

**Does FDI facilitate Domestic Entrepreneurship?  
Evidence from the Czech Republic**

**Meghana Ayyagari\***

**Renáta Kosová\*\***

**September 2006**

**Abstract:** How does foreign direct investment (FDI) affect industry dynamics? In this paper, we analyze the impact of FDI on domestic firm entry 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 forward linkages dominate both horizontal spillovers and spillovers through backward linkages. However, the 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, we find that while vertical spillovers prevail among competitive industries, horizontal spillovers dominate in less competitive industries. We also find differences in firm size distributions between industries with and without FDI, further suggesting the influence of FDI presence on industry dynamics.

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

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

\*Ayyagari: School of Business, George Washington University, [ayyagari@gwu.edu](mailto:ayyagari@gwu.edu) ; \*\*Kosová: School of Business, George Washington University, [kosova@gwu.edu](mailto:kosova@gwu.edu). We are thankful to Beata Javorcik for her helpful comments and suggestions. This research is supported by a grant from the American Consortium of European Studies (ACES). The paper's findings, interpretations, and conclusions are entirely those of the authors.

## **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.<sup>1</sup>

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 industries? and
- (d) Does FDI presence affect the firm size distribution of domestic firms?

---

<sup>1</sup> 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 transitional 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. The dataset covers a broad range of 245 industries (at 3-digit USSIC level), allowing a careful analysis of both horizontal and vertical spillovers from FDI. In addition, 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. The Czech Republic serves as a natural experiment environment for our study because 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 opposing effects on domestic entrepreneurship. Presence of foreign firms in an industry can have a negative impact on the 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 impact of FDI as well as the inter-industry impact of FDI via vertical linkages between industries.

To analyze the existence of 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 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. When we analyze 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 (both forward and backward) are of a much higher magnitude than horizontal spillovers. A 10% increase in foreign presence across all downstream industries increases the average domestic entry rate in the supplying industry by 9.4%. An even stronger impact is registered through forward linkages. A 10% increase in foreign presence across upstream industries increases the entry rate on average by 13.1%. Our results are also robust to controlling for endogeneity by including leads and lags of the foreign market shares.

However, the existence of entry spillovers varies greatly with the type of industry. While the service industries benefit from huge FDI spillover effects through both horizontal and vertical channels, manufacturing industries do not experience any significant positive spillovers from FDI, suggesting a higher entry barrier effect in manufacturing. We also find that in competitive industries (industries with less than 5

firms), domestic entrants benefit only from vertical spillovers, where as in uncompetitive industries, horizontal spillovers dominate.

The comparisons of domestic firm size distributions across industries with and without foreign presence further emphasize an important role of FDI for industry dynamics. We find that in industries *without* foreign presence, the size distributions of domestic firms are skewed to the right.

Our paper makes several contributions. First, it contributes to the literature on inter-industry linkages and FDI spillovers following Javorcik (2004). While she studies vertical spillovers through backward linkages in Lithuania, she focuses only on manufacturing industries and analyzes the impact of FDI on domestic firm productivity rather than entrepreneurship.

Second, our paper provides evidence on the relationship between FDI and domestic entrepreneurship in emerging markets. While De Backer and Sleuwaegen (2003) study horizontal spillovers and find that import competition and FDI discourage domestic entry, Görg and Strobl (2002) find a positive effect of foreign companies on the entry of indigenous firms through vertical linkages. However, both papers focus on developed countries (Belgium and Ireland, respectively), and on manufacturing industries alone. Moreover, neither of the papers analyzes horizontal spillovers together with the different kinds of vertical spillovers nor do they look at the impact of FDI on domestic firm size distributions.

Finally, our paper also derives an important methodological implication with regards to the relative importance of backward vs. forward linkages in instances when the

IO table is based on a higher level of industry classification than the level of industry classification used in the analysis.

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

## **2. Motivation and Related Literature**

### ***2.1. Entrepreneurship Literature***

A huge body of research has focused on the determinants of entrepreneurial activity. Much of this work has been focused on developed economies due to the lack of data for developing countries. In a series of papers, Dunne et al. (1988, 1989) explore entry and exit in U.S. manufacturing industries, documenting the rapid pace of entry during the early stage of industry life-cycle and its correlation with exit rates. The empirical literature has been supplemented by theoretical models on the evolution of industry dynamics. Models such as Lucas (1978), Jovanovic (1982), Jovanovic and MacDonald (1994) and Ericson and Pakes (1995) rely on gradual learning by entrepreneurs about their own ability and the nature of technological innovation in emerging industries.

Related to the study of entry rates and entrepreneurship is research on the determinants of firm growth and firm size distributions. Much of this literature has focused on Gibrat's law (the proposition that firm growth rate is independent of firm size) versus Sutton (1997) (firm size distributions are approximately lognormal), presenting mixed evidence. More recently, research has focused on the institutional and business

environment constraints that influence entry rates and firm size distributions. Cooley and Quadrini (2001) show that capital constraints explain the larger investment to cash flow sensitivity of small firms. Cabral and Mata (2003) explore the firm size distribution in a sample of Portuguese manufacturing firms and find that capital constraints explain the skewness (to the right) in firm size distributions. Klapper et al. (2006), in their study of firms from Eastern and Western Europe, find that entry regulations inhibit new firm creation, especially in industries characterized by high entry rates. In a related paper, Desai et al. (2005) find that political, legal, and regulatory factors affect both firm entry as well as firms' ability to transition and grow, particularly in less-developed markets.

As evident, most of the empirical work highlighted above focuses exclusively on domestic factors influencing industry dynamics, reflecting the closed economy framework of theoretical models on firm formation. Only recently, studies have used theoretical occupational choice models that predict that FDI may crowd out domestic entrepreneurs through their selections in product and labor markets.

In particular, De Backer and Sleuwaegen (2003) in their study of firm entry and exit across Belgian manufacturing industries, find that import competition and FDI discourage entry. On the other hand, Görg and Strobl (2002) find a positive effect of foreign presence on the entry of indigenous firms in manufacturing industries in Ireland.. Our paper differs from these studies in several aspects: First, 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). Second, our sample is not restricted to manufacturing alone but covers a range of industries. Third, we

analyze both horizontal 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. Finally, having rich panel data across several years allows us to control for aggregate trend and unobserved industry, region and year effects, which is crucial in this kind of analysis, in order to avoid endogeneity problems with FDI presence.

## ***2.2. FDI and Domestic Entrepreneurship 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 and 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 and Hoekman, 2000 in the Czech Republic; Sabirianova et al., 2005 and Javorcik, 2004 in Lithuania). 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.<sup>2</sup>

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.<sup>3</sup> Kosová (2005) 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 literature has 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

---

<sup>2</sup> For comprehensive surveys on FDI spillovers studies, see Blomström and Kokko (1998), Meyer (2004) or Görg and Strobl (2001).

<sup>3</sup> The key argument is that on one hand, while MNCs may try to minimize the extent of technology spillovers to domestic firms (rivals) within the same industry (i.e. horizontal spillovers) on the other hand, for their own benefit, MNCs will be more open to sharing technology or management expertise with their suppliers/customers in vertically related industries (i.e. vertical spillovers).

industry (horizontal 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 through which foreign presence can foster domestic 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 the foreign firm.<sup>4</sup> 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 effects simply as the *demand creation effect*.

However, foreign presence can also discourage domestic entrepreneurs either by raising entry barriers or exit costs. This *entry barrier effect* could arise due to several

---

<sup>4</sup> Javorcik and Spatareanu (2005) suggest that the labor turnover between foreign and domestic firms is not very often. E.g. According to a recent World Bank survey in the Czech Republic, only four percent 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 terms of numbers; those that leave and set up their own business have a substantial impact on the domestic economy.

reasons: Foreign firms are often more technologically advanced than domestic firms, especially in emerging markets, which allows them to reduce their production costs.<sup>5</sup> 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.<sup>6</sup>

### ***2.3. FDI in the Czech Republic***

The Czech Republic was a closed economy before the Velvet Revolution in 1989, which led to the first democratic elections followed by massive privatization of the overall economy. Today, the Czech Republic is one of the most successful transition economies in Central Europe in attracting FDI (see Appendix 1).

However, as Appendix 1 shows, the FDI inflows have not been uniform during our sample period: 1994-2000. The initial spurt in FDI immediately after completion of large scale privatization in 1995 (Kočenda and Svejnar, 2003), was followed by a decline due to economic recession in 1997. Privatization of financial institutions and a more welcoming approach to FDI by the government since 1998 again increased FDI inflows.

Several other factors have contributed to the massive FDI inflows in the Czech Republic. The country is strategically located at the center of Europe thus offering an easy access to both the developed Western European and the emerging Eastern European

---

<sup>5</sup> 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).

<sup>6</sup> Pavlínek (2004) reports that foreign firms in the Czech Republic receive \$5000 (approx. the average annual wage in the automotive 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.

markets. The prospects of EU membership (achieved in May 2004) also attracted many western investors. Initially the FDI inflows were attracted by the opportunity to capture the monopoly rents of domestic producers. More recently however, many foreign firms invest in the Czech Republic to benefit from cheap and highly skilled labor.<sup>7</sup> 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.<sup>8</sup> 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.<sup>9</sup>

The distribution of FDI across the different regions has not been uniform either. FDI has been primarily concentrated in a few large industrialized cities in central and north-western Bohemia that neighbor Germany and Austria, and thus benefit the most from cross-border FDI. Based on the Central National Bank statistics, Pavlínek (2004) concludes that in 2001, the capital, Prague and the surrounding region of Central Bohemia accounted for 60% of all FDI and the share of FDI stock located in the four largest cities -Prague, Brno, Ostrava and Plzeň - was 58%.

By sectors, majority of FDI inflows were directed into services rather than manufacturing. According to the Czech National Bank, the largest FDI recipients were

---

<sup>7</sup> Post 1998 (closer to the end of our sample period), several companies relocated their production facilities from Western Europe to the Czech Republic. E.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>).

<sup>8</sup> See article: "Major Players in Outsourcing", Business Week, January 30, 2006.

<sup>9</sup> See the US Department of State ([www.state.gov/e/eb/ifa/2005/42007.htm](http://www.state.gov/e/eb/ifa/2005/42007.htm)) for the latest information on the government FDI incentives and reforms.

financial services, transportation and telecommunications, hotels and restaurants, real estate and business activities, utilities and other sectors.<sup>10</sup>

While the above aggregate statistics provide 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 particular role in promoting domestic entrepreneurship. 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.<sup>11</sup> 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 information, 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).<sup>12</sup> 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

---

<sup>10</sup> See Arnold et al. (2005) for more detailed discussion of service liberalization in the Czech Republic.

<sup>11</sup> To maximize firm coverage and information on firm ultimate ownership, we combine data across several versions of Amadeus obtained at different dates: a DVD version covering period 1993-1998, and online downloads in: March 2002, Jan/Feb 2003 and Oct. 2005. Though year 1993 is available, we excluded it from the analyses because of a large proportion of missing data. In 1993 the Czechoslovak Republic split into the Czech and Slovak Republics so there might be some data miscoding in this year as well.

<sup>12</sup> The ownership data is based on cash flow rights rather than voting rights.

includes 9979 firms across 245 industries with USSIC: 104-874 (see Table 1). Out of these, 8584 are domestic and 1395 are foreign firms.<sup>13</sup> 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 the Czech Republic. 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 till they arrive at an independent ultimate owner who is not controlled by anyone else.<sup>14</sup> 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.<sup>15</sup> Thus our classification of foreign vs. domestic does not vary during the sample period.

### ***3.1. Description of Variables***

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,

---

<sup>13</sup> The starting sample contains unbalanced data on 11545 firms. Excluding small firms without balance sheets or at least year of incorporation (usually only firm ID, name or address were reported so we could not determine when a firm entered/exited the market), agriculture and other government controlled sectors reduces initial sample to 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.

<sup>14</sup> Firm ownership identified by tracking down the ultimate owner is a more accurate description of the controlling owner of a company than firm ownership identified by direct shareholdings (used in most studies of impact of FDI on productivity) as shown in La Porta et al. (1999).

<sup>15</sup> 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.

**ENTRY**<sub>it</sub> 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  $t-1$ .<sup>16</sup> 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 level. **FOREIGN MARKET SHARE**<sub>it</sub> 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**<sub>it</sub>, defined as the ratio of industry  $i$ 's sales to total sales in year  $t$ .

### **Insert Table 1**

#### **3.2. Summary Statistics**

Table 1 presents industry descriptive statistics on the 245 industries in our final sample. Most of the industries in the Czech Republic over the period 1994-2000, are relatively small with average industry shares less than 1%. The largest industry share belongs to the Electric Services industry (USSIC 491) which captures just over 7% of total average sales over the period. Table 1 shows that there is a huge variation in entry rates across industries over time. In some industries like Crude Petroleum and Natural Gas (131), Footwear (314) and Communication Services (489), there is no domestic entry during the time period studied. In other industries like Printing Trade Services (279) and Plastic Materials and Synthetics (282), average domestic entry rate exceeds 35%.<sup>17</sup>

---

<sup>16</sup> The same definition of entry rates is used in many other studies. See e.g. Dune et al. (1988); Agarwal and Gort (1996); De Backer and Sleuwagen (2003), Disney et al. (2003) and Desai et al. (2005). Other studies e.g. Klapper et al. (2006) also use percentage of employment at new firms. However, our time series data on employment is limited, preventing us from using this measure.

<sup>17</sup> In industry USSIC: 319 (Leather Goods), average entry rate is 100%. However, this outlying value is due to the fact that we have only 2 domestic (and no foreign) firms in the industry and we have non-missing firm sales only for one year. So we have only one-year observation per this industry in our final sample.

Average foreign market share (col. 4) varies from 0 to being slightly over 98% in Flat Glass industry (321) and Bus Terminal and Service Facilities (417).

Table 1 also reports the average number of domestic and foreign firms per industry. The number of domestic firms varies from being just one in some industries like Crude Petroleum and Natural Gas (147) and Commercial Banks (602) to over 500 firms in Professional and Commercial Equipment (504). Interestingly, the largest average number of foreign firms, 135, is also in Professional and Commercial Equipment. All our results are robust to removing possible outliers as discussed in section 5.3.

Appendix A2 presents the summary statistics for the above variables. The entry rates across industry-years range from 0 to 200% with an average entry rate of 8%. Average foreign market share is around 24% and is positively and significantly correlated with entry rates, with a correlation coefficient of 5%. Hence, we should expect higher rates of entry among domestic firms in industries with larger foreign presence.

The correlation of entry rates with foreign presence is also clear from Figure 1, which presents a bar chart of entry rates across industries with and without foreign presence during 1994-2000. 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 (dotted bars).

#### **4. Empirical Model and Methodology**

The summary statistics discussed above indicate that there exists 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 in FDI presence, it is important to control for unobserved fixed effects at the industry, regional and year level.<sup>18</sup> FDI may target more productive industries or it may be directed to regions with higher FDI incentives or it could be higher in certain years. Inter-regional and inter-industry patterns in FDI in the Czech Republic, discussed in section 2.3 further emphasize the importance to control for these various unobserved effects.

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, in all estimations we include annual and 8 regional dummies.<sup>19</sup> To better control for possible regional disparities and differences in industry structure, the region dummies are multiplied by the number of all firms (domestic and foreign) per industry-year in a given region. Moreover, to control for the possibility that industries that are relatively larger may experience lower or higher entry rates, we include industry share ( $INDUSTRY\ SHARE_{it}$ ). We also include a time trend to control for aggregate growth effects.<sup>20</sup> The baseline empirical equation we estimate is specified as follows:

---

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

<sup>19</sup> The 8 regions are defined as follows: 1) České Budějovice, 2) Central Bohemia-Ustí nad Labem, 3) Jihlava-Brno-Zlín, 4) Liberec-Hradec Králové, 5) Olomouc-Ostrava, 6) Plzeň-Karlovy Vary, 7) Praha and 8) Region unknown.

<sup>20</sup> Our results remain unchanged if we included only time dummies.

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

where subscripts  $i$  and  $t$  index industry and year respectively. All the variables are calculated at the 3-digit USSIC level as discussed in section 3.1.

#### ***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 for some countries, this is not the case for the Czech Republic. Hence we rely on the year 1995 IO table from the OECD, which is the most pertinent IO table for our sample period of 1994-2000.<sup>21</sup> However, since our IO table is based on 2-digit NACE (rev. 1.1) industry classification, we first translate the 2-digit NACE codes into 3-digit USSIC codes.<sup>22</sup> We then construct the measures of foreign presence via backward ( $\text{BACKWARD}_{it}$ ) and forward ( $\text{FORWARD}_{it}$ ) linkages at the 3-digit USSIC level.<sup>23</sup> Since we want to capture only the input-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:

---

<sup>21</sup> 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.

<sup>22</sup> The concordance tables we use for this purpose can be provided on request.

<sup>23</sup> Our measures are analogous to those used in other studies; see e.g. Javorcik (2004).

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

To better assess the impact of foreign presence via different types of vertical linkages, we first introduce backward and forward linkages separately and then both together.

#### **4.1.1. Construction of Backward Linkages**

Backward linkages capture the extent of contracting linkages between foreign firms that purchase output from domestic suppliers. Hence, the measure of foreign presence via backward linkages for a 3-digit industry  $i$  (corresponding to 2-digit NACE sector  $j$ ) in year  $t$ ,  $\text{BACKWARD}_{it}$ , 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  $\text{BACKWARD}_{it}$  is at the 3-digit USSIC level, the entries in our IO table are based on the 2-digit NACE (rev.1.1) codes (in discussion 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  $k \neq j$ :

- $\sigma_{jk}$  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):

- $\sigma_{jk}$  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  $k$ .<sup>24</sup>

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,  $j=1,2,\dots,N$ .<sup>25</sup>

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  $1/N$ .<sup>26</sup> Example: Suppose that a 3-digit USSIC industry  $i$  belongs to two  $j$ -sectors,  $j1$  and  $j2$ . Then the backward linkage is:

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

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

<sup>24</sup> 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,  $FOREIGN\ MARKET\ SHARE_{it}$ .

<sup>25</sup> Out of the 245 3-digit industries in our sample, only 23 industries have multiple correspondences with 2-digit NACE codes.

<sup>26</sup> 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:  $FOREIGN\ MARKET\ SHARE_{kt} = \sum_{h \in k} (w_h * foreign\ firm\ sales_{ht}) / \sum_{h \in k} (w_h * industry\ sales_{ht})$ , 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.

#### **4.1.2. Construction of Forward Linkages**

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 Impact**

##### **Insert Table 2**

Table 2 reports results for the baseline regression (1). Full sample results (col.1) show that FOREIGN MKT SHARE has a positive and significant impact on domestic entry rates even after controlling for industry, time and regional fixed effects.<sup>27</sup> This result is confirmed when we restrict the sample to only those observations that have positive entry rates greater than zero and less than or equal to one (col. 2). Restricting the

---

<sup>27</sup> In unreported regressions we also estimated the entry equation by random effects estimator, assuming that industry-level unobserved heterogeneity is part of the composite error term. While the foreign market share coefficients were still positive and significant and of similar magnitude (0.155 at the 1% level), the Hausman test rejected the random effects specification.

sample to (0,1] entry rates helps us verify that the full sample results are not driven by a few industries with extremely large entry rates or by entry rates being censored at 0.<sup>28</sup>

The impact of foreign presence on firm entry is also economically significant. Increasing foreign market share by 10% increases the entry rate of the Czech firms on average by 1.6%. 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%. Further, the R-squared in the reduced sample is much higher (0.44) than in the full sample (0.18). These results suggest that FDI has a significantly positive impact on new domestic firm creation.

In addition, the negative and significant coefficient of time trend confirms that industry entry rates decrease over time, as already suggested by Figure 1. The Wald test reported at the bottom of the tables also shows that there are no significant differences in entry rates across regions. This is not surprising - even though FDI inflows may be region specific, since the Czech Republic is a very small country, the positive spillover effects from foreign presence in one region can be easily experienced by new domestic firms in the neighboring regions. While there is a large industrial organization literature on spatial localization effects, the small size of the country and insignificant regional differences prevents us from exploring these effects within the Czech context.

---

<sup>28</sup>In order to control for data censoring we also tried to estimate correlated random effects tobit model (see Wooldridge, 2002). However, the significantly skewed distribution of entry rates violates the normality assumption imposed by the tobit model. Hence, in order to minimize the impact of censoring we decided to trim the entry rates into the interval (0,1] to achieve a more symmetric distribution (see Johnston and Dinardo (1997) p. 442 for more details). Though further trimming of the sample would provide us an even more symmetric distribution, it significantly reduced our sample size to derive reliable results.

## ***5.2. FDI and Domestic Entry: Impact via Backward and Forward Linkages***

Table 3 reports results from the specifications where, in addition to the horizontal FDI measure, we first include backward linkages (col. 1-2) and next include forward linkages (col. 3-4). We report the results for the full sample as well as the sample with entry rates  $\in (0,1]$ . As previously discussed, while our BACKWARD and FORWARD linkage measures are constructed at 3-digit USSIC level, the IO table is based on the 2-digit NACE codes. In instances when sector  $k=j$  (*i.e. sector  $j$  buys from itself*, see section 4.1), 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. 1-2, and as part of forward linkages in col. 3-4.

The results confirm positive and significant intra-industry FDI spillovers of almost the same magnitude as in Table 2. In addition, we also find positive and significant effect from backward and forward linkages in all columns. The estimated coefficients suggest that the effect of forward linkages is stronger than the impact of backward linkages. In particular, in the full sample, a 10% increase in foreign presence across downstream sectors increases the entry of new domestic firms in the supplying industry on average by 9.4%. By contrast, a 10% increase in foreign presence in upstream sectors is associated with a larger (13.1%) increase in the entry of new domestic firms. When we restrict the sample to observations with entry rates  $\in (0,1]$ , we again find that the magnitude of forward linkages is larger than that of backward linkages.

**Insert Table 3**

Overall, the results in Table 3 suggest a strong demand creation effect generated by FDI presence. Since demand creation is more accurately captured by entry rates rather than by an increase in productivity of domestic firms, besides the fact that productivity spillovers take longer to realize, it is no surprise that unlike most productivity based studies our results imply a substantial positive effect on domestic entrepreneurship.<sup>29</sup>

Table 4 shows the results from specifications when we include forward and backward linkages together, in addition to the horizontal FDI measure. In col. 1-2, we include 3-digit USSIC industries other than industry  $i$  that belong to the same sector  $j$  as part of the backward linkages, in col. 3-4; we include them as part of the forward linkages. In col. 5-6, we exclude these industries from both measures and include them as a separate regressor (Sector  $j$  buys from itself).

#### **Insert Table 4**

The results show that the relative significance of backward versus forward linkages depends 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. 1-2), we find that backward linkages are significant while forward linkages are insignificant. When we include them under the forward linkages (col. 3-4) we find the opposite result.

Hence, our results suggest that the most important vertical spillover effects, regardless of whether we refer to them as backward or forward linkages, 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). For instance, in our data, 3-digit industry USSIC 152

---

<sup>29</sup> Konings (1997, 2001) argues that in transition economies it takes time for privatization and restructuring to “feed through to firm performance”.



*(Residential Building Construction)* belongs to 2-digit sector NACE 45 (*Construction*).

The IO table and the computed backward/forward measures reveal that industry 152 has strong backward and forward linkages with *other* 2-digit NACE sectors.<sup>30</sup> Despite this, the biggest impact on entry in USSIC 152 comes from the linkages with *other* 3-digit industries (USSIC: 154-179) that also belong to the NACE 45 (these represent “Sector j buys from itself”).

When we include “Sector j buys from itself” as a separate regressor, the results in col. 5-6 strongly support the above conjecture. In the full sample (col. 5) 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. However, forward linkages are much stronger when we restrict the sample to entry rates  $\in (0,1]$ . These results altogether support our earlier findings that spillovers from FDI presence via forward linkages are more important than foreign presence via backward linkages.

In general, Table 4 suggests that when the IO table is based on higher-digit industry classification than is the unit of analysis, to accurately estimate the relative importance of backward vs. forward linkages, one should separate the linkages with industries that belong to the same (higher-digit) industry sector as the industry in question. Otherwise, comparison of results across different studies may be meaningless.

### ***5.2.1. Using Leads and Lags of Foreign Presence***

---

<sup>30</sup> Means of the vertical measures for USSIC 152 are: BACKWARD=0.118, FORWARD=0.175, Sector j buys from itself=0.063. The mean entry rate in USSIC 152 is 6.29% (see Table 1).

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. On the other hand, we believe that endogeneity concerns are largely alleviated in our study by controlling for all kinds of fixed effects at the region, industry, and year level in our estimations. However, to further explore whether endogeneity might be a problem, Table 5 shows the results when we use one-year leads and lags of all foreign presence measures. These specifications also help us investigate whether domestic entrants react more to past or anticipated future expansions in foreign investment.

#### **Insert Table 5**

Col. 1 and 2 of Table 5 show results using lags and leads of FOREIGN MARKET SHARE, i.e. only intra-industry spillovers. Col. 3-6 report results from the specifications where, in addition to the horizontal FDI measure, we include separately backward linkages (col. 3-4) and then forward linkages (col. 5-6). In col. 7 and 8, we report results from the specifications that contain both forward and backward linkages with 3-digit USSIC industries other than industry  $i$  that belong to the same sector  $j$  included as a separate regressor (Sector  $j$  buys from itself). To save space, we present results only for positive entry rates  $(0,1]$  in all specifications.

Both lags and leads of the FOREIGN MARKET SHARE are significantly positive in all columns with the estimated coefficients of the similar magnitude we found previously. This confirms that our findings on significant intra-industry spillovers are not

driven by endogeneity issues. In addition, we also find positive and significant entry spillovers through backward and forward linkages. While BACKWARD linkages have a significant positive effect on entry only when lagged (col. 3), FORWARD linkages show significant positive effect through both lagged and lead values (col. 5-6). Moreover, consistent with our previous findings, we find that forward linkages have a stronger impact on entry than horizontal or backward linkages. When we include all measures of vertical linkages together (col. 7 and 8) we confirm our other earlier finding that the largest impact from foreign presence comes from industries included as “Sector j buys from itself”. The results in col. 7-8 also suggest that when it comes to entry decision, domestic firms seem to be more sensitive to current and future (or anticipated) increases in FDI rather than the past expansions in foreign presence.

Overall, Table 5 shows that endogeneity is not an issue in our estimations. In all subsequent analyses, we report only the results for specifications with current measures of foreign presence and when we include “Sector j buys from itself” separately (in addition to horizontal, backward and forward linkage measures). In the following section we analyze whether our results vary across different industry sub-samples.

### ***5.3. Do FDI Spillovers Vary across Industries?***

#### ***5.3.1. FDI and Industry Structure***

In this sub-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 6, we drop 68 industries without any foreign presence and find the results to be consistent with the full

sample (col. 5, Table 4). 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 that do not have any intra-industry foreign presence (col. 2), we again find a strong evidence of positive vertical spillovers from closely related industries (Sector j buys from itself) and weaker evidence for positive impact from FDI presence via backward linkages. These results show that even industries without any foreign presence experience an increase in new domestic firm formation due to positive spillovers ensuing from FDI in other industries.

#### **Insert Table 6**

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, multinationals 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 or more 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 price of both domestic and foreign suppliers.

Table 6, 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.<sup>31</sup>

### **5.3.2. Removal of Outliers**

To examine whether our results are robust to the exclusion of possible outliers Table 7 reports the results for 4 specifications, each removing 24 industries (top 10%) that have average values of the following variables larger than the value of the 90<sup>th</sup> percentile in our sample: FOREIGN MARKET SHARE, INDUSTRY SHARE, the number of foreign firms and the number of domestic firms. More precisely, in col. 1 we drop industries that have average industry share greater than 1% (i.e. above 90<sup>th</sup> percentile); in col. 2, we drop industries with average foreign market shares greater than or equal to 60%; in col. 3, we drop industries with average number of foreign firms greater than 14 and in col. 4 we drop industries with average number of domestic firms greater than 73.

#### **Insert Table 7**

Table 7 shows that in all specifications, FOREIGN MARKET SHARE has a strong and significant impact on entry rates of domestic firms, showing that the positive impact of intra-industry FDI presence on domestic entrepreneurs, as established previously, is not driven by outliers. Table 7 also confirms the results in Table 4, namely: the strongest vertical spillovers on domestic entry are generated when the sector  $j$  buys

---

<sup>31</sup> The results do not change if we define competitive industries as industries with at least 5 *domestic* firms.

from itself; backward linkages (from other sectors than sector j) have an insignificant impact on domestic entry, but there is some evidence that FDI presence via forward linkages increases entry.

### ***5.3.3. Manufacturing vs. Services***

In this section we investigate how our results may vary across manufacturing and services, which were at very different levels of development prior to transition. Even though the Czech Republic was closed to foreign presence before transition, the manufacturing sector remained competitive at some level, 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 developing countries, the Czech Republic has had a long standing industrial base and is endowed with scientific and engineering human capital (Djankov and Hoekman, 2000). However, in the absence of foreign competition and a non-existent IT sector to stimulate growth and quality of service offerings, the service industries remained very poorly developed until transition. In addition, as already discussed in section 2.3., FDI inflows in the Czech Republic have been mostly directed towards service industries such as telecommunications and banking rather than the manufacturing industries. Hence, it is interesting to examine whether opening the floodgates to foreign competition had a different impact on manufacturing versus services.

#### **Insert Table 8**

In Table 8, col. 2-3, we analyze horizontal and vertical linkages in the services (USSIC: 401-874) and manufacturing industries (USSIC: 201-399 using the same specification as in Table 4, col. 5. We repeat the full sample results in col.1 for reference.

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.

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 weak evidence (at 10% significance level) of positive spillovers from foreign presence (in other sectors than sector  $j$ ) via forward linkages. 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.

There are several explanations for the huge spillover effects in services and the non-existence of 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.<sup>32</sup> Third, as discussed in Kugler (2005), foreign companies in manufacturing tend to have higher incentives to minimize the

---

<sup>32</sup> Klapper et al. (2006) construct an index of entry rates of new firms in 2-digit NACE industries for Europe and the U.S. in the late 1990s. They 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.

transfer of proprietary technical knowledge to potential competitors. Fourth, it might be that impact of vertical linkages depends on the industry source, i.e. backward linkages *with* manufacturing may affect entry differently than backward linkages *with* services.

To further 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* buying from itself 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* buying from itself. This suggests that inward 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.<sup>33</sup>

## 6. Foreign Presence and Firm Size Distributions

In this section, we examine 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 for firm size (measured by the logarithm of firm sales) distributions, for domestic firms 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. This shows that in industries *without* foreign presence, distribution of firm sizes across domestic firms is positively skewed (or skewed to the right).

---

<sup>33</sup> 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.

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.<sup>34</sup> 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 *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

---

<sup>34</sup> See Cabral and Mata (2003) for summary of stylized facts regarding firm age and size distributions.

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**

In this paper, we examine the impact of FDI on domestic entrepreneurship. 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 for domestic entrepreneurs (demand creation effect), thus fostering the emergence of new 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 industries in the Czech Republic, we find that foreign firms have an unambiguous positive impact on entry rates of domestic firms through both intra-industry (horizontal) and inter-industry (vertical) spillovers. Comparing the magnitudes of these entry spillovers, we find that inter-industry spillovers dominate intra-industry spillovers and that FDI spillovers through forward linkages (that is contacts between foreign suppliers and downstream domestic firms) are more important for new firm creation than backward linkages (that is contacts between domestic suppliers and downstream foreign firms). However, we also find that the strongest inter-industry spillovers arise from linkages with very closely related industries that can be grouped together under higher levels of industry classification (in our case 2-

digit NACE). Our results are robust to controlling for endogeneity by including leads and lags of the foreign market shares.

We also find that these effects substantially vary across different types of industries. In particular, in competitive industries, domestic entrants benefit only from inter-industry spillover effects, while in uncompetitive industries, positive intra-industry spillovers dominate. Moreover, while service industries benefit from huge FDI spillover effects through both horizontal and vertical channels, manufacturing industries do not show any significant positive spillover effects from FDI.

In addition, our finding on the skewness (to the right) of domestic firm size distributions in industries *without* foreign presence further suggests an important role of FDI for overall industry dynamics.

Our paper also makes an important methodological contribution to the use of Input-Output tables. Ours is one of the first papers to use the Input-Output table to examine how FDI affects domestic entrepreneurship. We find that when the IO table is based on higher-digit industry classification (in our case, 2-digit NACE) than the unit of analysis (in our case 3-digit USSIC), which is quite common in several studies, 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. E.g. in our data, industry USSIC 152 belongs to 2-digit sector NACE 45 of the IO Table. The IO table reveals that industry 152 has strong backward and forward linkages with *other* 2-digit NACE sectors. Yet, we find that the biggest impact on entry in USSIC 152 comes actually from linkages with *other* 3-digit industries (USSIC: 154-179) that also belong to the NACE 45 sector. Since these can represent

either forward or backward linkages, one should include them as a separate measure. This has significant implications for any study using IO tables to study FDI spillover effects.

Our findings also have significant policy implications for transitional economies. Rather than being a “death sentence” for local firms as argued by Dawar and Frost (1999) and others, our paper shows that foreign competition serves as a stimulus to domestic entrepreneurship via various channels.

## References

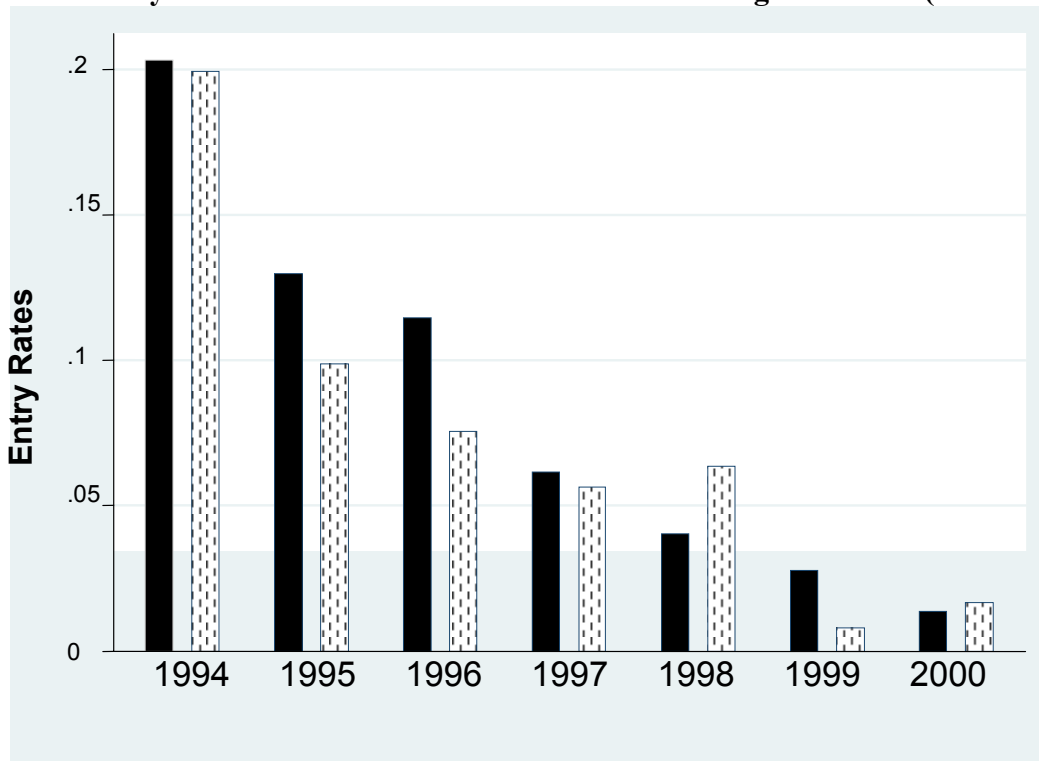
- Agarwal, R. and Michael Gort. 1996. The Evolution of Markets and Entry, Exit and Survival of Firms. *The Review of Economics and Statistics*, 78 (3): 489-498.
- Aitken, B. and Ann E. Harrison. 1999. Do Domestic Firms Benefit from Direct Foreign Investment? Evidence from Venezuela. *The American Economic Review*, 89 (3): 605-617.
- Alfaro, L., Chanda, A., Kalemli-Ozcan, S., and Selin Sayek. 2004. FDI and Economic Growth: The Role of Local Financial Markets, *Journal of International Economics*, 64 (1): 89-112.
- Arnold, J., Javorcik, B. and Aaditya Matoo. 2005. The Productivity Effects of Service Liberalization: Evidence from the Czech Republic. World Bank Working Paper.
- Blomström, M. 1986. Foreign Investment and Productive Efficiency: The Case of Mexico. *Journal of Industrial Economics*, 35 (1): 97-110.
- Blomström, M. and Hakan Persson. 1983. Foreign Investment and Spillover Efficiency in an Underdeveloped Economy: Evidence from the Mexican Manufacturing Industry. *World Development*, 11 (6): 493-501.
- Blomström, M. and Ari Kokko. 1998. Multinational Corporations and Spillovers. *Journal of Economics Surveys*, 12 (2): 1-31.
- Blomström, M., Kokko, A. and Mario Zejan. 2000. Foreign Direct Investment: Firm and Host Country Strategies, Macmillan Press LTD.
- Borensztein, E. J., De Gregorio and J.W. Lee. 1998. How Does Foreign Direct Investment Affect Economic Growth? *Journal of International Economics*, 45 (1): 115-135.
- Business Week. 2006. Major Players in Outsourcing. January 30.
- Cabral, Luis M.B., and José Mata. 2003. On the Evolution of the Firm Size Distribution: Facts and Theory. *The American Economic Review*, 93 (4), 1075-1090.
- Caves, R. E. 1974. Multinational Firms, Competition and Productivity in Host Country Markets. *Economica*, 41 (162): 176-93.
- Caves, R. E. 1996. Multinational Enterprises and Economic Analysis. Cambridge Surveys of Economic Literature, 2<sup>nd</sup> edition, Cambridge University Press.
- Cooley, T. F. and Vincenzo Quadrini. 2001. Financial Markets and Firm Dynamics. *The American Economic Review*, 91 (3): 1286-1310.
- Dawar, N. and Tony Frost. 1999. Competing with Giants: Survival Strategies for Local Companies in Emerging Markets. *Harvard Business Review*, March Issue.
- De Backer, K. and Leo Sleuwaegen. 2003. Does Foreign Direct Investment Crowd out Domestic Entrepreneurship? *Review of Industrial Organization*, 22: 97-84.
- Desai, M., Gompers, P. and Josh Lerner. 2005. Institutions, Capital Constraints and Entrepreneurial Firm Dynamics: Evidence from Europe. NBER WP #10165.
- Disney, R., Haskel, J. and Ylva Heden. 2003. Entry, Exit and Establishment Survival in UK Manufacturing. *Journal of Industrial Economics*, 51: 91-112.
- Djankov, S. and Bernard Hoekman. 2000. Foreign Investment and Productivity Growth in Czech Enterprises. *World Bank Economic Review*, 14 (1): 49-64.
- Dunne, T., Roberts, M. J. and Larry Samuelson. 1988. Patterns of Firm Entry and Exit in U.S. Manufacturing Industries. *RAND Journal of Economics*, 19 (4): 495-515.

- Dunne, T., Roberts, M. J. and Larry Samuelson. 1989. The Growth and Failure of U.S. Manufacturing Plants. *The Quarterly Journal of Economics*, Nov.: 671-698.
- Ederington, J. and Phillip McCalman. 2006. Shaking All Over? International Trade and Industrial Dynamics. University of California-Santa Cruz, Dept. of Economics, mimeo.
- Ericson, R. and Ariel Pakes. 1995. Markov-Perfect Industry Dynamics: A Framework for Empirical Work. *Review of Economic Studies*, 62: 53-82.
- Görg, H. and Eric Strobl. 2001. Multinational Companies and Productivity Spillovers: A Meta-Analysis with a Test for Publication Bias. *Economic Journal*, 111 (475): 723-739.
- Görg, H. and Eric Strobl. 2002. Multinational Companies and Indigenous Development: An Empirical Analysis. *European Economic Review*, 46: 1305-1322.
- Haddad, M. and Ann Harrison. 1993. Are There Positive Spillovers from FDI? Evidence from Panel Data for Morocco. *Journal of Development Economics*, 42 (1): 51-74.
- Harrison, A. E. and Margaret S. McMillan. 2003. Does Direct Foreign Investment Affect Domestic Firms Credit Constraints? *Journal of International Economics*, 61 (1): 73-100.
- Haskel, J. E., Pereira, S. C. and Matthew J. Slaughter. 2002. Does Inward Foreign Direct Investment Boost Productivity of Domestic Firms?, NBER #8724.
- Johnston, J. and John Dinardo. 1997. *Econometric Methods*, 4<sup>th</sup> edition. The McGraw-Hill Companies, Inc., New York.
- Jovanovic, B. 1982. Selection and the Evolution of Industry. *Econometrica*, 50 (3): 649-670.
- Jovanovic, B. and MacDonald, G. M. 1994. The Life Cycle of a Competitive Industry. *Journal of Political Economy*, 102: 322-347.
- Javorcik, B. 2004. Does Foreign Direct Investment Increase the Productivity of Domestic Firms? In Search of Spillovers through Backward Linkages. *The American Economic Review*, 94 (3): 605-627.
- Javorcik, B. and Marianna Spatareanu. 2005. Disentangling FDI Spillover Effects: What Do Firm Perceptions Tell Us? Published in *Does Foreign Direct Investment Promote Development?* T.Moran, E.Graham and M.Blomström, eds. Institute for International Economics, Washington, DC.
- Keller, W. 2004. International Technology Diffusion. Department of Economics, University of Texas mimeo.
- Klapper, L., Laeven, L. and Raghuram Rajan. 2006. Entry Regulation as a Barrier to Entrepreneurship. *Journal of Financial Economics*, forthcoming.
- Kočenda, E. and Jan Svejnar. 2003. Ownership and Firm Performance after Large-Scale Privatization. WDI Working Paper, Univ. of Michigan.
- Konings, J. 1997. Firm Growth in Transition Economies. *Economics Letters*, September.
- Konings, J. 2001. The Effects of Foreign Direct Investment on Domestic Firms: Evidence from Firm Panel Data in Emerging Economies, *Economics of Transition*, 9 (3): 619-33.
- Kosová, R.. 2005. Do Foreign Firms Crowd Out Domestic Firms? Evidence from the Czech Republic. Dissertation, University of Michigan Business School.
- Kugler, M. 2005. Spillovers from Foreign Direct investment: Within or Between Industries? *Journal of Development Economics*, forthcoming.

- La Porta, R., Lopez-de-Silanes, F. and Andrei Shleifer. 1999. Corporate Ownership around the World. *Journal of Finance*, 54: 471-517.
- Lucas, R. E. 1978. On the Size Distribution of Business Firms. *Bell Journal of Economics*, 9: 508-523.
- Markusen, J.R. 1995. The Boundaries of Multinational Enterprises and the Theory of International Trade. *Journal of Economic Perspectives*, 9 (2):169-189.
- Markusen, J. and Anthony J. Venables. 1999. Foreign Direct Investment as a Catalyst for Industrial Development. *European Economic Review*, 43: 335-356.
- McMillan, J. and Christopher Woodruff. 2002. The Central Role of Entrepreneurs in Transition Economies, *Journal of Economic Perspectives*, 16 (3): 152-170.
- Meyer, K. E. 2004. Perspectives on Multinational Enterprises in Emerging Economies. *Journal of International Business Studies*, 35 (4): 259-77.
- Olley, G. S. and Ariel Pakes. 1996. The Dynamics of Productivity in the Telecommunications Equipment Industry. *Econometrica*, 64 (6): 1263-1297.
- Pavlínek, P. 2004. Regional Development Implications of Foreign Direct Investment in Central Europe. *European Urban and Regional Studies*, 11(1): 47-70.
- Rodriguez-Clare, A. 1996. Multinationals, Linkages and Economic Development. *The American Economic Review*, 86 (4): 852-873.
- Sabirianova Peter, K., Svejnar, J. and Katherine Terrell. 2005. FDI Spillovers and Distance of Firms to the Frontier. *Journal of the European Economic Association Papers and Proceedings*, 3 (2-3): 576-586.
- Sutton, J. 1997. Gibrat's Legacy. *Journal of Economic Literature*, 35: 40-59.
- Svejnar, J. 2002. Transitional Economies: Performance and Challenges, *Journal of Economic Perspectives*, 16 (1): 2-28.
- Schumpeter, J. A. 1942. *Capitalism, Socialism and Democracy*. New York: Harper & Row, published 1950.
- Wooldridge, J. M. 2002. *Econometric Analysis of Cross Section and Panel Data*. MIT Press.

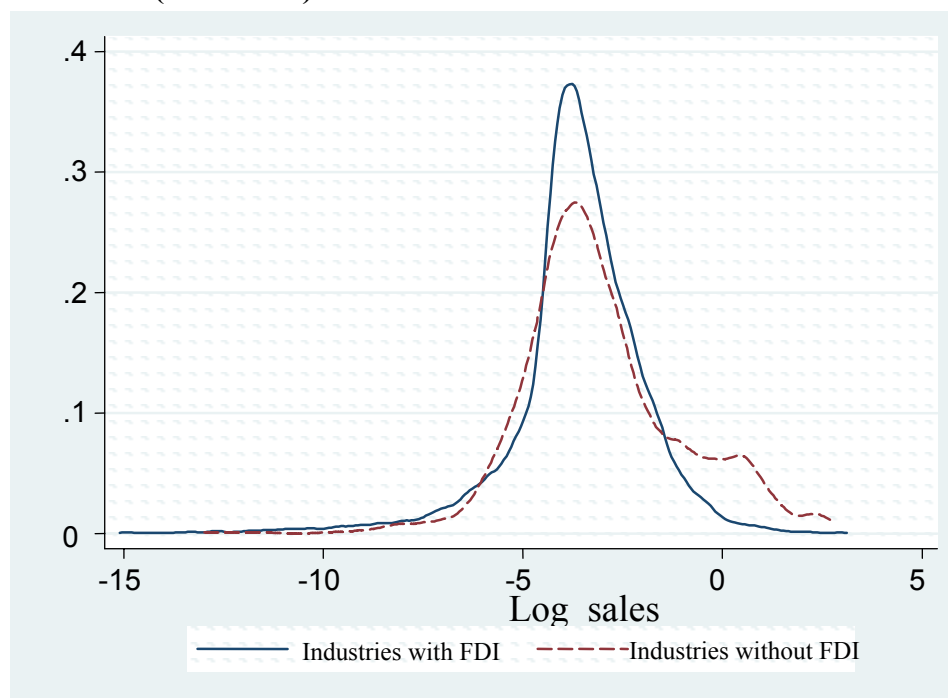


**Figure 1. Entry Rates in Industries with and without Foreign Presence (1994-2000).**

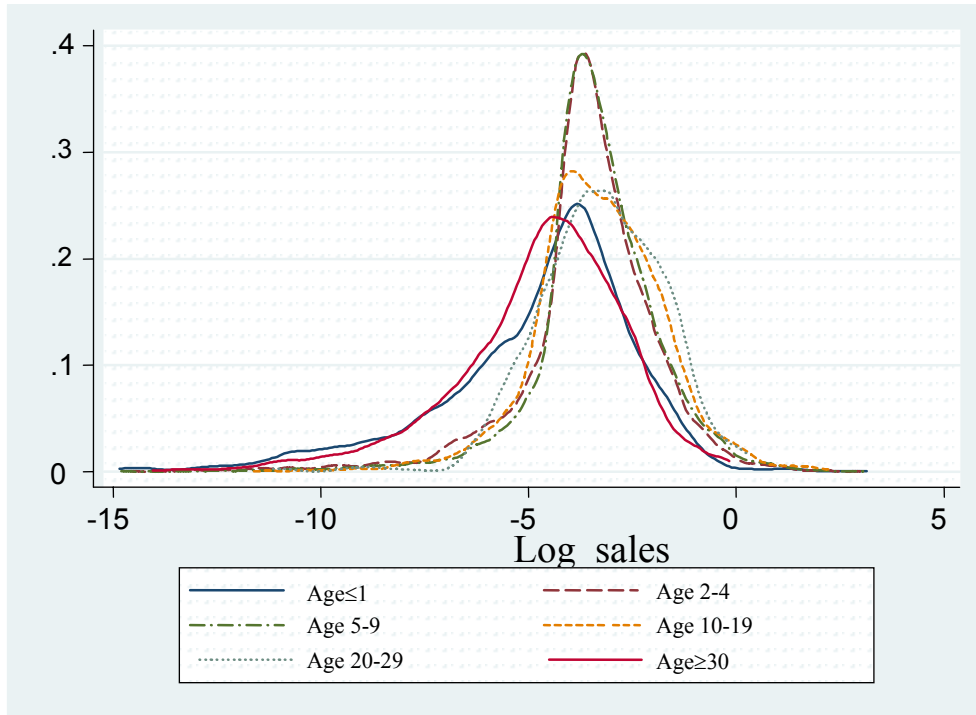


*Note:* The figure shows average entry rates of new domestic firms in industries with and without foreign presence over the period 1994-2000. The block shaded bars represent entry rates in industries *with* foreign presence. The dotted bars represent entry rates in industries *without* foreign presence.

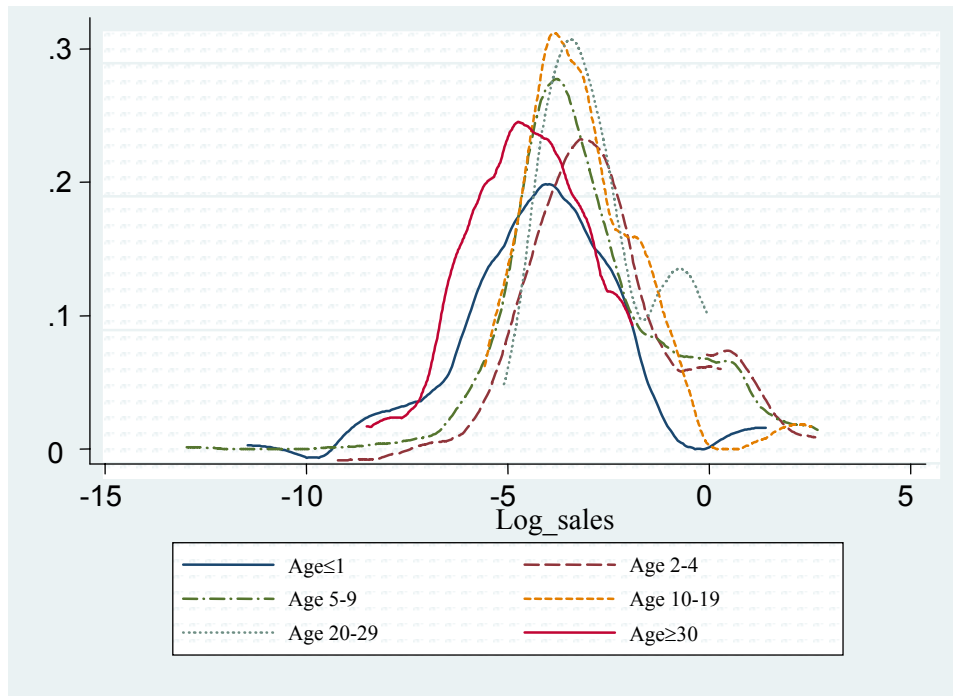
**Figure 2. Firm Size Distributions of Domestic Firms in Industries with and without Foreign Presence (1994-2000).**



**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. Entrepreneurship across Industries.**

This table presents industry level descriptive 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 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. Percentage values of the entry rate, foreign market share and industry share are reported. Number of domestic firms is the average number of domestic firms in the industry and number of foreign firms is the average number of foreign firms in the industry. All variables are averaged across our sample period, 1994-2000.

USSIC Code	Industry Description	ENTRY RATE (%)	FOREIGN MARKET SHARE (%)	INDUSTRY SHARE (%)	Number of Foreign Firms	Number of Domestic Firms
104	Gold and Silver Ores	8.33	0.00	0.02	0.00	3.86
109	Miscellaneous Metal Ores	0.00	0.00	0.07	0.00	1.00
122	Bituminous Coal and Lignite Mining	11.43	0.00	2.75	0.00	9.00
131	Crude Petroleum and Natural Gas	0.00	0.00	0.07	0.00	1.00
138	Oil and Gas Field Services	21.43	0.00	0.02	0.00	2.43
141	Dimension Stone	0.00	23.07	0.02	1.14	4.00
142	Crushed and Broken Stone	3.57	28.23	0.02	1.00	3.29
144	Sand and Gravel	9.52	88.28	0.20	9.71	6.14
145	Clay, Ceramic, + Refractory Minerals	5.71	8.09	0.07	1.00	6.00
147	Chemical and Fertilizer Minerals	0.00	0.00	0.02	0.00	1.00
149	Miscellaneous Nonmetallic Minerals	0.00	0.00	0.00	0.00	1.00
152	Residential Building Construction	6.29	19.64	2.82	15.14	261.71
154	Nonresidential Building Construction	16.67	0.00	0.00	0.00	3.14
161	Highway and Street Construction	7.23	65.63	0.96	15.43	30.29
162	Heavy Construction, Except Highway	3.33	13.75	0.50	3.14	73.00
171	Plumbing, Heating, Air-Conditioning	6.47	5.00	0.08	2.00	32.00
172	Painting and Paper Hanging	14.30	0.00	0.05	0.00	8.00
173	Electrical Work	5.72	26.25	0.25	1.83	46.33
174	Masonry, Stonework, and Plastering	5.56	41.42	0.08	2.00	19.00
175	Carpentry and Floor Work	5.24	0.00	0.02	0.00	6.43
176	Roofing, Siding, and Sheet Metal Work	4.42	0.00	0.01	0.00	7.57
178	Water Well Drilling	0.00	0.00	0.01	0.00	5.00
179	Misc. Special Trade Contractors	5.64	4.83	0.32	5.00	60.67
201	Meat Products	5.42	11.65	0.98	3.86	58.71
202	Dairy Products	7.11	13.65	1.20	8.57	49.00
203	Preserved Fruits and Vegetables	9.42	42.85	0.32	6.83	33.33
204	Grain Mill Products	5.50	1.13	1.01	4.43	75.00
205	Bakery Products	1.02	21.87	0.44	3.50	50.50
206	Sugar and Confectionery Products	6.12	56.10	0.35	4.29	6.57
207	Fats and Oils	11.56	45.38	0.51	1.00	7.14
208	Beverages	6.96	20.73	1.49	8.86	82.86
209	Misc. Food and Kindred Products	7.45	81.73	0.28	6.00	8.86
221	Broadwoven Fabric Mills, Cotton	11.12	8.30	0.17	2.00	10.14
222	Broadwoven Fabric Mills, Manmade	0.00	0.00	0.18	0.00	2.00
223	Broadwoven Fabric Mills, Wool	6.43	35.67	0.14	2.00	5.29
224	Narrow Fabric Mills	5.00	4.08	0.12	1.00	5.50
225	Knitting Mills	2.83	48.37	0.23	4.71	21.29
227	Carpets and Rugs	11.90	69.87	0.04	2.00	3.00
228	Yarn and Thread Mills	3.85	10.25	0.30	4.29	19.57
229	Miscellaneous Textile Goods	3.24	39.00	0.29	4.00	18.29
231	Men's and Boys' Suits and Coats	0.00	0.00	0.01	0.00	3.00
232	Men's and Boys' Furnishings	13.79	7.45	0.08	1.00	13.86
234	Women's and Children's Undergarments	0.00	48.23	0.08	1.00	2.00
237	Fur Goods	33.33	0.00	0.00	0.00	2.00
238	Miscellaneous Apparel and Accessories	8.33	0.00	0.01	0.00	4.14
239	Misc. Fabricated Textile Products	9.63	6.45	0.06	0.86	13.29
242	Sawmills and Planing Mills	9.01	33.16	0.40	10.71	49.71
243	Millwork, Plywood + Structural Members	6.09	3.55	0.23	3.00	31.17
244	Wood Containers	0.00	18.81	0.03	1.00	10.00
245	Wood Buildings and Mobile Homes	0.00	0.00	0.00	0.00	1.29
249	Miscellaneous Wood Products	4.76	61.94	0.01	1.00	1.43
251	Household Furniture	3.75	48.52	0.64	7.00	31.57
252	Office Furniture	1.79	0.00	0.03	0.00	9.00
261	Pulp Mills	0.00	0.00	0.22	0.00	3.14
262	Paper Mills	6.55	24.77	0.32	1.14	8.43
265	Paperboard Containers and Boxes	5.90	68.74	0.35	8.57	11.43
267	Misc. Converted Paper Products	10.16	3.11	0.04	1.00	15.00
271	Newspapers	3.57	23.67	0.20	2.14	13.00
272	Periodicals	10.61	42.97	0.17	5.29	7.57
273	Books	0.00	12.76	0.05	2.00	13.00
274	Miscellaneous Publishing	4.76	0.00	0.05	0.00	4.00
275	Commercial Printing	1.96	15.32	0.12	2.00	24.43
278	Blankbooks and Bookbinding	0.00	0.00	0.00	0.00	1.00
279	Printing Trade Services	35.00	0.00	0.02	0.00	5.00
281	Industrial Inorganic Chemicals	1.59	47.96	0.32	4.29	10.00
282	Plastics Materials and Synthetics	38.89	65.36	0.18	2.67	2.83
283	Drugs	5.35	24.07	0.50	3.00	12.00
284	Soap, Cleaners, and Toilet Goods	3.73	60.12	0.50	4.57	28.86

USSIC Code	Industry Description	ENTRY RATE (%)	FOREIGN MARKET SHARE (%)	INDUSTRY SHARE (%)	Number of Foreign Firms	Number of Domestic Firms
285	Paints and Allied Products	5.60	1.00	0.10	1.00	10.17
286	Industrial Organic Chemicals	4.17	1.30	0.36	0.83	5.83
287	Agricultural Chemicals	8.33	3.93	0.17	1.67	2.83
289	Miscellaneous Chemical Products	7.74	0.00	1.01	0.25	7.75
295	Asphalt Paving and Roofing Materials	8.33	0.00	1.59	0.00	3.00
299	Misc. Petroleum and Coal Products	0.00	0.00	0.20	0.00	1.00
301	Tires and Inner Tubes	0.00	83.05	0.58	1.00	1.29
302	Rubber and Plastics Footwear	12.18	10.17	0.17	3.00	10.20
305	Hose + Belting + Gaskets + Packing	5.24	49.49	0.20	5.71	6.29
308	Miscellaneous Plastics Products, NEC	4.41	32.94	0.63	21.71	69.43
311	Leather Tanning and Finishing	2.86	0.00	0.03	0.00	4.29
314	Footwear, Except Rubber	0.00	0.00	0.16	0.00	7.00
316	Luggage	0.00	0.00	0.01	0.00	1.00
317	Handbags and Personal Leather Goods	0.00	10.70	0.03	1.00	8.00
319	Leather Goods, NEC	100.00	0.00	0.01	0.00	2.00
321	Flat Glass	7.14	98.51	0.41	7.57	2.86
322	Glass and Glassware, Pressed or Blown	6.34	40.53	0.68	9.57	19.71
323	Products of Purchased Glass	0.00	96.41	0.14	2.00	3.14
324	Cement, Hydraulic	0.00	97.84	0.15	4.00	1.00
325	Structural Clay Products	6.15	69.80	0.59	14.86	20.57
326	Pottery and Related Products	4.08	37.15	0.20	7.29	9.00
327	Concrete, Gypsum, and Plaster Products	7.38	66.05	0.79	25.71	33.00
328	Cut Stone and Stone Products	7.04	52.14	0.13	5.14	10.43
329	Misc. Nonmetallic Mineral Products	0.00	4.65	0.04	0.67	2.00
331	Blast Furnace and Basic Steel Products	8.29	2.08	5.14	4.57	19.86
332	Iron and Steel Foundries	6.83	0.00	0.18	0.00	27.17
333	Primary Nonferrous Metals	14.60	38.07	0.46	2.00	9.86
334	Secondary Nonferrous Metals	10.00	0.00	0.01	0.00	2.60
336	Nonferrous Foundries (Castings)	2.04	9.43	0.14	1.00	8.00
339	Miscellaneous Primary Metal Products	3.48	22.66	0.05	5.00	12.60
341	Metal Cans and Shipping Containers	12.25	51.83	0.19	4.86	18.86
342	Cutlery, Handtools, and Hardware	7.52	18.71	0.22	7.00	41.00
343	Plumbing and Heating, Except Electric	7.94	0.73	0.32	0.67	30.67
344	Fabricated Structural Metal Products	7.67	15.57	0.62	11.86	109.86
345	Screw Machine Products, Bolts, Etc.	0.00	2.14	0.22	2.00	11.00
346	Metal Forgings and Stampings	11.64	22.29	0.37	7.57	48.14
347	Metal Services, NEC	2.38	0.00	0.04	0.00	7.29
348	Ordnance and Accessories, NEC	1.79	0.00	0.17	0.00	8.57
349	Misc. Fabricated Metal Products	13.81	48.66	0.32	19.00	41.86
351	Engines and Turbines	6.35	0.00	0.79	0.00	18.67
352	Farm and Garden Machinery	9.34	4.41	0.39	1.86	20.71
353	Construction and Related Machinery	5.34	23.00	0.55	9.00	55.29
354	Metalworking Machinery	8.34	8.50	0.68	5.43	48.29
355	Special Industry Machinery	6.49	26.84	0.53	12.71	64.14
356	General Industrial Machinery	6.90	19.64	0.89	14.71	85.43
357	Computer and Office Equipment	5.00	71.79	0.05	1.00	6.00
358	Refrigeration and Service Machinery	2.04	0.00	0.01	0.00	6.29
359	Industrial Machinery, NEC	5.32	50.89	1.96	28.43	72.57
361	Electric Distribution Equipment	5.80	5.21	0.09	3.00	23.50
362	Electrical Industrial Apparatus	9.66	56.47	0.89	16.57	72.86
363	Household Appliances	0.00	34.20	0.30	1.83	16.17
364	Electric Lighting and Wiring Equipment	6.37	44.11	0.63	8.29	33.29
365	Household Audio and Video Equipment	15.07	14.62	0.16	1.50	11.33
366	Communication Equipment	4.60	20.20	0.14	2.00	15.67
367	Electronic Components and Accessories	4.22	28.33	0.24	6.57	19.29
369	Misc. Electrical Equipment + Supplies	16.67	78.91	0.11	4.83	2.17
371	Motor Vehicles and Equipment	5.36	83.15	4.39	8.83	24.50
372	Aircraft and Parts	8.25	31.33	0.21	2.33	12.67
373	Ship and Boat Building and Repairing	0.00	0.00	0.01	0.00	1.00
374	Railroad Equipment	5.17	16.63	0.40	4.00	19.00
375	Motorcycles, Bicycles, and Parts	13.47	0.00	0.01	0.00	7.29
379	Miscellaneous Transportation Equipment	0.00	24.42	0.03	1.00	2.00
382	Measuring and Controlling Devices	4.95	23.85	0.16	6.29	31.86
384	Medical Instruments and Supplies	6.00	23.97	0.09	3.00	18.86
391	Jewelry, Silverware, and Plated Ware	6.03	0.00	0.11	0.00	11.86
393	Musical Instruments	4.17	0.00	0.03	0.00	4.83
394	Toys and Sporting Goods	1.10	40.46	0.08	3.71	14.00
395	Pens, Pencils, Office, + Art Supplies	8.66	20.63	0.12	4.67	11.67
396	Costume Jewelry and Notions	0.00	0.00	0.01	0.00	1.29
399	Miscellaneous Manufactures	2.78	23.54	0.06	2.00	6.67
401	Railroads	29.00	0.00	0.23	0.00	4.80
411	Local and Suburban Transportation	8.33	0.00	0.02	0.00	4.86
412	Taxicabs	33.33	0.00	0.00	0.00	2.00
414	Bus Charter Service	12.55	13.24	0.48	2.29	37.14
417	Bus Terminal and Service Facilities	20.00	<b>98.59</b>	0.03	2.00	2.00
421	Trucking + Courier Services, Ex. Air	8.98	11.96	1.03	14.00	175.86
422	Public Warehousing and Storage	11.54	44.69	0.03	3.71	12.86
423	Trucking Terminal Facilities	0.00	0.00	0.00	0.00	2.00

USSIC Code	Industry Description	ENTRY RATE (%)	FOREIGN MARKET SHARE (%)	INDUSTRY SHARE (%)	Number of Foreign Firms	Number of Domestic Firms
444	Water Transportation of Freight, NEC	0.00	0.00	0.09	0.00	4.00
449	Water Transportation Services	23.81	0.00	0.01	0.00	4.29
451	Air Transportation, Scheduled	0.00	0.00	0.48	0.00	2.00
452	Air Transportation, Nonscheduled	0.00	0.00	0.06	0.00	1.00
458	Airports, Flying Fields, + Services	33.33	23.99	0.10	1.00	3.00
461	Pipelines, Except Natural Gas	0.00	0.00	1.95	0.00	2.00
472	Passenger Transportation Arrangement	9.94	17.46	0.77	20.86	61.57
473	Freight Transportation Arrangement	0.00	0.00	0.01	0.00	1.20
474	Rental of Railroad Cars	33.33	0.00	0.01	0.00	3.33
478	Miscellaneous Transportation Services	13.89	86.48	0.03	2.00	4.50
481	Telephone Communication	12.03	80.61	2.25	7.43	22.14
483	Radio and Television Broadcasting	11.19	0.00	0.04	0.00	7.00
489	Communication Services, NEC	0.00	0.00	0.01	0.00	2.00
491	Electric Services	12.69	22.85	<b>7.34</b>	7.43	18.71
492	Gas Production and Distribution	0.00	0.00	1.58	0.00	8.00
493	Combination Utility Services	25.78	42.55	1.16	11.43	74.00
494	Water Supply	11.64	26.51	0.65	4.00	47.00
495	Sanitary Services	13.45	12.00	0.68	8.71	102.71
496	Steam and Air-Conditioning Supply	0.00	83.94	0.10	1.00	2.00
501	Motor Vehicles, Parts, and Supplies	7.19	36.73	1.18	14.29	119.71
502	Furniture and Homefurnishings	9.93	27.96	0.49	15.43	50.00
503	Lumber and Construction Materials	10.36	28.95	0.97	19.00	69.57
504	Professional + Commercial Equipment	10.15	29.71	3.02	<b>135.57</b>	<b>534.43</b>
505	Metals and Minerals, Except Petroleum	9.65	41.58	2.37	10.17	61.50
506	Electrical Goods	5.56	24.21	0.30	10.14	35.43
507	Hardware, Plumbing + Heating Equipment	9.47	7.59	0.27	4.00	45.25
508	Machinery, Equipment, and Supplies	6.30	30.06	0.91	24.71	107.14
509	Miscellaneous Durable Goods	9.71	16.32	0.67	10.57	47.71
512	Drugs, Proprietarys, and Sundries	7.51	54.66	1.27	18.71	41.71
513	Apparel, Piece Goods, and Notions	11.86	16.92	0.15	3.71	29.14
514	Groceries and Related Products	6.07	18.62	0.93	18.43	105.71
515	Farm-Product Raw Materials	3.53	1.78	0.54	3.00	44.67
516	Chemicals and Allied Products	8.36	34.69	0.77	17.14	50.14
518	Beer, Wine, and Distilled Beverages	18.59	40.21	0.03	2.00	6.71
519	Misc. Nondurable Goods	6.81	21.60	0.53	13.67	30.17
523	Paint, Glass, and Wallpaper Stores	15.75	39.97	0.13	1.00	9.29
531	Department Stores	16.67	52.59	0.67	18.57	87.29
541	Grocery Stores	3.78	7.20	1.75	11.00	123.67
542	Meat and Fish Markets	9.78	0.00	0.03	0.00	8.00
543	Fruit and Vegetable Markets	8.33	0.00	0.02	0.00	4.57
545	Dairy Products Stores	12.50	67.60	0.01	1.00	2.50
554	Gasoline Service Stations	9.78	30.98	2.03	3.83	37.17
557	Motorcycle Dealers	0.00	0.00	0.00	0.00	1.00
561	Men's + Boys' Clothing Stores	19.05	20.66	0.01	1.67	6.83
565	Family Clothing Stores	11.90	45.82	0.04	2.00	3.14
566	Shoe Stores	0.00	8.62	0.10	1.40	3.20
571	Furniture and Homefurnishings Stores	4.76	6.23	0.04	1.00	8.00
581	Eating and Drinking Places	20.92	19.00	0.10	2.00	30.50
591	Drug Stores and Proprietary Stores	2.08	13.65	0.10	3.00	26.00
592	Liquor Stores	33.33	0.00	0.00	0.00	1.67
593	Used Merchandise Stores	0.00	1.71	0.03	1.00	7.00
594	Miscellaneous Shopping Goods Stores	10.54	13.61	0.25	16.43	119.14
596	Nonstore Retailers	18.88	59.89	0.14	9.00	10.00
598	Fuel Dealers	0.00	0.00	0.01	0.00	1.00
599	Retail Stores, NEC	6.67	35.81	0.01	2.00	4.00
602	Commercial Banks	0.00	0.00	0.00	0.00	1.00
609	Functions Closely Related to Banking	2.78	25.18	0.03	1.83	7.50
611	Federal + Fed.-Sponsored Credit	16.67	0.00	0.01	0.00	1.83
614	Personal Credit Institutions	18.48	55.56	1.56	16.14	50.71
615	Business Credit Institutions	4.72	14.93	0.21	13.57	96.14
616	Mortgage Bankers and Brokers	0.00	0.00	0.00	0.00	3.00
621	Security Brokers and Dealers	22.48	49.62	0.06	9.57	33.29
628	Security and Commodity Services	2.38	2.83	0.03	0.17	11.00
639	Insurance Carriers, NEC	6.25	31.04	0.01	2.00	9.00
651	Real Estate Operators and Lessors	8.07	15.60	1.79	41.00	362.86
653	Real Estate Agents and Managers	15.12	11.52	0.21	14.71	76.86
654	Title Abstract Offices	25.00	0.00	0.00	0.00	1.25
655	Subdividers and Developers	13.49	37.05	0.08	1.00	7.50
671	Holding Offices	9.25	62.10	0.45	2.00	17.71
672	Investment Offices	9.95	0.00	0.07	0.00	10.33
673	Trusts	0.00	0.00	0.00	0.00	1.00
679	Miscellaneous Investing	10.48	50.72	0.34	13.57	92.43
701	Hotels and Motels	5.53	58.57	0.30	15.00	56.14
702	Rooming and Boarding Houses	3.57	0.00	0.01	0.00	4.43
703	Camps and Recreational Vehicle Parks	0.00	0.00	0.00	0.00	1.00
721	Laundry, Cleaning, + Garment Services	0.00	23.70	0.01	2.00	8.00
722	Photographic Studios, Portrait	4.76	66.75	0.03	1.86	3.86
726	Funeral Service and Crematories	5.56	0.00	0.00	0.00	3.50

USSIC Code	Industry Description	ENTRY RATE (%)	FOREIGN MARKET SHARE (%)	INDUSTRY SHARE (%)	Number of Foreign Firms	Number of Domestic Firms
729	Miscellaneous Personal Services	12.66	3.26	0.17	1.00	39.20
731	Advertising	11.40	22.07	0.22	15.14	74.29
733	Mailing, Reproduction, Stenographic	10.83	56.01	0.01	1.00	5.00
734	Services to Buildings	7.30	18.85	0.30	3.00	16.67
735	Misc. Equipment Rental + Leasing	7.78	27.67	0.05	2.83	13.83
736	Personnel Supply Services	0.00	4.74	0.04	1.00	5.00
737	Computer and Data Processing Services	7.82	41.45	0.54	24.00	150.00
738	Miscellaneous Business Services	9.57	35.47	0.34	6.67	67.83
751	Automotive Rentals, No Drivers	6.83	55.42	0.10	3.57	23.43
753	Automotive Repair Shops	7.61	3.31	0.66	2.71	157.00
754	Automotive Services, Except Repair	0.00	0.00	0.00	0.00	1.00
762	Electrical Repair Shops	0.00	0.00	0.01	0.00	4.00
781	Motion Picture Production + Services	17.66	0.00	0.03	0.00	6.50
782	Motion Picture Distribution + Services	0.00	15.14	0.01	1.00	2.00
792	Producers, Orchestras, Entertainers	3.37	0.00	0.01	0.00	9.29
794	Commercial Sports	17.36	15.09	0.03	1.83	16.00
799	Misc. Amusement, Recreation Services	9.63	2.64	0.36	3.00	24.14
871	Engineering + Architectural Services	6.60	14.61	0.92	20.71	227.43
872	Accounting, Auditing, + Bookkeeping	8.33	11.90	0.11	1.00	3.00
873	Research and Testing Services	5.06	5.16	0.27	8.00	64.29
874	Management and Public Relations	15.86	14.65	0.45	21.86	115.57

**Table 2. FDI and Domestic Entry Rates: Intra-Industry Impact.**

The regression equation estimated is  $ENTRY_{it} = \alpha + \beta_1 FOREIGN\ MARKET\ SHARE_{it} + \beta_2 INDUSTRY\ SHARE_{it} + \beta_3 Trend + Region\ Dummies_{it} + Year\ Dummies_t + Industry\ Dummies_i + e_{it}$ . 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. The region dummies are multiplied by the number of all firms in industry  $i$  in year  $t$  in a given region. Trend controls for aggregate growth effects and takes value 1 for year 1994 and value 7 for year 2000. All regressions are estimated by fixed effects estimator, controlling for industry unobserved (and correlated) heterogeneity. Column (2) reports results for a trimmed sub-sample where ENTRY RATES are greater than 0, but less than or equal to 1.

	1	2
	ONLY INTRA INDUSTRY	
	Full sample	Positive Entry rate (0,1]
	Entry Rate	Entry Rate
FOREIGN MARKET SHARE	0.163*** (0.045)	0.097** (0.039)
INDUSTRY SHARE	0.541 (1.499)	0.758 (1.001)
Trend	-0.032*** (0.003)	-0.036*** (0.003)
Constant	0.226*** (0.028)	0.269*** (0.028)
Observations	1459	697
# of industries	245	195
R-squared	0.18	0.44
<i>Joint Significance of Regional Dummies:</i>		
Wald Test	0.39	0.70

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

**Table 3. FDI and Domestic Entry Rates: Impact via Backward and Forward Linkages Considered Independently.**

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. Columns (1) and (2) include only BACKWARD linkages and columns (3) and (4) include only FORWARD linkages. 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 columns (1) and (2) and as part of FORWARD linkages in columns (3) and (4). Columns (2) and (4) show fixed effect results for a trimmed sub-sample with ENTRY RATES greater than 0, but less or equal to 1. All regressions are estimated by fixed effects estimator, controlling for industry unobserved (and correlated) heterogeneity.

	1	2	3	4
	ONLY BACKWARD (3-digit industries (other than industry $i$ ), all belonging to the same 2-digit sector $j$ , and buying from industry $i$ , are included in backward linkages.)		ONLY FORWARD (3-digit industries (other than industry $i$ ), all belonging to the same 2-digit sector $j$ , and buying from industry $i$ , are included in forward linkages.)	
	Full sample	Positive Entry rate (0,1]	Full sample	Positive Entry rate (0,1]
	Entry Rate	Entry Rate	Entry Rate	Entry Rate
FOREIGN MARKET SHARE	0.166*** (0.045)	0.107*** (0.038)	0.165*** (0.044)	0.110** (0.038)
BACKWARD	0.943*** (0.298)	0.733*** (0.220)		
FORWARD			1.309*** (0.357)	1.309*** (0.291)
INDUSTRY SHARE	0.680 (1.495)	0.861 (0.992)	0.573 (1.492)	0.662 (0.982)
Trend	-0.043*** (0.005)	-0.046*** (0.004)	-0.046*** (0.005)	-0.050** (0.005)
Constant	0.072 (0.056)	0.148*** (0.046)	-0.006 (0.069)	0.04 (0.058)
Observations	1459	697	1459	697
# of industries	245	195	245	195
R-squared	0.18	0.45	0.19	0.46

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



**Table 4. FDI and Domestic Entry Rates: Impact via Backward and Forward Linkages Considered Together.**

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. 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 columns (1) and (2); as part of FORWARD linkages in columns (3) and (4); and we include them separately in columns (5) and (6). Columns (2), (4), and (6) report results 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, controlling for industry unobserved (and correlated) heterogeneity.

	1		2		3		4		5		6	
	BACKWARD AND FORWARD (3-digit industries (other than industry $i$ ), all belonging to the same 2-digit sector $j$ , and buying from industry $i$ , are included in <i>backward linkages</i> .)				BACKWARD AND FORWARD (3-digit industries (other than industry $i$ ), all belonging to the same 2-digit sector $j$ , and buying from industry $i$ , are included in <i>forward linkages</i> .)				BACKWARD AND FORWARD (3-digit industries (other than industry $i$ ), all belonging to the same 2-digit sector $j$ , and buying from industry $i$ , included <i>separately</i> .)			
	Full sample		Positive Entry rate (0,1]		Full sample		Positive Entry rate (0,1]		Full sample		Positive Entry rate (0,1]	
	Entry Rate	Entry Rate	Entry Rate	Entry Rate	Entry Rate	Entry Rate	Entry Rate	Entry Rate	Entry Rate	Entry Rate	Entry Rate	
FOREIGN MARKET SHARE	0.165*** (0.045)	0.104*** (0.038)	0.165*** (0.044)	0.110*** (0.038)	0.166*** (0.045)	0.109*** (0.038)						
BACKWARD	0.869*** (0.304)	0.632*** (0.226)	0.325 (0.409)	0.071 (0.324)	0.372 (0.433)	0.038 (0.339)						
FORWARD	0.751 (0.615)	0.991* (0.526)	1.260*** (0.363)	1.288*** (0.306)	1.081* (0.648)	1.442*** (0.557)						
Sector $j$ buys from itself					1.329*** (0.417)	1.237*** (0.343)						
INDUSTRY SHARE	0.582 (1.496)	0.656 (0.995)	0.574 (1.492)	0.665 (0.983)	0.605 (1.495)	0.629 (0.991)						
Trend	-0.048*** (0.006)	-0.052*** (0.005)	-0.048*** (0.006)	-0.051*** (0.005)	-0.047*** (0.006)	-0.052*** (0.005)						
Constant	-0.018 (0.093)	0.030 (0.077)	-0.037 (0.080)	0.034 (0.063)	-0.022 (0.093)	0.02 (0.077)						
Observations	1459	697	1459	697	1459	697						
# of industries	245	195	245	195	245	195						
R-squared	0.18	0.46	0.19	0.46	0.19	0.46						

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

**Table 5. FDI and Domestic Entry Rates: Using Leads and Lags.**

The regression equation estimated is  $ENTRY_{it} = \alpha + \beta_1 FOREIGN\ MARKET\ SHARE_{it-1\ or\ t+1} + \beta_2 INDUSTRY\ SHARE_{it} + \beta_3 BACKWARD\ (or\ FORWARD)_{it-1\ or\ t+1} + \beta_4 Trend + Region\ Dummies_{it} + Year\ Dummies_t + Industry\ Dummies_i + e_{it}$ . 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. 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*, separately in columns (7) and (8). Columns (1), (3), (5), and (7) present results using lagged values of FOREIGN MARKET SHARE, FORWARD, BACKWARD and Sector *j* buys from itself, where as Columns (2), (4), (6), and (8) present results using lead values of FOREIGN MARKET SHARE, FORWARD, BACKWARD and Sector *j* buys from itself. All columns report results 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, controlling for industry unobserved (and correlated) heterogeneity.

	1		2		3		4		5		6		7		8	
	ONLY INTRA-INDUSTRY SPILLOVERS		ONLY BACKWARD (3-digit industries (other than industry <i>i</i> ), all belonging to the same 2-digit sector <i>j</i> , and buying from industry <i>i</i> , included in backward linkages.)				ONLY FORWARD (3-digit industries (other than industry <i>i</i> ), all belonging to the same 2-digit sector <i>j</i> , and buying from industry <i>i</i> , included in forward linkages.)				BACKWARD AND FORWARD (3-digit industries (other than industry <i>i</i> ), all belonging to the same 2-digit sector <i>j</i> , and buying from industry <i>i</i> , included separately.)					
	Positive Entry rate (0,1]		Positive Entry rate (0,1]		Positive Entry rate (0,1]		Positive Entry rate (0,1]		Positive Entry rate (0,1]		Positive Entry rate (0,1]		Positive Entry rate (0,1]		Positive Entry rate (0,1]	
	Lagged Values	Lead Values	Lagged Values	Lead Values	Lagged Values	Lead Values	Lagged Values	Lead Values	Lagged Values	Lead Values	Lagged Values	Lead Values	Lagged Values	Lead Values	Lagged Values	Lead Values
FOREIGN MARKET SHARE	0.116*** (0.043)	0.108** (0.050)	0.124*** [0.043]	0.108** [0.050]	0.123*** [0.043]	0.111** [0.049]	0.128*** [0.043]	0.108** [0.049]								
BACKWARD			0.546*** [0.210]	0.321 [0.254]									0.352 [0.328]	-0.365 [0.395]		
FORWARD					0.633** [0.278]	1.001*** [0.364]							-0.079 [0.555]	1.822** [0.707]		
Sector <i>j</i> buys from itself													0.763** [0.316]	0.875** [0.423]		
INDUSTRY SHARE	-1.354 (1.556)	0.637 (1.209)	-1.461 [1.544]	0.697 [1.209]	-1.431 [1.547]	0.952 [1.205]	-1.372 [1.551]	1.035 [1.207]								
Trend	-0.033*** (0.004)	-0.037*** (0.003)	-0.041*** [0.005]	-0.040*** [0.004]	-0.041*** [0.005]	-0.043*** [0.004]	-0.039*** [0.007]	-0.043*** [0.005]								
Constant	0.196*** (0.036)	0.263*** (0.028)	0.114** [0.047]	0.200*** [0.057]	0.09 [0.059]	0.039 [0.086]	0.135* [0.076]	-0.045 [0.121]								
Observations	537	654	537	654	537	654	537	654	537	654	537	654	537	654	537	654
# of industries	169	193	169	193	169	193	169	193	169	193	169	193	169	193	169	193
R-squared	0.34	0.41	0.35	0.41	0.35	0.42	0.369	0.42								

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

**Table 6. FDI and Industry Structure.**

The specification reported here is consistent with col. 5 in Table 4, when we separate the 3-digit industries (other than industry  $i$ ) that belong to the same 2-digit sector  $j$  and buy from industry  $i$ , from both measures of vertical linkages, and include them separately under variable “Sector  $j$  buys from itself”. Hence, regression equation estimated is:  $ENTRY_{it} = \alpha + \beta_1 FOREIGN\ MARKET\ SHARE_{it} + \beta_2 INDUSTRY\ SHARE_{it} + \beta_3 BACKWARD_{it} + \beta_4 FORWARD_{it} + \beta_5 Sector\ J\ buys\ from\ itself_{it} + \beta_6 Trend + Region\ Dummies_{it} + Year\ Dummies_t + Industry\ Dummies_i + e_{it}$ .  $ENTRY$  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. All regressions are estimated by fixed effects estimator, controlling for industry unobserved (and correlated) heterogeneity.

	1	2	3	4
	Industries <i>with</i> Foreign Presence	Industries <i>without</i> Foreign Presence	Competitive Industries ( $\geq 5$ firms)	Un-competitive Industries ( $< 5$ firms)
	Entry Rate	Entry Rate	Entry Rate	Entry Rate
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 7. Removal of Outliers.**

The specification reported here is consistent with col. 5 in Table 4, when we separate the 3-digit industries (other than industry  $i$ ) that belong to the same 2-digit sector  $j$  and buy from industry  $i$ , from both measures of vertical linkages, and include them separately under variable “Sector  $j$  buys from itself”. Hence regression equation estimated is:  $ENTRY_{it} = \alpha + \beta_1 \text{FOREIGN MARKET SHARE}_{it} + \beta_2 \text{INDUSTRY SHARE}_{it} + \beta_3 \text{BACKWARD}_{it} + \beta_4 \text{FORWARD}_{it} + \beta_5 \text{Sector J buys from itself}_{it} + \beta_6 \text{Trend} + \text{Region Dummies}_{it} + \text{Year Dummies}_t + \text{Industry Dummies}_i + e_{it}$ . 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. 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, controlling for industry unobserved (and correlated) heterogeneity.

	1	2	3	4
	Drop industries with average INDUSTRY SHARE > 90 <sup>th</sup> percentile	Drop industries with average FOREIGN MARKET SHARE >90 <sup>th</sup> percentile	Drop industries with average # of foreign firms > 90 <sup>th</sup> percentile	Drop industries with average # of domestic firms >90 <sup>th</sup> percentile
	Entry Rate	Entry Rate	Entry Rate	Entry Rate
FOREIGN MARKET SHARE	0.162*** (0.049)	0.224*** (0.047)	0.184*** (0.049)	0.167*** (0.048)
BACKWARD	0.301 (0.470)	0.569 (0.414)	0.499 (0.468)	0.284 (0.488)
FORWARD	0.69 (0.710)	1.249** (0.625)	0.88 (0.732)	0.798 (0.722)
Sector $j$ buys from itself	0.861* (0.449)	1.579*** (0.398)	1.264*** (0.466)	1.048** (0.479)
INDUSTRY SHARE	0.103 (3.798)	0.394 (1.499)	1.361 (1.739)	0.924 (1.674)
Trend	-0.041*** (0.007)	-0.053*** (0.006)	-0.047*** (0.007)	-0.043*** (0.007)
Constant	0.019 (0.103)	-0.063 (0.090)	0.005 (0.105)	-0.004 (0.106)
Observations	1300	1312	1291	1292
# of industries	221	221	221	221
R-squared	0.16	0.23	0.17	0.17

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

**Table 8. Manufacturing vs. Services.**

The columns (1)-(3) are consistent with the specification reported in Table 4, col. 5 (column (1) is a replica of col. 5 in Table 4). See notes in Table 5 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 5.3.3. 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.

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

	1994	1995	1996	1997	1998	1999	2000
<b>Czech Republic</b>	<b>749</b>	<b>2,526</b>	<b>1,276</b>	<b>1,275</b>	<b>3,591</b>	<b>6,234</b>	<b>4,943</b>
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).

## Appendix A2. Summary Statistics.

ENTRY 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 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. All variables are averaged across our sample period 1994-2000.

Variable	N	Mean	Standard Deviation	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