreign direct investment and equity foreign portfolio investment on economic growth, *European Economic Review*, 48(2), 285–306.
28. Dutt, A.K. (1997) The pattern of direct foreign investment and economic growth, *World Development,* 25(11), 1925–1936.
29. Firebaugh, G. (1992) Growth effects of foreign and domestic investment, *The American Journal of Sociology*, 98(1), 105–130
30. Firebaugh, G. (1996) Does foreign capital harm poor nations? New estimates based on Dixon and Boswell's measures of capital penetration, *The American Journal of Sociology*, 102(2), 563–575.

31. Fleisher, B. and Li, H. and Qiang Zhao, Min (2010) Human capital, economic growth, and regional inequality in China, *Journal of Development Economics*, Vol. 92(2), 215-231
32. Gao, T. (2002) The impact of foreign trade and investment reform on industry location: The case of China, *Journal of International Trade and Economic Development*, 11(4), 367–386.
33. Ghatak, A. and F. Halicioglu (2007) Foreign direct investment and economic growth: some evidence from across the world, *Global Business and Economic Review*, 9(4), 381–394.
34. Greenaway, D., D. Sapsford, and S. Pfaffenzeller (2007) Foreign direct investment, economic performance and trade liberalisation, *The World Economy*, 30(2), 197–210.
35. Gupta, K.L. (1975) Foreign capital inflows, dependency burden and saving rates in developing countries: A simultaneous equation model, *Kyklos,* 28(2), 358–374.
36. Gyimah-Brempong, K. (1992) Aid and economic growth in LDCs: Evidence from Sub-Saharan Africa, *Review of Black Political Economy,* 20(3), 31–52.
37. Hansen, H. and F. Tarp (2001) Aid and growth regressions, *Journal of Development Economics*, 64, 547–570.
38. Hansen, H. and J. Rand (2006) On the causal links between FDI and growth in developing countries, *The World Economy*, 29(1), 21–41.
39. Haveman, J.D., V. Lei and J.S. Netz (2001) International integration and growth: A survey and empirical investigation, *Review of Development Economics*, 5(2), 289–311.
40. Hein, S. (1992) Trade strategy and the dependency hypothesis: A comparative of policy, foreign investment, and economic growth in Latin America and East Asia, *Economic Development and Cultural Change*, 40(3), 495–521.
41. Hermes, N. and R. Lensink (2003) Foreign direct investment, financial development and economic growth, *The Journal of Development Studies,* 40(1), 142–163.
42. Jackman, R.W. (1982) Dependence on foreign investment and economic growth in the Third world, *World Politics*, 34(2), 175–196.
43. Jalilian, H. and J. Weiss (2002) Foreign direct investment and poverty in ASEAN region, *ASEAN Economic Bulletin*, 19(3), 231–252.
44. Kentor, J. (1998) The long-term effects of foreign investment dependence on economic growth, 1940-1990, *The American Journal of Sociology*, 103(4), 1024–1046.
45. Kentor, J. and T. Boswell (2003) Foreign capital dependence and development: A new direction, *American Sociological Review*, 68(2), 301–313.
46. Khawar, M. (2005) Foreign direct investment and economic growth: A cross-country analysis, *Global Economy Journal*, 5(1), 1–11.
47. Kosack, S. and J. Tobin (2006) Funding self-sustaining development: The role of aid, FDI and government in economic success, *International Organization*, 60, 205–243.

48. Laureti, L. and P. Postiglione (2005) The effects of capital inflows on the economic growth in the Med area, *Journal of Policy Modeling*, 27(7), 829–851.

49. Le, M.V. and T. Suruga (2005) Foreign direct investment, public expenditure and economic growth: the empirical evidence for the period 1970 – 2001, *Applied Economics Letters*, 12, 45–49.

50. Lensink, R. and O. Morrissey (2006) Foreign direct investment: Flows, volatility, and the impact on growth, *Review of International Economics*, 14(3), 478–493.

51. Li, X., and X. Liu (2005) Foreign direct investment and economic growth: An increasingly endogenous relationship, *World Development*, 33(3), 393–407.

52. Luo, C. (2007) FDI, domestic capital and economic growth: Evidence from panel data at China's provincial level, *Frontier of Economics in China*, 2(1), 92–113.

53. Makki, S.S. and A. Somwaru (2004) Impact of foreign direct investment and trade on economic growth: Evidence from developing countries, *American Journal of Agricultural Economics,* 86(3), 795–801.

54. Nair-Reichert, U. and D. Weinhold (2001) Causality tests for cross-country panels: a new look at FDI and economic growth in developing countries, *Oxford Bulletin of Economics and Statistics,* 63(2), 153–171.

55. Naudé, W.A. (2004) The effects of policy, institutions and geography on economic growth in Africa: An econometric study based on cross-section and panel data, *Journal of International Development*, 16, 821–849.

56. Oliva, M.A. and L.A. Rivera-Batiz (2002) Political institutions, capital flows and developing country growth: An empirical investigation, *Review of Development Economics*, 6(2), 248–262.

57. Olofsdotter, K. (1998) Foreign direct investment, country capabilities and economic growth, *Weltwirtschaftliches Archiv*, 134(3), 534–547.

58. Papanek, G.F. (1973) Aid, foreign private investment, savings, and growth in less developed countries, *The Journal of Political Economy,* 81(1), 120–130.

59. Ram, R. and K.H. Zhang (2002) Foreign direct investment and economic growth: Evidence from cross-country data for the 1990s, *Economic Development and Cultural Change*, 51(1), 205–215.

60. Reisen, H. and M. Soto (2001) Which types of capital inflows foster developing-country growth?, *International Finance*, 4(1), 1–14.

61. Schiff, M. and Wang Y. (2008) North-South and South-South Trade-Related Technology Diffusion: How Important Are They in Improving TFP Growth? *Journal of Development Studies*, 44 (1), 49–59.

62. Snyder, D.W. (1993) Donor bias towards small countries: an overlooked factor in the analysis of foreign aid and economic growth, *Applied Economics*, 25, 481-488
63. Stoneman, C. (1975) Foreign capital and economic growth, *World Development*, 3(1), 11–26.
64. Sylwester, K. (2005) Foreign direct investment, growth and income inequality in less developed countries, *International Review of Applied Economics*, 19(3), 289–300.
65. Teboul, R. and E. Moustier (2001) Foreign aid and economic growth: the case of the countries south of the Mediterranean, *Applied Economics Letters,* 8, 187–190.
66. Tsai, P-L. (1994) Determinants of foreign direct investment and its impact on economic growth, *Journal of Economic Development*, 19(1), 137–163.
67. Wang, C., X. Liu and Y. Wei (2004) Impact of openness on growth in different country groups, *The World Economy*, 27(4), 567–585.
68. Woo, J (2009) Productivity Growth and Technological Diffusion through Foreign Direct Investment*, Economic Inquiry,* 47(2), 226-248
69. Yang, B. (2008) FDI and growth: a varying relationship across regions and over time, *Applied Economics Letters*, 15, 105–108.
70. Zhang, K.H. (2001) How does foreign direct investment affect economic growth in China?, *Economics of Transition*, 9(3), 679–693.
71. Zhang, Q. and B. Felmingham (2002) The role of FDI, exports and spillover effects in the regional development of China, *The Journal of Development Studies*, 38(4), 157–178.

MACRO database summary statistics

Variable	*Obs*	*Mean*	*Std. Dev.*	*Min*	*Max*
Partial Correlation Coefficient	551	0.119	0.210	-0.751	0.689
SE (Partial Correlation Coefficient)	551	0.106	0.047	0.020	0.265
Variance (Partial Correlation Coefficient)	551	0.013	0.011	0.000	0.070
Number of citations per year	551	12.739	22.577	0.000	167.420
Panel Model (Y/N)	551	0.200	0.400	0	1
Human Capital Control (Y/N)	551	0.617	0.487	0	1
Capital/Capital per Worker Control (Y/N)	551	0.047	0.212	0	1
Trade/Export Control (Y/N)	551	0.459	0.499	0	1
Research and Development Control (Y/N)	551	0.020	0.140	0	1
FDI Specification not Linear (Y/N)	551	0.370	0.483	0	1
Endogeneity robust Specification (Y/N)	551	0.272	0.446	0	1
Fixed Effect Specification (Y/N)	551	0.260	0.439	0	1

On-line Appendix A4: Summary statistics of the JOINT Firm-to-Firm (micro) and Overall (Macro) Database

JOINT Level database summary statistics

Variable	*Obs*	*Mean*	*Std. Dev.*	*Min*	*Max*
Partial Correlation Coefficient	1116	0.085	0.178	-0.751	0.974
SE (Partial Correlation Coefficient)	1116	0.069	0.057	0.001	0.265
Variance (Partial Correlation Coefficient)	1116	0.008	0.011	0.000	0.070
Number of citations per year	1116	12.578	23.580	0.000	167.420
Panel Model (Y/N)	1116	0.359	0.480	0	1
Human Capital Control (Y/N)	1116	0.478	0.500	0	1
Capital/Capital per Worker Control (Y/N)	1116	0.399	0.490	0	1
Trade/Export Control (Y/N)	1116	0.361	0.481	0	1
Research and Development Control (Y/N)	1116	0.083	0.277	0	1
FDI Specification not Linear (Y/N)	1116	0.386	0.487	0	1
Endogeneity robust Specification (Y/N)	1116	0.310	0.463	0	1
Fixed Effect Specification (Y/N)	1116	0.385	0.487	0	1

On-line Appendix A5: Database Construction

In this section we describe the steps undertaken to build the meta-analysis datasets, MICRO and MACRO, respectively. We will cover the classification of Low and Middle-income countries, the search strategy for identification of relevant papers/studies, the initial classification/screening of those papers and the *firm-to-firm* (MICRO) and *overall* (MACRO) dataset construction. As explained in the main text both microeconomic and macroeconomic papers were considered, although in two initially different datasets due to the rather dissimilar nature of those studies. Those separate datasets have been then harmonized and merged in order to guarantee full comparability. The data collection process has been conducted by two experienced researchers up to the end of 2010 and therefore the methodology adopted should

be intended up to that precise date. No paper published after this cut-point has been included.

MICRO

Classification of Low and Middle-Income Countries

As far as the focus of the meta-analysis is concerned, we restrict our sample to Low and Middle-income countries and therefore we firstly define what the scholarly convention is on low/middle income countries definition. We identified those countries with two main criteria and then we matched the countries identified by one criterion with the countries identified by the other one. The chosen criteria were the following:

a) We start with the World Bank's definition. The World Bank's main criterion for classifying economies is gross national income (GNI) per capita. Based on its GNI per capita, every economy is classified as Low income, Middle income (subdivided into lower Middle and upper Middle), or High income. The groups are: low income, $975 or less; lower middle income, $976 - $3,855; upper middle income, $3,856 - $11,905.

b) We then proceed with a different definition, namely Less Developed countries are those as the 40% of Countries with lowest GNI per capita in purchasing power parity (PPP). We calculated the mean of GNI per capita from 1998 to 2008 for each country and we listed the countries with lowest 40% of GNI per capita. By looking at the distributions of the mean of GNI per capita, the threshold for the poorest country is set at GNI(PPP)<= 3534.545. The data on GNI per capita is taken from the World Development Indicators Dataset (World Bank).

By comparing the countries identified by the World Bank definition and the countries identified by the second definition, the countries identified with the latter criteria correspond to the World Bank 'low income' and 'middle income groups'. However, while the World Bank 'low income' and 'middle income' groups include 143 countries, by applying the second definition criterion we can only include 70 countries. Because of its greater

comprehensiveness, we adopted the WB definition. We are able to find relevant papers on 24 out of 143 countries. Some papers which cover the additional 119 countries have not been included purposely in the analysis, because they are not suitable for a codification *via* a Meta Regression Analysis, e.g. not in English, or/and lacking an econometric/statistical analysis, or/and analysing a different relationship with respect to the FDI-growth nexus. We should note that due to the fact that we follow the World Bank definition, in the group 'middle income' there are also relatively advanced economies such as Poland, Turkey and Lithuania. This classification has guided the search for relevant papers which is described in the sections below.

Search strategy for identification of relevant studies

Given the list of countries identified in step 1, we run extensive searches with the intent to identify the order of magnitude of the papers to be included in the finalized database. The searches were initially carried out with three engines: Google scholar, Scopus and "Publish or Perish" (http://www.harzing.com/pop.htm). As our interest ultimately laid in the effect of FDI on Low income countries we first had to identify all articles which discuss the effect of FDI in the countries of interest. In order to do this, two main searches were carried out: "FDI + country" and "foreign direct investment + country". We should note that in Google scholar we limited the search of the keywords to "title only" while in Scopus we searched the keywords selecting the option "Keyword, Abstract and Title". These are very broad searches which lead to a high number of papers, but we believe they allow identifying the majority of relevant papers for each country of interest. In this way we ensure that we don't miss any relevant study.

Out of the three softwares used, the searches in Google Scholar and Publish or Perish gave the highest number of papers. The lower number of articles identified by Scopus is because

the software only searches for papers published in academic journal, while Google Scholar and "Publish or Perish" also consider other sources (such as working paper). The highest number of papers for the keyword 'FDI + country' is given by Publish or Perish with 1488 records for countries coded in the 143 World Bank identified list. Out of 1488 papers 867 are on China. The highest number of search for the keyword 'Foreign direct investment + country' is given by Google scholar with 2796 records. Out all the papers identified by search with Google Scholar, 963 are on China.

We also carried out the following searches: "MC + country", "multinational + country", "TC + country", "transnational corporation + country". These searches did not lead to many relevant papers. For example, using the keywords 'MNC+ China' in Scopus we obtain 73 papers of which none was relevant to our project. The same keywords in Google scholar gave only 35 results, and again, none was relevant to our project. Because of the low number of results given by these searches they were not used, and we focused instead on "FDI + country" and "foreign direct investment + country".

As shown above the number of papers given by the search specified above are extremely high. Of course, many of the papers were not relevant to our research. An appropriate selection allowed us to build a finalized and polished dataset of articles. In the section below, we describe the methodology followed to selected relevant studies.

Initial classification of papers

The initial searches gave us a sense of the number of papers that could potentially be included in the meta-analysis. We used the results of the searches to classify the papers in a database. The classification of papers was done in several steps which can be summarized as follow:

a) Preliminary classification from the search 'FDI + country'

b) Definition of the type of microeconomic and macroeconomic studies to be classified

c) Definition of the variables to be included in the dataset

First, we screened the papers identified through the searches 'FDI + country'. We focused on the results of the searches from Google scholar and Scopus only. This because we assessed that the results from "Publish or Perish" were the same as those given by Google Scholar. We first identified the papers likely to be relevant to the project and we collected some basic information (Article Title/Author/Year/Publication) in an excel file. The initial selection of articles was done using a very broad criterion. More precisely we excluded from our preliminary dataset all articles that analyse the determinants of FDI location, and we included everything else. This selection was done by reading the article's title and abstract.

The initial selection included a high number of papers on a wide range of topics and therefore had to be refined. In order to do this, for each paper selected we classified the following detail: Link analysed; Year and sector analysed; Type of data and estimators used; main results, etc. With this information we formulated an initial judgment on the relevance of the papers to our research. The papers were initially graded according to two level of relevance:

- Paper not relevant, i.e. papers which analyse aspect of FDI not relevant to our research. These are both descriptive papers (e.g. literature review or descriptive analysis of the impact on FDI on the host country) and papers which have a relevant title but can't be accessed/downloaded (e.g. many Chinese papers have a relevant title but their texts are not accessible or are in Chinese). These types of papers initially classified were of a very different nature and dealt with many different research questions vis-à-vis the paper's focus.
- Papers that are relevant, i.e. all empirical papers that analyse the direct or indirect

impact of FDI on growth.

Secondly, we focused on the papers classified as 'relevant'. This selection included all articles on the impact of FDI on growth analysed from an empirical point of view. The final number of studies is 104, with codification of 565 estimates.

MACRO

In term of the macroeconomic studies we focused our interest on papers analysing the effect of FDI on GDP (and its transformation), while in term of microeconomic studies we restricted our attention to articles analysing the impact of FDI on firms and sectors growth or productivity. After having identified the types of MACRO studies to include in the dataset in comparison with the MICRO data, we therefore defined the data that had to be collected. In other words the decision on what data was needed from the papers was done separately for microeconomic and macroeconomic studies. While we applied the same methodology to both types of studies in terms of selection and classification, the data collected had to differ due to the nature of the studies. Because of this the dataset on micro level studies and that of macro studies contain different variables.

There are in fact Cross-Countries level dataset specificities vis-à-vis micro studies. We start our research fixing both the keywords and the sources for studies' research. In particular, we considered different keywords' combinations, taking either the acronyms or the full words and allowing for both British and American English. For the sake of simplicity, in what follows we report just the acronyms and the British English spelling:

FDI and GROWTH

FDI and GDP GROWTH

FDI and LABOUR PRODUCTIVITY GROWTH

FDI and TFP

FDI and TFP GROWTH

The bases for research were identified as Google Scholar and Scopus, to take into account both unpublished and published works.

At the very beginning the research was "unbounded", in the sense that we were searching the aforementioned keywords anywhere in the paper. Subsequently, for the sake of feasibility, we restrict our attention to papers having the relevant words just in the title. For example, the number of papers in Google Scholar having "FDI and GDP" anywhere is 26,600 while the ones having them just in the title are 361.

The cross-country focus of the research question led us to discharge time-series analysis, so that we considered cross-section and panel data studies only. Moreover, we excluded all the works sampling just developed countries, while we retained the ones having both developed and emerging/developing economies.

In order to double-check the relevance of the selected studies, we referred to the work of Doucouliagos, H., S. Iamsiraroj and M. A. Ulubasoglu, 2010. "Foreign Direct Investment and Economic Growth: A Real Relationship or Wishful Thinking?" DEAKIN School of Accounting, Economics and Finance working papers (published as Iamsiraroj, S. and M. A. Ulubasoglu, 2015).

This is the most authoritative and up-to-date meta-analysis on the effects of FDI and GDP growth at the macro level. Two notes in order. First, the country spectrum of Doucoliagos et al. (2010) is broader than ours. In fact, they consider not only low-income but also high-income economies. Second, they include time-series studies.

In our macro meta-analysis, we employed 551 observations taken from 71 studies, 66 of which are comprised into Doucoliagos et al. (2010). Four out of the remaining six were found through "TFP and FDI" keywords, using both Google scholar and Scopus; one refers to the search "FDI and growth" in Google Scholar (i.e. Alfaro et al, 2009) and the

last one is the very recent IMF working paper of Dabla-Norris et al. (2010) which probably was not available when Doucoliagos et al. (2010) undertook their research.

Table A1.1 MRA Controlling for model characteristics

	MICRO (a)				MACRO (b)				JOINT (c)							
	OLS	WLS	FAT-PET	PEESE	OLS	WLS	FAT-PET	PEESE	OLS	WLS	FAT-PET	PEESE	OLS	WLS	FAT-PET	PEESE
S.E. (Partial Correlation Coefficient)			1.045***				0.454				1.026***				0.960***	
			0.345				0.397				0.189				0.258	
Variance (Partial Correlation Coefficient)				11.589**				1.269				7.175***				4.836***
				4.75				2.062				1.652				1.848
Number of Citation p.y.	0.000	-0.000***	-0.000***	-0.000***	0.000	0.000	0.000	0.000	0.000	-0.000***	-0.000***	-0.000***	0.000	-0.000***	-0.000***	-0.000***
	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Panel Model Dummy	0.011	-0.026***	-0.023***	-0.026***	0.011	-0.033	-0.022	-0.028	0.004	-0.027***	-0.023***	-0.026***	-0.009	-0.027***	-0.024***	-0.026***
	0.029	0.008	0.008	0.008	0.039	0.026	0.026	0.026	0.026	0.008	0.008	0.008	0.022	0.008	0.008	0.008
Human capital control Dummy	-0.01	0.004	0.002	0.004	0.019	0.015	0.013	0.014	0.016	0.007	0.002	0.005	-0.007	0.004	0.003	0.004
	0.018	0.008	0.008	0.008	0.045	0.024	0.024	0.024	0.021	0.008	0.008	0.008	0.021	0.008	0.007	0.008
Capital/capital per worker control Dummy	-0.012	-0.008**	-0.008**	-0.008**	0.026	0.055*	0.054*	0.055*	-0.042**	-0.009***	-0.008**	-0.008***	-0.011	-0.007**	-0.007**	-0.008**
	0.018	0.003	0.003	0.003	0.047	0.03	0.028	0.029	0.018	0.003	0.003	0.003	0.016	0.003	0.003	0.003
Trade/export control Dummy	-0.031**	-0.001	-0.002	-0.001	-0.013	0.026	0.024	0.026	-0.012	-0.001	-0.002	-0.001	-0.016	0.000	-0.002	-0.001
	0.015	0.004	0.004	0.004	0.046	0.026	0.026	0.026	0.025	0.004	0.004	0.004	0.024	0.004	0.004	0.004
R&D control dummy	0.02	-0.017**	-0.016*	-0.017**	-0.103*	-0.042	-0.022	-0.034	-0.02	-0.018**	-0.016**	-0.017**	0.002	-0.018**	-0.016**	-0.017**
	0.025	0.008	0.008	0.008	0.054	0.029	0.026	0.028	0.026	0.008	0.008	0.008	0.027	0.008	0.008	0.008
FDI not linear Dummy	0.002	0.012	0.01	0.012	-0.045	-0.072***	-0.074***	-0.073***	-0.021	0.011	0.009	0.011	-0.015	0.012	0.01	0.012
	0.022	0.008	0.007	0.008	0.047	0.02	0.02	0.02	0.023	0.007	0.007	0.007	0.023	0.007	0.007	0.007
Endogeneity control Dummy	-0.052*	-0.009***	-0.010***	-0.009***	0.003	0.009	0.004	0.007	-0.021	-0.009***	-0.010***	-0.009***	-0.022	-0.009***	-0.010***	-0.009***
	0.028	0.002	0.003	0.002	0.035	0.023	0.022	0.022	0.022	0.003	0.003	0.002	0.022	0.002	0.002	0.002
Fixed effects control Dummy	-0.031**	0.003	0.002	0.003	-0.013	-0.016	-0.005	-0.01	-0.031*	0.003	0.002	0.003	-0.014	0.003	0.003	0.003

	0.015	0.003	0.003	0.002	0.031	0.023	0.021	0.022	0.017	0.003	0.003	0.003	0.018	0.002	0.003	0.002
MACRO dummy	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	-	-	-	0.027	0.065***	0.012	0.041**
													0.031	0.017	0.017	0.017
LOW income Dummy	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	-	-	-	0.062*	-0.002	-0.004	-0.003
													0.033	0.005	0.005	0.005
Constant (true effect)	0.099***	0.039***	0.035***	0.039***	0.131***	0.119***	0.083**	0.109***	0.127***	0.041***	0.035***	0.040***	0.081***	0.040***	0.035***	0.039***
	0.017	0.008	0.009	0.008	0.035	0.024	0.034	0.026	0.022	0.007	0.009	0.008	0.018	0.008	0.009	0.008
Observations	565	565	565	565	551	551	551	551	1,116	1,116	1,116	1,116	1,116	1,116	1,116	1,116
R-squared	0.076	0.121	0.133	0.129	0.016	0.117	0.125	0.119	0.039	0.12	0.147	0.135	0.072	0.134	0.148	0.139
N. Cluster	104	104	104	104	71	71	71	71	175	175	175	175	175	175	175	175

Robust standard errors in parentheses, "***" p<0.01, "**" p<0.05, "*" p<0.1 “n.a.”: not applicable

Table A1.2 MRA controlling for Countries Dummies

	MICRO (a)				JOINT (c)			
	OLS	WLS	FAT-PET	PEESE	OLS	WLS	FAT-PET	PEESE
S.E. (Partial Correlation Coefficient)			0.499				0.667*	
			0.547				0.363	
Variance (Partial Correlation Coefficient)				7.791				4.567**
				5.421				2.121
17 transition countries	-0.006	0.043***	0.037***	0.042***	-0.073***	-0.042**	-0.01	-0.019
	0.014	0.001	0.007	0.002	0.02	0.02	0.025	0.021
Argentina	-0.026	0.026*	0.013	0.02	-0.093***	-0.058**	-0.036	-0.039
	0.016	0.014	0.021	0.016	0.021	0.024	0.026	0.025
Belarus	-0.041***	0.007***	0.004	0.006***	-0.109***	-0.078***	-0.042	-0.055**
	0.014	0.001	0.004	0.001	0.02	0.02	0.026	0.021
Bulgaria	-0.046**	0.008	0.002	0.007	-0.113***	-0.077***	-0.045	-0.054*
	0.022	0.02	0.021	0.02	0.026	0.028	0.034	0.029
Chile	-0.029	0.006**	0.004	0.006**	-0.096***	-0.079***	-0.041	-0.055**
	0.021	0.003	0.003	0.003	0.025	0.02	0.027	0.021
China (see constant in MICRO)	\	\	\	\	-0.067***	-0.085***	-0.045	-0.061***
					0.024	0.02	0.028	0.021
Czech Republic, Hungary, and Poland	0.288***	0.335***	0.314***	0.320***	0.221***	0.251***	0.262***	0.265***
	0.014	0.001	0.023	0.011	0.02	0.02	0.017	0.019
Ghana	-0.096***	-0.041***	-0.058***	-0.051***	-0.163***	-0.126***	-0.108***	-0.108***
	0.014	0.001	0.018	0.007	0.02	0.02	0.019	0.02
India	0.032	0.518**	0.508*	0.513**	-0.036	0.433*	0.460*	0.453*
	0.065	0.254	0.262	0.258	0.065	0.251	0.25	0.251
Indonesia	-0.004	0.017*	0.015*	0.017*	-0.072**	-0.068***	-0.03	-0.045*
	0.027	0.009	0.009	0.009	0.03	0.022	0.029	0.023

Kenya	0.052***	0.099***	0.083***	0.090***	-0.016	0.014	0.032*	0.032
	0.014	0.001	0.018	0.007	0.02	0.02	0.019	0.02
Latvia	-0.056***	-0.009***	-0.031	-0.025**	-0.124***	-0.094***	-0.083***	-0.080***
	0.014	0.001	0.024	0.011	0.02	0.02	0.017	0.019
Lithuania	-0.064***	-0.005*	-0.012	-0.008	-0.131***	-0.090***	-0.060**	-0.068***
	0.016	0.003	0.009	0.005	0.021	0.02	0.025	0.021
Malaysia	-0.028**	0.017***	0.015***	0.017***	-0.096***	-0.068***	-0.031	-0.045**
	0.014	0.001	0.003	0.001	0.02	0.02	0.027	0.021
Mexico	0.056	0.089***	0.083***	0.087***	-0.011	0.004	0.037	0.026
	0.035	0.013	0.016	0.014	0.037	0.024	0.029	0.025
Morocco	0.03	0.051***	0.046***	0.050***	-0.038	-0.034*	-0.001	-0.011
	0.02	0.002	0.006	0.002	0.024	0.02	0.025	0.021
Poland	-0.048***	0.002	0.001	0.002	-0.115***	-0.082***	-0.045	-0.059***
	0.015	0.002	0.003	0.002	0.02	0.02	0.028	0.021
Romania	-0.035**	0.004	0.002	0.003	-0.102***	-0.081***	-0.043	-0.058***
	0.016	0.003	0.003	0.003	0.021	0.02	0.028	0.021
Russia	-0.030*	0.014**	0.013*	0.014**	-0.097***	-0.071***	-0.032	-0.047**
	0.015	0.007	0.007	0.007	0.02	0.021	0.029	0.022
South Africa	0.051***	0.101***	0.075***	0.078***	-0.017	0.016	0.021	0.026
	0.014	0.001	0.028	0.016	0.02	0.02	0.016	0.018
Tanzania	-0.050***	-0.002*	-0.022	-0.015*	-0.117***	-0.087***	-0.073***	-0.071***
	0.014	0.001	0.021	0.009	0.02	0.02	0.018	0.019
Thailand	-0.301***	-0.254***	-0.305***	-0.338***	-0.368***	-0.338***	-0.367***	-0.364***
	0.014	0.001	0.056	0.059	0.02	0.02	0.02	0.018
Turkey	0.05	0.042***	0.035**	0.039***	-0.017	-0.042*	-0.012	-0.021
	0.054	0.011	0.015	0.013	0.055	0.023	0.027	0.024
Ukraine	0.058	0.022***	0.022***	0.022***	-0.009	-0.063***	-0.023	-0.040*
	0.05	0.001	0.002	0.001	0.051	0.02	0.029	0.021
Uruguay	0.077***	0.113***	0.087***	0.084***	0.01	0.028	0.033*	0.034*
	0.015	0.003	0.029	0.027	0.02	0.02	0.018	0.019

Venezuela	-0.052***	-0.004***	-0.006**	-0.004***	-0.119***	-0.089***	-0.051*	-0.066***
	0.014	0.001	0.002	0.001	0.02	0.02	0.027	0.021
Vietnam	0.059	0.007	0.006	0.007	-0.008	-0.077***	-0.039	-0.054**
	0.078	0.009	0.009	0.009	0.078	0.022	0.029	0.023
Zambia	0.036**	0.078***	0.041	0.034	-0.031	-0.007	-0.016	-0.01
	0.014	0.001	0.04	0.031	0.02	0.02	0.015	0.016
Zimbabwe	0.088***	0.148***	0.131***	0.138***	0.021	0.063***	0.080***	0.081***
	0.014	0.001	0.019	0.007	0.02	0.02	0.019	0.02
Constant: China=MICRO; Macro=Joint	0.052***	0.005***	0.004**	0.004***	0.119***	0.089***	0.048*	0.066***
	0.014	0.001	0.002	0.001	0.02	0.02	0.029	0.021
Observations	565	565	565	565	1,116	1,116	1,116	1,116
R-squared	0.114	0.318	0.321	0.322	0.069	0.31	0.315	0.314
N. Cluster	104	104	104	104	175	175	175	175

Robust standard errors in parentheses, "***" p<0.01, "**" p<0.05, "*" p<0.1
Within MACRO studies countries dummies are "n.a.": Not Applicable.
"\": omitted dummy. See constant

TABLE A1.3 MRA controlling for Time Dummies

	MICRO (a)				MACRO (b)				JOINT (c)							
	OLS	WLS	FAT-PET	PEESE	OLS	WLS	FAT-PET	PEESE	OLS	WLS	FAT-PET	PEESE	OLS	WLS	FAT-PET	PEESE
S.E. (Partial Correlation Coefficient)			1.550***				1.063***				1.452***				1.471***	
			0.519				0.359				0.298				0.373	
Variance (Partial Correlation Coefficient)				12.462**				4.024**				8.318***				6.766***
				5.873				1.886				1.898				1.957
1943	-	-	-	-	0.327***	0.355***	0.244***	0.258***	0.365***	0.420***	0.180***	0.181***	0.377***	0.338***	0.171***	0.175***
					0.056	0.056	0.061	0.068	0.035	0.006	0.05	0.055	0.048	0.022	0.047	0.053
1948	-	-	-	-	0.031	0.059	-0.071	-0.063	0.069*	0.124***	-0.141**	-0.166**	0.081*	0.041*	-0.150***	-0.163**
					0.056	0.056	0.065	0.076	0.035	0.006	0.055	0.066	0.048	0.022	0.053	0.064
1953	-	-	-	-	-0.151**	-0.121*	-0.249***	-0.241***	-0.114**	-0.056	-0.319***	-0.342***	-0.102*	-0.138***	-0.328***	-0.340***
					0.071	0.072	0.072	0.078	0.055	0.044	0.068	0.073	0.056	0.048	0.066	0.07
1958	-	-	-	-	-0.093	-0.112*	-0.147***	-0.138**	-0.056	-0.047***	-0.182***	-0.139***	-0.044	-0.130***	-0.190***	-0.173***
					0.067	0.058	0.051	0.054	0.051	0.014	0.032	0.025	0.053	0.025	0.029	0.028
1959	-	-	-	-	0.268***	0.296***	0.248***	0.266***	0.305***	0.361***	0.207***	0.261***	0.256***	0.282***	0.207***	0.232***
					0.056	0.056	0.05	0.053	0.035	0.006	0.032	0.024	0.042	0.021	0.028	0.026
1960	-	-	-	-	0.142**	0.167***	0.096*	0.112*	0.179***	0.232***	0.047	0.080**	0.130***	0.153***	0.046	0.061*
					0.056	0.056	0.053	0.057	0.035	0.006	0.039	0.035	0.042	0.021	0.035	0.035
1963	-	-	-	-	-0.309**	-0.253*	-0.339**	-0.321**	-0.272*	-0.188	-0.393***	-0.365***	-0.260*	-0.271**	-0.402***	-0.383***
					0.151	0.133	0.133	0.133	0.142	0.118	0.133	0.136	0.134	0.119	0.132	0.132
1965	-	-	-	-	-0.009	0.02	-0.074	-0.056	0.028	0.085***	-0.131***	-0.110**	-0.021	0.006	-0.132***	-0.120***
					0.056	0.056	0.057	0.062	0.035	0.006	0.045	0.045	0.042	0.021	0.041	0.044
1967	-	-	-	-	0.043	0.074	0.013	0.032	0.080**	0.139***	-0.032	0.014	0.03	0.060***	-0.032	-0.01
					0.056	0.056	0.052	0.055	0.035	0.006	0.036	0.029	0.042	0.021	0.032	0.03
1968	-	-	-	-	0.031	0.088	0.022	0.041	0.068	0.153***	-0.025	0.019	0.03	0.073*	-0.027	-0.004
					0.076	0.067	0.062	0.063	0.062	0.037	0.051	0.045	0.062	0.041	0.048	0.045

1969	-	-	-	-	0.230***	0.263***	0.214***	0.232***	0.267***	0.328***	0.173***	0.226***	0.218***	0.249***	0.173***	0.198***
					0.056	0.056	0.051	0.053	0.035	0.006	0.033	0.024	0.042	0.021	0.028	0.026
1970	0.152***	0.173***	0.061	0.101**	0.011	0.004	-0.073	-0.056	0.065	0.122***	-0.025	0.019	0.04	0.083	-0.026	0.015
	0.039	0.021	0.043	0.04	0.086	0.099	0.088	0.09	0.058	0.044	0.061	0.061	0.062	0.056	0.061	0.067
1972	-	-	-	-	0.079	0.107*	0.052	0.07	0.116***	0.172***	0.009	0.060**	0.067	0.092***	0.008	0.033
					0.056	0.056	0.051	0.054	0.035	0.006	0.034	0.026	0.042	0.021	0.03	0.028
1973	0.205***	0.227***	0.106**	0.144***	-0.381***	-0.374**	-0.486***	-0.472***	-0.215	0.006	-0.159	-0.125	-0.224	-0.027	-0.161	-0.12
	0.035	0.006	0.041	0.04	0.143	0.149	0.146	0.148	0.146	0.166	0.203	0.215	0.153	0.19	0.204	0.22
1974	-	-	-	-	0.007	0.02	0.019	0.02	0.045	0.085***	-0.004	0.048***	0.057	0.002	-0.011	0.004
					0.056	0.056	0.048	0.052	0.035	0.006	0.019	0.011	0.048	0.022	0.02	0.02
1975	0.684***	0.706***	0.436***	0.311*	-0.055	0.08	0.058	0.064	0.05	0.161**	0.039	0.086	0.01	0.084	0.039	0.054
	0.035	0.006	0.091	0.186	0.134	0.094	0.104	0.102	0.126	0.066	0.091	0.095	0.133	0.068	0.091	0.09
1976	-	-	-	-	-0.074	-0.055	-0.083*	-0.07	-0.037	0.01	-0.115***	-0.058***	-0.086**	-0.070***	-0.115***	-0.092***
					0.056	0.056	0.049	0.052	0.035	0.006	0.027	0.017	0.042	0.021	0.023	0.022
1977	-	-	-	-	-0.302*	-0.238	-0.325**	-0.307*	-0.265*	-0.173	-0.379**	-0.352**	-0.314**	-0.252*	-0.380**	-0.366**
					0.153	0.15	0.155	0.155	0.144	0.136	0.154	0.158	0.145	0.137	0.153	0.154
1978	-	-	-	-	0.052	0.091	0.073	0.072	0.089	0.156***	0.044	0.079**	0.047	0.076**	0.043	0.045
					0.076	0.062	0.052	0.054	0.061	0.027	0.037	0.038	0.062	0.033	0.036	0.034
1980	0.016	0.038***	0.027***	0.037***	-0.008	0.027	0.02	0.02	0.028	0.059***	0.015	0.038**	0.007	0.028*	0.013	0.023
	0.035	0.006	0.007	0.007	0.077	0.061	0.06	0.06	0.062	0.02	0.019	0.017	0.067	0.014	0.018	0.017
1982	-0.121***	-0.122***	-0.262***	-0.232***	0.174***	0.202***	0.129**	0.148**	0.089	0.071	-0.088	-0.04	0.115	0.031	-0.093	-0.044
	0.035	0.006	0.048	0.052	0.056	0.056	0.054	0.057	0.123	0.141	0.125	0.117	0.113	0.111	0.122	0.103
1983	-0.039	-0.017***	-0.019***	-0.017**	-0.08	0.016	-0.009	-0.001	-0.051	-0.017***	-0.018***	-0.017***	-0.07	-0.017***	-0.019***	-0.017***
	0.035	0.006	0.006	0.006	0.079	0.07	0.078	0.076	0.055	0.006	0.006	0.006	0.052	0.006	0.006	0.006
1984	-	-	-	-	-0.017	-0.002	0.016	0.006	0.02	0.063	0.001	0.043	-0.029	-0.017	0.002	0
					0.069	0.076	0.069	0.072	0.053	0.05	0.05	0.049	0.057	0.054	0.052	0.053
1985	-	-	-	-	0.054	-0.026	0.001	-0.019	0.091*	0.039	-0.012	0.017	0.073	-0.042	-0.015	-0.028
					0.069	0.068	0.054	0.06	0.054	0.038	0.022	0.025	0.055	0.043	0.027	0.032
1986	-	-	-	-	-0.015	0.011	0.01	0.01	0.022	0.076***	-0.012	0.037	-0.004	-0.004	-0.015	-0.004
					0.068	0.063	0.055	0.059	0.052	0.029	0.034	0.029	0.05	0.036	0.035	0.034

1987	0.011	0.038***	0.011	0.033***	0.072	0.001	0.013	0.004	0.067	0.043***	0.009	0.034***	0.062	0.027*	0.009	0.026*
	0.037	0.008	0.013	0.009	0.09	0.061	0.052	0.055	0.063	0.008	0.013	0.008	0.063	0.016	0.012	0.014
1988	0.095***	0.106***	-0.04	-0.016	-0.052	-0.019	-0.013	-0.016	-0.006	0.049*	-0.034	0.016	-0.017	-0.029	-0.038*	-0.025
	0.035	0.006	0.049	0.058	0.066	0.062	0.05	0.056	0.047	0.025	0.021	0.018	0.044	0.032	0.021	0.024
1989	0.302***	0.345***	0.152*	0.123	-0.095	-0.102	-0.151***	-0.142**	-0.022	-0.002	-0.159***	-0.125***	-0.061	-0.075	-0.160***	-0.145***
	0.038	0.015	0.081	0.142	0.059	0.072	0.052	0.057	0.048	0.053	0.047	0.046	0.06	0.062	0.045	0.048
1990	-0.023	0.003	-0.024**	-0.002	-0.072	-0.002	-0.016	-0.011	-0.038	0.02	-0.029	0.001	-0.028	-0.004	-0.031	-0.01
	0.035	0.006	0.011	0.007	0.166	0.11	0.114	0.113	0.137	0.035	0.031	0.032	0.132	0.026	0.029	0.029
1991	0.086**	0.110***	0.104***	0.110***	0.069	0.098*	0.103**	0.101*	0.096**	0.113***	0.103***	0.111***	0.067	0.108***	0.103***	0.109***
	0.042	0.023	0.023	0.023	0.057	0.058	0.05	0.054	0.038	0.022	0.022	0.022	0.04	0.022	0.022	0.022
1992	0.012	-0.008	-0.008	-0.008	0.167*	0.099	0.1	0.098	0.094	-0.008	-0.007	-0.007	0.095*	-0.007	-0.008	-0.007
	0.042	0.007	0.006	0.007	0.09	0.071	0.06	0.064	0.067	0.007	0.006	0.007	0.056	0.007	0.006	0.007
1993	0.045	0.028***	0.023***	0.027***	-	-	-	-	0.01	0.027***	0.023***	0.027***	0.064	0.028***	0.023***	0.028***
	0.04	0.008	0.006	0.007					0.04	0.008	0.006	0.007	0.042	0.008	0.006	0.007
1994	0.018	-0.011	-0.046*	-0.024	0.09	0.103*	0.074	0.084	0.02	-0.006	-0.041	-0.016	0.033	-0.007	-0.04	-0.015
	0.039	0.033	0.028	0.029	0.057	0.062	0.049	0.053	0.045	0.034	0.026	0.03	0.047	0.033	0.027	0.031
1995 (see constant)	\	\	\	\	\	\	\	\	\	\	\	\	\	\	\	\
1996	-0.02	-0.003	-0.005	-0.003	-0.036	-0.006	0.012	0.003	-0.039	-0.003	-0.005	-0.003	-0.013	-0.003	-0.005	-0.003
	0.042	0.014	0.013	0.014	0.056	0.056	0.048	0.052	0.04	0.014	0.012	0.013	0.04	0.013	0.012	0.013
1997	0.029	0.018	0.007	0.016	0.435***	0.478***	0.352***	0.360***	0.014	0.018	0.008	0.017	0.055	0.018	0.008	0.017
	0.069	0.024	0.025	0.024	0.056	0.056	0.064	0.075	0.073	0.023	0.025	0.024	0.069	0.023	0.025	0.024
1998	-0.036	-0.009	-0.013*	-0.009	0.216***	0.244***	0.172***	0.192***	-0.047	-0.01	-0.013*	-0.01	0.003	-0.009	-0.013*	-0.009
	0.035	0.007	0.007	0.007	0.056	0.056	0.054	0.057	0.044	0.007	0.007	0.007	0.044	0.007	0.007	0.007
1999	0.016	-0.011	-0.011*	-0.01	0.131**	0.162***	0.169***	0.166***	0.004	-0.011*	-0.010*	-0.011	0.045	-0.01	-0.011*	-0.01
	0.045	0.007	0.006	0.007	0.058	0.06	0.055	0.057	0.047	0.007	0.006	0.007	0.045	0.007	0.006	0.007
2000	-0.022	-0.011*	-0.011*	-0.011	-	-	-	-	-0.057	-0.012*	-0.011*	-0.011*	-0.004	-0.011*	-0.011*	-0.011
	0.036	0.007	0.006	0.007					0.036	0.007	0.006	0.007	0.039	0.007	0.006	0.007
2001	-0.001	-0.017***	-0.017***	-0.017**	-	-	-	-	-0.035	-0.018***	-0.017***	-0.018***	0.009	-0.017***	-0.017***	-0.017***
	0.047	0.007	0.006	0.007					0.047	0.006	0.006	0.006	0.044	0.007	0.006	0.006

2002	-0.011	-0.012*	-0.008	-0.011*	-	-	-	-	-0.045	-0.012*	-0.008	-0.012*	0.001	-0.012*	-0.008	-0.011*
	0.037	0.007	0.006	0.007					0.037	0.006	0.006	0.006	0.041	0.006	0.006	0.006
2003	0.021	-0.005	-0.006	-0.005	-	-	-	-	-0.013	-0.006	-0.006	-0.005	0.008	-0.002	0.001	-0.001
	0.056	0.012	0.011	0.012					0.055	0.012	0.011	0.012	0.067	0.011	0.01	0.01
2004	0.092	0.015	0.019*	0.016	-	-	-	-	0.058	0.015	0.019*	0.015	0.111	0.015	0.019*	0.016
	0.075	0.011	0.011	0.011					0.074	0.011	0.011	0.011	0.075	0.011	0.011	0.011
2005	-0.011	0.016**	0.011*	0.016**	-	-	-	-	-0.045	0.015**	0.012**	0.015**	-0.04	0.019**	0.019**	0.020**
	0.035	0.006	0.006	0.007					0.035	0.006	0.006	0.006	0.046	0.008	0.008	0.008
Macro Dummy	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	-	-	-	0.041	0.084***	0.006	0.052**
													0.042	0.021	0.027	0.021
Low income Dummy	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-	-	-	-	0.062*	-0.003	-0.007	-0.004
													0.035	0.006	0.005	0.005
Constant (year 1995)	0.039	0.017***	0.011*	0.017**	0.111*	0.083	0.014	0.064	0.074**	0.018***	0.011**	0.017***	0.02	0.017***	0.011**	0.017***
	0.035	0.006	0.006	0.007	0.056	0.056	0.053	0.053	0.035	0.006	0.006	0.006	0.037	0.006	0.006	0.006
Observations	565	565	565	565	551	551	551	551	1,116	1,116	1,116	1,116	1,116	1,116	1,116	1,116
R-squared	0.135	0.103	0.125	0.111	0.202	0.167	0.211	0.188	0.127	0.113	0.145	0.126	0.159	0.122	0.146	0.129
N. Cluster	104	104	104	104	71	71	71	71	175	175	175	175	175	175	175	175

Robust standard errors in parentheses, "***" p<0.01, "**" p<0.05, "*" p<0.1
"n.a.": Not Applicable, there are no dummies for each country in cross-countries studies.
"\": omitted dummy. See constant

Table A1.4 MRA controlling for Papers characteristics, Time and Countries Dummies

	MICRO (a)				MACRO (b)				JOINT (c)			
	OLS	WLS	FAT-PET	PEESE	OLS	WLS	FAT-PET	PEESE	OLS	WLS	FAT-PET	PEESE
S.E. (Partial Correlation Coefficient)			0.902				0.807*				0.947**	
			0.578				0.422				0.373	
Variance (Partial Correlation Coefficient)				10.859				2.661				5.813***
				6.768				2.058				2.117
Number of Citation p.y.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.001	0.000	0.000	0.000	0.001	0.001	0.001	0.000	0.001	0.000	0.000	0.000
Panel Model Dummy	-0.005	-0.025***	-0.024**	-0.024***	-0.042	-0.059**	-0.043	-0.052*	-0.025	-0.025***	-0.024***	-0.025***
	0.02	0.009	0.01	0.009	0.037	0.027	0.028	0.027	0.023	0.009	0.009	0.009
Human capital control Dummy	-0.001	-0.008	-0.012	-0.01	0.014	0.005	0.004	0.003	0.009	-0.008	-0.011	-0.008
	0.022	0.012	0.011	0.012	0.04	0.022	0.022	0.022	0.028	0.011	0.01	0.011
Capital/capital per worker control Dummy	-0.023	-0.016	-0.015	-0.016	0.101***	0.104***	0.093***	0.098***	-0.014	-0.016	-0.015	-0.016
	0.027	0.012	0.011	0.011	0.022	0.013	0.017	0.015	0.026	0.011	0.01	0.011
Trade/export control Dummy	-0.014	0.013	0.014	0.013	-0.028	0.004	-0.006	0	-0.034	0.012	0.013	0.012
	0.023	0.009	0.009	0.009	0.044	0.026	0.024	0.025	0.03	0.008	0.009	0.008
R&D control dummy	-0.004	-0.008	-0.008	-0.008	-0.116*	-0.055	-0.021	-0.038	-0.018	-0.008	-0.008	-0.008
	0.04	0.008	0.008	0.008	0.058	0.033	0.026	0.03	0.038	0.008	0.008	0.008
FDI not linear Dummy	0.015	0.005	0.004	0.005	-0.043	-0.052***	-0.061***	-0.058***	-0.026	0.004	0.003	0.004
	0.017	0.007	0.007	0.007	0.032	0.018	0.02	0.019	0.02	0.006	0.006	0.006
Endogeneity control Dummy	-0.038*	-0.004	-0.005	-0.004	0.047*	0.03	0.023	0.027	0.001	-0.004	-0.004	-0.004
	0.022	0.003	0.003	0.003	0.028	0.026	0.024	0.025	0.017	0.003	0.003	0.003
Fixed effects control Dummy	-0.011	0.003	0.003	0.003	0.021	0.011	0.029	0.024	-0.007	0.003	0.003	0.003
	0.014	0.002	0.002	0.002	0.039	0.028	0.025	0.026	0.02	0.002	0.002	0.002
1943	-	-	-	-	0.363***	0.348***	0.286***	0.295***	0.311***	0.288***	0.179***	0.147**
					0.075	0.061	0.076	0.083	0.058	0.031	0.052	0.059

1948	-	-	-	-	0.067	0.052	-0.024	-0.017	0.015	-0.008	-0.133**	-0.185***
					0.075	0.061	0.081	0.093	0.058	0.031	0.057	0.071
1953	-	-	-	-	-0.133*	-0.124*	-0.206**	-0.195**	-0.190***	-0.181***	-0.304***	-0.355***
					0.068	0.067	0.079	0.084	0.056	0.056	0.07	0.077
1958	-	-	-	-	-0.083	-0.115**	-0.128**	-0.124**	-0.141**	-0.169***	-0.209***	-0.207***
					0.071	0.057	0.055	0.057	0.058	0.032	0.034	0.034
1959	-	-	-	-	0.303***	0.288***	0.274***	0.279***	0.251***	0.230***	0.177***	0.185***
					0.075	0.061	0.06	0.061	0.058	0.031	0.036	0.034
1960	-	-	-	-	0.149**	0.164***	0.122*	0.134**	0.091*	0.113***	0.041	0.032
					0.07	0.057	0.064	0.065	0.055	0.03	0.039	0.04
1963	-	-	-	-	-0.291**	-0.256**	-0.307**	-0.293**	-0.348***	-0.312**	-0.398***	-0.410***
					0.131	0.127	0.126	0.126	0.127	0.127	0.134	0.137
1965	-	-	-	-	0.028	0.014	-0.034	-0.025	-0.025	-0.049	-0.142***	-0.159***
					0.075	0.06	0.07	0.075	0.058	0.031	0.047	0.05
1967	-	-	-	-	-0.051	-0.033	-0.057	-0.048	0.006	0.036	-0.028	-0.026
					0.074	0.06	0.063	0.063	0.054	0.028	0.036	0.035
1968	-	-	-	-	0.027	0.078	0.041	0.057	-0.025	0.042	-0.023	-0.026
					0.085	0.069	0.068	0.068	0.071	0.046	0.051	0.049
1969	-	-	-	-	0.219***	0.216***	0.204***	0.209***	0.212***	0.205***	0.151***	0.159***
					0.075	0.063	0.061	0.062	0.057	0.03	0.035	0.033
1970	0.170***	0.129***	0.067	0.067	0.019	0.001	-0.044	-0.031	-0.016	0.04	-0.031	-0.02
	0.064	0.038	0.054	0.053	0.097	0.1	0.098	0.099	0.07	0.059	0.064	0.068
1972	-	-	-	-	-0.015	-0.001	-0.02	-0.011	0.042	0.068**	0.01	0.015
					0.074	0.06	0.062	0.062	0.054	0.028	0.034	0.033
1973	0.183***	0.145***	0.073	0.072	-0.355**	-0.385**	-0.447***	-0.437***	-0.275*	-0.094	-0.181	-0.175
	0.045	0.011	0.046	0.046	0.144	0.146	0.149	0.152	0.142	0.183	0.192	0.208
1974	-	-	-	-	0.061	0.037	0.063	0.051	0.002	-0.051	-0.060*	-0.051*
					0.071	0.057	0.049	0.051	0.056	0.032	0.031	0.031
1975	0.660***	0.623***	0.464***	0.277	-0.046	0.049	0.05	0.047	-0.008	0.045	0.014	0.017
	0.045	0.011	0.101	0.214	0.13	0.101	0.106	0.105	0.138	0.077	0.091	0.095

1976	-	-	-	-	-0.037	-0.061	-0.059	-0.059	-0.09	-0.124***	-0.158***	-0.146***
					0.075	0.06	0.055	0.057	0.058	0.031	0.033	0.031
1977	-	-	-	-	-0.298**	-0.266*	-0.304*	-0.297*	-0.323**	-0.299**	-0.384**	-0.398**
					0.148	0.148	0.156	0.154	0.155	0.139	0.15	0.154
1978	-	-	-	-	0.094	0.084	0.085	0.077	0.045	0.024	0	-0.004
					0.077	0.066	0.053	0.059	0.067	0.043	0.035	0.037
1980	-0.014	0.004	-0.003	0.001	-0.01	0.033	0.025	0.026	-0.031	0.003	-0.006	-0.002
	0.039	0.025	0.024	0.024	0.09	0.076	0.073	0.075	0.081	0.026	0.026	0.027
1982	-0.243***	-0.300***	-0.356***	-0.383***	0.168**	0.194***	0.152**	0.168**	0.025	-0.076	-0.14	-0.136
	0.069	0.094	0.108	0.113	0.075	0.06	0.065	0.065	0.1	0.176	0.174	0.166
1983 (=Venezuela in MICRO)	-0.053	0.041	0.048	0.041	-0.063	0.024	0.02	0.024	-0.118	-0.03	-0.057	-0.054
	0.082	0.051	0.05	0.051	0.087	0.066	0.069	0.068	0.074	0.048	0.063	0.066
1984	-	-	-	-	-0.004	-0.002	0.026	0.009	-0.024	-0.064	-0.055	-0.051
					0.073	0.07	0.067	0.069	0.062	0.063	0.061	0.061
1985	-	-	-	-	0.081	0.071	0.077	0.073	0.024	-0.047	-0.029	-0.037
					0.073	0.07	0.064	0.067	0.062	0.041	0.033	0.034
1986	-	-	-	-	0.019	0.031	0.049	0.041	-0.017	-0.038	-0.046	-0.039
					0.069	0.066	0.06	0.063	0.06	0.038	0.038	0.037
1987	-0.02	-0.069***	-0.087***	-0.074***	0.088	0.022	0.024	0.021	0.022	-0.059***	-0.072***	-0.061***
	0.06	0.022	0.026	0.022	0.108	0.079	0.072	0.076	0.07	0.019	0.021	0.019
1988	0.046	0.553***	0.512**	0.472**	-0.026	-0.004	0.015	0.005	-0.068	-0.061	-0.064	-0.058
	0.118	0.203	0.206	0.208	0.063	0.055	0.048	0.052	0.052	0.046	0.039	0.04
1989	0.242***	0.333***	0.220**	0.14	-0.103	-0.084	-0.106	-0.102	-0.078	-0.102	-0.159***	-0.165***
	0.04	0.026	0.086	0.156	0.072	0.078	0.07	0.075	0.067	0.067	0.054	0.054
1990	-0.02	-0.087***	-0.106***	-0.091***	-0.055	0.014	0.015	0.014	-0.095	-0.078**	-0.096**	-0.084**
	0.063	0.023	0.026	0.023	0.171	0.116	0.12	0.118	0.157	0.035	0.038	0.036
1991	0.074*	0.091***	0.090***	0.090***	0.074	0.106	0.118*	0.112	0.076	0.090***	0.088***	0.090***
	0.038	0.026	0.024	0.025	0.074	0.077	0.069	0.073	0.054	0.023	0.022	0.023
1992	-0.005	-0.008	-0.009	-0.009	0.210**	0.122	0.134*	0.128	0.097	-0.004	-0.006	-0.005
	0.038	0.023	0.023	0.023	0.099	0.09	0.078	0.084	0.068	0.022	0.021	0.022

1993	0.015	0.02	0.021	0.02	-	-	-	-	0.019	0.025	0.025	0.024
	0.042	0.026	0.025	0.025					0.059	0.024	0.023	0.024
1994	-0.065	-0.088***	-0.096***	-0.091***	0.102	0.115	0.102	0.108	0.014	-0.078***	-0.088***	-0.081***
	0.043	0.022	0.023	0.022	0.07	0.071	0.063	0.067	0.049	0.022	0.022	0.021
1995 (see constant)	\	\	\	\	\	\	\	\	\	\	\	\
1996	-0.04	-0.011	-0.013	-0.012	-0.11	-0.042	-0.025	-0.032	-0.015	-0.01	-0.012	-0.01
	0.042	0.019	0.018	0.019	0.077	0.072	0.067	0.069	0.043	0.018	0.017	0.017
1997	0.002	-0.009	-0.016	-0.011	0.472***	0.521***	0.448***	0.459***	0.071	-0.007	-0.013	-0.008
	0.051	0.012	0.012	0.012	0.068	0.054	0.068	0.076	0.062	0.011	0.01	0.011
1998	-0.011	-0.021	-0.005	-0.012	0.178**	0.212***	0.177**	0.188**	0.017	-0.019	-0.003	-0.015
	0.059	0.027	0.033	0.032	0.083	0.073	0.074	0.077	0.065	0.025	0.03	0.027
1999	-0.023	-0.023	-0.023	-0.023	0.144*	0.162**	0.179***	0.170**	0.036	-0.02	-0.02	-0.02
	0.053	0.019	0.018	0.019	0.077	0.067	0.066	0.065	0.052	0.018	0.017	0.018
2000	-0.045	-0.005	-0.006	-0.005	-	-	-	-	-0.01	-0.004	-0.004	-0.004
	0.041	0.01	0.009	0.01					0.052	0.009	0.009	0.009
2001	-0.063	-0.021	-0.023	-0.022	-	-	-	-	-0.019	-0.019	-0.02	-0.019
	0.047	0.015	0.015	0.015					0.051	0.014	0.014	0.014
2002	-0.088*	0.007	0.007	0.007	-	-	-	-	-0.066	0.009	0.009	0.009
	0.051	0.014	0.014	0.014					0.052	0.013	0.012	0.013
2003	-0.096	0.001	-0.002	0.001	-	-	-	-	-0.055	0.003	0.001	0.003
	0.12	0.023	0.023	0.023					0.121	0.022	0.022	0.022
2004	-0.004	0.540***	0.555***	0.551***	-	-	-	-	0.03	0.529***	0.547***	0.536***
	0.113	0.204	0.206	0.204					0.104	0.197	0.198	0.197
2005	-0.158*	0.028	0.023	0.027	-	-	-	-	-0.103	0.03	0.026	0.03
	0.095	0.024	0.024	0.024					0.091	0.023	0.023	0.023
country==17 transition countries	0.036	0.014	0.005	0.013	n.a.	n.a.	n.a.	n.a.	-0.013	-0.089***	-0.049	-0.064**
	0.098	0.022	0.023	0.022					0.117	0.032	0.036	0.033
country==Argentina	-0.037	0.063***	0.050*	0.058**	n.a.	n.a.	n.a.	n.a.	-0.117**	-0.044	-0.008	-0.021
	0.052	0.023	0.026	0.024					0.048	0.029	0.03	0.029

country==Belarus	-0.002	-0.013	-0.020*	-0.014	n.a.	n.a.	n.a.	n.a.	0.012	-0.115***	-0.071**	-0.089***
	0.029	0.01	0.011	0.01					0.059	0.03	0.034	0.03
country==Bulgaria	-0.067*	0.012	0.005	0.012	n.a.	n.a.	n.a.	n.a.	-0.114***	-0.090***	-0.049	-0.065**
	0.034	0.013	0.014	0.013					0.043	0.031	0.035	0.031
country==Chile	-0.056	0.027	0.01	0.02	n.a.	n.a.	n.a.	n.a.	-0.091*	-0.076**	-0.044	-0.054
	0.054	0.031	0.037	0.035					0.055	0.036	0.04	0.037
country==China (see constant for MICRO Data)	\	\	\	\	n.a.	n.a.	n.a.	n.a.	-0.043	-0.103***	-0.054	-0.078***
									0.045	0.028	0.034	0.028
country==Czech Republic, Hungary, and Poland	0.237***	0.349***	0.313***	0.328***	n.a.	n.a.	n.a.	n.a.	0.110*	0.242***	0.253***	0.257***
	0.053	0.024	0.033	0.028					0.066	0.032	0.031	0.031
country==Ghana	-0.155***	-0.040***	-0.066***	-0.052***	n.a.	n.a.	n.a.	n.a.	-0.154***	-0.141***	-0.119***	-0.122***
	0.047	0.015	0.023	0.016					0.053	0.028	0.028	0.027
country==India	0.026	0.162*	0.139	0.15	n.a.	n.a.	n.a.	n.a.	-0.021	0.064	0.088	0.082
	0.06	0.094	0.092	0.092					0.074	0.093	0.094	0.093
country==Indonesia	-0.066**	0.023	0.022	0.024	n.a.	n.a.	n.a.	n.a.	-0.112**	-0.082***	-0.033	-0.056**
	0.03	0.02	0.019	0.02					0.045	0.027	0.032	0.028
country==Kenya	0.099**	0.203***	0.185***	0.195***	n.a.	n.a.	n.a.	n.a.	-0.036	0.091***	0.122***	0.114***
	0.041	0.031	0.032	0.03					0.04	0.034	0.034	0.033
country==Latvia	-0.068	-0.002	-0.035	-0.022	n.a.	n.a.	n.a.	n.a.	-0.125**	-0.104***	-0.090***	-0.090***
	0.046	0.01	0.026	0.018					0.057	0.029	0.029	0.028
country==Lithuania	-0.073	0.038	0.014	0.025	n.a.	n.a.	n.a.	n.a.	-0.158***	-0.071	-0.047	-0.052
	0.044	0.044	0.047	0.048					0.058	0.052	0.057	0.054
country==Malaysia	-0.002	0.006	0.005	0.007	n.a.	n.a.	n.a.	n.a.	-0.054	-0.098***	-0.05	-0.072***
	0.023	0.01	0.01	0.01					0.049	0.027	0.032	0.027
country==Mexico	-0.071	0.072***	0.073***	0.073***	n.a.	n.a.	n.a.	n.a.	-0.028	-0.032	0.018	-0.005
	0.047	0.015	0.015	0.015					0.061	0.031	0.036	0.031
country==Morocco	-0.042	0.03	0.022	0.027	n.a.	n.a.	n.a.	n.a.	-0.102*	-0.079**	-0.038	-0.054
	0.043	0.032	0.032	0.032					0.054	0.04	0.044	0.041
country==Poland	-0.069**	0.016	0.015	0.016	n.a.	n.a.	n.a.	n.a.	-0.118**	-0.087***	-0.039	-0.061**
	0.034	0.013	0.013	0.013					0.046	0.029	0.034	0.029

country==Romania	-0.045	0.016	0.014	0.016	n.a.	n.a.	n.a.	n.a.	-0.124***	-0.089***	-0.041	-0.063**
	0.029	0.012	0.011	0.012					0.043	0.032	0.037	0.032
country==Russia	-0.059*	0.03	0.031	0.031	n.a.	n.a.	n.a.	n.a.	-0.079**	-0.072**	-0.022	-0.047
	0.035	0.019	0.019	0.019					0.04	0.03	0.034	0.029
country==South Africa	-0.012	-0.464**	-0.523**	-0.505**	n.a.	n.a.	n.a.	n.a.	-0.031	-0.555***	-0.568***	-0.552***
	0.11	0.206	0.212	0.207					0.11	0.197	0.198	0.196
country==Tanzania	-0.002	0.102***	0.078**	0.089***	n.a.	n.a.	n.a.	n.a.	-0.137***	-0.01	0.016	0.01
	0.041	0.031	0.033	0.031					0.04	0.034	0.034	0.033
country==Thailand	-0.288***	-0.261***	-0.348***	-0.376***	n.a.	n.a.	n.a.	n.a.	-0.353***	-0.364***	-0.406***	-0.400***
	0.045	0.032	0.068	0.078					0.044	0.033	0.037	0.035
country==Turkey	-0.011	0.025	0.013	0.022	n.a.	n.a.	n.a.	n.a.	-0.086	-0.081***	-0.043	-0.056*
	0.045	0.025	0.027	0.025					0.084	0.029	0.032	0.03
country==Ukraine	-0.009	-0.535**	-0.550***	-0.547***	n.a.	n.a.	n.a.	n.a.	-0.06	-0.626***	-0.593***	-0.608***
	0.071	0.204	0.206	0.204					0.075	0.196	0.197	0.195
country==Uruguay	-0.004	-0.438**	-0.481**	-0.462**	n.a.	n.a.	n.a.	n.a.	0.054	-0.358	-0.365	-0.359
	0.107	0.206	0.21	0.206					0.072	0.234	0.225	0.223
country==Venezuela (see dummy 1983)	-	-	-	-	n.a.	n.a.	n.a.	n.a.	-0.007	-0.036	0.044	0.012
									0.085	0.063	0.083	0.079
country==Vietnam	0.076	0.003	0.003	0.003	n.a.	n.a.	n.a.	n.a.	0.039	-0.101***	-0.051	-0.075**
	0.092	0.021	0.021	0.021					0.103	0.032	0.037	0.032
country==Zambia	0.056	0.175***	0.121***	0.118***	n.a.	n.a.	n.a.	n.a.	-0.060*	0.063*	0.057*	0.059*
	0.037	0.029	0.045	0.045					0.036	0.033	0.032	0.031
country==Zimbabwe	0.136***	0.252***	0.233***	0.243***	n.a.	n.a.	n.a.	n.a.	0.001	0.140***	0.170***	0.162***
	0.041	0.031	0.032	0.031					0.04	0.034	0.034	0.033
Constant (1995: Micro=China, Joint=MACRO)	0.146***	0.038***	0.035**	0.037***	0.101	0.084	0.02	0.065	0.161***	0.140***	0.087**	0.114***
	0.049	0.014	0.014	0.014	0.07	0.057	0.053	0.053	0.054	0.03	0.036	0.03
Observations	565	565	565	565	551	551	551	551	1,116	1,116	1,116	1,116
R-squared	0.283	0.481	0.486	0.486	0.231	0.252	0.267	0.259	0.196	0.46	0.467	0.465

N. Cluster	104	104	104	104	71	71	71	71	175	175	175	175

Robust standard errors in parentheses, "***" p<0.01, "**" p<0.05, "*" p<0.1. Venezuela Dummy is omitted in the MICRO sample due to perfect collinearity with year 1983. "n.a.": Not Applicable, there are no dummies for each country in cross-countries studies. "\": omitted dummy. See constant