

IS FDI INTO CHINA CROWDING OUT THE FDI INFLOWS INTO THE
EUROPEAN UNION? IMPLICATIONS FOR REGIONAL GROWTH AND
DEVELOPMENT

Laura RESMINI¹, Iulia SIEDSCHLAG²

1 Università della Valle d'Aosta, Facoltà di Scienze politiche, Loc Grand Chemin, 73/75, 111020, Saint Christophe (AO)

2 ESRI, Whitaker Square, Sir John Rogerson's Quay, Dublin 2, Ireland

SOMMARIO

We estimate an augmented gravity model to analyse the effects of FDI into China originating in OECD countries on FDI into European Union (EU) and other countries over the period 1990-2004. Our results suggest that on average, *ceteris paribus*, over the analysed period, FDI inflows into China have been complementary to FDI inflows into other recipient countries. If we consider FDI inflows as a part of international strategies adopted by multinational enterprises, it appears that FDI inflows into China have fostered synergies with all other recipient countries. However, these complementarities follow a decreasing trend over the analysed period of time. Furthermore, the FDI inflows into China affect differently horizontal and vertical FDI. Our results suggest that countries which attract mainly horizontal FDI, because of their high market potential, adjust better to competitive pressures from China. As far as vertical FDI are concerned, competition with China arises in presence of low cost advantages. As cost advantages increase, complementarities become more likely. FDI inflows to China complement FDI inflows to the EU, too. However, this positive relation is less intense in the case of horizontal FDI and more intense in the case of vertical FDI than in other recipient countries.

IS FDI INTO CHINA CROWDING OUT THE FDI INFLOWS INTO THE
EUROPEAN UNION? IMPLICATIONS FOR REGIONAL GROWTH AND
DEVELOPMENT*

Laura RESMINI¹, Iulia SIEDSCHLAG²

1 Università della Valle d'Aosta, Facoltà di Scienze politiche, Loc Grand Chemin, 73/75, 111020, Saint Christophe (AO)

2 ESRI, Whitaker Square, Sir John Rogerson's Quay, Dublin 2, Ireland

SOMMARIO

We estimate an augmented gravity model to analyse the effects of FDI into China originating in OECD countries on FDI into European Union (EU) and other countries over the period 1990-2004. Our results suggest that on average, *ceteris paribus*, over the analysed period, FDI inflows into China have been complementary to FDI inflows into other recipient countries. If we consider FDI inflows as a part of international strategies adopted by multinational enterprises, it appears that FDI inflows into China have fostered synergies with all other recipient countries. However, these complementarities follow a decreasing trend over the analysed period of time. Furthermore, the FDI inflows into China affect differently horizontal and vertical FDI. Our results suggest that countries which attract mainly horizontal FDI, because of their high market potential, adjust better to competitive pressures from China. As far as vertical FDI are concerned, competition with China arises in presence of low cost advantages. As cost advantages increase, complementarities become more likely. FDI inflows to China complement FDI inflows to the EU, too. However, this positive relation is less intense in the case of horizontal FDI and more intense in the case of vertical FDI than in other recipient countries.

* Financial support from the EU 6th RTD Framework Programme is gratefully acknowledged. We thank Roger Stough and participants at research seminars in Dublin, Cluj-Napoca, Milan, and Westport for helpful comments and suggestions. Finally, we express our appreciation to Maria Giovanna Bosco for her precious assistance during the construction of the database.

1 INTRODUCTION

In this paper we examine whether and to what extent the surge in the foreign direct investment (FDI) into China in recent years has come at the expense of FDI inflows into European Union (EU) countries.

China has recently become a leading destination for FDI. In a recent survey on FDI prospects, transnational companies rank China as one of the most attractive global business location (UNCTAD, 2007). In 2003, China has overtaken the US as the number one destination for FDI (Prasad and Wei, 2005).

The FDI inward stock in China has increased dramatically since early 1990s, from 20.7 billion US dollars in 1990 to 292.6 billion US dollars in 2006. While the annual average of FDI inward flows over the period 1990-2000 was 30.1 billion US dollars, FDI inward flows into China in recent years have been much higher, 72.4 billion US dollars in 2005 and 69.5 billion US dollars in 2006¹. This surge in FDI in China has followed the opening of the economy to the world economy, the selective easing of capital controls and an available pool of labour (Prasad and Wei, 2005).

The success of China in attracting FDI has raised concerns that this has come at the expense of other countries and regions. This paper aims to bring empirical evidence to answer this concern. In particular the focus of this paper is on the impact of FDI to China on FDI into EU countries. Has the surge in the FDI into China in recent years affected the FDI inflows into EU countries? In which direction? Has this impact changed over time? Is the China effect different for horizontal and vertical FDI?

To our knowledge, this is the first analysis of the effects of FDI into China on the FDI inflows into EU countries. Previous analyses have focused on the effects of FDI into China in developing countries, in particular the Asian countries and the Latin America and Caribbean (LAC) countries (Eichengreen and Tong, 2006a, 2006b; Cravino, Lederman and Olarreaga, 2007).

We estimate the effects of FDI inflows into China originating from OECD countries on FDI inflows into EU countries and other countries by using a panel of cross-country annual observations over the period 1990-2004. We have data for 35 host countries, including the EU member states before the enlargement of 2004 (EU15),

¹ UNCTAD (2007)

and the ten new EU countries in Central and Eastern Europe (CEE)². In addition, we estimate the China effects to horizontal and vertical FDI. In comparison with existing studies, we employ improved econometric techniques to control for unobserved country heterogeneity and simultaneity effects.

Our results suggest that on average, *ceteris paribus*, FDI inflows into China have been complementary with FDI inflows into other countries. This complementary effect is less intense in the EU than in the other recipient countries. This difference however tends to reduce over time.

The remainder of this paper is organized as follows. Section 2 discusses the theoretical and empirical background for our analysis. Section 3 explains our empirical strategy and the model specifications. In section 4 we describe the data set that we use. The results of our empirical analysis are presented and discussed in Section 5. Finally we summarize our findings and conclude in Section 6.

2 THEORETICAL AND EMPIRICAL BACKGROUND

The theoretical framework of our analysis is the theory of multinational enterprises (MNEs) which has been formalized in several seminal papers by Markusen (1984 and 1995), Helpman (1984), Markusen and Venables (1997, 1998). The theoretical models of MNEs explain the volume of production of MNEs as a function of the characteristics of the home and host countries such as size, relative endowments, and transaction costs.

The theoretical literature distinguishes between foreign direct investment driven by “horizontal” and “vertical” motivations. Horizontal MNEs or market-seeking FDI produce the same goods and services in multiple locations. Models of horizontal MNEs (Markusen, 1984; Horstmann and Markusen, 1987, 1992; and Markusen and Venables, 1998, 2000) predict that MNEs production will concentrate in large countries and in countries with similar relative endowments.

² EU15: Austria, Belgium, Denmark, France, Finland, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and United Kingdom; CEE countries: Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia; The other host countries are: Brazil, China, Cyprus, India, Japan, Malta, Mexico, the Russian Federation, Switzerland and the United States.

Vertical MNEs, or “efficiency-seeking FDI”, imply the geographic fragmentation of production into stages. Models of vertical MNEs (Helpman, 1984; and Helpman and Krugman, 1985) predict that MNEs production will locate in relatively labour abundant countries.

Existing empirical studies have used a standard gravity model applied to FDI to explain bilateral FDI flows (Brenton, and al., 1999; Egger and Pfaffermayr, 2004; Brainard, 1997, Ekholm, 1995, 1997, 1998; Stein and Duade, 2007). They find empirical evidence showing that:

- i) FDI is concentrated among countries relatively similar in size and in relative endowments;
- ii) Capital abundant countries conduct more outward FDI and receive less FDI;
- iii) Labour-abundant countries receive more FDI and conduct less outward FDI

Several empirical studies focus on the quality of institutions to explain bilateral FDI flows (Wei, 2000; Duade and Stein, 2001; Globerman and Shapiro, 2002; Benassy-Quéré et al, 2007). Good quality institutions in the home and host countries have a positive effect on bilateral FDI flows via productivity growth and reduced uncertainty.

In this theoretical framework, FDI competition may arise when FDI inflows into one country divert FDI inflows from another country. However, if this should occur, it would be due to market rather than resource constraints (Zhou and Lall, 2005).³ Let us consider the importance of such a constraint for horizontal and vertical FDI.

Horizontal FDI is determined by the size, the growth and the attractiveness of domestic markets in host countries. Thus, an investment in one country, i.e. China, which offers an attractive domestic market should not pre-empt investments in other countries, i.e. European countries, provided that they also have attractive markets.

³ Competition in any resource flow may obviously occur when the resource in question is available in limited amounts. However, this “zero-sum” hypothesis is difficult to justify in the case of FDI. FDI represents only 12.6% of global gross domestic capital formation (UNCTAD, 2007), and additional resources can be easily diverted from domestic resources and other international capital flows should investment opportunities arise. Moreover, although multinational firms’ globalisation strategies have recently assumed a regional cast (Felker, 2003) they do not allocate investible funds on a regional basis in order not to loose profitable opportunities. Finally, if one firm is not able to undertake a foreign investment because of resource constraints, there would be several other firms able to do this. See Zhou and Lall (2005) for a detailed discussion on these issues.

Hence, horizontal FDI flows do not appear to compete each other. Rather, to the extent that FDI increases GDP growth, thus stimulating demand for goods, complementarities among FDI flows in different countries may arise.

Vertical FDI implies the geographical fragmentation of the production chain in separate stages, according to each country's comparative advantage. This strategy allows multinational firms to exploit cost advantages where they arise. Consequently, an investment in one country is more likely to crowd *in* rather than *out* FDI in another country, provided that these countries are not specialized in the same segment of the production chain. In that case, in fact, MNEs have to make a location choice, unless they fragment international production networks on a regional basis.⁴ Complementarities among FDI inflows are driven by increases in demand for raw materials and intermediates, while the magnitude of the FDI creation (diversion) depend on the degree of fragmentation of the production chain.⁵

In conclusion, existing theory does not predict *ex-ante* the net effect of FDI into China on FDI into other host countries. Therefore, this question should be investigated empirically, as we attempt to do in this paper.

Our research relates to several recent econometric analyses of the effects of FDI into China on FDI into other countries such as Eichengreen and Tong (2006a, 2006b), Mercereau (2005), Cravino et al. (2007), Chantasasawat et al. (2005), Zhou and Lall (2005) and Wang et al. (2007). While the starting point in all these studies is a model explaining determinants of bilateral FDI flows augmented with the FDI into China, they differ in the measurement of this variable and the estimation techniques as well.

Eichengreen and Tong (2006a, 2006b) employ a gravity model and show that the emergence of China as a leading FDI destination has encouraged FDI flows to other Asian countries via supply chain production linkages. They also find evidence suggesting that FDI inflows into China have substituted FDI inflows into European countries. They explain this diversion effect by the negative effect of distance on

⁴ The regional attitude of MNEs' international production networks has emerged in the last two decades (Felker, 2003; Ravenhill, 1998).

⁵ The degree of fragmentation of the production chain varies across sectors according to the technological intensity of the production process and the value added-weight ratio of the product. Only simple processes can be relocated to low wage, low skill countries, while only light, high value products can be transported, allowing MNEs to exploit even small differences in production costs. The most fragmentable activities are those engineering based, such as machinery, automobiles and chemicals, while the least fragmentable are activities with continuous processes, such as food and paper processing (Zhou and Lall, 2005).

supply-chain production linkages. In contrast, Mercereau (2005) uses a panel approach to show that on average, the FDI into China has had a negative effect on FDI into other Asian countries. However, his estimates of country-specific effects indicate that the diversion effect is driven by two countries, namely Singapore and Myanmar. It appears that the FDI inflows into China have not affected the other Asian countries. Also Chantasasawat et al. (2005), Zhou and Lall (2005) and Wang et al. (2007) estimate panel models to investigate the China effect on Asian economies. They find that, on average, China raised rather than diverted FDI into neighbouring countries. At country level, diversion effects have affected Indonesia, the Republic of Korea, Malaysia and Taiwan Province of China. Finally, Cravino, et al. (2007) examine the effect of foreign capital stock in China on the Latin American and Caribbean (LAC) countries and they find no evidence for a FDI diversion from OECD countries, in particular from the US to China at the expense of the LAC countries. While the growth of capital stocks in China originating from the OECD especially from the US was faster than in LAC countries over the period 1990-1997 this relative growth has slowed down since 1997.

To our knowledge our paper is the first contribution focusing on the effects of the FDI inflows into China on the FDI inflows into European Union countries and, particularly, into the new EU member states of Central and Eastern Europe, where FDI played a leading role in their efforts to modernize the economy and still offers a positive contribution to growth and development of local markets. Furthermore, in contrast to previous studies we estimate a theory-based model.

3 EMPIRICAL METHODOLOGY

Our baseline model shown below explains bilateral FDI flows as a function of home and host countries characteristics as suggested by the theory of multinational enterprise:

$$\ln(FDI_{ij,t+1}) = a_0 + a_1 \ln(MKTSIZE_{ijt}) + a_2 |\ln GDPCAP_{it} - \ln GDPCAP_{jt}| + a_3 INST_{jt} + \alpha_i + \beta_j + \tau_t + \varepsilon_{ijt} \quad (1)$$

All regressors are lagged by one year to account for the fact that the implementation of investment decisions is in practice lagged⁶. Further, lagging the regressors avoids potential endogeneity arising from the effect of FDI on some of the explanatory variables. This issue has been raised by recent literature on FDI and growth (Borensztein et al., 1998; Rodriguez-Clare, 1996 and Zhang, 2001), according to which FDI and GDP might be simultaneously determined and this could bias the estimates. However, this literature usually considers aggregate FDI inflows and not bilateral flows, as we do in this paper.⁷

According to eq. (1), FDI flows from home country i to host country j at time $t+1$ are a function of the following explanatory variables:

- market size (MKTSIZE), proxied by the product of home and host countries' GDPs at time t weighted by the distance between host and source. Foreign investors who target the market are assumed to be attracted by large market potentialities. Therefore, the expected sign for this variable is positive, since we consider it as a proxy for horizontal (market-seeking) FDI incentive;
- relative endowments (capital/labour ratio): the absolute difference at time t of the GDP per capita in the home ($GDPCAP_{it}$) and host country ($GDPCAP_{jt}$). This variable is a proxy for vertical (efficiency-seeking) FDI incentive, since it captures labour cost differences between source and recipient countries (Eichengreen and Tong, 2006b; Mercereau, 2005). Therefore, the expected sign should be positive, though the empirical literature is not unanimous on this (Globerman and Shapiro, 2002);
- the quality of institutions at time t in the host country ($INST_{jt}$). Uncertainty, political instability and their related risk can discourage FDI inflows despite favourable economic conditions (Wei, 2000);
- home and host country fixed effects (α_i, β_j) to capture unobserved factors that are peculiar to source and destination countries;
- time specific effects (τ_t)

ε_{ijt} is the error term.

⁶ See also Mercereau (2005).

⁷ See also Baier and Bergstrand (2007) on this issue.

To estimate the effect of FDI flows into China to FDI flows in other host countries we include in the above model a measure of FDI flows into China at time $t+1$ from each home country ($FDICN_{it+1}$). Unobserved global shocks can affect both the attractiveness of FDI to China and other countries. To correct for this potential endogeneity we instrument $FDICN_{it+1}$ with a measure for the market potentially available for investors from home country i to China, and the absolute difference in the GDP per capita in the home country i and the GDP per capita in China at time t .⁸

We estimate the following system of simultaneous equations:

$$\begin{aligned} \ln(FDI_{ij,t+1}) = & a_0 + a_1 \ln(MKTSIZE_{ijt}) + a_2 | \ln GDPCAP_{it} - \ln GDPCAP_{jt} | + \\ & + a_3 INST_{jt} + a_4 \ln FDICN_{it+1} + \alpha_i + \beta_j + \tau_t + \varepsilon_{ijt} \end{aligned} \quad (2)$$

$$\ln FDICN_{it+1} = b_0 + b_1 \ln(MKTSIZE_{ijt}) + b_2 | \ln GDPCAP_{it} - \ln GDPCAP_{CNt} | + \psi_{it}$$

The coefficient of interest is a_4 in the primary equation: $a_4 > 0$ suggests that the FDI flows to China and FDI flows to other countries are complementary, while $a_4 < 0$ suggests that the FDI flows to China and FDI flows to other countries are substitutes.

We estimate first the average effects of FDI flows into China on FDI flows into other countries and next we allow the coefficient for FDI flows into China to be different for EU15, CEE and the rest of the countries. In addition we allow the coefficient of FDI into China to vary over time.

To test whether the China effect varies with FDI motivations we interact the instrumented FDI into China with the horizontal FDI incentive, i.e. the proxy for the market size, and the vertical FDI incentive, i.e. the absolute difference in the GDP per capita in the home and host countries, respectively.⁹ The estimated model, therefore, becomes as follows:

$$\begin{aligned} \ln(FDI_{ijt+1}) = & c_0 + c_1 \ln(MKTSIZE_{ijt}) + c_2 | \ln GDPCAP_{it} - \ln GDPCAP_{jt} | + c_3 INST_{jt} + \\ & + c_4 \ln FDICN_{it+1} + c_5 \ln FDICN_{it+1} * \ln(MKTSIZE_{ijt}) + \\ & + c_6 \ln FDICN_{it+1} * | \ln GDPCAP_{it} - \ln GDPCAP_{jt} | + \mu_i + \nu_j + \lambda_t + \xi_{ijt} \end{aligned} \quad (3)$$

⁸ These variables correspond to those previously defined for FDI flows from home country i to host country j with $j \neq$ China.

⁹ These interacted terms have been suggested in previous studies on bilateral FDI flows, for example Markusen and Maskus (2002) and Eichengreen and Tong (2006a).

$$\ln FDI_{it+1} = d_0 + d_1 \ln(MKTSIZE_{ijt}) + d_2 |\ln GDPCAP_{it} - \ln GDPCAP_{CN,t}| + \psi_{it}$$

Given the introduction of the two interacted terms into the model specification, regression coefficients reflect conditional relationships and the impact of FDI into China on other host countries is no longer constant, as indicated by the implied derivative:

$$\frac{\delta FDI_{ijt+1}}{\delta FDI_{CN,t+1}} = c_4 + c_5 * MKTSIZE_{ijt} + c_6 * |GDPCAP_{it} - GDPCAP_{jt}| \quad (4)$$

We first estimate the average China effect and discuss the implied marginal effects and then allow the coefficients of the interacted terms to be different for EU15, CEE and the other host countries. We also check whether these effects change over time.

4 THE DATA

The data on FDI that we use in this paper is from the OECD *International Direct Investment Statistics Yearbook*, published by OECD (2004). OECD defines FDI as an international investment by a firm in one country (the home country) with the objective of establishing a long lasting interest in an enterprise located in another country (the host country) different from that of the investing firm.

Direct investment involves either the initial transaction between the two firms or all subsequent capital transactions between them. Given our specific focus on the dynamics of the impact of FDI into China on the FDI into other countries, we use annual bilateral outward FDI flows rather than stocks. We have data for bilateral FDI flows originating in 23 OECD countries disaggregated on 35 OECD and non-OECD host countries, over the period 1990 to 2004.¹⁰ As pointed out in the literature, FDI stocks are indeed less volatile than flows since the re-direction of FDI from one country to another requires a significant amount of time.

¹⁰ Source countries are Austria, Belgium, Czech R., Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Luxembourg, Mexico, Netherlands, Poland, Portugal, Slovak R., Spain, Sweden, Switzerland, United Kingdom and the United States. The recipient countries include, besides the 23 OECD countries just mentioned, Brazil, Bulgaria, Cyprus, Estonia, India, Latvia, Lithuania, Malta, Romania, Russia Federation, and Slovenia, too.

The original FDI data were obtained in current US dollars. We deflate these data by using the US price deflator for investment (2000=100) taken from the AMECO data base of the European Commission. Real GDP and GDP per capita in constant 2000 US dollar are obtained from the World Bank Development Indicators data base. The distance between the home and host countries ($DIST_{ij}$) is measured as the great circle distance between the capital cities in the home and host countries. The source for these data is the Centre d'Etudes Prospectives et d'Informations Internationales (CEPII). Our proxy for the quality of institutions (INST) is the Political Constraint Index developed by Henisz (Henisz, 2000). This index measures the feasibility of changes in policy given the structure of the policy institutions and the preferences of the actors playing in those institutions. It takes values from 0 (high instability) to 1 (perfect stability). Further details about the data and variable description are given in Table A1 in the Appendix.

Following conventional practice used in the gravity model literature, we add one to FDI flows before transforming them in log, in order to avoid the problems with zero observations.¹¹

5 ESTIMATION RESULTS

Table 1 presents the estimates of equations (1) and (2). Column (1) shows the estimates of the standard determinants of bilateral FDI flows. The estimates are consistent with theory predictions and other empirical studies discussed in Section 2. On average, *ceteris paribus*, bilateral FDI flows are positively related to economic size, the quality of institutions in the host countries and similarity of relative endowments. According to these results, bilateral FDI flows as a whole appears to be mainly market rather than efficiency seeking.¹²

[insert table 1 about here]

¹¹ Nearly 11 per cent of our observations have a zero value for bilateral flows of FDI and 15 per cent record a divestiture from the host countries. After the transformation, we restricted the sample to include only observations with strictly positive values for our dependent variables. Alternatively, we might have considered zero flows as missing values and directly dropped them from the sample. We use both strategies and found minimal differences in the estimated coefficients. Results are available upon request.

¹² The negative sign of our proxy for labour costs may be due to the fact that differences in wage levels are not compensated by productivity and skill levels. See Globerman and Shapiro (2002) for a discussion on this issue.

Column (2) of Table 1 shows the estimates for eq. (2). As discussed above, we instrument FDI inflows to China to account for potential correlation of FDI inflows to China and the error term due to unobserved factors that may increase simultaneously the attractiveness of China and other countries as FDI destinations.¹³

The significance and magnitude of the coefficients of bilateral FDI flows are similar to those obtained with our baseline regression. The coefficient of the variable of interest in this model ($\text{LnFDI}_{i,\text{CN},t+1}$) is positive and significantly different from zero at the one percent significance level. A 10 percent increase in the FDI flows to China would raise the level of FDI inflows to other recipient countries by about 5 percent. Therefore, we can conclude that, on average, inward FDI to China and other recipient countries are complement rather than substitute, as suggested by the theory.

The main objective of this paper is to examine whether and to what extent the FDI inflows into China have affected the FDI inflows into the European Union countries. To this purpose, we re-estimate eq. (2) allowing the coefficient of the fitted value of Chinese FDI to vary across groups of countries. We distinguish between EU15 and the new EU countries in Central and Eastern Europe (CEECs). The estimates are shown in column (3) of Table 1. The results suggest that the setting up of production plants in China has not discouraged additional investment in EU member states. Rather, FDI into China complements FDI inflows into either EU15 or CEE countries, though to a lesser extent with respect to non-EU recipient countries. A 10 percent increase in FDI inflows to China would raise the level of FDI inflows to EU15 countries by two percent and to CEE countries by 0.5 percent.¹⁴

This result may reflect the fact that most of FDI in CEE countries is efficiency-seeking and therefore there is more room for competition with China than in other EU recipient countries.

¹³ The results of the first stage regression of FDI inflows into China are shown in Table A3 in the Appendix. The estimated model explains 93 percent of the variation of the FDI inflows into China. These estimates indicate that both the capital/labour ratio differential (labour cost differential) and the market size are positively associated with the FDI inflows into China. This is in line with the prediction of either the vertical MNEs models and the assumed geographic fragmentation of production into stages or horizontal MNEs models. Hence, we can conclude that China is equally attractive for both market and efficiency seeking FDI.

¹⁴ The interpretation of the estimated coefficients in column (3) of Table 1 is as follows: The coefficients of LnFDICN_{it+1} interacted with the EU15 and the CEE dummies indicate how much the slope coefficient of the average effect, that is, the coefficient of LnFDICN_{it+1} , differs from the slope coefficient of the FDI flows into the EU15 countries and the CEECs, respectively. The slope coefficient of the FDI effect for EU15 is $0.326 - 0.113 = 0.213$ and the effect on FDI into CEE countries is $0.326 - 0.274 = 0.052$.

The estimated China effect may have varied over the analysed period due to adaptation of foreign investors to changes either in China's investment climate or in CEE countries. To account for this potential time specific effects, we estimate our augmented gravity model separately for three equal periods: 1990-1994, 1995-1999, and 2000-2004. This strategy allows us to uncover interesting results which are shown in Table 2.

First of all, it is worth noticing that the China effect, though always positive, weakens over time, becoming negligible in 2000s. Also FDI inflows into China and into EU countries become more complementary and in 2000s the China effect in EU15 countries is not different from other non-EU recipient countries, while additional FDI inflows into CEE countries due to a 10 percent increase in FDI inflows to China rise from 0.2 percent of the early 1990s to 0.5 percent of the early 2000s. Thus, no estimate suggests that China is diverting FDI from other recipient countries as a whole; rather there seems to be a FDI creating effect, which is however decreasing over time in all recipient countries with exception of CEE countries.

These trends may reflect important changes in the FDI inflows into China and other recipient countries. During the 1990s China's economy expanded quickly, with an average annual growth rate reaching over eight percent over the period. This impressive growth might have attracted relatively more market seeking FDI, thus reducing the opportunities for generating complementarities with FDI inflows in other recipient countries. This may also explain the reduced competition with FDI inflows into CEE countries. Recent changes in global production systems (Felker, 2003; Ravenhill, 1998) have also contributed to weaken competing factors, while strengthening complementary opportunities.

[insert Table 2 about here]

5.1 Horizontal vs. vertical FDI

We turn now to the role played by horizontal and vertical motivations for FDI in driving the previous results.

According to theory, horizontal FDI usually involves the replication of the production facilities in the host countries. Given the fact that their main purpose is to serve local markets, the market size is one of the main drivers for this type of FDI. Vertical FDI,

instead, implies the fragmentation of the vertical chain of production and the relocation of production stages in low cost locations stimulated by international differences in input prices.

In order to measure the China effect on vertical and horizontal FDI separately, the fitted FDI inflows into China variable has been interacted first with the market size variable, and then with our proxy for labour cost differentials (the absolute difference of GDP per capita in the source and in host countries), as shown in eq. (3). The first interacted variable captures the effect of FDI into China on horizontal FDI, while the latter captures the China effect on vertical FDI.

Estimates of this latter model are shown in Table 3.

[insert table 3 about here]

Column (1) of Table 3 shows that the direct effect of FDI into China is negative and significant at the one percent level, while the coefficients of the interacted variables are both positive and significant at the conventional levels of significance. In order to obtain the net effect, we substitute the estimated coefficients in eq. (4):

$$\frac{\delta FDI_{ijt+1}}{\delta FDI_{it+1}} = 1.640 + 0.022 * MKTSIZE_{ijt} + 0.093 * |GDPCAP_{it} - GDPCAP_{jt}| \quad (5)$$

Eq. (5) may be negative, positive or equal to zero, according to the values assumed by the two conditioning variables. On economic terms, it implies that the net China effect is negative for very small values of market size and similar values of home and host countries' GDPs per capita. Therefore, only FDI flows directed towards less attractive host countries in terms of either market size or factor cost advantages are negatively affected by FDI inflows into China. This negative effect, however, weakens as host countries increase their advantages, as indicated by the coefficients of the two modifying variables, which are both positive and significant at the conventional levels. Therefore, having a large domestic market and/or factor cost advantages may help in developing complementarities with FDI inflows to China.

In order to understand what kind of advantages matters more we need to choose a specific value for at least one of the variable included in eq. (5). To this purpose, it is useful to note that for similar countries in terms of GDP per capita (GDPCAP), the net China effect, as defined by eq. (5), becomes positive for values of $MKTSIZE > 74.54$.

Since $\max(MKTSIZE_{ijt}) < 74.54$, market advantages do not suffice to compensate for China's competition in vertical FDI; therefore, we assess the marginal effect of FDI to China on FDI inflows in other recipient countries for all values of the labour cost proxy variable while setting the MKTSIZE variable at its maximum, average, and minimum values, respectively. The implied equations are plotted in Figure 1, which also shows the China's average value of the labour cost variable for comparison.

[insert Figure 1 about here]

Figure 1 shows that the China effect is negative and statistically significant when host and home countries' GDPs per capita are very similar, thus confirming that FDI inflows into China are substitutes for FDI into countries which are not attractive for vertical FDI. As factor cost advantages increase the marginal effect of FDI into China becomes positive, though it is statistically significant for very high values of the GDP per capita difference variable, only. Therefore, in order to benefit from FDI inflows into China, other host countries have to possess high cost advantages. The latter, however, should not necessarily be higher than China's ones. As it is shown in Figure 1, countries with very attractive domestic markets can exploit synergies with FDI inflows to China even when their cost advantages are below China's average one. The lower the market attractiveness the higher the level of cost advantages that assures complementarities with FDI inflows to China. At the extreme, when market potential assumes its minimum level, FDI inflows to China complement FDI inflows into other host countries only if the latter are more competitive than China in terms of cost advantages.

Overall, these results suggest that host countries with high levels of horizontal FDI adjust to the competitive pressure exerted by China better than countries attracting mainly vertical FDI. An increase in FDI flows into China diverts vertical FDI flows from countries less competitive than China in terms of cost advantages, and creates additional FDI flows in host countries with similar or higher level of cost advantages than China. These results are consistent with theoretical predictions discussed in section 2.

As far as the European countries are concerned, the impact of FDI into China on FDI inflows into EU15 countries is less (more) intense on horizontal (vertical) FDI than in other non-EU host countries, as indicated by the coefficients of the corresponding

variables shown in Column (2) of Table 3. The China effect for CEE countries is not statistically different from that of other host countries. These results are consistent over time, as it is shown in Table 4. Overall, they suggest that European MNEs have integrated China into their global strategies more intensively than MNEs belonging to non-EU countries, without diverting FDI from other more traditional and less distant destinations such as CEE countries. Risk diversification strategies (Lall and Albaladejo, 2004) or the fragmentation of production networks by geographical regions may explain this fact. These average effects, however, hide interesting differences across countries, as it is discussed in the next section.

[insert Table 4 about here]

5.2 Further disaggregation by recipient countries

In order to investigate which source and destination countries are driving the results highlighted above, we allow the market size variable in eq. (5) to vary across recipient countries. In particular, we set it at its average values. Results are summarised in Table A3 in the appendix and in Figures 2-4.

As discussed above, FDI inflows into China have been on average complementary with FDI into all other recipient countries. However, negative effects may arise for countries with similar levels of development, proxied by the levels of GDP per capita. Consistently with these results, Figures 2-4 show that diversion effects arise within EU15 countries, within CEE countries, and between CEECs and Latin American countries, with few marginal exceptions.¹⁵

In EU15, FDI inflows into China complement FDI inflows in Italy, Spain and Sweden, regardless of the source of FDI inflows, while they substitute FDI flows into Austria, Germany, Belgium, France, The Netherlands, the United Kingdom, and between Greece and Portugal. Therefore, geographical and cultural proximity do not suffice to compensate the lack of cost advantages. A very similar picture emerges within CEECs, where China's FDI inflows seem to penalize mainly the Baltic countries and Poland. An increase in FDI inflows to China has a negative effect on

¹⁵ We refer here to bilateral FDI flows between Luxembourg and Japan and Switzerland, and between Portugal and Slovenia, and Greece and Poland.

Polish FDI into Hungary and Slovakia. Interestingly, no negative effect is recorded in Bulgaria, while China diverts Mexican FDI flows to Czech Republic.

As far as the other recipient countries are concerned, FDI inflows into China create additional FDI flows into the United States of America, India, and the Russia Federation from any source they may come from, and diverts FDI flows originated in Central and Eastern Europe from Brazil and Mexico. FDI diversion occurs also in Malta and Cyprus and it concerns only two EU15 countries, i.e. Greece and Portugal.

Overall, these results suggest that whether and to what extent FDI inflows to China divert FDI inflows to other recipient countries depend on the characteristics of both the source and the recipient countries. These characteristics determine their comparative advantage and, therefore, their relative position in the different segments of the production chain.

6 CONCLUDING REMARKS

In this paper we analyse the effects of FDI into China originating in OECD countries on FDI into EU and other countries. In particular, we estimate an augmented gravity model using a panel of cross-country annual data over the period 1990-2004. We first examine determinants of bilateral FDI flows and the impact of FDI into China on FDI into other countries. Second, we investigate whether and to what extent FDI flows into China have occurred at the expense of FDI into European Union countries. In particular, we distinguish between the EU countries prior to the enlargements of 2004 and 2007 (EU15) and the new EU member states from Central and Eastern European (CEE) countries. Third, we estimate the China effects on horizontal and vertical FDI into recipient countries as a whole and taken individually.

Our results suggest that FDI outflows from OECD countries take place mainly among countries with similar factor endowments, large markets high levels of institutional quality. These results are in line with the theory of multinational enterprises and consistent with previous empirical studies. Moreover, they suggest that most of bilateral FDI recorded in our sample respond to market rather than efficiency motivations.

We provide empirical evidence showing that, *ceteris paribus*, FDI inflows into China raise FDI inflows into other countries. This complementary relationship is however not constant across countries, being less strong in Europe than outside Europe. Within Europe, the most penalized countries are the new member states of Central and Eastern Europe. This result suggests that the advantage of these latter countries related to their proximity to FDI source countries is not sufficient to offset the attractiveness of China as a FDI destination. Our results also indicate that this FDI diversion effect on EU countries has decreased over the analysed period.

The upsurge of FDI into China has encouraged both horizontal and vertical FDI into the other countries included in our sample. In the case of EU15, the FDI complementarity has been lower in the case of horizontal FDI and higher in the case of vertical FDI in comparison with non-EU host countries.

We also examined the China effect on a country basis and found that, while the FDI creation effect prevails on average, bilateral diversion effects can not be avoided. They mainly affect pairs of similar countries within EU15, CEE and other recipient countries. Most interestingly, we found that FDI inflows to China do not crowd out FDI inflows to four mature and relatively high income economies – USA, Sweden, Italy and Spain – and three emerging relatively low income countries, i.e. Bulgaria, Russia and India. Therefore, differences in income levels do not seem to play any role in the emergence of complementarities with FDI into China.¹⁶

Two important messages can be derived from our study. First, China does not seem to have crowd out FDI inflows from the EU as a whole and other recipient countries. Secondly, whether the China effect is positive or negative depends on the relative position of each economy participating in the production process. This position, of course, may evolve over time according to changes in the comparative advantages of the countries involved in the global production processes. This implies that FDI substitution effects may arise in place of FDI complementarities and vice versa. Therefore, individual economies should pay a lot of attention in developing value creation activities in order to reinforce complementary effects with China.

¹⁶ This result is consistent with Wang et al. (2007), who however restrict their analysis to Asian economies.

References

- Baier S. and J. Bergstrand (2007). "Do Free Trade Agreements Actually Increase Members' International Trade?", *Journal of International Economics*, 71:72-95.
- Bénassy-Quéré A., Coupet M. and T. Mayer (2007). "Institutional Determinants of Foreign Direct Investment", *The World Economy*, 30(5):764-82.
- Borensztein E., De Gregorio G. and J-W Lee (1998). "How does Foreign Direct Investment Affect Economic Growth?", *Journal of International Economics*, 45: 115-135.
- Brainard, S.L. (1997). "An Empirical Assessment of the Proximity-Concentration Trade-off Between Multinational Sales and Trade", *American Economic Review*, 87(4): 520-44.
- Brenton, P., F. Di Mauro and M. Lucke (1999). "Economic Integration and FDI: An Empirical Analysis of Foreign Investment in the EU and in Central and Eastern Europe", *Empirica*, 26(2): 95-121.
- Chantasawat B., Fung K.C. and H. Izaka (2005), "The Giant Sucking Sound: Is China Diverting Foreign Direct Investments from Other Asian Economies?", Department of Economics, UCSC, working paper n. 594.
- Cravino, J., D. Lederman, and M. Olarreaga (2007). "Substitution between Foreign Capital in China, India, the Rest of the World, and Latin America: Much Ado about Nothing?", Policy research working paper No. 4361, the World Bank.
- Egger, P. and M. Pfaffermayr (2004). "Foreign Direct Investment and European Integration in the 1990s", *The World Economy*, 27(1): 99-110.
- Eichengreen, B., and H. Tong (2006a). "How China is Reorganizing the World Economy", *Asian Economic Policy Review*, 1: 73-97.
- Eichengreen B. and H. Tong (2006b). "Is China's FDI Coming at the Expense of other Countries?", *Journal of the Japanese and International Economies*, 21(2): 153-172.
- Ekholm, K. (1995). "Multinational Production and Trade in Technological Knowledge", Lund Economic studies No. 58.
- Ekholm, K. (1997). "Factor Endowments and the Pattern of Affiliate Production by Multinational Enterprises", CREDIT Working Paper No. 97/19.
- Ekholm, K. (1998). "Headquarter Services and Revealed Factor Abundance", *Review of International Economics*, 6(4): 545-53.
- Globerman S. and D. Shapiro (2002). "Global Foreign Direct Investment Flows: The Role of Governance Infrastructure", *World Development*, 30(11): 1899-1919.
- Felker G.B. (2003), "Southeast Asian Industrialization and the Changing Global Production System", *Third World Quarterly*, 24(2): 255-282.
- Helpman, E. (1984). "A Simple Theory of Trade with Multinational Corporations", *Journal of Political Economy*, 92: 451-71.
- Helpman, E., and P. Krugman (1985). *Market Structure and Foreign Trade*, Cambridge, MA: MIT Press.
- Henisz W. (2000), "Institutional Environments for Multi-National Investment" *Journal of Law, Economics and Organizations* 16(2): 334-364.
- Horstmann, I.J. and J. R. Markusen (1987). "Strategic Investments and the Development of Multinationals", *International Economic Review*, 28: 109-21.
- Horstmann, I.J. and J. R. Markusen (1992). "Endogeneous Market Structures in International Trade", *Journal of International Economics*, 32: 109-29.

- Lall S. and M. Albaladejo (2004), "China's competitive performance: a threat to East Asian manufactured exports?", *World Development*, 30(11): 1441-1466.
- Markusen, J.R. (1984). "Multinationals, Multi-Plant Economies, and the Gains from Trade", *Journal of International Economics*, 16: 205-26.
- Markusen, J.R. (1995), "The Boundaries of Multinational Enterprises and the Theory of International Trade", *Journal of Economic Perspectives*, 9 (2),: 169-89.
- Markusen, J.R., and A. Venables (1997). "The Role of Multinational Firms in the Wage-Gap Debate", *Review of International Economics*, 5(4): 435-51.
- Markusen, J.R., and A. Venables (1998). "Multinational Firms and the New Trade Theory", *Journal of International Economics*, 46: 183-203.
- Markusen, J.R., and A. Venables (2000). "The Theory of Endowment, Intra-Industry and Multinational Trade", *Journal of International Economics*, 52(2): 209-34.
- Mercereau B. (2005). "FDI Flows to Asia: Did the Dragon Crowd out the Tigers?", IMF Working Paper No. 189.
- Prasad, E. and S-J. Wei (2005). "The Chinese Approach to Capital Inflows: Patterns and Possible Explanations", IMF Working Paper No. 05/79.
- Ravenhill J. (1998), "The Regionalization of Production and Competitiveness in East Asia", in Anderson R., Cohn T., Day C., Howlett M. and C. Murray, (eds), *Innovation Systems in a Global Context: The North American Experience*, pp. 174-193, McGill-Queen's University Press, Montreal.
- Rodriguez-Clares A. (1986). "Multinationals, Linkages and Economic Development", *American Economic Review*, 86(4): 852-73.
- Stein, E. and C. Duade (2007). "Longitude Matters: Time Zones and the Location of Foreign Direct Investment", *Journal of International Economics*, 71: 96-112.
- Zhang K.H. (2001). "Does Foreign Direct Investment Promote Economic Growth? Evidence from East Asia and Latin America", *Contemporary Economic Policy*, 19(2): 175-185.
- Zhou Y. and S. Lall (2005). "The Impact of China's FDI surge on FDI in South-East Asia: panel data analysis for 1986-2001", *Transnational Corporation*, 14(1): 41-65.
- United Nations Conference on Trade and Development (UNCTAD) (2007), *World Investment Report*, New York: United Nations.
- Wang C., Wei Y. and X. Liu (2007), "Does China Rival its Neighbouring Economies for Inward FDI", *Transnational Corporation*, 16(3): 35-60.
- Wei S-J. (2000). "How Taxing is Corruption on Internal Investors?", *The Review of Economics and Statistics*, 82(1): 1-11.
- Zhou Y. and S. Lall (2005), "The Impact of China's Surge on FDI in South-East Asia: Panel Data Analysis for 1986-2001", *Transnational Corporation*, 14(1): 41-65.

Table 1: Bilateral FDI flows and the impact of FDI into China on FDI into other countries

	Bilateral FDI flows (OLS)	The impact of FDI to China on FDI to other countries	The impact of FDI to China on FDI to EU countries
Ln MP _{ijt}	1.0912*** (0.042)	1.097*** (0.045)	0.869*** (0.090)
Abs diff GDP per capita i,j	-0.208*** (0.021)	-0.158*** (0.025)	-0.086*** (0.027)
INST _{it}	1.525*** (0.304)	1.772*** (0.480)	1.500*** (0.369)
Ln FDICN _{it}		0.461*** (0.090)	0.326*** (0.072)
Ln FDICN _{it} *EU15			-0.113*** (0.030)
Ln FDICN _{it} *CEE			-0.274*** (0.036)
EU15			-0.366 (0.354)
CEE			2.213*** (0.300)
Home country fixed effects	F(21, 4863) = 109.58 Prob>F = 0.000	$\chi^2(19) = 1018.06$ Prob> $\chi^2 = 0.000$	F(20, 4241) = 5.79 Prob>F = 0.000
Host country fixed effects	F(32,4863)=55.14 Prob>F 0.000	$\chi^2(32)=1384.82$ Prob> χ^2 0.000	F(31,4241)=4.42 Prob>F = 0.000
Time specific fixed effects	F(13,4863) = 46.48 Prob >F = 0.000	$\chi^2(12) = 88.49$ Prob > $\chi^2 = 0.000$	F(13,4241) = 6.12 Prob >F = 0.000
Hansen J test H ₀ = all instr. valid		0.910 Prob > $\chi^2 = 0.340$	
Obs.	4935	4234	4197
R ²	0.7349	0.7258	0.7141

Robust standard errors in parenthesis. ***, **, * indicates significance at levels 1%, 5%, and 10%, respectively. Estimates for constant terms are omitted.

Table 2: The impact of FDI to China on other countries over time

	1990-1994	1995-1999	2000-2004
$\ln MP_{ijt}$	0.835*** (0.196)	1.005*** (0.157)	0.842*** (0.226)
Abs diff GDP per capita i,j	0.208*** (0.069)	-0.035 (0.041)	-0.140*** (0.051)
$INST_{it}$	1.913*** (0.638)	-0.157 (0.660)	0.343 (1.391)
$\ln FDICN_{it}$	0.343*** (0.160)	0.247** (0.127)	0.328* (0.196)
$\ln FDICN_{it*EU15}$	-0.232*** (0.067)	-0.134** (0.049)	-0.076 (0.048)
$\ln FDICN_{it*CEE}$	-0.317*** (0.111)	-0.287*** (0.059)	-0.274*** (0.056)
EU15	-0.669 (0.728)	-0.288 (0.602)	-2.585** (1.019)
CEE	-0.529 (0.728)	1.214** (0.515)	-0.907 (0.650)
Home country fixed effects	F(14, 844) = 5.67 Prob>F = 0.000	F (16, 1488) = 5.59 Prob> F ² = 0.000	F(20, 1436) = 3.88 Prob>F = 0.000
Host country fixed effects	F(31,844)=4.48 Prob>F 0.000	F (31, 1488)=3.26 Prob> F = 0.000	F(31,1436)=2.56 Prob>F = 0.000
Time specific fixed effects	F(3,844) = 3.24 Prob >F = 0.021	F (4,1488)=5.48 Prob > F = 0.000	F(3,1436) = 0.74 Prob >F = 0.525
Obs.	901	1548	1499
R ²	0.7746	0.7844	0.7412

Robust standard errors in parenthesis. ***, **, * indicates significance levels at 1%, 5%, and 10%, respectively. Estimates for constant terms are omitted.

Table 3: The China effect on horizontal and vertical FDI

	Spillover effects to all countries	Spillover effects to EU countries
$\ln MP_{ijt}$	0.831*** (0.094)	0.907*** (0.095)
Abs diff GDP per capita i,j	-0.510*** (0.043)	-0.406*** (0.042)
$INST_{it}$	1.200*** (0.356)	1.336*** (0.360)
$\ln FDICN_{it}$	-1.640*** (0.260)	-1.017*** (0.313)
$FDICN*HOR$	0.022*** (0.005)	0.028*** (0.006)
$FDICN*VER$	0.093*** (0.007)	0.000 (0.011)
$FDICN*HOR*EU15$		-0.019*** (0.002)
$FDICN*VER*EU15$		0.095*** (0.010)
$FDICN*HOR*CEE$		-0.011 (0.007)
$FDICN*VER*CEE$		0.044 (0.032)
EU15		-2.785*** (0.563)
CEE		-1.018** (0.404)
Home country fixed effects	F(20,4241)=7.48 Prob>F=0.000	F(20,4237)=8.38 Prob>F=0.000
Host country fixed effects	F(32,4241)=4.26 Prob>F=0.000	F(31,4237)=5.32 Prob>F=0.000
Time specific fixed effects	F(13,4241)=5.80 Prob>F=0.000	F(13,4237)=5.66 Prob>F=0.000
Obs.	4314	4314
R^2	0.7447	0.7497

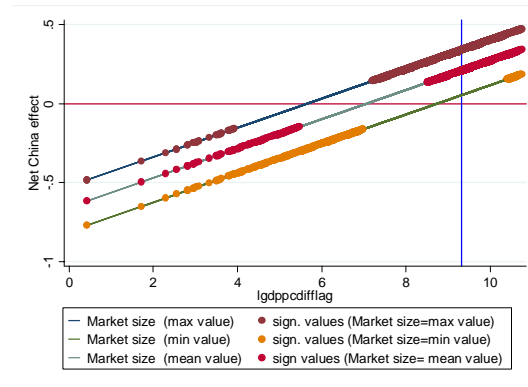
Robust standard errors in parenthesis. ***, **, * indicates significance levels at 1%, 5%, and 10%, respectively. Estimates for constant terms are omitted.

Table 4: The China effect on horizontal and vertical FDI over time

	1990-1994	1995-1999	2000-2004
Ln MP _{ijt}	1.009*** (0.213)	1.040*** (0.160)	0.815*** (0.227)
Abs diff GDP per capita i,j	-0.117 (0.192)	-0.469*** (0.061)	-0.305*** (0.068)
INST _{jt}	1.916*** (0.639)	-0.270 (0.644)	0.245 (1.390)
Ln FDICN _{it}	0.386 (0.946)	-1.752*** (0.456)	-0.635 (0.570)
FDICN*HOR	0.002 (0.016)	0.042*** (0.009)	0.023** (0.011)
FDICN*VER	-0.024 (0.046)	0.000 (0.018)	-0.010 (0.015)
FDICN*HOR*EU15	-0.019*** (0.006)	-0.023*** (0.003)	-0.016*** (0.003)
FDICN*VER*EU15	0.088*** (0.032)	0.116*** (0.018)	0.080*** (0.016)
FDICN*HOR*CEE	-0.001 (0.026)	-0.020 (0.010)	-0.005 (0.010)
FDICN*VER*CEE	-0.018 (0.120)	0.088* (0.046)	0.010 (0.046)
EU15	-1.007 (0.823)	-2.767*** (0.941)	-2.565** (1.027)
CEE	0.370 (0.756)	-1.265* (0.754)	-1.070* (0.636)
Home country fixed effects	F(14,840)=5.43 Prob>F=0.000	F(16,1484)=7.98 Prob>F=0.000	F(20,1432)=4.26 Prob>F=0.099
Host country fixed effects	F(31,840)=4.35 Prob>F=0.000	F(31,1484)=4.16 Prob>F=0.000	F(31,1432)=3.10 Prob>F=0.000
Time specific fixed effects	F(3,840)=3.44 Prob>F=0.016	F(4,1484)=5.53 Prob>F=0.000	F(3,1432)=0.85 Prob>F=0.467
Obs.	901	1548	1499
R ²	0.7792	0.8010	0.7486

Robust standard errors in parenthesis. ***, **, * indicates significance levels at 1%, 5%, and 10%, respectively. Estimates for constant terms are omitted.

Figure 1: The impact of FDI inflows to China on other recipient countries: marginal effects

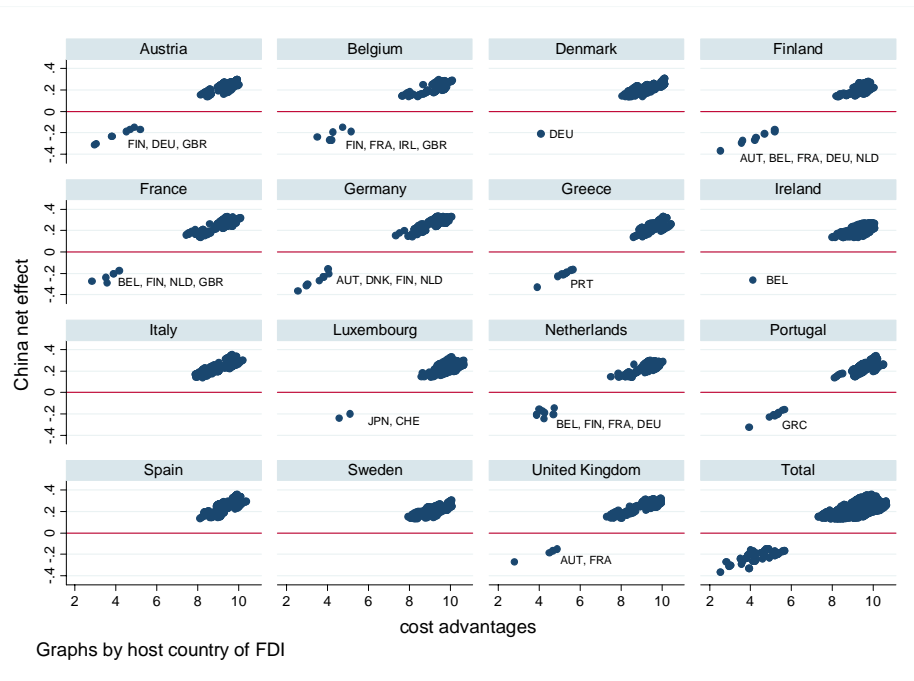


China net effect has been computed as follows:

$$\frac{\delta FDI_{ijt+1}}{\delta FDI_{it+1}} = 1.640 + 0.022 * MKTSIZE + 0.093 * |GDPCAP_{it} - GDPCAP_{jt}|$$

with MKTSIZE taking its maximum, minimum and mean value.

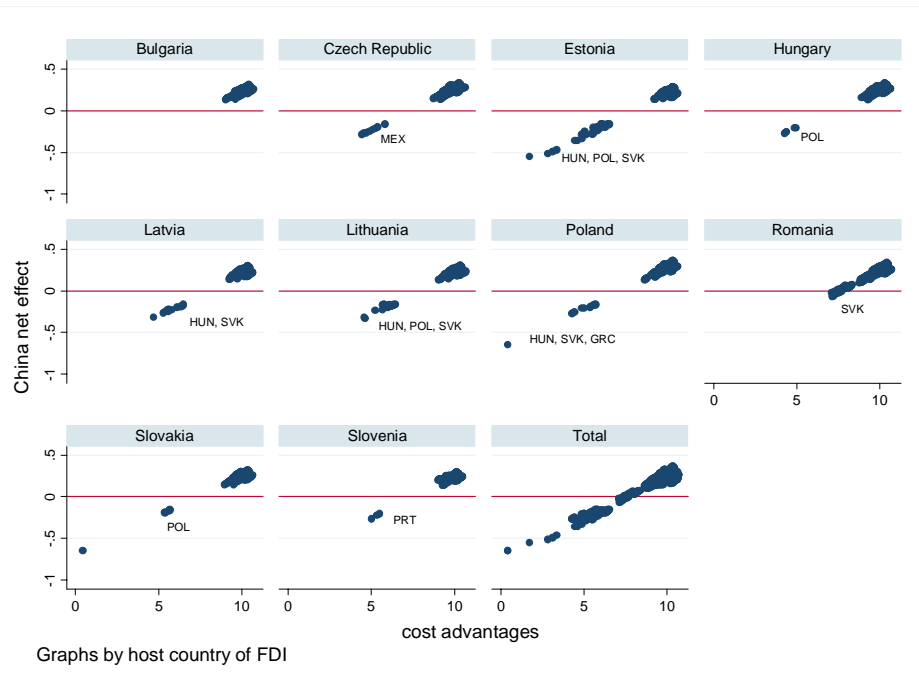
Figure 2: The China marginal effect in the EU15



All the included marginal effects are significant at 5% level. China net effect in each recipient country has been computed as follows:

$$\frac{\delta FDI_{ijt+1}}{\delta FDI_{it+1}} = 1.640 + 0.022 * \overline{MKTSIZE}_j + 0.093 * |GDPCAP_{it} - GDPCAP_{jt}|$$

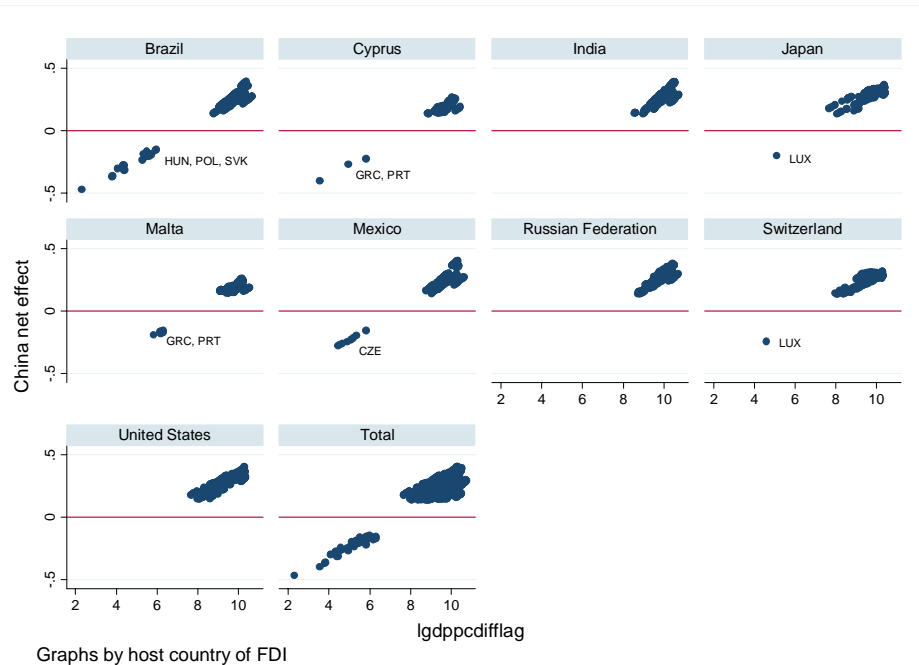
Figure 3: The China marginal effect in Central and Eastern Europe



All the included marginal effects are significant at 5% level. China net effect in each recipient country has been computed as follows:

$$\frac{\delta FDI_{ijt+1}}{\delta FDI_{it+1}} = 1.640 + 0.022 * \overline{MKTSIZE}_j + 0.093 * |GDPCAP_{it} - GDPCAP_{jt}|$$

Figure 4: The China marginal effect in other recipient countries



All the included marginal effects are significant at 5% level. China net effect in each recipient country has been computed as follows:

$$\frac{\delta FDI_{ijt+1}}{\delta FDI_{it+1}} = 1.640 + 0.022 * \overline{MKTSIZE}_j + 0.093 * |GDPCAP_{it} - GDPCAP_{jt}|$$

Appendix

Table A1: Definitions and Data Sources of Variables

Variable	Definition and source
FDI_{ijt}	Aggregate foreign direct investment outflows from source country i to host country j at time t . Data come from the OECD <i>International Direct Investment Statistics Yearbook</i>
$GDP_{i(j)t}$	Gross domestic product in USD in country i (j) at time t , constant 2000 prices. World Bank, <i>World Development indicators</i> .
$GDPCAP_{i(j)t}$	Per capita gross domestic product in USD in country i (j) at time t , constant 2000 prices. World Bank, <i>World Development indicators</i> .
$INST_{jt}$	Quality of institutions in country j at time t . Political Constraint Index . It ranges from 0 (instability) to 1 (complete stability). POLCON dataset (http://www-management.wharton.upenn.edu/henisz/polcon/contactinfo.html)
$DIST_{ij}$	Great circle distance between home country i and host country j . CEPII database
α_i, β_i	Source and host country dummy variables
τ_t	Time dummy variables
$FDICN_{it}$	Aggregate bilateral foreign direct investment outflows from source country i to China at time t . Data come from the OECD <i>International Direct Investment Statistics Yearbook</i> ,
$DISTCN_i$	Great circle distances between source country i and China. CEPII database
$GDPCN_t$	Gross domestic product in USD in China at time t , constant 2000 prices. World Bank, <i>World Development indicators</i> .
$GDPCAPCN_t$	Per capita gross domestic product in USD in China at time t , constant 2000 prices. World Bank, <i>World Development indicators</i> .

**Table A2: Determinants of FDI to China
(Estimates from first stage IV regression)**

$\ln MP_{i,CN,t}$	4.330***	(0.428)
$\ln GDPCAP_{it} - GDPCAP_{CN,t} $	4.475***	(0.374)
$\ln MP_{ijt}$	0.022	(0.020)
$\ln GDPCAP_{it} - GDPCAP_{jt} $	0.004	(0.010)
$INST_{jt}$	-0.002	(0.138)
Obs.	4234	
Centered R^2	0.9321	
Uncentered R^2	0.9822	

Robust standard errors in parenthesis.

*** indicates significance at 1% level.

The estimation includes home country, host country and time specific effects and a constant.

Table A3: Estimated marginal effects by recipient country

Country	Obs	Mean	St. dev.	Min	Max
Austria (AUT)	203	0.2142	0.0970	-0.3121	0.2979
Belgium (BEL)	209	0.2138	0.0841	-0.2687	0.2933
Denmark (DNK)	281	0.2123	0.0477	-0.2099	0.3065
Finland (FIN)	205	0.1827	0.0960	-0.3681	0.2774
France (FRA)	231	0.2384	0.0905	-0.2925	0.3302
Germany (DEU)	227	0.2489	0.1070	-0.3681	0.3345
Greece (GRC)	219	0.2134	0.1025	-0.3302	0.3308
Ireland (IRL)	195	0.1969	0.0510	-0.2678	0.2720
Italy (ITA)	277	0.2336	0.0493	0.1352	0.3531
Luxembourg (LUX)	277	0.2305	0.0552	-0.2438	0.3309
The Netherlands (NLD)	211	0.2161	0.0899	-0.2471	0.3006
Portugal (PRT)	221	0.2126	0.1027	-0.3302	0.3402
Spain (ESP)	281	0.2302	0.0533	0.1355	0.3586
Sweden (SWE)	229	0.2147	0.0413	0.1356	0.3037
United Kingdom (GBR)	230	0.2441	0.0743	-0.2746	0.3214
Bulgaria (BUL)	224	0.2336	0.0377	0.1400	0.3147
Czech R. (CZE)	230	0.2409	0.0991	-0.2788	0.3379
Estonia (EST)	238	0.1496	0.1691	-0.5520	0.2917
Hungary (HUN)	227	0.2420	0.0825	-0.2670	0.3356
Latvia (LAT)	222	0.1979	0.1060	-0.3176	0.3019
Lithuania (LIT)	232	0.1961	0.1173	-0.3309	0.3101
Poland (POL)	240	0.2532	0.1215	-0.6511	0.3651
Romania (ROM)	322	0.1926	0.1016	-0.0650	0.3387
Slovenia (SLO)	202	0.2137	0.0649	-0.2622	0.2980
Slovakia (SVK)	225	0.2298	0.0937	-0.6511	0.3205
United States (USA)	291	0.2868	0.0531	0.1402	0.4040
Switzerland (CHE)	283	0.2557	0.0550	-0.2438	0.3182
Russian F. (RUS)	251	0.2775	0.0558	0.1363	0.3823
Mexico (MEX)	232	0.2412	0.1043	-0.2788	0.4040
Malta (MAL)	149	0.1694	0.0819	-0.1924	0.2615
Japan (JPN)	292	0.2885	0.0529	-0.1996	0.3664
India (IND)	257	0.2679	0.0587	0.1370	0.3934
Cyprus (CYP)	141	0.1759	0.0802	-0.4006	0.2694
Brazil (BRA)	254	0.2241	0.1472	-0.4685	0.3938
<i>Average effects:</i>					
All countries	7727	0.2278	0.0942	-0.6511	0.4040
EU15	3215	0.2219	0.0817	-0.3681	0.3586
CEECs	2362	0.2140	0.1095	-0.6511	0.3651
others	2150	0.2519	0.0891	-0.4685	0.4040

China net effect in each recipient country has been computed as follows:

$$\frac{\delta FDI_{ijt+1}}{\delta FDI_{ijt}} = 1.640 + 0.022 * \overline{MKTSIZE}_j + 0.093 * \overline{GDPCAP}_{it} - \overline{GDPCAP}_{jt} /$$

All the included marginal effects are significant at 5% level. Average effects are simple averages of the mean values or each country included in the corresponding groups of recipient countries.