

Does FDI facilitate Domestic Entry? Evidence from the Czech Republic

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Abstract

This paper analyzes the impact of FDI on domestic firm entry and firm size distributions in 245 industries in the Czech Republic during 1994 to 2000. We find that larger foreign presence stimulates the entry of domestic firms within the same industry indicating the existence of positive horizontal spillovers from FDI. We also find evidence of significant vertical entry spillovers – FDI in downstream (upstream) industries initiates entry in upstream (downstream) sectors via the presence of backward (forward) linkages. Our results also show that entry spillovers through vertical linkages are stronger than horizontal spillovers. However, these entry spillovers vary substantially across industries: while service industries benefit from both horizontal and vertical spillovers, manufacturing industries do not experience significant positive entry spillovers of any kind. In addition, while vertical spillovers prevail among competitive industries, horizontal spillovers dominate in less competitive industries. We also find that country of origin of FDI matters - horizontal spillovers are driven by FDI from the EU countries. The right skewness of the firm size distributions in industries without FDI further emphasizes an important role of FDI presence for overall industry dynamics.

Keywords: Foreign Direct Investment, FDI spillovers, Firm Entry, Industry Dynamics, Firm Size Distributions

JEL Classification: L1, L6, L8, F2, D24

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Introduction

Since Schumpeter (1942), researchers have argued that new firm creation and entrepreneurship are the engines of economic growth and development. However, most studies analyzing the process of transition from a command to a market economy have focused on the privatization of existing firms rather than on the creation of new domestic firms, arguably an equally important channel for growth and development. Only recently, researchers have started to evaluate the determinants of entrepreneurship, including the impact of the business environment, institutions, and the role of the government. But, studies of entrepreneurship in the transition economies are incomplete without considering the impact of foreign direct investment (FDI), which has been shown to play a critical role in fostering growth, technology transfer, new market development, and enterprise restructuring.¹

In this paper, we analyze the impact of FDI presence on domestic firm formation. Specifically, we ask the following questions:

- (a) What is the impact of foreign presence on the entry of domestic firms? Does FDI generate positive entry spillovers that stimulate domestic entry or does it raise the barriers to entry for domestic firms?
- (b) Given the existence of backward and forward linkages between suppliers, producers, and customers, what is the nature of FDI entry spillovers? Are these spillovers primarily “horizontal” (intra-industry) or “vertical” (inter-industry)?
- (c) Does the extent of FDI entry spillovers vary across different types of industries?
- (d) What role does the country of origin of the FDI play in entry spillovers?
- (e) Does FDI presence affect the firm size distribution of domestic firms?

¹ See Rodriguez-Clare (1996), Svejnar (2002), Alfaro et al. (2004), Markusen and Venables (1999), and Borensztein et al. (1998).

While several studies have analyzed the impact of FDI presence on domestic firm productivity, our study is one of the first to examine how FDI presence affects domestic firm formation in a transition country. To answer the questions above, we use an extensive firm-level panel dataset of 9979 domestic and foreign firms in the Czech Republic, during 1994-2000 for 245 industries (at the 3-digit USSIC level). Our dataset provides an extensive coverage of firms of different sizes, including small firms and single entrepreneurs, whose presence is crucial to fully capture the changes in industry dynamics. Moreover, rich panel data across several years and across a broad range of industries allows us to carefully analyze both horizontal and vertical spillovers from FDI while controlling for aggregate trend and unobserved industry, region, and year effects. We focus on the Czech Republic since this country received one of the highest FDI inflows in the Central Europe and unlike other transition countries (e.g. Hungary and Poland), it was virtually closed to foreign competition until the very beginning of transition in 1989.

FDI can have two opposing effects on domestic entry. Presence of foreign firms in an industry can discourage entry of domestic firms by raising the technological barriers to entry. We refer to this as the *entry barrier effect*. Alternatively, foreign presence can generate demand for local products and services, bring new or higher quality inputs, and generate new business opportunities in the local market, thus encouraging the entry of domestic firms. We refer to this as the *demand creation effect*. While multinational firms might want to prevent loss of proprietary technology to potential competitors within the same industry and therefore raise the barriers to entry, they might also want to encourage the entry of new suppliers and customers in vertically related industries. Hence, in order to evaluate which of these two effects dominates, it is important to analyze both the intra-industry as well as the inter-industry impact of FDI.

To analyze vertical entry spillovers and to distinguish between backward (i.e. when

domestic firms *supply* their output to foreign firms) and forward linkages (i.e. when domestic firms *buy* inputs from foreign suppliers), we use an Input-Output (IO) table to construct foreign market shares (as measures of foreign presence) across upstream and downstream industries.

Our results show that foreign presence generates significant positive spillovers on the entry of domestic firms. In terms of horizontal entry spillovers, we find that a 10% increase in foreign market share increases the entry rates of Czech firms on average by 1.6%. However, FDI spillovers via vertical linkages are of a much higher magnitude than horizontal spillovers. Depending on the type of vertical linkages, a 10% increase in foreign presence in vertically related industries increases entry rates between 8.7-13.3%. Our results are robust to excluding potential outliers and controlling for endogeneity by including lags of the spillover measures and industry-time trend cross effects.

We also find that the extent of entry spillovers varies greatly across industries. While services benefit from huge FDI spillover effects through both horizontal and vertical channels, manufacturing industries do not experience any significant positive spillovers, suggesting higher entry barriers. In competitive industries domestic entrants benefit only from vertical spillovers, while in uncompetitive industries, horizontal spillovers dominate. We also find that domestic firm size distributions in industries without foreign presence are right-skewed compared to those in industries with foreign presence, suggesting an important role for FDI in shaping overall industry dynamics.

When we analyze entry spillovers by country of origin of the FDI, we find that horizontal spillovers are largely driven by foreign firms from the EU countries suggesting the importance of geographical and cultural proximity in entry spillover effects.

Our paper makes several contributions. First, it contributes to the literature on inter-industry linkages and FDI spillovers. In this context, Javorcik (2004) studies vertical spillovers through backward linkages in Lithuania, but she focuses only on the manufacturing sector and analyzes the impact of FDI on domestic firm productivity rather than entry. Alfaro and Charlton (2006) analyze impact of financial liberalization across 100 countries and conclude that FDI and its ensuing spillovers through industry linkages serve as a channel through which international financial integration affects domestic firm entry. However, in their study the authors rely on the IO table from the US as an approximation of the inter-industry linkages in all countries, a questionable assumption especially for transition or less developed countries. Focusing on one country allows us to capture the impact of FDI via inter-industry linkages more accurately by using the IO table specific for the Czech Republic.

Second, our paper provides evidence on the relationship between FDI, domestic entrepreneurship and overall industry dynamics in emerging markets. Using data for Belgium, De Backer and Sleuwaegen (2003) find that import competition and FDI discourage domestic entry. By contrast, Görg and Strobl (2002) find a positive effect of foreign companies on the entry of indigenous firms in Ireland. Our paper differs from these studies in several aspects: We focus on a transition economy, rather than a developed country, where the spillover effects may vary significantly due to the larger technology gap (e.g. Caves, 1996; Blomström et al., 2000) or due to the vastly different institutional environment (Desai et al., 2005). In addition, our sample covers a range of industries and is not restricted to manufacturing as in the other studies. We also analyze both horizontal and vertical spillovers while De Backer and Sleuwagen focus solely on the horizontal impact of FDI. Though Görg and Strobl (2002) consider backward vertical

linkages, they do not separate them from intra-industry linkages. Furthermore, we also consider impact of FDI on firm-size distributions of domestic firms.

Third, our findings also extend the literature in international trade and finance that emphasizes importance of geographic and cultural distance for trade and investment flows.

Finally, our paper has methodological implications with regards to the relative importance of backward vs. forward linkages in instances when the IO table is based on a more aggregate level of industry classification than is the unit of analysis.

The rest of the paper is structured as follows. Section 2 reviews the relevant literature and provides motivation. Sections 3 and 4 describe data and empirical methodology. Section 5 presents the empirical results. Section 6 discusses firm size distributions. Section 7 concludes.

2. Motivation and Related Literature

2.1. FDI and Its Impact on Domestic Firms in Emerging Markets

Transitional countries often try to attract FDI by offering generous investment packages (e.g. tax holidays, import duty exemptions, grants or preferential loans). One reason for these preferential policies is the belief that multinational firms confer “technology spillovers” to domestic firms. This view, supported by early case studies and industry-level findings (Caves, 1974; Blomström & Person, 1983; Blomström, 1986), emphasizes that multinational activity should generate technology/knowledge externalities, i.e. facilitate the transfer of more efficient technology and management practices from foreign to domestic firms.

However, recent firm-level panel studies have found negative or zero spillover effects, especially in transitional economies (e.g. Konings, 2001 in Bulgaria, Romania, and Poland; Djankov & Hoekman, 2000 in the Czech Republic; and Sabirianova et al., 2005). Aitken and

Harrison (1999) explain these contradictory findings as a “market stealing” or crowding out effect. They argue that even though technology spillovers exist, more efficient foreign firms may draw demand from domestic firms, forcing them to cut production. Other studies (Caves, 1996; Blomström et al., 2000) suggest that the likelihood that MNCs will “crowd out” local companies from the product markets is larger in developing than in developed countries, because of a higher technology gap between domestic and foreign firms.²

The work on negative spillovers has been recently contradicted by two streams of research, one emphasizing the demand creation effect from FDI and the other emphasizing the role of vertical (inter-industry) linkages instead of horizontal (intra-industry) linkages between domestic and foreign firms for technology spillovers.³ Kosová (2004) combines the dominant firm-competitive fringe industry structure with Jovanovic’s (1982) model on firm dynamics to study the impact of FDI on growth rates and survival of domestic firms in the Czech Republic. In her framework, foreign firms in the industry represent the dominant firm and domestic firms form the competitive fringe. She concludes that the crowding out is only a short-term effect, realized upon foreign entry into the domestic industry. In the long run, foreign presence has a strong positive impact due to “demand creation”. She argues that foreign firms increase demand for domestic products and services and thus increase the survival and growth rates of domestic firms.

The other stream of research suggests that researchers have been looking for evidence of technology spillovers in the wrong places. Javorcik (2004) finds positive FDI productivity spillovers through contracts between foreign affiliates and their local suppliers (vertical spillovers), but no spillovers from foreign presence within the same industry (horizontal

² For surveys on FDI spillovers studies, see Blomström & Kokko (1998), Meyer (2004) or Görg & Strobl (2001).

³ The key argument is that while MNCs may try to minimize the extent of technology spillovers to domestic firms (rivals) within the same industry (i.e. horizontal spillovers), at the same time for their own benefit, MNCs will be more open to sharing technology or management expertise with their suppliers/customers (i.e. vertical spillovers).

spillovers). For other studies that find an evidence of vertical FDI spillovers see Kugler (2005) and the references therein. As evident, most studies on FDI spillovers have relied on the estimations of domestic firm productivity functions. We, on the other hand, focus on industry (as opposed to firm) dynamics and examine how FDI presence affects entry rates of domestic firms or domestic entrepreneurship and firm size distributions in a transitional country.

There are several channels via which foreign presence can foster domestic entry and entrepreneurship. First, employees working for foreign firms can leave and start their own businesses in the same or related industries, leveraging the expertise acquired while working for a MNC.⁴ Second, foreign presence can stimulate domestic entry via a ‘demonstration effect’ as domestic entrepreneurs observe and learn from the successes and failures of foreign firms (Caves, 1996). Third, the positive impact of FDI on domestic entry can arise through vertical linkages. Foreign firms can increase the demand for existing local inputs and intermediate goods or generate a demand for completely new inputs in upstream industries (backward linkages). Similarly, foreign firms in upstream industries can bring new or higher quality inputs to domestic customers and thus increase the demand for domestic output in downstream industries (forward linkages). All these represent new business opportunities that should encourage the entry of domestic firms. We refer to all these channels commonly as the *demand creation effect*.

However, foreign presence can also discourage domestic entrants either by raising entry barriers or exit costs. This *entry barrier effect* may arise due to several reasons: Foreign firms are often more technologically advanced than domestic firms, especially in emerging markets, which

⁴ Javorcik & Spatareanu (2005) suggest that the labor turnover between foreign and domestic firms is not very high. Based on a recent World Bank survey in the Czech Republic, only 4% of firms reported hiring workers previously employed in MNCs. However, Meyer (2004) points out that while the movement of employees may not be large in numbers; those that leave and set up their own business have a substantial impact on the domestic economy.

allows them to reduce their production costs.⁵ Moreover, being much larger, less financially constrained and more experienced than domestic entrants, they can better exploit economies of scale or incur huge sunk costs such as advertising expenses. In addition, generous FDI incentives from local governments often help them out-compete domestic firms on the local labor markets.⁶

2.2. FDI in the Czech Republic

The Czech Republic was a closed economy before the Velvet Revolution in 1989 that led to the first democratic elections and massive privatization of the overall economy. As Appendix A1 shows, the initial spurt in FDI after the large scale privatization in 1995 (Kočenda & Svejnar, 2003) was followed by a decline due to recession in 1997. Privatization of financial institutions and introduction of FDI incentives in 1998 again increased FDI inflows. Today, the Czech Republic is one of the most successful transition economies in Central Europe in attracting FDI.

Several factors have contributed to the massive FDI inflows. The Czech Republic is strategically located at the center of Europe with an easy access to both the developed and the emerging European markets. The prospects of EU membership (achieved in May 2004) attracted additional - mostly EU- investors. By 2000, FDI from the EU constituted nearly 84% of all the investments - with Netherlands (30.1%), Germany (25.5%), and Austria (11.1%) being the largest contributors. By contrast, FDI investments from Slavic Countries represent only 1.1% with Slovakia and Poland being the largest contributors.⁷ Initially the FDI inflows were attracted by the opportunity to capture the monopoly rents of domestic producers. More recently however,

⁵ MNCs are usually characterized by high levels of R&D, high values of intangible assets and patents, new or technically complex products, see Markusen (1995).

⁶ Pavlínek (2004) reports that MNCs in the Czech Republic receive \$5000 (cca. the average annual wage in the auto-industry) for each newly created job and that these payments are often used to pay higher wages. By contrast, compared to FDI incentives, government support for development of small or medium local enterprises is negligible.

⁷ See official report by the Central Bank of the Czech Republic on Foreign Direct Investment (2000). According to the Czech National Bank, the following Slavic countries held FDI positions in the Czech Republic in 2000: Belarus, Bosnia & Herzegovina, Bulgaria, Croatia, Poland, Russia, Slovakia, Slovenia and Ukraine.

many foreign firms invest in the Czech Republic to benefit from cheap and highly skilled labor.⁸ Moreover, the presence of skilled technical labor encourages investors to go beyond setting up mere production facilities and invest in knowledge intensive activities via R&D and design centers.⁹ In addition, high quality infrastructure together with government regulatory reforms emphasizing better property rights protection and securities laws, as well as generous FDI incentives (e.g. tax holidays, job creation or re-training grants, R&D subsidies) further increased FDI inflows.¹⁰

However, the regional distribution of FDI has not been uniform. Most FDI targeted large cities in Central or north-western Bohemia close to Germany and Austria. In 2001, the capital, Prague, and its surrounding region accounted for 60% of all FDI (Pavlínek (2004)).

By sectors, services received more FDI than manufacturing. According to the Czech National Bank, the largest FDI recipients were financial services, transportation and telecommunications, hotels and restaurants, real estate and business activities, utilities and other sectors.¹¹ Even though the Czech Republic was closed to foreign presence before transition, the manufacturing sector remained competitive to some extent, thanks to the trade flows with the previous Soviet bloc countries and the strategic focus of the socialist policy makers to develop skilled labor (e.g. apprentices, craftsmen etc.). Moreover, unlike other transition countries, the Czech Republic has had a long standing industrial base and relatively high scientific and engineering human capital (Djankov & Hoekman, 2000). However, in the absence of foreign competition and a missing IT sector to stimulate growth and quality of service offerings, the

⁸E.g. as a result of cost-cutting measures Matsushita moved its production of television sets from Cardiff to Plzeň in 2000; Compaq (now HP) moved assembly jobs from Scotland (www.ft.com-Sept 2001) and Black & Decker transferred several jobs from its UK plant (<http://www.guardian.co.uk/recession/story/0,7369,803785,00.html>).

⁹ See article: "Major Players in Outsourcing", Business Week, January 30, 2006.

¹⁰ See the US Department of State (www.state.gov/e/eb/afd/2005/42007.htm). for the latest information on the government FDI incentives and reforms.

¹¹ See Arnold et al. (2005) for more detailed discussion of service liberalization in the Czech Republic.

service industries remained very poorly developed until transition. Hence, the Czech government introduced more extensive reforms in the services sector especially in the late 90's that attracted huge amounts of FDI.

While the above discussion offers some evidence on the role of FDI in creation of a dynamic market economy, it is difficult to quantify to what extent FDI played a role in promoting domestic entry and changing industry dynamics. In order to get a more accurate picture it is important to look at longitudinal data across industries.

3. Data and Summary Statistics

We use firm-level panel data for the Czech Republic during 1994-2000 from the Amadeus database.¹² Amadeus is a commercial database provided by Bureau van Dijk, containing balance sheet information on over 7 million public and private companies in 38 European countries. In addition to financial data, Amadeus also provides firm registration information (firm ID, year of incorporation, city, region), as well as information on the name and country of the ultimate owner (owner at the top of the ownership chain).¹³ Our data is based on 3-digit USSIC industry classification and we exclude agriculture (USSIC<100), government and legal agencies (USSIC>900), and health-care providers (USSIC: 800-870), since these are mostly government controlled sectors and foreign ownership is excluded by law.

The dataset is a good representation of the entire economy since it includes not only medium and large firms, but also small firms and entrepreneurs. Our final sample includes 9979 firms across 245 industries with USSIC: 104-874. Out of these, 8584 are domestic and 1395 are

¹² To maximize firm coverage and information on firm ultimate ownership, we combine data across several versions of Amadeus obtained at different dates: DVD version for the period 1993-98, and online downloads in: March 2002, Jan/Feb 2003, Oct. 2005 and Aug. 2008. Though year 1993 is available, we excluded it from the analyses due to a large proportion of missing data. In 1993 the Czechoslovakia split into the Czech and Slovak Republics so there might be some data miscoding in this year as well.

¹³ The ownership data is based on cash flow rights rather than voting rights.

foreign firms.¹⁴ The final sample is an unbalanced panel and the number of firms per year varies from 6311 in 1994 to 9002 in 2000.

We classify a firm as foreign if the country of its ultimate owner is not Czech. Amadeus defines the ultimate owner as the shareholder with 24.9% or more of the cash flow rights and is not controlled by anyone else. This usually involves tracking down multiple chains and repetitive identification of major shareholders until they arrive at an independent ultimate owner who is not controlled by anyone else.¹⁵ However, Amadeus reports firm ownership as per the most recent balance sheet rather than annually. Fortunately, since our dataset combines various Amadeus versions obtained at different dates, we were able to fill the missing gaps and maximize data on ultimate owners by combing the information over time.¹⁶

As a measure of entrepreneurial activity in an industry, we construct annual entry rates at 3-digit USSIC level as a proportion of domestic entrants relative to the number of domestic incumbents operating in the industry in the prior year. More precisely, \mathbf{ENTRY}_{it} in industry i in year t is the fraction of new domestic firms that enter industry i in year t , to the total number of domestic firms in industry i in the year $t-1$.¹⁷ A new firm (entrant) is a firm of age 1 or less in a given year, where firm age is calculated from the year of establishment of the firm. To measure the extent of foreign presence in an industry, we compute foreign market shares at 3-digit USSIC

¹⁴ The initial sample contains unbalanced data on 11545 firms. Excluding small firms without balance sheets or the year of incorporation (only firm ID, name or address were reported so we could not determine when a firm entered or exited the market), agriculture and other government controlled sectors left 10335 firms. Eliminating missing data and obvious data miscoding (e.g. balance sheets reported before the year of incorporation, duplicated balance sheets etc.) further reduces sample to 9979 firms (55668 firm-year observations) in 245 industries.

¹⁵ Firm ownership based on the ultimate owner is a more accurate description of the controlling owner than firm ownership identified by direct shareholdings (La Porta et al., 1999).

¹⁶ When we compared the ultimate ownership for firms that have an ultimate owner reported in each data version we use, we found that the ultimate owners do not change much over time. We find a 90% match in ultimate ownership data among all online downloads, and a 62% match with data from DVDs.

¹⁷ The same definition of entry rates is used in many other studies. See e.g. Agarwal & Gort (1996); De Backer & Sleuwagen (2003), Disney et al. (2003) or Desai et al. (2005). We prefer to use “gross” rather than “net” entry rates in our analyses due to several reasons: First, we do not have data on firm exit to measure net entry. Second, firm exit and survival in the industry might be affected by factors that are completely unrelated to the foreign presence (e.g. firm managerial ability) that cannot be controlled for in our industry level analyses.

level. **FOREIGN MARKET SHARE**_{it}, is defined as the share of industry sales captured by foreign firms in industry *i* and year *t*. To measure the relative industry size we compute **INDUSTRY SHARE**_{it}, defined as the ratio of industry *i*'s sales to total sales in year *t*.

Insert Table 1

Table 1 presents the summary statistics for all the variables. Most industries are relatively small with average industry shares less than 1%, but there are also few large industries (e.g. Electric Services Industry) with industry share as high as 7% over our entire sample period. As the table shows there is a huge variation in entry rates, from 0 to 200% with an average entry rate of 8%. In some industries e.g. Crude Petroleum & Natural Gas, Footwear or Communication Services, there is no domestic entry during our sample period. In others, e.g. Printing Trade Services or Plastic Materials & Synthetics, average domestic entry rate exceeds 35% over the entire sample period. Foreign market shares vary from 0, e.g. Coal & Lignite Mining, to over 98%, e.g. Flat Glass industry, with the sample average of 24% and are positively and significantly correlated with entry rates (correlation coefficient of 5%). Hence, we should expect higher rates of entry among domestic firms in industries with larger foreign presence. The industries vary also in terms of number of domestic firms, from just one e.g. Crude Petroleum & Natural Gas to over 500 firms in Professional & Commercial Equipment. Our results are robust to removing possible outliers as discussed in section 5.2.

The correlation of entry rates with foreign presence is also clear from Figure 1, which shows average annual entry rates across industries with and without foreign presence. The figure shows that in five out of the seven years, industries with foreign presence (shaded bars) experience higher entry rates of domestic firms than industries without foreign presence.

4. Empirical Model and Methodology

The summary statistics above indicate a positive correlation between foreign presence and domestic firm entry. To analyze this relation in more detail taking into account other factors that may affect domestic entry rates, we conduct the following regression analyses.

First, we analyze horizontal (intra-industry) FDI spillovers by estimating how foreign presence within a 3-digit USSIC industry in a given year, affects entry of new domestic enterprises in the same industry. Second we use the input-output table to construct foreign market shares across vertically related industries and estimate vertical spillover effects in addition to horizontal FDI spillovers. In order to avoid potential endogeneity bias due to FDI presence as suggested by the discussion on inter-regional and inter-industry differences in FDI presence in sections 2.2 and 3, it is important to control for unobserved fixed effects at the industry, regional and year level.¹⁸ FDI may target more productive industries, be attracted to the regions with higher FDI incentives or increase/decrease in certain years.

To avoid these endogeneity problems, we use fixed effects estimator and control for industry unobserved (and correlated) heterogeneity via industry fixed effects in all regressions. In addition, to control for the changes in industry size or demand over time, as well as the possibility that industries that are relatively larger may experience lower or higher entry rates, we include industry share ($INDUSTRY\ SHARE_{it}$). In all estimations, we also include time trend to control for aggregate growth effects and separate time dummies to control for business cycles and other macro-level shocks such as inflation, political changes or introduction of reforms in certain years. Also, to control for possible regional disparities, differences in industry structure and their changes over time, we include 8 region dummies multiplied by the number of all firms

¹⁸ See e.g. Keller (2004) or Aitken and Harrison (1999) for more discussion on this.

(domestic and foreign) per industry-year in a given region. The baseline specification we estimate is specified as follows:

$$\text{ENTRY}_{it} = \alpha + \beta_1 \text{FOREIGN MARKET SHARE}_{it} + \beta_2 \text{INDUSTRY SHARE}_{it} + \beta_3 \text{Trend} \\ + \text{Region Dummies}_{it} + \text{Year Dummies}_t + \text{Industry Dummies}_i + e_{it} \quad (1)$$

where subscripts i and t index industry and year respectively.

4.1. Vertical FDI Spillovers

To examine how foreign presence in the upstream/downstream sectors affects domestic entry rates, we calculate the inter-industry linkages at the 3-digit industry level using an input-output (IO) table. Input-output data show the flow of commodities from production through intermediate use to purchases by final users. While annual IO tables are available from the OECD for some countries, for the Czech Republic, IO tables are available only for the years 1995 and 2002. We use the 1995 IO table for the Czech Republic, which is the most pertinent IO table for our sample period of 1994-2000.¹⁹

Since the Czech IO table is available only at 2-digit NACE (rev. 1.1) industry classification, we first translate the 2-digit NACE codes into 3-digit USSIC codes.²⁰ Then we construct the measures of foreign presence via backward (BACKWARD_{it}) and forward (FORWARD_{it}) linkages at the 3-digit USSIC level.²¹ Since we want to capture only the input-

¹⁹ Since the year 1995 is at the beginning of our sample period this eliminates the possibility of endogeneity bias arising from FDI inflows affecting the coefficients in the IO table.

²⁰ We rely on 3-digit rather than 2-digit industry analysis due to the following reasons: First, our data offer a rich variation across 3-digit industries that we explore in the analyses and that we would lose via aggregation into the 2-digit level. Second, since 3-digit industries vary significantly in various characteristics, such aggregation would lead to measurement errors and introduce endogeneity biases into our analyses. Third, our sample size would drastically drop from 1459 observations across the 245 3-digit industries to just 390 observations across the 59 2-digit sectors, affecting thus the reliability of our estimations. Finally, several recent papers have emphasized the need for doing disaggregated analysis below the 2-digit to correctly identify spillover effects. (e.g. Alfaro & Charlton, 2007).

²¹ Our measures of vertical linkages are analogous to those used in other studies, e.g. Javorcik (2004).

output transactions between domestic and foreign firms, we exclude imports, output produced for exports and final consumption from the IO table. The equation we estimate is as follows:

$$\begin{aligned} \text{ENTRY}_{it} = & \alpha + \beta_1 \text{FOREIGN MARKET SHARE}_{it} + \beta_2 \text{INDUSTRY SHARE}_{it} + \beta_3 \text{Trend} \\ & + \beta_4 \text{BACKWARD}_{it} + \beta_5 \text{FORWARD}_{it} \\ & + \text{Region Dummies}_{it} + \text{Year Dummies}_t + \text{Industry Dummies}_i + e_{it} \end{aligned} \quad (2)$$

4.1.1. Construction of Backward and Forward Linkages

Backward linkages capture the extent of contracting linkages between foreign firms that purchase output from domestic suppliers. Thus, the measure of foreign presence via backward linkages for a 3-digit industry i (corresponding to 2-digit NACE sector j) in year t , BACKWARD_{it} , is a weighted sum of foreign presence across all downstream industries (that purchase output from industry i). The weights measure the proportions of output in industry i purchased by individual downstream sectors. We calculate these weights based on input-output entries in the IO table.

Recall that while BACKWARD_{it} is at the 3-digit USSIC level, the entries in our IO table are based on the 2-digit NACE (rev.1.1) codes (below we refer to these as “sectors”).

Consequently, a 2-digit NACE sector j in our IO table may correspond to one or more 3-digit USSIC industries. For the simplest case, when a single 3-digit industry i corresponds to a single 2-digit sector j , we have:

$$\text{BACKWARD}_{(i \in j)t} = \sum_k \sigma_{jk} * \text{FOREIGN MARKET SHARE}_{kt} \quad (3)$$

where *for* $k \neq j$:

- σ_{jk} is a proportion of 2-digit sector j 's output purchased by 2-digit sector k .

- *FOREIGN MARKET SHARE*_{kt} is a share of sector *k*'s sales captured by foreign firms, i.e. the sum of foreign firm sales across all 3-digit USSIC industries that belong to 2-digit NACE sector *k*, divided by the total industry sales in sector *k*.

and for $k=j$ (i.e. sector *j* buys from itself):

- σ_{jk} is a proportion of 2-digit sector *j*'s output that is purchased by the sector itself.
- *FOREIGN MARKET SHARE*_{kt} is a share of sector ($k=j$)'s sales captured by foreign firms in all 3-digit USSIC industries *other* than industry *i*, i.e. the sum of foreign firm sales across all 3-digit USSIC industries that belong to 2-digit NACE sector *k* but *excluding* industry *i*, divided by the total industry sales in sector *k*.²²

In exceptional cases, due to overlaps between 2-digit NACE and 3-digit industry codes, a single 3-digit USSIC industry *i* may belong to multiple *j*-sectors, $j=1,2,\dots,N$.²³ In these cases, the final backward linkage measure is the sum of the backward linkages calculated for each $j=1,2,\dots,N$, and weighted by $1/N$.²⁴ Example: Suppose that a 3-digit USSIC industry *i* belongs to two *j*-sectors, *j1* and *j2*. Then the backward linkage is:

$$\text{BACKWARD}_{it} = 1/2(\text{BACKWARD}_{j1} + \text{BACKWARD}_{j2})_{it}. \quad (4)$$

The larger the foreign presence in the downstream industries that purchase output from industry *i*, the larger the demand creation effect we should see in industry *i* due to greater business opportunities. Hence, we expect a significant and positive impact of BACKWARD_{it} on domestic entry rates.

²² This is to avoid double-counting since the impact of foreign presence in industry *i* is already included in our intra-industry (or horizontal spillover) measure, *FOREIGN MARKET SHARE*_{it}.

²³ Out of the 245 3-digit industries in our sample, only 23 industries have multiple correspondences with 2-digit NACE codes.

²⁴ Analogically, when a single 3-digit industry belongs to multiple *k*-sectors (that buy from sector *j*) we allocate foreign and total industry sales from the 3-digit industry equally among *N* *k*-sectors, by weighting it by $1/N$. In these cases, *FOREIGN MARKET SHARE*_{kt} is calculated according to the following formula: *FOREIGN MARKET SHARE*_{kt} = $\sum_{h \in k} (w_h * \text{foreign firm sales}_{ht}) / \sum_{h \in k} (w_h * \text{industry sales}_{ht})$, where $w_h = 1$ if 3-digit industry *h* belongs just to one 2-digit sector *k*, and $w_h = 1/N$ if industry *h* belongs to *N* *k*-sectors. Otherwise, the sum of foreign and total sales across all the sectors in the economy would be inflated.

To analyze how foreign presence via forward linkages affects domestic entry, we construct the forward linkage measure ($FORWARD_{it}$), following the same procedures as outlined above for backward linkages. The only difference is that now instead of measuring foreign presence across downstream industries, we measure foreign presence across upstream industries, i.e. the industries that *supply* inputs, services or intermediate products *to* domestic firms. Larger foreign presence in the upstream industries should bring new or higher quality inputs to domestic firms, leading to an increase in their product offerings and output quality. This in turn, should increase demand for the output of domestic firms in the downstream industries, thus encouraging domestic firm entry.

5. Regression Results

5.1. FDI and Domestic Entry: Intra-Industry and Inter-Industry Impact

Insert Table 2

Table 2 (col.1) reports the results when we include only intra-industry spillovers and cols. 2-4 show results when we include both intra-industry and inter-industry spillovers. As the table shows, FOREIGN MKT SHARE always has a positive and significant impact on domestic entry rates. Moreover, this impact is about the same across all columns and is also economically significant. Increasing foreign market share by 10% increases the entry rate of the Czech firms within the same industry by 1.6% on average. Alternatively, increasing foreign market share by one standard deviation in our sample (0.2644) increases domestic entry rate by 4.3%. This is quite a significant increase given that the mean entry rate in our sample is 8%.²⁵

The negative and significant coefficient of time trend also confirms that entry rates decrease over time, as suggested by Figure 1. Wald tests (unreported) also show that there are no

²⁵ This impact is similar even when we exclude the industries without foreign presence in col. 1.

significant differences in entry rates across regions. Though FDI inflows may be region specific, since the Czech Republic is a very small country, the positive spillovers from foreign presence in one region can be easily experienced by new domestic firms in the neighboring regions.²⁶

Columns 2-4 show the results when, in addition to the horizontal FDI measure, we include forward and backward linkages. In cases when sector $k=j$ (*i.e.* sector j buys from itself, see section 4.1.1), it is not clear whether 3-digit USSIC industries other than industry i that belong to the same 2-digit sector j , should be considered as forward or backward linkages. Hence, we treat them as part of backward linkages in col. 2, as part of forward linkages in col. 3 and we include them as a separate regressor (Sector j buys from itself) in col. 4.

These results show that the relative significance of backward versus forward linkages depends largely on how we treat 3-digit industries (other than industry i) when “Sector j buys from itself”. When we include them as part of the backward linkages (col. 2), we find that backward linkages are significant while forward linkages are insignificant. When we include them under the forward linkages (col. 3) we find the opposite result. When we include “Sector j buys from itself” separately, we find that the Sector j has a significant positive impact on domestic entry while backward linkages (from other sectors than Sector j) are insignificant and forward linkages (from other sectors than Sector j) are positive but significant only at 10% level. Comparing the magnitude of vertical entry spillovers to horizontal spillovers shows that vertical entry spillovers are always larger than horizontal spillovers. Specifically, increasing foreign presence by 10% increases domestic entry by 8.7% via backward linkages (col. 2), 12.6% via forward linkages (col. 3) and 13.3% via Sector J linkages (col. 4).

²⁶ While there is a large industrial organization literature on spatial localization effects, the small country size and insignificant regional differences prevents us from exploring these effects within the Czech context.

Overall, Table 2 shows that larger foreign presence stimulates the entry of domestic firms via both horizontal and vertical spillover effects and vertical spillovers dominate horizontal spillovers. In addition, the most important vertical spillover effects occur among industries that are closely related to each other in the type of products they produce, and thus can be grouped together under higher-digit industry codes (in our case, 2-digit NACE codes in the IO table).

5.2. FDI and Domestic Entry: Robustness

In this section, we present several robustness checks of our main specification in Table 2 (col. 4). One of the concerns with the full sample results is that they may be driven by the entry rates censored at 0. Hence, in Table 3 (col. 1) we re-estimate our results using Random-effects Tobit model. Since tobit doesn't allow for industry fixed effects, we control for correlated unobserved heterogeneity following Wooldridge (1995, 2002) by including the vector of industry level means of all industry-time varying regressors. The results from this specification confirm our previous findings of horizontal and much stronger vertical (from Sector J) entry spillovers. However, it must be noted that the significantly skewed distribution of entry rates violates the normality assumption imposed by the Tobit model. Moreover, even the adjusted version of the Tobit model that we estimate allows us to only partially control for unobserved industry fixed effects (unlike the linear fixed effects model).

Insert Table 3

Since censoring bias is largely due to the asymmetry in the distribution of the dependent variable (Johnston & Dinardo, 1997, p. 442), in col. 2 we restrict the sample to only those observations with positive entry rates greater than zero and less than or equal to one. This helps us obtain a more symmetric distribution of entry rates and verifies that our findings are not

driven by a few industries with extremely large entry rates or by entry rates censored at 0.²⁷ Once again we find strong evidence of horizontal and Sector j vertical entry spillovers. These results also suggest that forward linkages might have a stronger impact on entry than backward linkages.

A positive relationship between foreign presence and domestic entry does not necessarily have to imply causality. Larger foreign presence could increase domestic entry, but it could be that both domestic entry rates and foreign presence might be driven by some unobserved shock at the industry-year level that we can not control for in our estimations. While we believe that endogeneity concern is largely alleviated in our estimations by controlling for region, industry, and year fixed effects, as well as controlling for demand changes via trend and industry share, we address this potential concern in two additional ways. First, in col. 3 of Table 3 we include one-year lags of all spillover measures into our previous robustness specification in col. 2. Then, in col. 4, in addition to lags we also include industry-specific time trends to control for possible industry time-varying effects and sectoral growth. Since our entry rates are at the 3-digit USSIC level preventing us from using 3-digit industry-year effects, we do the second best by including the interaction of 58 2-digit USSIC industry dummies with time trend (in addition to controlling for year dummies).²⁸ Once again, the FOREIGN MARKET SHARE and “Sector j buys from itself” are positive and significant.²⁹ These results confirm that our findings of a significant impact of foreign presence on domestic firm entry are not driven by endogeneity issues.

In unreported regressions, we also verified that our results are robust to the exclusion of possible outliers. In particular, we excluded industries that have average values of the following

²⁷ In unreported regressions we trimmed the sample even more and the results were similar, but this additional trimming significantly reduced our sample size.

²⁸ Due to small sample size we do not include cross effects between 2-digit industries and years. It may also be noted that the coefficient for Trend is the trend effects for only the omitted industry group and is not significant.

²⁹ Our results are not materially different when we include lags and/or cross effects in the full sample instead of the sample with positive entry rates.

variables greater than the corresponding 90th percentile value for that variable – foreign market share, industry share, the number of foreign or the number of domestic firms.

In all subsequent analyses, we report only the results for our main specification (Table 2, col. 4) when we include the current measures of foreign presence and include “Sector j buys from itself” separately (in addition to horizontal, backward and forward linkage measures).

5.3. FDI and Industry Structure

In this section, we examine to what extent the presence/absence of foreign firms in the industry and the degree of competitiveness in the industry affects the importance of intra- versus inter-industry spillovers. In col. 1, Table 4, we drop 68 industries without any foreign presence and find the results to be consistent with the full sample (col. 4, Table 2). Specifically, intra-industry foreign presence (FOREIGN MKT SHARE) increases domestic entry rates with the same magnitude as before. In addition, inter-industry spillovers from FDI in upstream sectors (forward linkages) and in closely related industries (Sector j buys from itself) dominate both the intra-industry spillovers as well as inter-industry spillovers from FDI via backward linkages.

Restricting the sample to 68 industries *without* intra-industry foreign presence (col. 2), we again find a strong evidence of positive vertical spillovers from closely related industries in Sector j and positive (though weaker) evidence of FDI impact via backward linkages. So even in industries without any foreign presence domestic entrants benefit from FDI in other industries.

Insert Table 4

The relative importance of intra- versus inter-industry spillovers from foreign presence could also depend on the extent of industry competition. As Kugler (2005) discusses, MNCs try to minimize the risk of propagation of technical knowledge to potential competitors and this

rivalry effect is more likely to dominate positive spillovers within the industry than among the industries. This suggests that we are more likely to find FDI intra-industry spillovers in uncompetitive industries (we define them as industries with less than 5 firms- both domestic and foreign) than in competitive industries (industries with at least 5 firms). On the other hand, we should see the opposite result in case of FDI vertical spillovers, because higher industry competition increases quality and reduces the prices of both domestic and foreign suppliers.

Table 4, col. 3-4, show results for 181 competitive and 64 uncompetitive industries, respectively. The results confirm that FDI intra-industry spillovers are mostly present in uncompetitive industries. In competitive industries, on the other hand, inter-industry FDI spillovers through forward linkages and linkages within sector j play the most important role.³⁰

5.4. Manufacturing vs. Services

This section explores how our results may vary across manufacturing and services, which were at very different levels of development prior to transition and experienced higher FDI inflows as discussed in section 2.2. Hence, it is interesting to examine whether opening the floodgates to foreign competition had a different impact on manufacturing versus services.

Insert Table 5

In Table 5, cols. 2-3, we analyze horizontal and vertical linkages in the services (USSIC: 401-874) and manufacturing industries (USSIC: 201-399). For reference, in col. 1 we repeat the full sample results from Table 2 (col. 4). Although in col. 2 and 3, the sample is restricted to only manufacturing industries or services, the backward or forward linkages capture the impact of foreign presence across all industries, including manufacturing, services and other industries.

³⁰ The results do not change if we define competitive industries as industries with at least 5 *domestic* firms or if we use alternate cut-offs of 10 or 15 firms.

In col. 2, we find a strong positive impact of FDI in services through both horizontal and vertical linkages. As in the full sample (col. 1), the largest positive impact on entry rates in the services comes from foreign presence in industries that belong to the same 2-digit service sector j . A 10% increase in foreign presence when “Sector j buys from itself”, results in a 35% increase in domestic entry rates in services (compared to 13% in the full sample). We also find evidence of a significant and positive impact via backward linkages but only a weaker evidence (at 10% significance level) for positive spillovers from foreign presence via forward linkages (in other sectors than Sector j). The large positive impact on entry in services from foreign presence via backward linkages must arise primarily due to the fact that the service industries typically provide inputs to all other industries, and unlike manufacturing inputs, services can not be imported. By contrast, we find no significant evidence of FDI spillover effects on domestic entry in manufacturing industries through either horizontal or vertical linkages as shown in col. 3.³¹

There are several explanations for large spillover effects in services and no spillovers in manufacturing. First, it could be due to the higher FDI inflows into services than manufacturing. Second, it could be that barriers to entry are much higher in manufacturing than in services. Third, as discussed in Kugler (2005), foreign firms in manufacturing tend to have higher incentives to minimize the transfer of proprietary technical knowledge to potential competitors. Fourth, the impact of vertical linkages may depend on the industry type, i.e. backward linkages with *manufacturing* may affect entry differently than backward linkages with *services*.³²

³¹ Klapper et al. (2006) find similar results. They create an index of entry rates across Europe and the US in the late 1990s and show that the highest entry rates are in telecommunications (telephone, wireless, etc) computer services and other services, while the lowest entry rates are in manufacturing of chemicals, construction and transportation.

³² Given the fact that both sectors have almost equal representation in our sample (services - 43%; manuf. - 47%), it is not surprising that some results (e.g. FDI impact via backward linkages) differ from the full-sample results. In full sample these opposite effects simply cancel each other when aggregated and represented by a single estimate.

To explore the last alternative, in col. 4-6, we split the backward and forward linkage measures into 3 groups: backward and forward linkages with manufacturing industries; backward and forward linkages with services; and backward and forward linkages with all other industries. In the full sample (col. 4), we again find that the Sector j has the largest positive impact on entry rates. In services, we are further able to isolate the source of the backward and forward linkages. Precisely, in col. 5, we find that domestic entry in services is mainly influenced by backward linkages with other downstream services industries, forward linkages with upstream manufacturing industries, forward linkages with upstream industries other than manufacturing and services, and Sector j linkages. This suggests that FDI into manufacturing and other non-services industries spurs the development of downstream service industries.

In col. 6 we find that domestic entry rates in the manufacturing industries are negatively affected by backward linkages with downstream services industries or that foreign presence in service industries inhibits entry of domestic firms in the supplying manufacturing industry. Since most manufacturing inputs to the service industries constitute communications and information technology or office automation equipment - which are typically industries with high technological standards - it is not surprising that domestic firms in these industries face higher barriers to entry. Hence, it is very likely that foreign service providers prefer to rely on other foreign partners or their own suppliers rather than domestic suppliers.³³

5.5. Does Country of Origin of FDI Matter?

In this section, we examine whether the FDI inflows have a differential impact depending on the country of origin. In our sample, consistent with the official statistics discussed earlier,

³³ Arnold et al. (2005) analyze the impact of service liberalization on productivity of Czech manufacturers and find a positive impact. However, their finding relates to forward not backward linkages. In our paper, forward linkages with services have a positive, but insignificant, impact on entry in manufacturing.

majority of the foreign firms are from EU countries and very few from Slavic countries (1.36%). To examine whether EU-sourced FDI has a different impact than Non-EU sourced FDI, we divide the foreign firms in our data into those from: EU countries (the composition of the European Union at the end our sample in 2000) and Non-EU countries, using the country of the ultimate owner. For about 30% of the foreign firms in our sample we are unable to precisely identify the country of the ultimate owner and these are included into the third “Unknown” category.³⁴ To explore whether language proximity plays a role in FDI spillover effects, we further divided the Non-EU countries into Slavic versus Non-Slavic countries.³⁵

We are able to create measures according to the FDI origin only for the intra-industry spillovers (FOREIGN MKT SHARE). In the case of inter-industry spillovers, the backward and forward linkages are a weighted sum of foreign presence across all downstream or upstream industries respectively, where the weights are based on inter-industry transactions from the IO table. However, the IO table does not contain any information that could allow us to assess how these inter-industry transactions can be further allocated among foreign firms from different regions.³⁶ Hence we split only the intra-industry spillovers into EU versus non-EU sources.

Insert Table 6

Col. 1 of Table 6 shows that the intra-industry spillover effects are really driven by the foreign firms from the EU countries. The FOREIGN MARKET SHARE_NonEU and FOREIGN MARKET SHARE_Unknown are insignificant. When we further split the Non-EU countries into

³⁴ Either the country of the ultimate owner was missing in our data or a firm did not have an ultimate owner reported since it only has minority shareholders. While the country of origin cannot be determined, in each of these cases, we could reliably determine that a firm is foreign, based on the names(s) of the shareholders and the firm's legal form.

³⁵ In our sample, we have 19 foreign firms (1.36%) from the following Slavic countries: Bulgaria, Poland, Slovakia, and Slovenia and 169 foreign firms (12%) from the following Non-Slavic countries: U.S., Switzerland, Japan, Andorra, Australia, Canada, Cyprus, Lichtenstein, Norway, and Iceland.

³⁶ Based on the IO table we only know the proportion that sector *i* bought from (or sold to) sector *j*, but we do not know in what proportions this transaction involved firms from the EU countries, Non-EU firms or firms with the Unknown origin. It might be that foreign firms from the EU countries are only those that enter backward linkages, while firms from the Non-EU countries enter only forward linkages or vice-versa.

Slavic versus Non-Slavic sources (col. 2), we again do not find any significant differences. Col. 3 of Table 6 shows similar results when we trim the sample to entry rates in the interval (0,1].

Our finding that intra-EU investments are driving the demand creation effect in the case of intra-industry spillovers can be attributed to the geographic and cultural proximity of the Czech Republic to the EU countries. The Czech Republic was historically part of the Austrian-Hungarian Empire and thus had business and trade linkages with these countries before the communist regime took over in the late 1950s. Even today, the EU countries are the main trading partners of the Czech Republic and the most attractive export destinations for Czech firms. Our findings are consistent with findings in the trade literature that geographic proximity (e.g. Frankel & Romer, 1999; Redding & Venables, 2004) and cultural proximity (e.g. Boisso & Ferrantino, 1997; Disdier & Mayer, 2007; Guiso, Sapienza, & Zingales, 2006) are significant determinants of bilateral trade and investment flows. Our findings are also consistent with Javorcik & Spatareanu (2007) who find that FDI from different regions (American vs. Asian vs. European) has different impacts on firm productivity in Romania.

6. Foreign Presence and Firm Size Distributions

The last section examines how FDI presence affects firm size distributions of domestic firms across 245 industries in our sample. Our empirical results show that FDI has a strong positive impact on formation of new domestic firms. While the analysis of FDI impact on new firm creation may reflect industry dynamics better than the estimations of domestic firm productivity, the most complete characterization of industry dynamics is provided by the firm size distributions. The impact of foreign competition on firm size distribution in a transition economy is particularly interesting, since, under socialism, the firm size distribution was determined by central planning rather than market or stochastic forces.

To investigate whether FDI spillovers also translate into the domestic firm size distributions, we compare the skewness of these distributions across industries with and without foreign presence. Figure 2 shows the kernel density estimates (measured by the logarithm of firm sales) for domestic firm size distributions in 68 industries without foreign presence and in 177 industries with foreign presence. The skewness coefficients are (-1.21) and 0.289 for industries *with* and *without* FDI presence respectively. Thus in industries *without* foreign presence, distribution of firm sizes across domestic firms is positively skewed (or skewed to the right).

In Figures 3 and 4, in addition to separating distributions across the two groups of industries, we also divide them by age cohorts. Figure 3 presents the domestic firm size distributions by age cohorts for industries with foreign presence. Figure 4 presents the same for industries without foreign presence. In both cases, the distributions are generally less skewed and more similar to the standard normal distribution for the older cohorts, consistent with the “stylized facts” in industry dynamics.³⁷ More importantly, however, we see much more dynamism (i.e. shifts in distributions) across age cohorts in industries *without* foreign presence.

There are several possible channels through which FDI may alter the skewness and cause shifts in domestic firm size distributions. It is conceivable that foreign presence in an industry not only stimulates the entry of domestic firms, but also alleviates their financing constraints, which in turn would affect firm size distribution. For instance, Cabral and Mata (2003) find that right skewness of the distribution can be explained by larger financial constraints. Since younger firms tend to be more financially constrained, they also find that distributions for younger cohorts are skewed more to the right than distributions for older cohorts. As firms age and financial constraints weaken, right skewness declines and distribution shifts toward the normal distribution. Hence, in our context, right skewness and larger shifts in distributions in industries

³⁷ See Cabral and Mata (2003) for summary of stylized facts regarding firm age and size distributions.

without FDI suggest that domestic firms in these industries are probably more financially constrained than domestic firms in industries *with* FDI presence.

Alternatively, the liberalization reforms that attracted FDI in the first place, may have changed the institutional environment, as suggested by Desai et al. (2005) and Ederington and McCalman (2006), resulting in differences in distributions among industries with and without foreign presence. While these comparisons suggest the important role of FDI for aggregate industry dynamics, we leave more detailed analyses of these questions for future work.

7. Conclusion.

This paper examines the impact of FDI on creation of new domestic firms. Foreign presence can have two opposing effects on domestic entry. On one hand, foreign firms can raise the barriers to entry (entry barrier effect) and thus inhibit the creation of new domestic firms. On the other hand, foreign firms can generate positive entry spillover effects via bringing new business opportunities to domestic entrepreneurs (demand creation effect), thus encouraging the entry of domestic firms across industries. Assessing which of these two effects dominates is critical for the public policy debate on the restructuring process in the transition economies.

Using data from 1994-2000, for 245 3-digit industries in the Czech Republic, we find that foreign firms have an unambiguous positive impact on entry rates of domestic firms via both intra-industry (horizontal) and inter-industry (vertical) spillovers. Comparing the magnitudes of entry spillovers, we find that inter-industry spillovers dominate intra-industry spillovers. We also find that the strongest inter-industry spillovers arise from linkages with very closely related industries that can be grouped together under higher level of industry classification (in our case 2-digit NACE). Our results are robust to excluding potential outliers and controlling for

endogeneity by including lags of the spillover measures and industry-time trend cross effects. Overall, our results indicate a strong demand creation effect from FDI presence.

We also find that the entry spillovers vary substantially across industries. In particular, in competitive industries, domestic entrants benefit only from inter-industry spillover effects, while in uncompetitive industries, positive intra-industry spillovers dominate. This is consistent with previous research that suggests that demand creation effect within the same industry is strongly affected by the degree of competition. It also underscores the importance of analyzing the inter-industry spillovers even when there are no intra-industry spillovers. Moreover, while services benefit from huge FDI entry spillovers via both horizontal and vertical channels, manufacturing industries do not show any significant positive entry spillovers, suggesting higher barriers to entry in manufacturing. When we look at the origin of FDI, our analyses show that horizontal spillovers are driven by FDI from the EU countries. This emphasizes the importance of geographic and cultural proximity for FDI spillover effects.

Differences in firm size distributions further highlight the importance of FDI for overall industry dynamics. We find that domestic firm size distributions in industries without foreign presence are skewed to the right compared to industries with foreign presence. We interpret this finding as an indication of higher financing constraints in industries without foreign presence, which in turn can affect domestic entry. We leave the analysis of the relationship between FDI presence and firm financing constraints for future research.

Our paper is among the first ones to use the country-specific Input-Output (IO) table to explore how FDI affects domestic entrepreneurship in a transition country via intra- and inter-industry linkages. Our analyses also bring an important methodological contribution to the use of IO tables. The IO tables are typically available at higher-digit industry classification (as the 2-

digit NACE in our case) than the unit of analysis required to accurately document spillover effects in detail (as the 3-digit USSIC in our paper). In such instances, we find that the relative importance of backward vs. forward linkages may depend on how one treats the linkages with industries that belong to the same industry sector in the IO table, as the industry in question. Our results suggest that these linkages should be included as a separate measure. This has significant implications for all FDI spillovers studies using IO tables.

Our findings have significant policy implications for transition economies. Rather than being a “death sentence” for local firms as argued by e.g. Dawar and Frost (1999), our paper shows that foreign competition can serve as a stimulus to domestic firm creation and encourage domestic entrepreneurship via various channels.

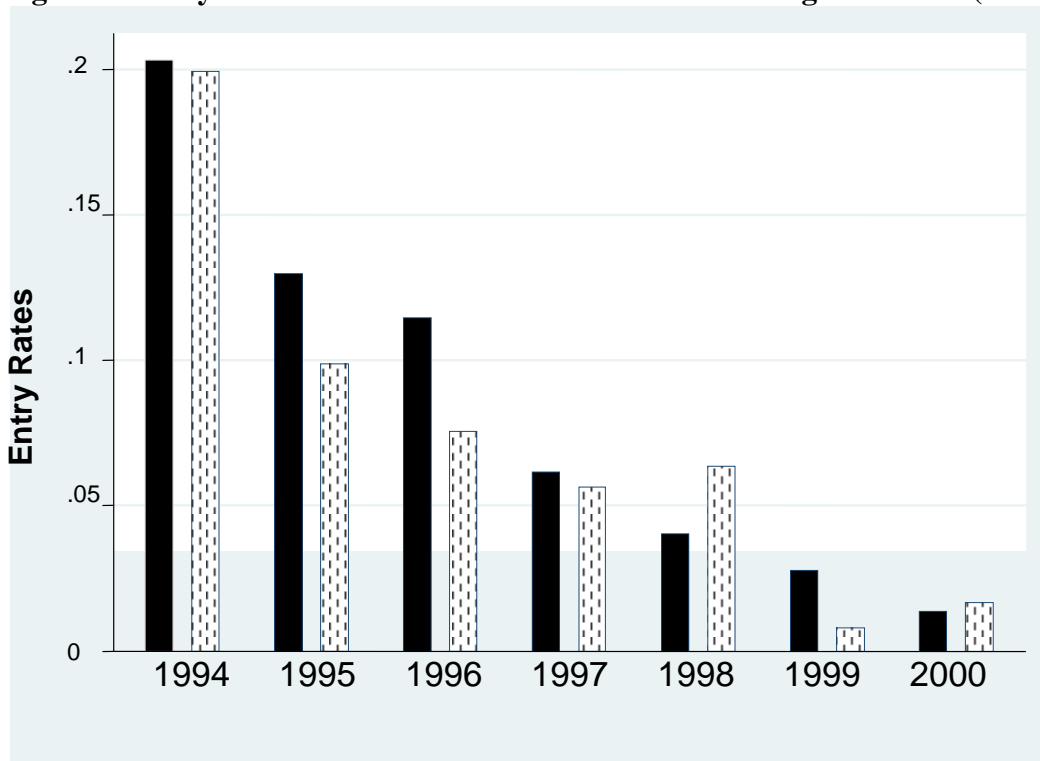
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Figure 1. Entry Rates in Industries with and without Foreign Presence (1994-2000).



Note: The figure shows average entry rates of new domestic firms in industries with and without foreign presence over the period 1994-2000. The block shaded bars represent entry rates in industries *with* foreign presence. The dotted bars represent entry rates in industries *without* foreign presence.

Figure 2. Firm Size Distributions of Domestic Firms in Industries with and without Foreign Presence (1994-2000).

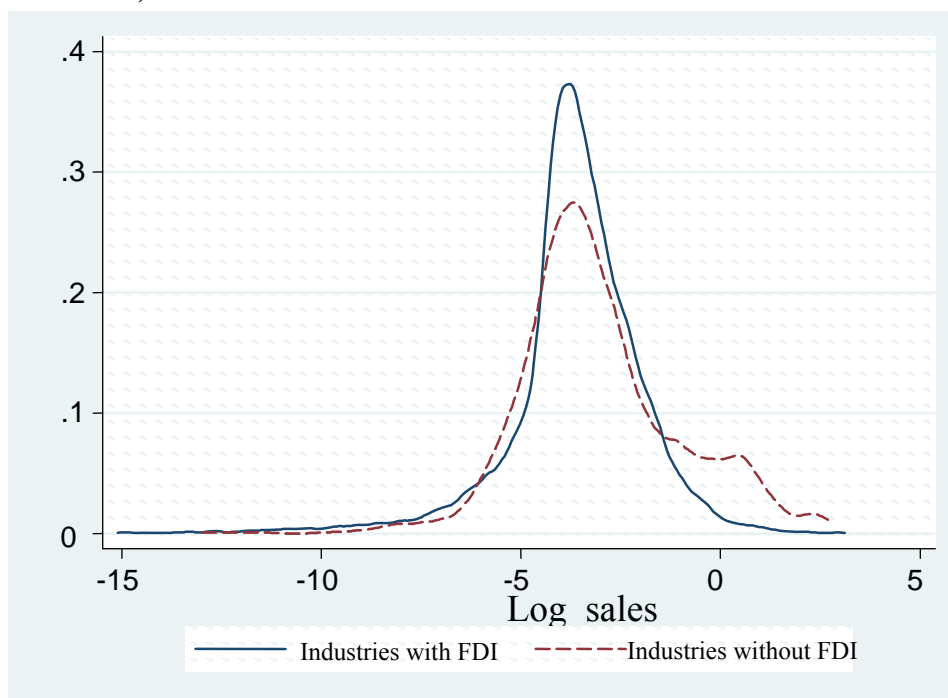


Figure 3. Firm Size Distributions of Domestic Firms by Age Cohort in Industries with Foreign Presence (1994-2000).

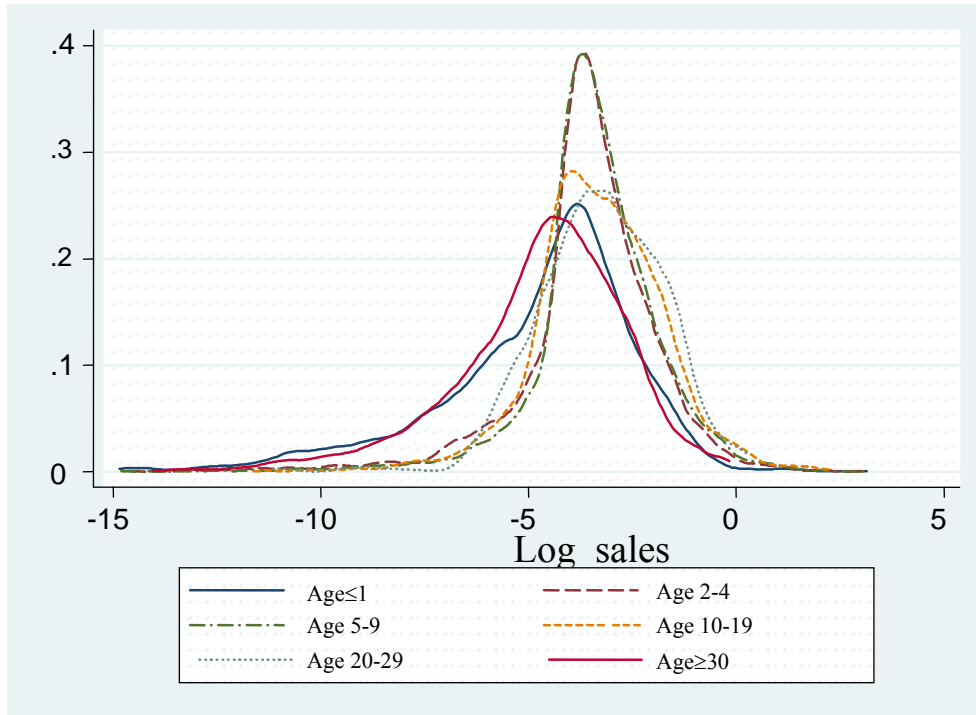


Figure 4. Firm Size Distributions of Domestic Firms by Age Cohort in Industries without Foreign Presence (1994-2000).

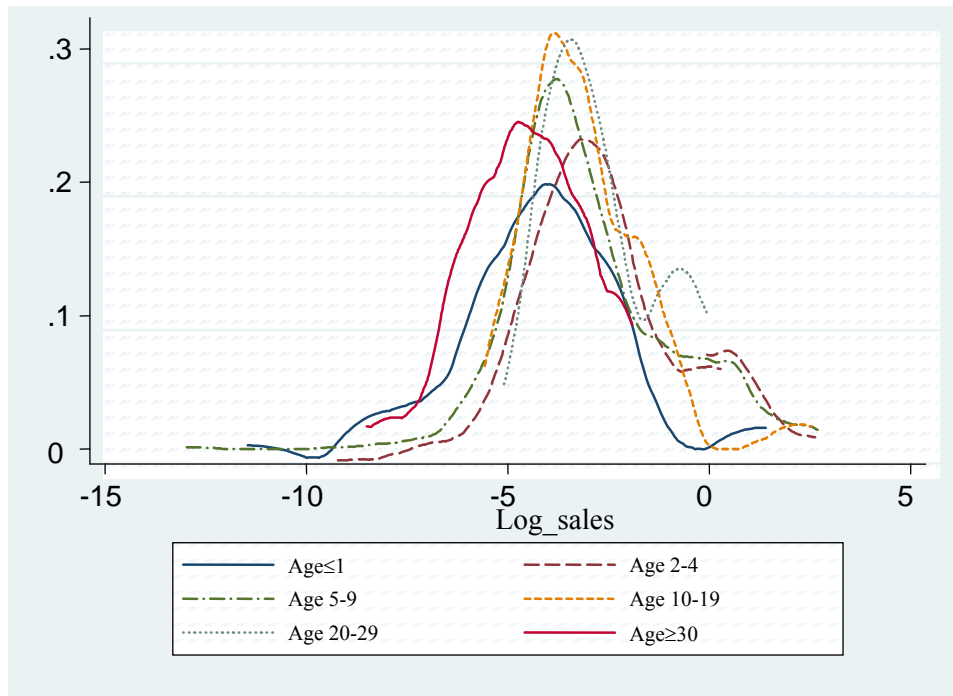


Table 1. Summary Statistics

ENTRY RATE is the fraction of new domestic firms in year t to the total number of domestic firms in the year $t-1$, where a new firm is one that is one year old or less. FOREIGN MARKET SHARE is a measure of foreign presence in the industry in year t and is the share of industry's sales captured by foreign firms. INDUSTRY SHARE is the industry's share of total sales and measures the relative size of the industry sector. BACKWARD measures the contracting linkages (as indicated in the IO table) between domestic firms (suppliers) in industry i and foreign firms across all downstream industries. FORWARD measures the contracting linkages (as indicated in the IO table) between domestic firms (customers) in industry i and foreign firms across all upstream industries. # FOREIGN/DOMESTIC FIRMS count number of firms per industry-year. All variables are averaged across sample period 1994-2000.

Variable	N	Mean	Stand.Dev.	Minimum	Maximum
ENTRY RATE	1459	0.0803	0.1683	0	2
FOREIGN MARKET SHARE	1459	0.2374	0.2644	0	1
INDUSTRY SHARE	1459	0.0046	0.0088	3.72E-09	0.12
BACKWARD	1459	0.2262	0.0470	0.052	0.47
FORWARD	1459	0.2347	0.0518	0.076	0.39
# FOREIGN FIRMS	1459	5.7875	11.317	0	146
# DOMESTIC FIRMS	1459	32.394	57.693	1	611

Table 2. FDI and Domestic Entry: Intra-Industry and Inter-Industry Spillovers.

The regression equation estimated is $ENTRY_{it} = \alpha + \beta_1 FOREIGN\ MARKET\ SHARE_{it} + \beta_2 INDUSTRY\ SHARE_{it} + \beta_3 BACKWARD$ (or $FORWARD$) $_{it} + \beta_4 Trend + Region\ Dummies_{it} + Year\ Dummies_t + Industry\ Dummies_i + e_{it}$. ENTRY is the fraction of new domestic firms in industry i in year t to the total number of domestic firms in the industry in year $t-1$, where a new firm is defined as being one year old or less. FOREIGN MARKET SHARE is a measure of foreign presence in an industry in year t and is the share of that industry's sales captured by foreign firms. INDUSTRY SHARE is a measure of the relative size of the industry sector and is the ratio of the industry's sales to total sales. BACKWARD measures the contracting linkages (as indicated in the Input-Output table) between domestic firms (suppliers) in industry i and foreign firms across all downstream industries. FORWARD measures the contracting linkages (as indicated in the Input-Output table) between domestic firms (customers) in industry i and foreign firms across all upstream industries. The region dummies are multiplied by the number of all firms in industry i in year t in a given region. Trend controls for the aggregate growth effects and takes values 1 for year 1994 and 7 for year 2000. In column 1, we include only Intra-Industry Spillovers. Cols. 2-4 include both Intra-Industry and Inter-Industry Spillovers. When sector j (2-digit NACE group in the IO table) buys from itself, we consider all 3-digit USSIC industries (other than industry i) that belong to the same sector j and buy from industry i , as part of BACKWARD linkages in col. 2 ; as part of FORWARD linkages in col. 3; and separately in col. 4. All regressions are estimated by fixed effects estimator.

	1	2	3	4
	Intra-Industry Spillovers Only	Intra-Industry AND Inter-Industry Spillovers		
		3-digit industries (other than industry i), all belonging to the same 2-digit Sector j , and buying from industry i , included:		
		In <i>Backward</i> linkages.	In <i>Forward</i> linkages.	Separately as: "Sector J buys from itself"
FOREIGN MKT. SHARE	0.163*** (0.045)	0.165*** (0.045)	0.165*** (0.044)	0.166*** (0.045)
BACKWARD		0.869*** (0.304)	0.325 (0.409)	0.372 (0.433)
FORWARD		0.751 (0.615)	1.260*** (0.363)	1.081* (0.648)
Sector j buys from itself				1.329*** (0.417)
INDUSTRY SHARE	0.541 (1.499)	0.582 (1.496)	0.574 (1.492)	0.605 (1.495)
Trend	-0.032*** (0.003)	-0.048*** (0.006)	-0.048*** (0.006)	-0.047*** (0.006)
Constant	0.226*** (0.028)	-0.018 (0.093)	-0.037 (0.080)	-0.022 (0.093)
Observations	1459	1459	1459	1459
# of industries	245	245	245	245
R-squared	0.18	0.18	0.19	0.19

*, ** and *** represent significance at 10, 5 and 1% levels respectively

Table 3. FDI and Domestic Entry: Robustness

The regression equation estimated is $ENTRY_{it} = \alpha + \beta_1 \text{FOREIGN MARKET SHARE}_{it-1} + \beta_2 \text{INDUSTRY SHARE}_{it} + \beta_3 \text{BACKWARD (or FORWARD)}_{it-1} + \beta_4 \text{Trend (or Cross Effects 2-Digit Industry Dummies x Trend)} + \text{Region Dummies}_{it} + \text{Year Dummies}_{it} + \text{Industry Dummies}_{it} + e_{it}$. ENTRY is the fraction of new domestic firms in industry i in year t to the total number of domestic firms in the industry in year $t-1$, where a new firm is defined as being one year old or less. FOREIGN MARKET SHARE is a measure of foreign presence in an industry in year t and is the share of that industry's sales captured by foreign firms. INDUSTRY SHARE is a measure of the relative size of the industry sector and is the ratio of the industry's sales to total sales. BACKWARD measures the contracting linkages (as indicated in the Input-Output table) between domestic firms (suppliers) in industry i and foreign firms across all downstream industries. FORWARD measures the contracting linkages (as indicated in the Input-Output table) between domestic firms (customers) in industry i and foreign firms across all upstream industries. The region dummies are multiplied by the number of all firms in industry i in year t in a given region. Trend controls for the aggregate growth effects and takes values 1 for year 1994 and 7 for year 2000. When sector j (2-digit NACE group in the IO table) buys from itself, we consider it separately. Col. 1 shows from the full sample estimated by Random Effects Tobit model. Marginal effects at means are reported for the Tobit specification. Col. 2-4 show results for a trimmed sub-sample with ENTRY RATES greater than 0, but less than or equal to 1 estimated by standard linear fixed effects model.

	1	2	3	4
	FULL SAMPLE: <i>Random Effects Tobit</i>	POSITIVE ENTRY RATE (0,1]: <i>Linear Fixed Effects</i>		
			Lags	Lags + Cross Effects (2-digit Industry Dummies x Trend)
FOREIGN MARKET SHARE	0.168** [0.084]	0.109*** (0.038)		
BACKWARD	0.390 [0.793]	0.038 (0.339)		
FORWARD	0.374 [1.158]	1.442*** (0.557)		
Sector j buys from itself	1.625** [0.777]	1.237*** (0.343)		
FOREIGN MKT SHARE (Lag)			0.128*** [0.043]	0.143*** [0.042]
BACKWARD (Lag)			0.352 [0.328]	0.194 [0.379]
FORWARD (Lag)			-0.079 [0.555]	-0.219 [0.521]
Sector j buys from itself (Lag)			0.763** [0.316]	0.805** [0.320]
INDUSTRY SHARE	1.750 [2.673]	0.629 (0.991)	-1.372 [1.551]	-2.997** [1.514]
Trend	-0.085*** [0.010]	-0.052*** (0.005)	-0.039*** [0.007]	-0.04 [0.030]
Constant	0.091 [0.073]	0.02 (0.077)	0.135* [0.076]	0.112 [0.085]
Observations	1459	697	537	537
# of industries	245	195	169	169
R-squared	0.29	0.46	0.37	0.62

*, ** and *** represent significance at 10, 5 and 1% levels respectively

Table 4. FDI and Industry Structure.

The regression equation estimated is $ENTRY_{it} = \alpha + \beta_1 \text{FOREIGN MARKET SHARE}_{it} + \beta_2 \text{INDUSTRY SHARE}_{it} + \beta_3 \text{BACKWARD (or FORWARD)}_{it} + \beta_4 \text{Trend} + \text{Region Dummies}_{it} + \text{Year Dummies}_t + \text{Industry Dummies}_i + e_{it}$. ENTRY is the fraction of new domestic firms in industry i in year t to the total number of domestic firms in the industry in year $t-1$, where a new firm is defined as being one year old or less. FOREIGN MARKET SHARE is a measure of foreign presence in an industry in year t and is the share of that industry's sales captured by foreign firms. INDUSTRY SHARE is a measure of the relative size of the industry sector and is the ratio of the industry's sales to total sales. BACKWARD measures the contracting linkages (as indicated in the Input-Output table) between domestic firms (suppliers) in industry i and foreign firms across all downstream industries. FORWARD measures the contracting linkages (as indicated in the Input-Output table) between domestic firms (customers) in industry i and foreign firms across all upstream industries. When sector j (2-digit NACE group in the IO table) buys from itself, we consider it separately. The region dummies are multiplied by the number of all firms in industry i in year t in a given region. Trend controls for the aggregate growth effects and takes values 1 for year 1994 and 7 for year 2000. All regressions are estimated by fixed effects estimator.

	1	2	3	4
	Industries <i>with</i> Foreign Presence	Industries <i>without</i> Foreign Presence	Competitive Industries (≥ 5 firms)	Un-competitive Industries (< 5 firms)
FOREIGN MARKET SHARE	0.168*** (0.040)		0.043 (0.039)	1.070*** (0.181)
BACKWARD	-0.006 (0.434)	2.257* (1.344)	0.300 (0.388)	0.354 (1.627)
FORWARD	1.613** (0.680)	-0.937 (1.638)	1.241** (0.630)	1.329 (1.724)
Sector j buys from itself	0.900** (0.411)	4.108*** (1.309)	0.967*** (0.371)	1.752 (1.582)
INDUSTRY SHARE	0.672 (1.405)	-4.951 (6.588)	1.814 (1.251)	-23.198** (10.151)
Trend	-0.049*** (0.006)	-0.049*** (0.018)	-0.049*** (0.006)	-0.052** (0.020)
Constant	-0.037 (0.095)	-0.039 (0.271)	0.023 (0.087)	-0.411 (0.325)
Observations	1084	375	1129	330
# of industries	177	68	181	64
R-squared	0.24	0.14	0.27	0.25

*, ** and *** represent significance at 10, 5 and 1% levels respectively.

Table 5. Manufacturing vs. Services.

The columns (1)-(3) are consistent with the specification reported in Table 2, col. 4 (column (1) is a replica of col. 4 in Table 2). See notes in Table 2 for details. In columns (4)-(6) we further separate BACKWARD and FORWARD linkages across 3 groups of industries: manufacturing, services and all other industries as described in section 5.4. Columns (1) and (4) report results for the full sample, while columns (2) and (5) report results only for services (2-digit USSIC: 40-87) and columns (3) and (6) report results only for manufacturing industries (USSIC: 20-39).

	1	2	3	4	5	6
	Full Sample	Services	Manufacturing	Full Sample	Services	Manufacturing
FOREIGN MARKET SHARE	0.166*** (0.045)	0.269*** (0.066)	-0.024 (0.064)	0.166*** (0.045)	0.271*** (0.066)	-0.032 (0.064)
BACKWARD (all industries)	0.372 (0.433)	2.873** (1.286)	-0.462 (0.600)			
FORWARD (all industries)	1.081* (0.648)	2.154* (1.172)	0.663 (1.070)			
BACKWARD (only services)				-0.153 (0.988)	3.793** (1.912)	-4.287*** (1.472)
FORWARD (only services)				0.826 (0.916)	-0.089 (1.451)	1.171 (2.213)
BACKWARD (only manufacturing)				0.436 (0.622)	1.163 (1.971)	-0.055 (0.720)
FORWARD (only manufacturing)				1.883* (1.095)	9.526** (3.730)	1.03 (1.300)
BACKWARD (other industries than manufacturing and services)				0.389 (1.747)	-14.437 (12.268)	2.09 (1.716)
FORWARD (other industries than manufacturing and services)				3.959 (3.742)	13.616* (7.038)	-1.529 (5.812)
Sector j buys from itself	1.329*** (0.417)	3.456*** (1.030)	0.882 (0.565)	1.412*** (0.428)	2.407*** (0.781)	0.644 (0.538)
Trend	-0.047*** (0.006)	-0.089*** (0.016)	-0.032*** (0.008)	-0.050*** (0.007)	-0.078*** (0.019)	-0.032*** (0.010)
INDUSTRY SHARE	0.605 (1.495)	-0.05 (2.131)	0.294 (2.419)	0.672 (1.499)	1.086 (2.163)	1.155 (2.440)
Constant	-0.022 (0.093)	-0.599** (0.244)	0.157 (0.125)	-0.046 (0.104)	-0.392 (0.342)	0.199 (0.167)
Observations	1459	629	690	1459	629	690
# of industries	245	107	115	245	107	115
R-squared	0.19	0.24	0.17	0.19	0.25	0.18

*, ** and *** represent significance at 10, 5 and 1% levels respectively.

Table 6. Does Country of Origin of FDI Matter?

The regression equation estimated is $ENTRY_{it} = \alpha + \beta_1 FOREIGN\ MARKET\ SHARE_{it} + \beta_2 INDUSTRY\ SHARE_{it} + \beta_3 BACKWARD\ (or\ FORWARD)_{it} + \beta_4 Trend + Region\ Dummies_{it} + Year\ Dummies_{it} + Industry\ Dummies_{it} + e_{it}$. ENTRY is the fraction of new domestic firms in industry i in year t to the total number of domestic firms in the industry in year $t-1$, where a new firm is defined as being one year old or less. FOREIGN MARKET SHARE is a measure of foreign presence in an industry in year t and is the share of that industry's sales captured by foreign firms. INDUSTRY SHARE is a measure of the relative size of the industry sector and is the ratio of the industry's sales to total sales. BACKWARD measures the contracting linkages (as indicated in the Input-Output table) between domestic firms (suppliers) in industry i and foreign firms across all downstream industries. FORWARD measures the contracting linkages (as indicated in the Input-Output table) between domestic firms (customers) in industry i and foreign firms across all upstream industries. The region dummies are multiplied by the number of all firms in industry i in year t in a given region. Trend controls for the aggregate growth effects and takes values 1 for year 1994 and 7 for year 2000. When sector j (2-digit NACE group in the IO table) buys from itself, we consider it separately. In column (1) we split FOREIGN MARKET SHARE into FOREIGN MARKET SHARE from EU countries, Non-EU countries, and Unknown sources. In column (2), we split FOREIGN MARKET SHARE from Non-EU countries into Slavic vs. Non-Slavic countries. Column (3) repeats column (2) for a trimmed sub-sample with ENTRY RATES greater than 0, but less than or equal to 1. All regressions are estimated by fixed effects estimator.

	1	2	3
	Full Sample		Positive Entry rate (0,1]
FOREIGN MARKET SHARE_EU	0.194*** (0.049)	0.197*** (0.049)	0.108*** (0.040)
FOREIGN MARKET SHARE_NonEU	0.073 (0.089)		
FOREIGN MARKET SHARE_Slavic		-0.091 (0.207)	1.110 (1.280)
FOREIGN MARKET SHARE_NonSlavic		0.109 (0.098)	0.055 (0.099)
FOREIGN MARKET SHARE_Unknown	0.075 (0.133)	0.080 (0.133)	0.192 (0.125)
BACKWARD	0.439 (0.435)	0.451 (0.436)	0.026 (0.344)
FORWARD	1.058 (0.648)	1.041 (0.649)	1.421** (0.559)
Sector J buys from itself	1.299*** (0.417)	1.297*** (0.417)	1.230*** (0.348)
INDUSTRY SHARE	0.600 (1.496)	0.588 (1.496)	0.645 (0.995)
Trend	-0.048*** (0.006)	-0.048*** (0.006)	-0.052*** (0.005)
Constant	-0.024 (0.093)	-0.024 (0.093)	0.022 (0.077)
Observations	1459	1459	697
# of industries	245	245	195
R-squared	0.19	0.19	0.47

*, ** and *** represent significance at 10, 5 and 1% levels respectively.

Appendix A1. Net Inflows of FDI (in Millions of USD) in CEEC's Countries: 1994-2000.

	1994	1995	1996	1997	1998	1999	2000
Czech Republic	749	2,526	1,276	1,275	3,591	6,234	4,943
Croatia	110	109	486	347	835	1,445	1,086
Hungary	1,097	4,410	2,279	1,741	1,555	1,720	1,123
Poland	542	1,134	2,741	3,041	4,966	6,348	8,171
Slovak Republic	236	194	199	84	374	701	2,058
Slovenia	129	161	167	303	221	59	71
Estonia	212	199	111	130	574	222	324
Latvia	279	245	379	515	303	331	400
Lithuania	31	72	152	328	921	478	375
Bulgaria	105	98	138	507	537	789	1,003
Romania	341	417	415	1,267	2,079	1,025	1,051
EU	47,082	68,814	70,696	75,204	145,563	206,428	401,868

Source: EBRD Transition Report (May 2003) and World Bank World Development Indicators (2002).