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Modelling EU FDI Deflection Between the New EU Member States and Chinese Provinces

The issue of regionalism and how it affects FDI allocation within and between regions has not yet been dealt with satisfactorily by the voluminous literature on FDI. The issue of FDI dispersion, or of how traditional recipients of FDI flows can be affected by rising competitive advantages in countries of the same region as well as in countries of other regions, has received little attention. This article introduces the concept of EU FDI deflection across regions and measures it for 14 chosen locations in the new EU member states and Chinese provinces against the background of the fifth EU enlargement.

Ever since the 1980s, the process of economic globalisation has been driven by the rapid increase of international trade and international capital inflows. In the movement of international capital, foreign direct investment (FDI) by multinational corporations (MNCs) has been the driving force and fierce competition for FDI has been on stage, particularly among both developing and transition economies. According to the 2002 World Investment Report, international direct investment rose dramatically during the 1990s followed, however, by a decline in 2001 and 2002. As global FDI fell consecutively and unevenly, FDI in Asia and the Pacific dropped the least in the developing world because of China, which with a record inflow of US $ 53 billion became the world's largest host country in 2002. In the same year, the Central and Eastern European Countries (CEECs[1]) did the best of all regions, increasing their FDI inflows to a record of US $ 29 billion. In addition, during the process of building global production systems, MNCs are pushing forward the adjustment of the industrial structure worldwide and enhancing regional economic integration. For example, driven by further integration in the EU, the introduction of the euro and the fifth EU enlargement, cross-border restructuring in major industrial sectors in the enlarged EU25[2] is inevitable. European industries now have the opportunity to shift their operations from within the boundaries of the former EU15[3] to the new member states.

A vast empirical literature has focused on the regional determinants of FDI. Nonetheless, not only has there been little empirical research on FDI allocation and disparities among the different regions within a single economy,[4] but also no specific consideration has been given in the past to empirical studies linking regional economic integration and FDI allocation, although a few have focused on EU economic integration and FDI. For instance, research on the topic of EU enlargement and on intra-EU FDI has drawn attention with the approaching of the CEECs' accession process.[5] However, the issue of FDI "displacement" between an ever more integrated and enlarged EU and Asia against the background of a growing interdependence between EU and Asian economies has been extremely limited.[6] Since the EU has recently been enlarged to incorporate ten new countries with levels of development comparable to those of some of the Chinese coastal provinces, a pertinent and cog-

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[1] The CEECs are the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, the Slovak Republic, Slovenia, Bulgaria and Romania.

[2] The EU25 refers to the EU after the fifth enlargement, i.e. the EU15 member countries plus the 10 new EU member states.

[3] The EU15 consists of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom.

[4] R. E. Caves: Multinational Enterprise and Economic Analysis, 2nd Edition, New York 1996, Cambridge University Press.

[5] Cf. for example A. Bevan, S. Estrin, H. Grabbe: The impact of EU accession prospects on FDI inflows to central and eastern Europe, in: Policy Paper 06/01, first published in 2001 by the ESRC "One Europe or Several?" Programme, Sussex European Institute, University of Sussex, Brighton, UK 2001.

[6] To name a few attempts on this issue, see for example: B. Andreosso-O'Callaghan, J.P. Bassino: Japanese Direct Investment in Asia and in the European Union. Is there an Interdependence?, in: B. Andreosso-O'Callaghan, J.P. Bassino, J. Jassaud (eds.): The Changing Economic Environment in Asia, London and New York 2001, Macmillan/Palgrave, pp. 26-51; F. Sachwald: The Integration of China and East European Countries in Global Networks, Les Etudes de l'IFRI 2, Paris 2004, IFRI; and also Sachwald (2004).

nate research question embraces an analysis of the fifth EU enlargement, and in particular potential EU FDI deflection between the CEEC-8[7] and Chinese coastal provinces. The primary objective of this article is therefore to explore the interaction between regional integration (i.e. the fifth EU enlargement) and inter-regional FDI allocation (i.e. the new EU member states versus Chinese coastal provinces). The article represents one step forward in the literature on FDI theory and introduces for the first time the concept and a model of "EU FDI deflection" by applying it to the fourteen chosen locations in the new EU member states and the Chinese coastal provinces.

The article first provides a review of the literature on EU FDI in the context of the fifth enlargement. The effect of EU enlargement on EU FDI to China and the new EU member states is then discussed and recent trends examined. This is followed by a definition of the concept of EU FDI deflection and a description of the research methodology for modelling it. We then present our empirical results. Finally, the findings are summarised and the limitations to the research pointed out.

Literature on EU FDI

Although the impact of regional economic integration on the location of foreign investment has marginally been examined in the literature, the constitution of the European Union and its subsequent effect on international capital flows have given researchers the opportunity to study the topic of EU economic integration and its connection with EU FDI allocation within a specific geographical area.[8]

After the constitution of the EEC and with an increased level of integration, the reduction of transaction costs within the member states provided foreign firms with advantages in terms of product and process specialisation by coordinating their activities in separate European plants and serving a much wider market. Empirical evidence suggests that the net effect of European economic integration has been to increase the flow of foreign investment to individual member countries.[9] The theory of international production can help to explain how EU regional economic integration not only changes locational advantages, but also how it affects the distribution of ownership advantages between firms of different origins, and the configuration of both ownership and locational advantages. Through expanding market size and creating opportunities for economies of scale, firms inside the European Union can improve their competitive advantages.[10]

In general, much of the work on the impact of European economic integration on FDI was concerned with an assessment of the trend in the flows of US FDI to the European Community. For example, Clegg[11] argued that the phases of EU market integration caused the responsiveness of US FDI to market growth to be greater for EU countries than for non-EU countries over the forty-year period to the early 1990s. Empirical studies also found that FDI by EU MNCs themselves also expanded rapidly within the European Union. Furthermore, Molle and Morsink[12] found that intra-EC trade and intra-EC investment are, in fact, complementary flows.

The enlargement of the EU in 1973 to include the United Kingdom and Ireland, the EU accession of Spain and Portugal in 1986 and the 1995 enlargement to include Austria, Finland and Sweden stimulated the analysis of the impact of the evolution of European economic integration on the patterns of location of intra-EU FDI. In general, Norman[13] disclosed that the process of regional integration in the EU resulted in a rapid growth of intra-EU FDI in that intra-EU FDI increased from 25 per cent of the total inward stock in 1980 to 40 per cent by 1988.

Mayes[14] and Grant[15] found that the UK's entry into the community had no real impact on the location pat-

[7] The CEECs that acceded to the EU in May 2004 (the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, the Slovak Republic and Slovenia).

[8] This is in spite of early work on the issue; (cf. the pioneering work in: H. Giersch: Economic Union between Nations and the Location of Industries, in: The Review of Economic Studies, No. 2, 1949-1950, pp. 87-97.

[9] J. Dunning: The European Internal Market Programme and Inbound Foreign Direct Investment, part 1, in: Journal of Common Market Studies, Vol. 35, 1997, pp. 1-30; J. Dunning: The European Internal Market Programme and Inbound Foreign Direct Investment, part 2, in: Journal of Common Market Studies, Vol. 35, 1997, pp. 189-223.

[10] UNTCMD (United Nations Transnational Corporations and Management Division): From the Common Market to EC 92: Regional Economic Integration in the European Community and Transnational Corporations, New York 1992.

[11] J. Clegg: US Foreign Direct Investment in the EU - The Effects of Market Integration in Perspective, in: F. Burton, M. Yamin, S. Young (eds.): International Business and Europe in Transition, New York 1996, St. Martin Press.

[12] W. T. M. Molle, R. L. A. Morsink: European direct investment in Europe, paper presented at the International Workshop on Multinational Firms and European Integration, Department of Economics, University of Geneva, 1989, p. 17.

[13] G. Norman: Japanese Foreign Direct Investment: The Impact on the European Union. In: N. M. Healey (ed.): The Economics of the New Europe: From Community to Union, London 1995, Routledge.

[14] D. G. Mayes: EC Trade effects and factor mobility, in: A. M. El-Agraa (ed.): Britain within the European Community: The Way Forward, London 1983, Macmillan.

[15] R. Grant: The impact of EEC membership upon the United Kingdom's industrial performance, in: R. Jenkins (eds.): Britain and the EEC, Proceeding of Section F (Economics) of the British Association for the Advancement of Science, London 1983.

tern of FDI in the enlarged EC. However, O'Farrell[16] found that Ireland's membership of the EC attracted FDI from both non-EC and EC sources. In de Sousa and Lochardy,[17] it is disclosed that in the case of Spain and Portugal EU membership seems to have had no intrinsic effect on intra-EU FDI, nor on investment from third countries, while for Austria, Finland and Sweden enlargement has contributed significantly to increasing intra-EU FDI (Austria, Finland and Sweden have received more FDI from other EU countries and have invested more in these countries) and FDI from non-EU countries.

In Barry's analysis[18] on the potential threat of intra-EU FDI being diverted from Ireland towards the CEECs, the characteristics of Ireland in the 1970s (which featured as marketing seeking and low-tech) were identified as being similar to those of the current CEECs. Furthermore, Barry's studies also point out the fact that the formation of the Common Market and the completion of the Single Market were accompanied by a substantial net increase in both intra-EU and extra-EU FDI flows, with the largest increases coming from countries outside the EU itself. The conclusion was thus drawn that high-tech and export-oriented multinational companies expect to invest heavily in the CEECs and some at least of the CEECs could successfully adopt a strategy similar to that of Ireland and enjoy equally rapid convergence after EU accession. However, two somewhat conflicting suggestions have been formulated in both works. On the one hand, the fifth enlargement is not a zero sum game in which the new member states will compete with current incumbents for a fixed pool of FDI. Therefore, Ireland may have less to fear from enlargement, as FDI flows tend to grow. On the other hand, it is undeniable that accession will change substantially the nature, origin and sectoral destination of FDI inflows to the CEECs. The pace of change tends to be more rapid today, making the new member countries rapidly structurally similar to Ireland. This in turn increases the direct competition between Ireland and the CEECs.

Furthermore, research on EU investment in different regions (e.g. Europe and Asia) as competing or, alternatively, complementary FDI destinations is in its infancy. Few studies tackle this issue. For example, Andreosso-O'Callaghan and Bassino[19] investigated the interdependence of EU and Asian markets through the global operation of Japanese multinational firms after the Asian financial crisis. The study focused on a number of selected technology-based Japanese manufacturing industries including motor vehicles, electrical, telecommunications and optical equipment, in that manufacturing industries are more likely than services to induce complementarities at the global level, and also because the high-tech sector is more prone to product cycle effects and to technology diffusion. Andreosso-O'Callaghan and Bassino noted that the investment pattern of Japanese firms is different across the two regions. Investment in the EU is polarised in a few selected countries, while investment in the ASEAN (Association of Southeast Asian Nations) tends to be spread more evenly on a geographical basis. In Andreosso-O'Callaghan and Bassino, interdependence between EU and Asian markets (excluding Japan) is defined as the percentage of sales of finished and intermediate products produced in one region and sold in another. It is shown that finished products accounted for the majority of intra-group sales from one region to the other, with Asian countries being the manufacturing base for finished products exported to Europe. With respect to Japanese FDI diversion issues, Andreosso-O'Callaghan and Bassino found that even if there is a certain amount of geographical substitution between Europe and Asia, the decline of Japanese FDI to Asia does not necessarily imply the diversion of investment to Europe since the USA can be chosen, in the case of some industries, as an alternative destination.

In his study of the integration of China and East European countries in to the global networks of EU multinationals, Sachwald[20] noted that trade and FDI liberalisation by developing and transition economies since the 1980s have created more favourable conditions for the development of global production networks (GPNs). He found that some CEECs have become involved in the global production networks of electronic goods, office machinery, telecommunications and the automotive industry. In China, the rate of growth of high-tech exports is clearly related to FDI by

[16] P. N. O'Farrell: Ireland, in: L. H. Klaassen, W. T. M. Molle (eds.): Industrial Mobility and Migration in the European Community, Aldershot 1983, Gower, pp. 301-351.

[17] J. de Sousa, J. Lochardy: Foreign Direct Investment and Integration: Lessons for CEECs, Institution and Policies for the New Europe, International Conference, Portoroz-Koper, Slovenia, 17-19 June 2004.

[18] F. Barry: EU Accession and Prospective FDI Flows to CEE Countries: A View from Ireland, University College Dublin, August 2002; F. Barry, A. Hannan: Will Enlargement Threaten Ireland's FDI Inflow, in: Quarterly Economic Commentary, Dublin 2001, Economic and Social Research Institute, pp. 55-67.

[19] B. Andreosso-O'Callaghan, J. P. Bassino, op. cit.

[20] F. Sachwald, op. cit.

leading companies, and vertical trade[21] with high-income countries. Furthermore, by comparing American and Japanese multinationals with European ones in the regional focus of their GPNs, Sachwald disclosed that American and Japanese MNCs took China as a manufacturing platform and tended to be more involved in vertical trade with China, while European firms tended to focus on sales to the Chinese domestic market. In the examination of French intra-firm trade (IFT) patterns with China and the CEECs, Sachwald argued that the CEECs played a more important role than China in the industrial networks of French firms as most imports from China, and exports to China in particular, are not traded within multinationals.

In his study of the impact of EU Enlargement on the location of production in Europe, Sachwald[22] argued that a certain division of labour has been developing between the EU15 and accession countries since the 1990s, and that the recent EU enlargement should be analysed in the context of globalisation, in which competitive pressures from emerging countries like China will continue to grow on both old and new EU members. In his sectoral studies of the automobile, ICT (information and communication technology), and textile and clothing industries, Sachwald examined in detail the determinants and consequences of firms' location decisions in the CEECs. In the automobile industry, it is found that the types of cars and components being produced reflect the dual motive for investing in the CEECs: low costs and an increasing local demand. Apart from geographical proximity, the CEECs are also attractive due to a very good level of automobile-specific training and an increasingly stable political situation. As a result, enlargement should expand and strengthen the EU car industry. In the ICT sector, it is found that producers from the EU15 and from new EU member countries can be in a complementary position but the latter may be vying with Chinese manufacturers for some products along the computer value chain. In the mobile telecommunications sector, European leaders such as Nokia and Ericsson have progressively integrated the CEECs into their GPNs and enlargement will allow these leading firms and contract manufacturers to deepen the vertical division of labour which started in the 1990s in Europe. In the textile and clothing industry, Sachwald noted that EU firms can benefit from enlargement by successfully reorganising the clothing industry on a European scale so as to maintain upstream production of textiles in Europe.

What these few studies show is that the issue of increasing FDI cannot be disconnected from the existence of GPNs. This implies that the trade-off between Asia and Europe as competing locations needs to be integrated into the analysis of FDI in these two regions. Our study will follow this line of thinking.

Effect of the Fifth EU Enlargement

A prominent feature of EU FDI trends from the mid-1990s to the early 2000s is the rising importance of emerging markets as investment destinations of EU firms. In 1994, the distribution of EU FDI outflows between the emerging markets, namely Latin America, Far East Asia and the EU candidate countries, was almost homogenous. At the close of 1999, €288.9 billion were held by EU firms in the emerging markets. This represented 24.3 per cent of total extra-EU FDI outflows, with Latin America accounting for 11.5 per cent, Far East Asia for 6.7 per cent, the EU candidate countries for 4.9 per cent and the Mediterranean partner countries for the remaining 1.2 per cent. As far as EU FDI to the new EU members is concerned, EU FDI outflows to the area increased nearly fourfold from ECU 3.222 billion in 1994 to €12.1 billion in 1999. As a result of the preoccupation with the prospective fifth EU enlargement, EU FDI outflows to the new EU member countries recorded the largest progression with a growth rate of 27.4 per cent in 2000. Compared with other locations, it is clear however that the preparation of the CEECs for membership stimulated EU FDI towards these countries and helped to maintain a stable amount of EU FDI inflows into the area in the early 2000s. Will the accession of the new member states ultimately affect EU FDI inflows to China and do these two locations directly compete with each other in attracting EU FDI? We shall present a brief comparison between EU FDI (in terms of FDI stock, trend of FDI inflows and sectoral breakdown) in the two areas and highlight the comparative advantages of the new EU member states vis-à-vis China in attracting EU FDI.

In the first place, in terms of extra-EU FDI outward stock, the new EU member states accounted for 3.45 per cent and 4.1 per cent of total extra-EU FDI outward stock worldwide in 2000 and 2001 while the figures for China are only 0.67 per cent and 0.81 per cent respectively. As a result, EU FDI stock in China is comparable to that the Czech Republic and half that in Poland in 2000 and 2001.

[21] The analysis of GPNs and associated trade flows focused on vertical intra-industry trade (VIIT). Vertical flows are distinguished from horizontal flows within IIT on the basis of price differences between imports and exports. Vertical specialisation can be evaluated based on the extent of VIIT (ibid., pp. 10 ff.)

[22] F. Sachwald: The Impact of EU Enlargement on the Location of Production in Europe, in: Les Etudes de l'Ifri, No. 4, Paris 2005, IFRI..

Table 1
EU15 Direct Investment Outward Stock 1994-2001
(ECU/EUR billion)

	1994 ECU	1995 ECU	1996 ECU	1997 ECU	1998 EUR	1999 EUR	2000 EUR	2001 EUR
Extra EU	462 580	508 185	594 154	678 841	823 151	1 248 674	2 068 153	2 182 493
European Free Trade Association of which	49 338	53 264	55 991	63 530	88 329	100 772	134 481	191 802
Switzerland	42 300	45 408	46 410	52 161	78 415	80 888	105 706	160 124
Norway	6 390	6 816	8 515	9 926	9 113	19 030	27 084	29 858
New EU Member States of which	–	–	–	–	–	–	71 409	89 718
Czech Republic	3 437	4 367	6 087	8 013	9 841	12 600	15 179	18 449
Hungary	4 246	5 014	6 305	8 504	11 085	12 571	16 836	20 216
Poland	2 066	3 068	4 643	7 150	10 593	17 922	27 763	34 508
Russia	531	776	1 417	2 419	2 854	4 303	6 123	8 595
Africa	15 400	16 715	18 172	23 861	24 514	38 515	45 522	54 355
North America of which	212 206	224 201	252 139	317 369	435 642	671 254	770 555	922 362
USA	196 564	207 181	232 967	293 196	411 096	640 020	696 928	843 992
Canada	15 641	17 020	19 174	24 173	24 548	31 235	73 626	78 354
Central America	31 995	32 206	34 027	44 218	38 631	48 767	69 107	88 565
South America of which	32 822	35 733	42 274	55 764	81 235	108 977	151 872	162 652
Brazil	16 071	17 061	20 417	24 487	37 333	52 468	70 043	74 508
Argentina	5 198	6 236	7 447	11 264	23 371	30 188	45 792	50 397
Asia of which	47 971	51 861	64 951	73 370	80 550	110 354	128 746	153 284
Japan	10 855	11 047	12 062	11 694	13 393	23 835	28 635	25 853
China	1 645	2 322	3 565	5 939	6 586	10 527	13 911	17 767
India	1 524	1 569	1 964	2 613	2 981	4 107	5 097	5 509
ASEAN	18 974	20 576	26 944	29 526	28 047	35 375	36 234	51 439
Oceania of which	24 201	26 109	31 494	33 862	25 924	28 569	33 416	41 534
Australia	19 937	20 967	26 502	27 953	21 285	25 028	28 543	36 105

Source: Eurostat, 2004.

Second, with respect to extra-EU FDI outflows in the early 2000s, the general trend of declining investments occurred in the vast majority of countries outside the European Union. According to Eurostat, extra-EU FDI outflows contracted in 2002 for the second consecutive year, with a value of €140 billion, which is 48 per cent lower than 2001. In general, the EU invested much less in most countries outside the EU in 2002 than in 2001, with a few exceptions such as Switzerland, Australia, Canada and the EU acceding countries (i.e. the new EU member states after 1 May 2004). Specifically, the trend of EU FDI to the emerging markets, particularly to the new EU member states in the early 2000s, compared with other destinations such as Far East Asia in the same period, is largely affected by regional economic integration into the EU itself.

In terms of annual growth rate, China (+43 per cent) ranked number one in 2001 (due to its WTO membership) followed by Argentina (+29 per cent) and the Czech Republic (+15 per cent). In 2002, the Czech Republic (+84 per cent) ranked the first amongst main destinations, followed by Switzerland (+51 per cent) and Australia (+41 per cent) (cf. Figures 1 and 2).

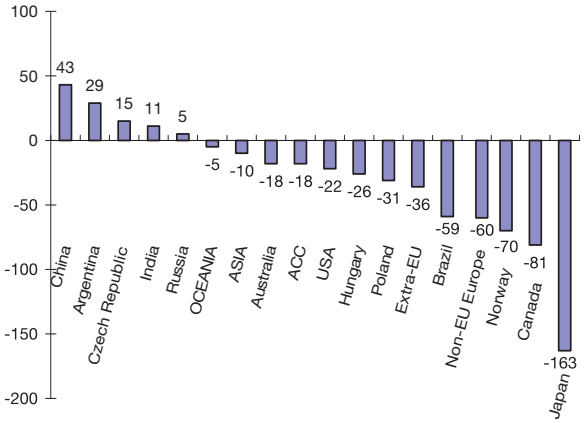
In terms of annual regional growth rate, EU FDI outflows to the new EU member states declined by 18 per cent in 2001, and were more or less stable (-1 per cent) in 2002. The annual growth of EU FDI flows to Asia contracted by 10 per cent in 2001/2000 and by 34 per cent in the 2002/2001 period. The annual growth rate of EU FDI in China declined sharply from +43 per cent in 2001/2000 to -18 per cent in 2002/2001 period, marking the greatest decline among all destinations (cf. Figures 1 and 2).

Third, the new EU member states accounted for 16.1 per cent and 12.4 per cent of total extra-EU FDI outflows in 2001 and 2002 respectively, while the figures for Latin America were 14.8 per cent and 14.7 per cent and for China 2.6 and 2.0 per cent.[23]

With regard to cumulative FDI inflows, extra-EU FDI to the new member countries increased from ECU 6.0 billion in 1997 to €16.1 billion in 2002. The cumulative EU FDI to the new member countries represented at least 4.8 per cent of total extra-EU FDI in this period.

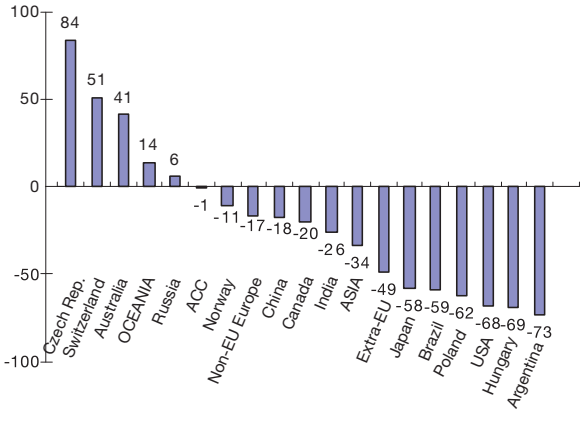
[23] Eurostat: Eurostat Yearbook, Luxembourg 2003.

Figure 1
EU FDI Outflows, Growth Rate 2001/2000 for Selected Main Destinations



Source: Eurostat.

Figure 2
EU FDI Outflows, Growth Rate 2002/2001 for Selected Main Destinations



Source: Eurostat.

In the same period, extra-EU FDI to China stood at only ECU 1.8 billion in 1997 and €2.57 billion in 2002, and cumulative EU FDI to China accounted for about only 0.8 per cent of Europe's FDI outflow from 1997 to 2002. Furthermore, EU FDI accounted for the lion's share of FDI inflows into the new EU member states.

Fourth, the new EU member states are found to rely more than China on FDI from the EU. In the year 2000, for example, 79 per cent of total FDI in the then EU acceding countries came from the EU, albeit this only represented 6.3 per cent of total extra-EU FDI. In the same year, EU FDI inflows accounted for 11 only per cent of total FDI in China. Consequently, and as confirmed by a direct comparison of the data in Table 2, the CEEC-8 among the new EU member states are shown as privileged partners of the EU and the gap between the CEEC-8 and China in terms of annual EU FDI inflows is rather large and has a tendency to widen.

Finally, the sectoral breakdown of EU FDI in the new EU member countries is very different from the sectoral pattern (predominance of the manufacturing sector) of EU FDI in the Chinese market.

CEC[24] and Eurostat data give the geographical breakdown of FDI to the major CEEC-8 and they also provide detailed data by sector of activity. As far as EU FDI stock until 1999 is concerned, three countries supply more than half of the FDI to candidate countries: the Netherlands (22 per cent), Germany (20 per cent) and the United States (9 per cent). The relative importance of Austria, when size is accounted for, should also be noted. FDI is distributed almost evenly between manufacturing and service activities. Services account for between 51 and 53 per cent of total FDI stocks in the Czech Republic, Poland, Slovenia and the Slovak Republic, and for 65 per cent in the Baltic countries. Generally speaking, EU investors, particularly from mainland Europe, prefer to invest in the CEECs which are geographically close to their own countries and in sectors such as trade and repairs, financial intermediation, and transport and communication. Because of geographical proximity Swedish investors were active in the Baltic States such as Estonia and supplied 41 per cent of total FDI stock in the area, concentrating their assets mainly in financial

Table 2
EU FDI Outward Flow to CEEC-8 and China

(ECU/EUR million)

	1995	1996	1997	1998	1999	2000	2001	2002
NMS	-	-	6 000	9 800	12 100	19 900	16 300	16 100
Czech Republic	1 944	1 155	1 592	1 670	3 055	2 943	3 377	6 224
Estonia	-	72	88	384	331	276	281	343
Latvia	-	23	53	63	115	435	250	22
Lithuania	-	64	61	433	241	211	188	191
Hungary	2 378	1 442	1 768	2 705	121	4 864	3 591	1 103
Poland	1 153	2 424	2 420	4 218	7 662	9 352	6 456	2 454
Slovenia	81	85	164	168	481	127	521	1050
Slovakia	108	278	275	307	347	1 366	1 346	4 003
China	787	1 654	1 816	435	2 196	2 181	3 124	2 570
China's Percentage to NMS	-	-	30.27 %	4.44 %	18.15 %	10.96 %	19.17 %	15.96 %

Source: Eurostat and author's calculations.

[24] Commission of the European Union Foreign Direct Investment Yearbook 2001, Brussels 2001.

intermediation, and transport and communication. Investors from the Netherlands, followed by those from Germany and the UK, were the largest contributors of FDI in the Czech Republic and Poland. German and Dutch investors played a dominant role in manufacturing industries such as metal and mechanical products, vehicles and food products. Belgium and Luxembourg dominate the financial intermediation industry in the Czech Republic, whereas most of Austria's FDI stocks (84 per cent) are in Slovenia and 25 per cent in the Slovak Republic.

Defining EU FDI Deflection

The strategic response of MNCs to a more integrated area such as European Union gives rise to what Kindleberger[25] called investment-creation and investment-diversion phenomena. Investment creation, i.e. the surge of inward FDI from non-member countries can be seen as the strategic response of firms to trade diversion.[26] Investment diversion, in contrast to investment creation, was defined by Kindleberger as a strategic response to trade creation. According to Kindleberger, it stemmed from the anticipated reorganisation of the European investment of outside companies that were already established in Europe to take advantage of newly arisen opportunities for economies of scale and specialisation, thus causing a shift of investment from one member to another. As a result, Kindleberger's study of the investment-creation and investment-diversion phenomena remained very much within the scope of the EU itself (i.e. intra-EU). However, the studies of some contemporary events (e.g. the fifth EU enlargement with the possible EU FDI diversion to the CEEC-8 and the further opening up of the People's Republic of China as a competitive EU FDI host country) do suggest that substantial modifications must be made to the received FDI theories.

One way in which the theory can be developed further is by introducing the notion of "FDI deflection" in the analysis of extra-EU FDI to the CEECs versus China. By "FDI deflection" we mean the strategic response of MNCs (from the EU in our case) to the EU enlargement, which requires the reorganisation of production within their global production networks (GPNs), thus calling for a shift of investment across regions (i.e. from the EU, and in particular the new EU member states, to China, and in particular to its coastal provinces). This stems from the fact that the CEECs and China may be seen by the MNCs as competing directly one with another in terms of FDI location.

The word "deflection" is used because it implies, in everyday usage, a deviation from (something). This concept of "deflection" goes beyond the idea of "investment diversion" presented in Kindleberger's work in that it considers a shift of investment across regions, as opposed to within regions. Furthermore, EU FDI deflection includes, but is not limited to, FDI relocation.[27] It is broader as it refers to all EU FDI (i.e. old and new) that is being located in a Chinese province (in our specific context) after consideration of specific EU regions/countries as alternative locations. In contrast, relocation implies the shift of an already existing investment pool.

Hypothesis and Model Development

As highlighted above in the literature review, the literature on the potentiality of EU FDI diversion across regions of the world, say, Europe and Asia, in the context of the fifth EU enlargement is sparse. This article therefore introduces for the first time a model for measuring EU FDI deflection between regions, i.e. China and the new EU member states.

The rationale behind the idea of EU FDI deflection is that the economic structure of some of the CEEC-8 shows characteristics comparable to those of some of the Chinese provinces. This implies that the CEEC-8 may be seen by EU firms that organise their production within the ambit of a GPN as a competing location with China in terms of EU FDI, and *vice versa*. Whether the CEEC-8 can compete directly with some of the Chinese provinces depends on their *structural similarity* (denoted as *S*).

In order to measure the extent of S between the CEEC-8 and China, the analysis will be confined to the CEEC-8 and to the major recipients of EU FDI among the Chinese provinces (i.e. Provinces in Bohai Rim, the Yangtze River Delta and the Pearl River Delta). The selected data is for the years 2001 and 2002.[28] Comparing the CEE countries to Chinese provinces with regard to their attractiveness for EU FDI involves de-

[25] C. P. Kindleberger: European integration and the international corporation, in: Columbia Journal of World Business, Vol. 1, 1966, pp. 65-73.

[26] UNTCMD (United Nations Transnational Corporations and Management Division): From the Common Market to EC 92: Regional Economic Intergration in the European Community and Transnational Corporations, New York 1992.

[27] Relocation refers to the physical shift (i.e. displacement) from location a in t_1 to location b in t_2.

[28] The reasons for choosing data for 2001 and 2002 are as follows: (i) Since the early 2000s the issue of EU FDI to China associated with the changing composition of the EU (i.e. the fifth EU enlargement) and its possible impact on EU FDI inter-regional flows has begun to grow in importance, (ii) It would be better to include the data from 2001 to the present, but the data for EU FDI to Chinese provinces in 2003 and 2004 were not available at the time of this research.

Table 3
Specification of Variables in the Regression Analysis and Predication of EU FDI Inflows to China from 1996 to 2002

Variable Names	Specification of Variables	Source
Dependent variable		
EU FDI inflows to China 1996 to 2002	EU FDI inflows in realised value in each Province from 1996 to 2002 (ten thousand USD)	Almanac of China Foreign Economic and Trade; Statistical yearbooks of each province, 1997-2003
Independent variables		
PGDP	Gross Domestic Product of each province from 1996 to 2002 (RMB Yuan current price) and expected to be positive.	China Statistical Yearbook, 1997-2003
PMKT	Market proximity gives an indication of market access. It reflects the importance of freight in each province and it is calculated as the number of 100 million ton-km including national railways, local railways, highways and waterways, divided by the population in each province, from 1996 to 2002. This is expected to be positive.	
EW	The efficiency wage is measured as the ratio between the average wage per province/municipality and the average productivity per province/municipality from 1996 to 2002. The calculation of average productivity is the total industrial output divided by the total number of workers. The lower the ratio, the higher the efficiency wage, and the more attractive to FDI. This is expected to be negative.	
EDU	This variable relates to the educational level in each province and it is measured as the percentage of employees above college level in each Province from 1996 to 2002. This is expected to be positive.	
RCXA	The revealed comparative export advantage variable gives an indication of relative export performance by provinces. It is defined as an indicator between a trade openness index and a standard RCA (Revealed Comparative Advantages) index. RCXA=(Xi/GDPi) / (Xn/GDPn), where Xi/GDPi is the value of exports in each province divided by provincial GDP and Xn/GDPn is the value of national exports divided by national GDP from 1996 to 2002. This is expected to be positive.	
LOC	Coastal location as a dummy variable, which assumes a value of 1 if the province is a coastal location, and of 0 otherwise. This is expected to be positive.	

fining structural similarity so as to formulate the appropriate hypothesis and model.

Hypothesis: Consider two locations *x* and *z*, with *x* being a traditional host for FDI and *z* being a possible new host; if there is *structural similarity* between *x* and *z*, then FDI flows are likely to be diverted (or deflected) away from *x* and into *z*. Therefore, it is posited that the incidence of EU FDI deflection from one location to another is determined by their structural similarity, i.e. by the similarity of their economic structures. It is assumed that the greater the degree of structural similarity between any two locations *x* and *z*, the greater the incidence of FDI deflection between them.

The first issue is therefore to define structural similarity. In order to measure the distance (or, conversely, proximity) between locations' structural features a composite indicator to define structural similarity can be constructed by using the Euclidian distance.

The Euclidian distance is defined as the distance between two locations *x* and *z*, which is:

$$d(x, z) = \left\| x - z \right\| = \sqrt{\left[\sum_{i=1}^{n} (x_i - z_i)^2 \right]}$$

The distance between any pair of a Chinese province and a country in the CEEC-8 can be measured to disclose their structural similarity. A number of macroeconomic indicators[29] such as GDP (GDP per capita at PPP compared to the EU25 average), LAB (labour productivity in terms of efficiency wages), and HK (human capital measured by the ratio of expenditure on human resources, i.e. government funding education, to GDP), help define structural characteristics of *x* (and of *z*). Therefore x_i is a vector of structural characteristics of location *x* and can be computed for each year.

At the theoretical level, it can be concluded that the smaller the value of d (the Euclidian distance), between any two locations *x* and *z*, the greater will be the value of *S* (e.g. the greater the degree of structural similarity) and the greater will be the probability of FDI deflection. In the limit case (i.e. where the Euclidian distance equals zero), this means that the two locations are perfect direct competitors for foreign (EU) investors, and that the probability of the occurrence of FDI deflection is at a maximum.

[29] In this analysis, we have chosen the three macroeconomic variables which are most relevant to the empirical analysis of the locational determinants of EU FDI to China and the CEEC-8 and for which data are generally available both for the CEEC-8 and for Chinese provinces. Other possible indicators such as the relative share of high-tech industry (in terms of employment, value added and total manufacturing exports) could also be chosen; however, the data are not directly relevant and were not available for the Chinese provinces at the time of the research.

Table 4
Specification of Variables in the Regression Analysis and Predication of EU FDI Inflows to CEEC-8 from 1996 to 2002

Variable Names	Specification of Variables	Source
Dependent variable		
EU FDI inflows to CEEC-8 from 1996 to 2002	EU FDI inflows value of each country from 1996 to 2002 (million euro)	Eurostat
Independent variables		
GDP	Gross Domestic Product of each country from 1996 to 2002 (million euro).	Eurostat
PMKT	Market proximity gives an indication of market access. It reflects the importance of freight in each country and it is calculated as the number of 100 million ton-km including national railways, local railways, highways and waterways, divided by the population in each country, from 1996 to 2002.	
W	The average wage is measured as the gross wages and salaries divided by total number of persons in employment per country from 1996 to 2002.	
EDU	This variable relates to the educational level in each country and it is measured as the percentage of tertiary students enrolled to population in each country from 1996 to 2002.	
RCXA	The revealed comparative export advantage variable gives an indication of the competitiveness of a country's export performance. RCXAi=(Ei/GDPi) / (En/GDPn), where Ei/GDPi is the value of exports by country i divided by its GDP and En/GDPn is the value of exports of CEEC-8 divided by total GDP of CEEC-8 from 1996 to 2002.	

Before we come to our model of FDI deflection, we need to estimate EU FDI inflows into the CEEC-8 and Chinese provinces in recent years and to find out which locations are over and under invested.

In order to predict and test the relative importance of the chosen variables in determining the location decisions of EU FDI in China in the late 1990s, a model using ordinary least squares regression is constructed:

$$(1)\ EUFDI_{it} = \alpha_i + \beta_1 GDP_{it} + \beta_2 PMKT_{it} + \beta_3 EW_{it} + \beta_4 EDU_{it} + \beta_5 RCXA_{it} + \beta_6 LOC + U_{it}$$

$EUFDI_{it}$ refers to inflows in realised value to Chinese province *i* at time *t* and is set as the dependent variable. Six determinant variables are chosen, namely: GDP (provincial gross domestic product), PMKT (per capita market proximity), EW (efficiency wage), EDU (tertiary educated workforce set as labour quality), RCXA (revealed comparative export advantage) index on a provincial level from 1996-2002. A dummy variable for "coastal location" is also added to the model. All variables used are further described in Table 3.

The prediction and test of the relation between a number of FDI determinants and EU FDI inflows into the CEEC-8 based on the data from 1996 to 2002 employs the same model and similar determinant variables (except the dummy variable for location) as the one predicting and testing locational determinant of EU FDI in China:[30]

$$(2)\ EUFDI_{it} = \alpha_i + \beta_1 GDP_{it} + \beta_2 PMKT_{it} + \beta_3 W_{it} + \beta_4 EDU_{it} + \beta_5 RCXA_{it} + U_{it}$$

Where subscript *i* refers to the individual country in CEEC-8, *t* refers to years from 1996-2002 and α_i is the intercept. All variables used are further described in Table 4.

Based on equations 1 and 2, cumulative EU FDI inflow figures for each selected location are estimated for 2001 and 2002. This is labelled $EFDI^i_{t,t+1}$ with *t* representing the year 2001 and *t+1* for 2002 and *i* the location). In the meantime, the aggregate real FDI ($\sum_i^n RFDI^i_t + \sum_i^n RFDI^i_{t+1}$) and the aggregate estimated FDI ($\sum_i^n EFDI^i_t + \sum_i^n EFDI^i_{t+1}$), for the locations in 2001 and 2002 can be calculated. The theoretical cumulative FDI inflows for each location *i* in 2001 and 2002 can then be defined as follows:

$$(3)\ TFDI^i_{t,t+1} = EFDI^i_{t,t+1} * \frac{(\sum_i^n RFDI^i_t + \sum_i^n RFDI^i_{t+1})}{(\sum_i^n EFDI^i_t + \sum_i^n EFDI^i_{t+1})}$$

A comparison of these results with real cumulative FDI ($RFDI^i_{t,t+1}$) for each location in 2001 and 2002 is shown as:

$$(4)\ \Delta FDI^i_{t,t+1} = RFDI^i_{t,t+1} - TFDI^i_{t,t+1}$$

Based on the above methodology, it is posited that the difference between cumulative real FDI and theoretical FDI for each location in the years 2001 and 2002 (i.e. $\Delta FDI^i_{t,t+1}$), denotes an FDI surplus (if the sign

[30] Note that these variables have been identified as the standard explanatory variables of FDI in the economics literature (on this issue, see for example Broadman and Sun,1997.

is positive), and an FDI deficit (in the case of a negative sign) in the two years.

If locations *x* and *z* as possible alternative locations have the same sign, it is posited that there may be no FDI deflection between them. Otherwise, it is assumed that there is FDI deflection between them. As stated above, the probability of the occurrence of FDI deflection is related to the degree of structural similarity between two locations. A binomial logistic regression model is therefore used for testing the relationship between structural similarity and the probability of FDI deflection between any pairs of locations across the two regions. The model can be written as:

$$(5)\ \text{Prob}(Y=1) = \text{logit}(X\beta) = \frac{e^{x\beta}}{(1+e^{x\beta})} = \frac{1}{(1+e^{-x\beta})}$$

In this model, the dependent variable (Y) is binary and denotes whether or not there is FDI deflection between each pair of locations by taking the values of one or zero respectively. The estimated values of the dependent variable can be interpreted as the probability of FDI deflection. X includes the two variables: structural similarity between any pair of locations, and geographical locality (if the two locations in a pair are in the same geographical area, it is denoted as 0, otherwise it is denoted as 1). Finally, β is the vector of parameters to be estimated. By introducing the geographical locality variable, our model does not exclude the possibility of having two locations in the same geographical area (say the CEEC-8) competing one with another, although the emphasis of the work remains on the inter-regional level.

Measuring Structural Similarity

Following the methodology above, the first task is to measure structural similarity by using the Euclidian distance between each pair of locations in the CEEC-8 and Chinese provinces. Due to the lack of data, seven countries in the CEEC-8 have been chosen. These are the Czech Republic (CZ), Estonia (EE), Lithuania (LT), Hungary (HU), Poland (PL), Slovenia (SI) and Slovakia (SK). For the same reason, seven out of nine Chinese provinces/municipalities (leaving out Jiangsu and Liaoning) are chosen, namely Beijing (BJ), Tianjin (TJ), Hebei (HB) and Shandong (SD) in the Bohai Rim, Shanghai (SH) and Zhejiang (ZJ) in the Yangtze River Delta and Guangdong (GD) in the Pearl River Delta. The provinces in these three industrial clusters are the major recipients of EU FDI inflows.

As noted above, the three macroeconomic variables presented in Table 5 are chosen to form the composite indicators so as to measure structural similarity between each pair of locations.

Table 5
Macroeconomic Indicators for Structural Similarity Analysis (2001 and 2002)

	2001			2002		
	Per Capita GDP in PPP (EU25=1)	LAB (EW)	HK	Per Capita GDP in PPP (EU25=1)	LAB (EW)	HK
New EU Member States						
CZ (Czech R.)	0.6620	0.0820	0.0416	0.6739	0.097	0.0441
EE (Estonia)	0.4235	0.0930	0.0550	0.4388	0.100	0.0570
LT (Lithuania)	0.4155	0.0700	0.0590	0.4352	0.077	0.0590
HU (Hungary)	0.5643	0.0860	0.0515	0.5834	0.099	0.0539
PL (Poland)	0.4587	0.1150	0.0556	0.4552	0.110	0.0541
SI (Slovenia)	0.7474	0.1680	0.0610	0.7599	0.177	0.0600
SK (Slovakia)	0.4897	0.0660	0.0400	0.5157	0.070	0.0430
Chinese Provinces						
BJ (Beijing)	0.5910	0.2755	0.0759	0.6035	0.2797	0.0683
TJ (Tianjin)	0.5264	0.2426	0.0291	0.5445	0.2332	0.0291
HB (Hebei)	0.2392	0.1915	0.0217	0.243	0.1859	0.0343
SD (Shandong)	0.2999	0.1805	0.0202	0.3106	0.1808	0.0199
SH (Shanghai)	0.8811	0.2283	0.0310	0.8897	0.2348	0.0322
ZJ (Zhejiang)	0.4202	0.3205	0.0254	0.4484	0.3225	0.0253
GD (Guangdong)	0.3930	0.2429	0.0241	0.402	0.2632	0.0276

Sources: Eurostat; China Statistical Yearbook; IMF; author's own calculations.

With regard to per capita GDP in PPP terms in relation to the EU25 average, Slovenia is positioned first in the CEEC-8 and Shanghai ranks no.1 in China. Lithuania and Shandong rank lowest in each area respectively. If we compare the per capita GDP in PPP terms to the EU25 average, the three Chinese municipalities (Beijing, Tianjin and Shanghai) and Zhejiang are comparable to the countries in the CEEC-8, while Hebei, Shandong and Guangdong are all far below the CEEC-8's average due to their large population. The efficiency wages for the seven Chinese provinces are much higher than most of the new EU member states except Poland and Slovenia. This implies significant labour productivity differences between the CEEC-8 and Chinese provinces. Although Chinese provinces are acknowledged as attractive locations in terms of labour costs, they may largely lose their comparative advantages to the CEEC-8 when taking labour productivity into account. In terms of the ratio of government funds on education to GDP, all the CEEC-8 locations maintain a slight comparative advantage over the Chinese provinces (expect Beijing). This denotes a higher level of human capital and labour quality in the CEEC-8.

Using the Euclidian distance as a tool, structural similarity results are calculated and are shown in Ta-

Table 6
Absolute Euclidian Distance between Locations

		1 CZ	2 EE	3 LT	4 HU	5 PL	6 SI	7 SK	8 BJ	9 TJ	10 HB	11 SD	12 SH	13 ZJ	14 GD
1	Czech Republic (CZ)	–	.336	.345	.134	.301	.171	.236	.287	.283	.620	.530	.368	.467	.448
2	Estonia (EE)	.336	–	.034	.202	.046	.469	.111	.349	.252	.302	.221	.671	.322	.231
3	Lithuania (LT)	.345	.034	–	.212	.074	.485	.113	.378	.283	.311	.234	.689	.354	.262
4	Hungary (HU)	.134	.202	.212	–	.169	.279	.108	.266	.216	.491	.403	.484	.381	.340
5	Poland (PL)	.301	.046	.074	.169	–	.428	.095	.308	.213	.326	.240	.630	.301	.221
6	Slovenia (SI)	.171	.469	.485	.279	.428	–	.385	.267	.326	.727	.637	.208	.501	.519
7	Slovakia (SK)	.236	.111	.113	.108	.095	.385	–	.328	.245	.408	.323	.589	.372	.302
8	Beijing (BJ)	.287	.349	.378	.266	.308	.267	.328	–	.121	.523	.441	.417	.248	.292
9	Tianjin (TJ)	.283	.252	.283	.216	.213	.326	.245	.121	–	.422	.336	.495	.186	.198
10	Hebei (HB)	.620	.302	.311	.491	.326	.727	.408	.523	.422	–	.093	.913	.332	.240
11	Shandong (SD)	.530	.221	.234	.403	.240	.637	.323	.441	.336	.093	–	.824	.271	.167
12	Shanghai (SH)	.368	.671	.689	.484	.630	.208	.589	.417	.495	.913	.824	–	.651	.691
13	Zhejing (ZH)	.467	.322	.354	.381	.301	.501	.372	.248	.186	.332	.271	.651	–	.112
14	Guangdong (GD)	.448	.231	.262	.340	.221	.519	.302	.292	.198	.240	.167	.691	.112	–

Source: Results from the output of the test on Euclidian distance.

ble 6. Hebei province has the greatest distance to Shanghai (0.913), followed by Slovenia (0.727) and the Czech Republic (0.620). These results show the location with which Hebei is mostly structurally dissimilar. The distance between Hebei and Poland is less than all the distances between Hebei and any other Chinese provinces/municipality expect Shandong and Guangdong. This implies that Poland, among the CEEC-8 countries, most resembles Hebei, after Shandong and Guangdong in the Chinese provinces. Similar results are also found for the relationship between Tianjin and Poland.

The absolute Euclidian distance between Estonia and Lithuania is the smallest (0.034) in the CEEC-8 and between Hebei and Shandong (0.093) in the Chinese provinces, implying that the two locations in each pair are close in terms of structural similarity. Among the Chinese provinces/municipalities, Shanghai is the most similar to the CEEC-8. It is found to be closer to Slovenia (0.208) than to Beijing (0.417), and closer to the Czech Republic (0.368) than to Tianjin (0.495) respectively.

Predicting EU FDI Inflows

We shall now predict EU FDI inflows into the CEEC-8 and into the Chinese provinces using a regression analysis of the determinants of EU FDI in the two broad areas. Following the model described above, the data related to EU FDI in China and CEEC-8 was run using STATA with OLS, fixed effect and random effect models to create the regression equation; the total observation is 129 cases for China and 44 cases for CEEC-8. The time span is seven years.

Both results of the tests show that the OLS model and random effects model (the result of the Hausman test favoured the random effects model over the fixed effect model) are favoured. Using the results in the econometric analysis of EU FDI inflows to both China and CEEC-8 from each OLS model, the predicated values of EU FDI inflows to each of the CEEC-8 countries and selected Chinese provinces in 2001 and 2002 are shown in Table 8. The predicted and real values of EU FDI inflows to Chinese provinces are further transformed into euro from US dollar based on the exchange rate in 2001 and 2002. Following the meth-

Table 7
Cumulative EU FDI in Each Location in 2001 and 2002 (million euro)

	Cumulative Value of EU FDI Inflows in 2001 and 2002 to Each Location			Cumulative Δ EU FDI in 2001 and 2002
	Real Value	Predicted Value	Theoretical Value	Value of FDI Surplus/Deficit
Czech Republic	9601	6175.252	6326.751	3274.249
Estonia	624	387.8837	397.1994	226.8006
Lithuania	379	377.6346	386.7042	-7.7042
Hungary	4694	5153.2	5276.964	-582.964
Poland	8910	13804.92	14136.47	-5226.47
Slovenia	1571	1691.55	1732.176	-161.176
Slovakia	5349	2573.821	2635.636	2713.364
Beijing	469.147	465.4672	476.6463	-7.49932
Tianjin	263.5747	379.8376	388.9601	-125.385
Hebei	155.7284	318.7524	326.4078	-170.679
Shandong	518.7503	637.8031	653.1211	-134.371
Shanghai	623.5624	622.9599	637.9215	-14.3591
Zhejiang	311.824	546.0375	559.1516	-247.328
Guangdong	1560.985	1057.592	1082.993	477.9924

Source: Author's calculation based on the output of the regression model on EU FDI to China and EU FDI to the CEEC-8 based on the OLS models.

Table 8
Pairs of Locations

Case No.	Pairs of Locations*	ED	Deflection	GL	Case No.	Pair of Locations**	ED	Deflection	GL
	CEEC-8					**CEEC-8 versus Chinese Provinces**			
					43	SI-SH	0.208	0	1
1	EE-LT	0.034	1	0	44	PL-TJ	0.213	0	1
2	EE-PL	0.046	1	0	45	HU-TJ	0.216	0	1
3	LT-PL	0.074	0	0	46	EE-SD	0.221	1	1
4	PL-SK	0.095	1	0	47	PL-GD	0.221	1	1
5	HU-SK	0.108	1	0	48	EE-GD	0.231	0	1
6	EE-SK	0.111	0	0	49	LT-SD	0.234	0	1
7	LT-SK	0.113	1	0	50	PL-SD	0.240	0	1
8	CZ-HU	0.134	1	0	51	SK-TJ	0.245	1	1
9	HU-PL	0.169	0	0	52	EE-TJ	0.252	1	1
10	CZ-SI	0.171	1	0	53	LT-GD	0.262	1	1
11	EE-HU	0.202	1	0	54	HU-BJ	0.266	0	1
12	LT-HU	0.212	0	0	55	SI-BJ	0.267	0	1
13	CZ-SK	0.236	0	0	56	CZ-TJ	0.283	1	1
14	HU-SI	0.279	0	0	57	LT-TJ	0.283	0	1
15	CZ-PL	0.301	1	0	58	CZ-BJ	0.287	1	1
16	CZ-EE	0.336	0	0	59	PL-ZJ	0.301	0	1
17	CZ-LT	0.345	1	0	60	EE-HB	0.302	1	1
18	SI-SK	0.385	1	0	61	SK-GD	0.302	0	1
19	PL-SI	0.428	0	0	62	PL-BJ	0.308	0	1
20	EE-SI	0.469	1	0	63	LT-HB	0.311	0	1
21	LT-SI	0.485	0	0	64	EE-ZJ	0.322	1	1
					65	SK-SD	0.323	1	1
	Chinese Provinces				66	PL-HB	0.326	0	1
					67	SI-TJ	0.326	0	1
22	HB-SD	0.093	0	0	68	SK-BJ	0.328	1	1
23	ZJ-GD	0.112	1	0	69	HU-GD	0.340	1	1
24	BJ-TJ	0.121	0	0	70	EE-BJ	0.349	1	1
25	SD-GD	0.167	1	0	71	LT-ZJ	0.354	0	1
26	TJ-ZJ	0.186	0	0	72	CZ-SH	0.368	1	1
27	TJ-GD	0.198	1	0	73	SK-ZJ	0.372	1	1
28	HB-GD	0.240	1	0	74	LT-BJ	0.378	0	1
29	BJ-ZJ	0.248	0	0	75	HU-ZJ	0.381	0	1
30	SD-ZJ	0.271	0	0	76	HU-SD	0.403	0	1
31	BJ-GD	0.292	1	0	77	SK-HB	0.408	1	1
32	HB-ZJ	0.332	0	0	78	CZ-GD	0.448	0	1
33	TJ-SD	0.336	0	0	79	CZ-ZJ	0.467	1	1
34	BJ-SH	0.417	0	0	80	HU-SH	0.484	0	1
35	TJ-HB	0.422	0	0	81	HU-HB	0.491	0	1
36	BJ-SD	0.441	0	0	82	SI-ZJ	0.501	0	1
37	TJ-SH	0.495	0	0	83	SI-GD	0.519	1	1
38	BJ-HB	0.523	0	0	84	CZ-SD	0.530	1	1
39	SH-ZJ	0.651	0	0	85	SK-SH	0.589	1	1
40	SH-GD	0.691	1	0	86	CZ-HB	0.620	1	1
41	SD-SH	0.824	0	0	87	PL-SH	0.630	0	1
42	HB-SH	0.913	0	0	88	SI-SD	0.637	0	1
					89	EE-SH	0.671	1	1
					90	LT-SH	0.689	0	1
					91	SI-HB	0.727	0	1

Notes: * Locations in the same region. ** Inter-regional locations.

odology above, the theoretical values, of FDI surplus/deficit for each of the 14 locations are calculated, and presented in Table 7.

As Table 7 shows, the Czech Republic, Estonia, Slovakia and Guangdong are over-invested locations and received more EU FDI in 2001 and 2002 than their potential. The remaining ten locations are under-invested and received less EU FDI in 2001 and 2002 than their potential. Therefore, the risk of FDI deflection in each pair of locations is identifiable and will be disclosed below.

Test Results

Table 8 highlights the data used to test the relations between structural similarity and EU FDI deflection among locations. The fourteen chosen locations can be grouped into 91 pairs of locations. Using the information from Table 7, if the two locations within any pair have different signs (i.e. one has an FDI surplus and the other a deficit), it is posited there is a risk of FDI deflection between the two locations and their relationship is denoted by 1; otherwise it is denoted by 0. Taking geographical locality into consideration, if the two locations in a pair are in the same geographical area, it is denoted as 0, otherwise it is denoted as 1. The Euclidian distances among the 91 pairs of locations are rearranged in ascending order. The results relating to the pairs involving a CEEC-8 and a Chinese location, which are the primary focus of this research, are given on the right of Table 8. The results of the pairs in the CEEC-8 and Chinese provinces alone are given on the left of Table 8.

Following the methodology above, the binary logistic regression model will be used (Eq. 4). In this model, Y (the probability of the occurrence of FDI deflection) is an option within a binary choice. X includes two variables: structural similarity measured by ED (Euclidian distance) between any pair of locations and GL (geographical locality). Therefore, the probability of obtaining a particular value of Y (the dependent variable) is affected by these two explanatory variables.

Following the hypothesis formulated, the impact of the Euclidian distance variable is expected to be negative. This indicates that a greater Euclidian distance (i.e. a lower structural similarity) between any two locations is associated with a lower probability of the occurrence of FDI deflection between these two locations. Our model also includes the possibility of having two locations in the same geographical area competing one with another (i.e. by introducing the geographical locality variable), although the emphasis of the work remains on the inter-regional level.

Table 9
Binary Logistic Regression Result
(Dependent Variable: FDI Deflection)

	Coefficient	S.E.	Wald	Sig.
Constant	0.347	0.495	0.491	0.483
ED (S)	-2.162*	1.341	2.599	0.107
GL	0.255	0.446	0.327	0.568
-2 Log-Likelihood			121.971	
R Square (Cox & Snell)			0.031	
R Square (Nagelkerke)			0.041	
Omnibus tests of model coefficients				
Chi-square (2df)			2.849	0.241
Hosmer-Lemeshow Test				
Chi-square (8df)			3.813	0.874
No. of Observations			91	

*Significant at the 10 per cent level

The binary logistic regression was run with SPSS and the sample includes 91 observations. Table 9 presents the empirical results of the binary logistic regression.

The –2 log-likelihood was 121.971, the Cox & Snell R Square is 0.031 and the Nagelkerke R Square 0.041 respectively. The Hosmer-Lemeshow statistics shows a Chi-square with 8 degrees of freedom and its *p* value (0.874) is not significant, suggesting a good model calibration and goodness of fit. Overall, the model correctly classified 56 per cent of the observations.

The coefficient on the ED variable has a Wald statistics equal to 2.599 and was found to be negative and significant at the 10 per cent level. The negative coefficient on the ED factor indicates that an increasing Euclidian distance between any pair of locations (i.e. a lower degree of structural dissimilarity) tends to occur with decreasing probability of FDI deflection. In other words, the probability of FDI deflection between any pair of locations is negatively related to the importance of the Euclidian distance between them, or the more the structural similarity and the greater the probability of FDI deflection. The coefficient on GL has a low Wald statistic equal to 0.327 and was found to be positive and insignificant. Statistically, there was no significant relationship between FDI deflection and geographical locality. As a result, there was some evidence to support the proposed hypothesis: the smaller the Euclidian distance or the greater *S* (e.g. the greater the degree of structural similarity) between any pair of locations, the greater the probability of the occurrence of FDI deflection. Although the hypothesis is not strongly supported by these results, this pioneer study on EU FDI deflection between the CEEC-8 and China does present some evidence that structural similarity is an important variable in explaining the probability of the occurrence of EU FDI deflection between locations.

Summary and Conclusions

Up to now, the vast majority of empirical and less empirical studies have focused on the regional determinants of FDI within a specific area, e.g. within the EU. Although the accession of the CEEC-8 to the EU has led to deeper studies on the topic of the fifth EU enlargement and intra-EU FDI, the issue of EU FDI relocation or deflection across regions of the world, say Europe and Asia, has not been satisfactorily explored. This points to a new possible research direction on the issue of EU FDI to China in the early 2000s associated with the changing composition of the EU and its possible impact on EU FDI flows across regions. Addressing this new research question was the objective of this article. This empirical research has proved to be a starting-point in the econometric analysis of potential EU FDI deflection across structurally similar locations in the CEEC-8 and China.

Although the results of this pioneering study supported the hypothesis proposed, several limitations may affect the expected results. First, the data is confined to a short time-span, and this may only give insights into the situation at one moment in time, neglecting the trend over a longer period (i.e. from the early 2000s to the present). Second, due to a lack of sufficient data, Latvia in the CEEC-8 and some locations in the coastal provinces in China had to be omitted. This resulted in the reduction of the number of observations in the empirical test. Third, the results on the regression analysis on the determinants of EU FDI are general in nature and fail to take into account the specificity of certain industries. Some industries may be sensitive to market proximity, which weakens the probability of FDI deflection. Finally, as EU FDI inflows are not a fixed pool to be devided among the CEEC-8, China and the rest of world, it is difficult to predict with a great degree of accuracy the amount and direction of FDI deflection among the chosen locations. For example, the decline of EU FDI in a certain year to Chinese provinces does not necessarily imply the diversion of this particular investment to the CEEC-8 since other locations such as Latin America can be chosen, in the case of some industries, as an alternative destination. Therefore, future research needs to include more locations and more suitable variables.