

FOREIGN DIRECT INVESTMENT IN CENTRAL EUROPE – DOES IT CROWD IN DOMESTIC INVESTMENT?

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Abstract:

In this article, we tried to estimate whether foreign direct investment in the Czech Republic, Hungary and Poland crowds in or crowds out domestic investment. We used a model of total investment that introduced, from the point of view of the recipient country, foreign direct investment as an exogenous variable. We found that for the time period 1990 – 2000 there was an evidence of crowding out effect in Poland. In Hungary we found a crowding in effect for the time period 1990 – 2000 as well as for the Czech Republic for the time period 1993 – 2000.

Keywords: investment, foreign direct investment, investment incentives, crowding in effect, crowding out effect

JEL Classification: F210, F230

1. Introduction

Foreign direct investment (FDI)¹⁾ is considered to be one of the most important channels through which countries may obtain resources for their development. Economic literature distinguishes between direct and indirect effects of foreign investment on a host country. Among the major potential positive direct economic effects belongs growth of the real income in a host country as a result of capital import, technology, and skills, which would be otherwise unavailable. Externalities or side effects include the diffusion of imported skills efficiency and the creation of close links with home economies. As also observed in several studies, domestic firms become more competitive after becoming suppliers and buyers of products of foreign owned companies.

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1) Foreign direct investment is defined by United Nations Conference on Trade and Development (UNCTAD) as an investment involving management control of a resident entity in one economy by an enterprise resident in another economy. FDI involves a long-term relationship reflecting an investor's lasting interest in a foreign entity (see <http://www.unctad.org>, Press Release, TAD/INF/2856, 3 October 2000).

2. Foreign Direct Investment in Central Europe

Foreign direct investment has played a significant role during the transformation process in the Central European countries since 1989. Among the countries, which have mostly benefited from the FDI inflows belong Hungary, the Czech Republic and Poland. They have been more successful in attracting foreign direct investment than any other country in Central Europe. Major factors encouraging high FDI inflows into these three countries were: relatively small level of risk associated with these three countries compared to other countries in the region, they were three of the largest economies in the region (measured by GDP per capita), the earlier liberalization, the fastest recovery from the transitional recession, and the fastest restructuring and stabilisation of their economies as well as political systems. Furthermore, approximation towards the EU and trade linkages with the Western countries have helped in attracting FDI into these countries.

Table 1

Foreign Direct Investment in the Central European Countries

Country	Foreign Direct Investment Inflow									Cumulative FDI Inflow between 1990 – 2000	
	FDI inflows (USD million)			FDI inflow per capita (USD)			FDI inflow / GDP (per cent)			USD million	per capita
	1998	1999	2000	1998	1999	2000	1998	1999	2000	2000	2000
Czech Republic	3,718	6,324	4,595	361	615	447	6.4	11.8	9.0	23 098	2 247
Hungary	2,036	1,944	2,135	201	193	196	4.3	4.0	4.1	21 362	2 094
Poland	5,129	4,884	8,291	132	174	230	3.3	4.4	5.2	28 619	1 015

Source: WIIW Database; UN/ECE secretariat, based on national balance of payments statistics, Economic Survey of Europe, 2001, No. 1.

The high amount of FDI capital in these three countries has resulted in an increasing share of foreign affiliates in production and employment. The role of foreign affiliates is more important in manufacturing, retail trade and banking than in other branches of the economy. In Hungary as much as 70 per cent of manufacturing sales in 1998 came from foreign investment enterprises, which employed 45 per cent of manufacturing labour force. In 1999, these shares increased to 73 per cent and 46 per cent respectively (see Table 2). In Poland, foreign investment enterprises participated in manufacturing sales with 41 per cent in 1998 and they employed 26 per cent of manufacturing labour force. In the Czech Republic the share of foreign enterprises in manufacturing sales reached 32 per cent in 1998 and they were

Table 2

Shares of Foreign Enterprises in Main Indicators of Manufacturing Companies (in per cent)

	Equity capital			Employment			Investment			Sales			Export sales		
	1996	1998	1999	1996	1998	1999	1996	1998	1999	1996	1998	1999	1996	1998	1999
Czech Republic	1.5 ¹⁾	27.9	n.a.	13.1	19.6	n.a.	33.5	41.6	n.a.	22.6	31.5	n.a.	15.9	47.0	n.a.
Hungary	67.4 ²⁾	72.7 ²⁾	72.9 ²⁾	36.1	44.9	46.5	82.5	78.7	n.a.	61.4	70.0	73.0	77.5	85.9	88.8
Poland	29.3	43.2	n.a.	12.0	26.0	n.a.	30.6	51.0	n.a.	17.4	40.6	n.a.	26.3	52.4	n.a.

1) Own capital.

2) Nominal capital in cash.

Source: Hunya, 2001.

employing 20 per cent of labour force. In all these three countries labour productivity and investment propensity is much higher in the foreign sector than in the domestic sector.

3. Investment – Key Determinant of Economic Growth

It is generally accepted in the economic literature that investment is a key variable determining economic growth, and thus when evaluating the impact of FDI on the economic development in a host country a key question arises whether foreign investment crowds in domestic investments or whether it has the opposite effects of displacing domestic producers. If foreign direct investment crowds out domestic investment or does not contribute to capital formation, then there would be a question about its benefits for recipient countries.

Effects of foreign direct investment on domestic investment may vary a lot as it depends on several factors such as domestic country policy, specific kinds of foreign direct investment received by a host country and on the strength and financial situation of domestic enterprises. Foreign direct investment, which brings in goods and services that are new to a domestic economy usually have favourable effects on capital formation²⁾ than foreign direct investment in sectors with already existing domestic companies. On the other hand, if foreign investors invest in sectors with competing domestic companies it may cause the effect of emptying investment opportunities for domestic investors in favour of foreign investors.³⁾ Moreover, the contribution of foreign investment to capital formation is usually more positive when sectorial distribution of foreign direct investment is considerably different from the distribution of the existing capital stock than when the distribution of foreign direct investment is almost the same as the existing distribution of the capital stock.

In this article, we tried to estimate whether foreign direct investment in transitive economies in Central Europe (in the Czech Republic, Hungary and Poland) crowds in or crowds out domestic investment. We used a modified theoretical model carried out by Agosin, Mayer, (1999) which the authors applied for the period 1970 – 1996 and two subperiods 1976 – 1985 and 1986 – 1996 in three developing regions (Africa, Asia and Latin America). Results of their testing indicated in Asia, and less obviously in Africa, strong crowding in of domestic investment by foreign direct investment. On the other hand, strong crowding out was identified in Latin America. As the authors stated one reason for crowding out in Latin America was much weaker overall investment than in Asia and also the fact that Latin American countries were less selective about foreign direct investment than Asian countries.

4. Theoretical Model of Investment with Foreign Direct Investment

The theoretical model for the evidence of crowding in or crowding out in Asia, Africa and Latin America was developed by Agosin and Mayer. In our paper we modified this model for the conditions in the Czech Republic, Poland and Hungary.

2) In this case the effects on capital formation are positive and foreign investors do not displace domestic investors because they offer new products (services) for which domestic investors are not able to offer.

3) In this case the effects are obviously negative because the contribution to total capital formation of such FDI is presumably to be less than the FDI flow itself.

In order to find the empirical evidence of crowding in or crowding out we used a model of investment in transitive countries that introduced, from the point of view of the recipient country, foreign direct investment as an exogenous variable. For our paper we considered that FDI depended on variables that related to conditions in the world economy, multinational strategies, etc.

The analysis of the FDI effects on investment starts from the identity, which states that total investments in the time period t (I_t) is the sum of domestic investment ($I_{d,t}$) and investment undertaken by multinationals ($I_{f,t}$):

$$I_t = I_{d,t} + I_{f,t}, \quad (1)$$

where I_f is at most cases thought as of FDI. However, this is an over-simplification because foreign direct investment is not an equivalent to new investments by foreign enterprises. FDI is indeed a financial balance of payments concept and investment is a real national accounts variable. Much FDI, mainly in recent years, never becomes investment in real terms because mergers and acquisitions (M&As)⁴⁾ represent only ownership transfers of existing assets from domestic to foreign enterprises. Thus, investments undertaken by multinationals can be taken as being a function of FDI because FDI is often not used at once to finance real investment (there is a lag between FDI and I_f). Therefore I_f will not depend just on contemporary FDI but also on its lagged values. In our model, we supposed two-lag periods, which we considered as substantial enough for the FDI adjustment in Central European countries. This assumption may be further supported by the fact that high FDI inflows, mostly attributed with privatization of state-owned assets, represent for a small and highly open economy such as Hungary or the Czech Republic a significant shock and therefore it results in a lag between FDI and real I_f .

$$I_{f,t} = \gamma_0 F_t + \gamma_1 F_{t-1} + \gamma_2 F_{t-2}, \quad (2)$$

where F_t , F_{t-1} , and F_{t-2} is FDI variable in time period t , $t-1$, and $t-2$.

Conversely, domestic investment has to be specifically modelled. We suppose that investment is basically a stock adjustment variable, which responds to the difference between the desired (K^*) and actual capital stock (K). Investment adjusts on one side because firms face liquidity constraints to investment and on the other side because the adjustment takes time. Then the basic model is as follows:

$$I_{d,t} = \lambda(K_t^* - K_{t-1}), \quad (3)$$

where λ represents a relation between total and domestic investment (I_d); $\lambda = \frac{I_d}{I}$ or $\lambda = \frac{I - I_f}{I}$ and K_d^* represents the capital stock desired by domestic firms. Based on the above stated premises we derived equations (3a) and (3b):

$$K_{d,t}^* = \lambda K_t^* \quad (3a)$$

$$K_{d,t-1} = \lambda K_{t-1} \quad (3b)$$

In the model, the desired level of the capital stock depends positively on expected gross domestic product growth (G^e), and on the difference between actual economic output (Y) and potential output (Y_p) of the economy. The missing variable is the user cost of capital. Based on our experience from the multinational investment

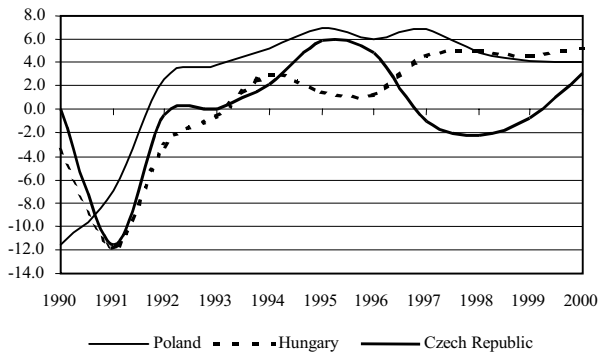
4) M&A is by a definition of United Nations Conference on Trade and Development (UNCTAD) a change of assets from domestic to foreign subjects and, at least initially, they do not add to the productive capacity of host countries (see <http://www.unctad.org>, Press Release, TAD/INF/2856, 3 October 2000).

company NEWTON of doing business in the Central and Eastern European countries we have found that interest rates or other proxies for the user cost of capital are not significant in explaining variations in investment rates. Very similar results were found by Mandel, Tomšík (2001), who estimated that correlation between FDI and real interest rate was not statistically significant in the Czech Republic. Therefore, we do not include interest rates as explanatory variables in our investment model, which is as follows:

$$K_t^* = \phi_0 + \phi_1 G_t^e + \phi_2 \sum_{n=1}^7 (Y_{t-n} - Y_p), \quad (4)$$

where $\phi_0, \phi_1, \phi_2 > 0$. In our model, we used a seven-year business cycle period, which we consider as appropriate for these three transitive countries. The seven-year business cycle period is evident from empirical data in the Czech Republic.

Gross Domestic Product Growth (year-on-year, in %)



Source: NEWTON Holding Database.

Consider next the law of motion of the capital stock:

$$K_{d,t} = (1 - dp)\lambda K_{t-1} + I_{d,t}, \quad (5)$$

where $K_{d,t} = \lambda K_t$, and dp is the annual depreciation rate of capital stock.

Combining (3) through (5) we derived equation (6):

$$I_{d,t} = \theta_0 + \theta_1 G_t^e + \theta_2 \sum_{n=1}^7 (Y_{t-n} - Y_p) - I_{d,t-1} - \rho_1 I_{d,t-2} - \rho_2 I_{d,t-3}, \quad (6)$$

where $\theta_0 = \phi_0 - (1-dp)^3 K_{d,t-4}$, $\theta_1 = \lambda \phi_1$, $\theta_2 = \lambda \phi_2$, $\rho_1 = (1-dp)$, $\rho_2 = (1-dp)^2$.

Now, we introduce equation (2) for investment by multinationals and we will convert our model for domestic investment into one for total investment. Replacing (6) and (2) into (1) and collecting terms:

$$I_t = \theta_0 + \theta_1 G_t^e + \theta_2 \sum_{n=1}^7 (Y_{t-n} - Y_p) + \gamma_0 F_t + \gamma_1 F_{t-1} + \gamma_2 F_{t-2} - I_{d,t-1} - \rho_1 I_{d,t-2} - \rho_2 I_{d,t-3} \quad (7)$$

Finally, last thing that has to be done is to specify a process of expectation formation for the gross domestic product (GDP) growth rate. If expectations are rational, expected GDP growth should not deviate systematically from actual growth. In this case, $G_t^e = G_t$. The alternative is adaptive expectations:

$$G_t^o = \eta_1 G_{t-1} + \eta_2 G_{t-2} + \eta_3 G_{t-3} \quad (8)$$

In our empirical estimations, we considered adaptive expectations as we supposed that they were more natural (common) for behaviour of economic agents.⁵⁾

5. Testing for Crowding In or Crowding Out Effect

The equation used to determine the specific effect of FDI on investment in each transitive country is an adaptation of (7) and (8) under the adaptive expectations and under the condition that sum of differences between actual and potential outputs during one business cycle equals zero, which considers the possibility that within each region the β_i associated with FDI can vary from country to country:

$$I_t = \beta_0 + \beta_1 F_t + \beta_2 F_{t-1} + \beta_3 F_{t-2} + \beta_4 I_{d,t-1} + \beta_5 I_{d,t-2} + \beta_6 I_{d,t-3} + \beta_7 G_{t-1} + \beta_8 G_{t-2} + \beta_9 G_{t-3} + \varepsilon_t \quad (9)$$

where I equals to investment/GDP ratio; F equals to FDI/GDP ratio; G equals to growth of GDP; I_d equals to domestic investment/investment ratio and ε is a serially uncorrelated error.

The model was empirically estimated for a panel of yearly data for three countries (the Czech Republic, Hungary and Poland) over the period 1990 – 2000.⁶⁾ The model was tested only in one version, i.e. with ratios (investment/GDP, FDI/GDP, etc.).⁷⁾ The data on foreign direct investment were obtained from official balances of payments available on the Internet sites of the central banks in each country.⁸⁾ Data on gross domestic product and investment were drawn from national statistics (several issues). For the estimation we used the econometric software EViews (Econometric Views).

In our model, we were testing for long term crowding in or crowding out effect. For this the relevant coefficient is:

$$\pi = \frac{\sum_{i=1}^3 \beta_i}{1 - \sum_{i=4}^6 \beta_i} \quad (10)$$

The criteria used to identify crowding in or crowding out effect is the value and significance of π .⁹⁾ There exist three possibilities:

5) We came to this conclusion while observing behaviour of companies in wage bargaining and investment strategies (see Carlin, Soskici, 1990; Fischer, 1977; Lindbeck, Snower, 1986).

6) In case of the Czech Republic we tested the model over the period 1993 – 2000 because of unavailability of data for the period 1990 – 1993 due to the split of former Czechoslovakia.

7) Agosin and Mayer tested their model in two versions. One has the GDP growth rate as the only explanatory variable of domestic capital formation. In the second version, they incorporated a proxy for the gap between actual and potential GDP output. As they concluded the results of both versions were practically identical.

8) National Bank of Poland (NBP) in case of Poland (<http://www.nbp.pl>); National Bank of the Czech Republic (CNB) in case of the Czech Republic (<http://www.cnb.cz/>) and National Bank of Hungary (NBH) in case of Hungary (<http://www.mnb.hu/index-a.htm>).

9) The calculated value of π is crucial for the entire model. If $\pi > 1$ than there is an evidence of crowding in effect, conversely, if $\pi < 1$ than there is an evidence of crowding out effect and if $\pi = 1$, there are no externalities from FDI inflows. To explain the fundamental, which stands behind the equation (10), we sim-

– with the Wald test it is not possible to reject the hypothesis that $H_0: \pi = 1$. This means that in the long run an increase in FDI of one USD (or, more precisely, of one percentage point of GDP) results in one USD additional total investment (or investment amounting to one percentage point of GDP);

– the case in which the null hypothesis $H_0: \pi = 1$ is rejected and $\pi > 1$, there is an evidence of crowding in effect. In a long term, one additional USD of FDI becomes more than one additional USD of total investment;

– the case in which the null hypothesis $H_0: \pi = 1$ is rejected and $\pi < 1$, there is an evidence of crowding out effect. In a long term, one additional USD of FDI results in less than a one USD increase of total investment. In other word, there is displacement of domestic investment by FDI.

If long term effect of FDI inflow produces crowding in, long term macroeconomic externalities are positive. On the other hand, the evidence of crowding out implies that FDI inflow has negative long term externalities on investment. The results of empirical estimations for the Czech Republic, Hungary and Poland are presented in Table 2 and the calculated results showing the crowding in or crowding out effect in Table 3. The equations explain a high percentage of the variation in each country investment, and all presented coefficients are statistically significant at least at 10 per cent level (statistically insignificant coefficients were excluded from the final empirical estimations).

We found that for the time period 1990 – 2000 there was an evidence of crowding out effect in Poland. In Hungary in the time period 1990 – 2000 we found a crowding in effect as well as for the Czech Republic in the time period 1993 – 2000. Based on the results presented in Table 3 we could conclude that FDI produces (in terms of increasing domestic investment) long term positive externalities in the Czech Republic and Hungary, and negative externalities in Poland. But, the conclusion is not as explicit because we have to realise the difference between the time periods (in the Czech Republic, we considered the time period 1993 – 2000 and in Poland and Hungary the time period 1990 – 2000). At the beginning of the 1990s each of these three countries was strongly hit by transformation recession, especially the industrial production and investment fell abruptly due to closing down inefficient production and uncertainty of economic agents about the future perspectives, which were linked with the expected privatization process. These factors had strongly influenced the results of our testing in Hungary and Poland, but in case of the Czech Republic (tested in the time period 1993 -2000) these factors already dimi-

plify equation (9) as follows: $I/Y = \beta_1 FDI/Y + \beta_2 I_d/Y$, and the equation (10) $\pi = \beta_1 / (1 - \beta_1)$. We suppose that FDI inflows into recipient countries are stable (constant) for several years in a row and cumulative value of coefficient β_1 in the FDI// variable, for example, equals to 0.6 (considering the lag values). Then when the cumulative coefficient β_1 in the I_d/I variable equals to 0.4 (considering the lag values as well) $\pi = 1$ and there are no externalities (neither positive nor negative) from FDI inflows. As FDI inflows continue to flow at a stable pace in following years, multinationals would create close links with domestic companies, which would in order to become more competitive invest and create new production capacities. This process would stimulate a new stream of domestic investment. The cumulative value of coefficient β_1 of FDI// variable would still equal to 0.6 (considering lag values) but the cumulative value of coefficient β_1 of I_d/I variable would increase to 0.5 (considering lag values) as a result of inducement of new domestic investment. Then $\pi > 1$ (in this case π equals to 1.2) and there is a slight crowding in effect of I_d by FDI. In the following year this process would continue. Cumulative value of coefficient β_1 of FDI// variable would still equal to 0.6 and cumulative value of coefficient β_1 of I_d/I variable would increase to 0.6. Then $\pi > 1$ (in this case π equals to 1.5) and the crowding out effect would even strengthen. The assumption that FDI inflows induce additional domestic investment can be illustrated by several examples from the Czech Republic or Hungary. In case of the Czech Republic, an additional stream of domestic investment was, for example, accompanied with the purchase of Škoda Auto, a.s. by Volkswagen Group. In case of Hungary, the same thing can be observed in the General Electric purchase of Turisgam and subsequent stream of domestic investment.

Table 3

Empirical Results of Investment Equations for the Czech Republic, Hungary and Poland

Variable	Czech Republic	Hungary	Poland
Period	1993 – 2000	1990 – 2000	1990 – 2000
<i>F</i>	-	-	-11.377 (-14.69) ³⁾
<i>F</i> (-1)	0.813 (59.78) ³⁾	0.556 (64.84) ³⁾	-
<i>F</i> (-2)	-	0.337 (23.43) ²⁾	10.028 (17.72) ³⁾
<i>G</i> (-1)	0.141 (15.18) ²⁾	-	0.236 (7.68) ²⁾
<i>G</i> (-2)	0.498 (48.04) ²⁾	-	-0.791 (-15.54) ³⁾
<i>G</i> (-3)	-	0.379 (63.89) ³⁾	-
<i>I_d</i> (-1)	0.165 (7.72) ¹⁾	0.431 (43.11) ²⁾	2.388 (22.59) ³⁾
<i>I_d</i> (-2)	0.496 (26.60) ²⁾	0.245 (17.33) ²⁾	0.578 (7.897) ²⁾
<i>I_d</i> (-3)	-	-0.020 (-7.64) ¹⁾	-
AR (2)	-	-	-
Adjusted <i>R</i> -square	0.999721	0.999987	0.999000
Durbin-Watson statistic	3.60	2.51	2.14
<i>F</i> -Statistic	894.83	15753.25	399.54

Note: Figures in parenthesis are *t*-statistic; statistically insignificant variables were replaced by “-”.

1) Significantly different from zero to the 10 per cent level.

2) Significantly different from zero to the 5 per cent level.

3) Significantly different from zero to the 1 per cent level.

nished and therefore we expected better results. Our expectations were confirmed by the empirical test.

After considering these facts we may conclude that Hungary has been most successful in taking advantages of high FDI inflows because even though it underwent a deep recession at the beginning of transformation, accompanied with a sharp fall of overall investment activity, it managed to stimulate additional stream of domestic investment to top the foreign investment. Behind such a positive development in term of overall investment activity stands the structure of foreign investment, which was mainly export-oriented, i.e. it encouraged additional domestic investment. On the other hand, foreign investment in Poland has been primarily oriented on domestic market and so foreign investors competed with domestic producers and it caused the effect of emptying investment opportunities for domestic investors in favour of foreign investors. This explains why we found a relatively strong crowding out effect in Poland. But once again, we have to emphasize that crowding out effect in Poland was strongly influenced by the transformation recession and we suppose that in long term the situation would change. In case of the Czech Republic, we have to realize that the data were tested for the period 1993 – 2000 and so they were not influenced by the initial transformation recession. This fact partially explains why the crowding in effect in the Czech Republic was found almost as strong as in Hungary, which

is considered at present time to be the most successful country in transformation process. The recent high FDI inflow was primarily linked with real investment (new sales network, expansion of production resulting in new greenfield and brownfield investment) and it stimulated new stream of domestic investment as more domestic companies have started to be suppliers of foreign multinationals. This development was apparently supported by introduction of investment incentive scheme, which stimulated new greenfield and brownfield investment with their positive impact on development of domestic investment.

Table 4
Regions and Countries: Effects of Foreign Direct Investment on Investment

Region / Country	Long-term coefficient linking FDI and I	Long-term effect
Estimation by Agosin and Mayer		
1986 – 1996		
Africa	1.30	crowding in
Asia	2.91	crowding in
Latin America	0.04	crowding out
Our Estimation		
1993 – 2000		
Czech Republic	2.41	crowding in
1990 – 2000		
Hungary	2.60	crowding in
Poland	0.69	crowding out



The main aim of this article was the estimation whether the foreign investment crowds in or crowds out domestic investment. The results of our empirical estimations for the Czech Republic, Poland and Hungary indicated that crowding in effect has been relatively strong in Hungary and in the Czech Republic, and crowding out effect has been found in Poland. But, it is important to emphasize that the results in the Czech Republic were positively influenced by the tested time period (1993 – 2000). If the tested time period for the Czech Republic was the same as in case of Hungary and Poland (1990 – 2000) then the crowding in effect would not probably be as strong as found and it could even change into crowding out effect.

Based on our results we conclude that Hungary has been most successful in taking advantage of high foreign direct investment inflows and their positive impacts on domestic sector. The Czech Republic was successful as well, but not as much as Hungary. On the other hand, the high FDI in Poland did not induce additional domestic investment and resulted in crowding out effect. But in long term, we suppose that the crowding out effect would change into crowding in effect and foreign direct investment inflow into Poland would produce, in terms of overall investment, positive externalities in a long term.

The leading conclusion coming from our study is that the positive impacts of foreign direct investment on domestic investment are not assured because total investment may in some cases increase much less than FDI or even fail to rise when FDI increases.

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