Technological asymmetry among foreign investors and mode of entry

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Abstract

How does the preferred entry mode of foreign investors depend upon their technological capability relative to that of their rivals? This paper develops a simple model of entry mode choice and evaluates its main testable implication using data on foreign investors in Eastern European countries and the successor states of the Soviet Union. The model considers competition between two asymmetric foreign investors and captures the following trade-off: while a joint venture (JV) helps a foreign investor secure a better position in the product market vis-a-vis its rival, it also requires that profits be shared with the local partner. The model predicts that the efficient foreign investor is less likely to choose a JV and more likely to enter directly relative to the inefficient investor. Our empirical analysis supports this prediction: foreign investors with more sophisticated technologies and marketing skills (relative to other firms in their industry) tend to prefer direct entry to joint ventures. This empirical finding is robust to controlling for host country specific effects and other commonly cited determinants of entry mode.

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1 Non-Technical Summary

This study examines how the technological capability of a foreign investor relative to its competitors affects its choice between entering a host country through a fully-owned subsidiary or via a joint venture (JV) with a local partner. A simple theoretical model of competition between two asymmetric foreign investors is developed and its main testable implications are evaluated using data on foreign investment in Eastern European countries and the successor states of the Soviet Union.

The model captures the following trade-off: while a JV helps a foreign investor secure a better position in the product market vis-a-vis its rival, it also requires that profits be shared with the local partner. The main prediction of the model is that the efficient foreign investor is less likely to choose a JV and more likely to enter directly relative to the inefficient investor. Our empirical analysis supports this prediction: foreign investors with more sophisticated technologies and marketing skills (relative to other firms in their industry) tend to prefer direct entry to joint ventures. This empirical finding is robust to controlling for host country specific effects and other commonly cited determinants of entry mode.

2   Introduction

During the last several decades, there has been a significant change in the attitudes of many countries towards inflows of foreign direct investment (FDI). From being viewed as evil exploiters, foreign investors are now welcomed as a source of new technologies, know-how, better management and marketing techniques. One only needs to consider the large scale economic liberalization that has been undertaken by Eastern European transition economies and the successor states of the Soviet Union to appreciate the reversal in attitudes toward FDI that has occurred in the world. As a result, there has been renewed interest among policymakers and academic researchers regarding the relationship between technology transfer and FDI.[1]

An interesting finding in the existing empirical literature on international technology transfer is that the technologies of joint ventures (JVs) tend to be of an older vintage relative to those employed by wholly owned subsidiaries of multinational firms (Mansfield and Romeo, 1980). A reasonable explanation for this finding is that firms are reluctant to share state of the art technologies with local partners in foreign countries due to the fear of potential competition.[2] However, this explanation ignores the fact that firms have strong incentives to utilize their best technologies to compete more effectively with their rivals. In other words, to fully understand the relationship between mode choice and technology transfer, one needs to account for competitive pressures *among* investors. In this paper, we ask: do foreign firms that possess relatively more sophisticated technologies than their rivals prefer direct entry to joint ventures? We develop a simple duopoly model of mode choice that investigates this question and then evaluate its main finding empirically by using data from a survey of foreign investors in Eastern European transition economies and the former Soviet Republics conducted by

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[1] There are several reasons for this interest. For instance, the consequences of restrictions on foreign ownership that are widely prevalent in many developing countries (UNCTC, 1987) are likely to depend upon whether mode choice is systematically related to technology transfer. Similarly, the degree of intraindustry spillovers from FDI may also vary with the mode of investment (see Javorcik and Spatareanu, 2002).

[2] See Ramachandran (1993) for a model in which the effort expended by the local agent determines the extent of technology transfer.

the European Bank for Reconstruction and Development (EBRD).

A casual examination of our sample suggests that there might indeed be a systematic relationship between a firm's relative technological sophistication and its preferred mode of entry. We measure a firm's technological sophistication by the ratio of its R&D intensity (R&D expenditures as a percentage of total sales) to the average R&D intensity of major firms operating in the same industry in industrialized countries. Figure 1 presents the average technological sophistication index of foreign investors entering directly and via JVs in the top five investment destinations in our sample broken down by industry. As is clear, JVs are associated with lower values of the index in all of these five countries except Russia. For example, in the case of the Czech Republic and Hungary, JVs are associated with lower values of the index in eight out of nine industries.

Similarly, as Figure 2 indicates, a cross country comparison of the average technological sophistication of investors operating JVs and subsidiaries for several broadly defined industries reveals a similar pattern: in food, machinery, electronics and automobile industries, investors with higher technological sophistication seem to prefer direct entry to JVs.

In addition to these pointers from our sample, two prominent stylized facts of international business inform our simple model. First, it is well known that foreign investors often choose JVs to pair up with local partners that possess complementary skills and assets. For example, in a recent survey of JVs in developing countries, more than sixty-five percent of the foreign respondents rated knowledge of local politics, government regulations, local customs, and local markets as important considerations for seeking local partners (see Miller et. al., 1996). While local partners in JVs often bring much needed skills to a project, they also require compensation for their services through some sort of profit sharing. The second stylized fact motivating the model is that multinationals operate mostly in oligopolistic markets and are quite responsive to each other's decisions (see Caves, 1996). Thus, it is important to capture the strategic decision-making involved in the choice of entry mode.

In the model, the two investing firms are technologically asymmetric and two

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independent parameters quantify the rent sharing aspect and the complementarity of JV partners. The main result is that since firms are asymmetric, they tend to favor different modes of entry: the more technologically advanced a foreign investor, the more likely it is to choose direct entry over a JV. In fact, in equilibrium it is never the case that the technologically advanced firm forms a JV and its rival firm chooses direct entry.[3] Our model adds value to the theoretical literature on mode choice by considering competition between asymmetric investors. By contrast, most existing models typically consider the case of a single investor and when they do consider multiple investors they either do not allow for JVs or assume all investors to be symmetric (see Ethier and Markusen, 1996, Horstmann and Markusen, 1992, Markusen, 2001, Asiedu and Esfahani, 2001).

To evaluate the empirical validity of our main result, we estimate a probit model with the dependent variable taking on the value of one if investor i engages in a JV with a local partner in country k, and zero if it chooses direct entry. The results lend support to our theoretical model by indicating that firms possessing more sophisticated technologies (relative to other firms operating in their industry in developed countries) are *less* likely to engage in JVs and more likely to enter the market directly. The same is true of firms with above average marketing sophistication. Coefficients on both variables (relative technological and marketing sophistication) are statistically significant and remain so even when entered into the same equation. Furthermore, these results are robust to the inclusion of host country and industry dummies. However, when both host country and industry dummies are included in the same equation, only the technological sophistication index remains significant.

As a further robustness check, not employed in the earlier studies of mode choice, we estimate a two-stage model that captures two choices: (i) the decision to undertake FDI in a given country and (ii) the choice between direct entry and a JV. In other words, we control for selection bias that may be present when only

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[3]One has to be careful here: the model does not say that the efficient firm never chooses a JV but rather that, if the inefficient firm does not choose a JV, the efficient firm will never do so either. There certainly exist parameter values for which both firms opt for a JV.

actual investment projects are considered and observations pertaining to firm-country pairs with no investment are discarded. It turns out that our results are robust to controlling for the investment decision: it is still the case that firms with more sophisticated technologies and marketing techniques are averse to sharing ownership and prefer direct entry. Finally, we note that our results are robust to controlling for country characteristics such as the evolution of the transition process and the distance between the source and host country.

While existing empirical studies of entry mode find a negative relationship between the importance of firm or industry level intangible assets and the probability of entering through a JV (see Stopford and Wells, 1972; Gatignon and Anderson, 1988; Gomes-Casseres, 1989 and 1990; Asiedu and Esfahani, 2001), this paper focuses on technological and marketing sophistication of investing firms *relative* to other firms operating in the industry worldwide.[4] Thus, we concentrate on *intraindustry* differences as a determinant of mode choice in addition to controlling for *interindustry* effects. Moreover, we employ a data set that is unique in the extent of its coverage. Previous studies on the choice of entry mode use data on FDI originating in one source country (i.e., Sweden in the case of Blomström and Zejan, 1991 or the United States as in the case of Asiedu and Esfahani, 2001) or FDI entering a single host country (typically the United States as in Kogut and Singh, 1988). Our data set covers investment projects undertaken in multiple economies by investors from all over the world.

This paper is structured as follows. The next section presents our theoretical model of entry mode choice. Section 3 discusses our empirical strategy, the data used and the results obtained. The last section concludes. Details of theoretical derivations and the data used are collected in separate appendices.

3 Model

In this section we develop a partial-equilibrium duopoly model of mode choice. Two foreign firms are considering entry into a market where the inverse demand

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[4]Some studies, however, did not find statistically significant results (e.g., Blomström and Zejan, 1991).

function is given by $p(q)$ and q denotes total output. Each firm can enter the market directly and produce the good on its own or form a JV with a local partner who lacks the ability to produce the good alone. Let e denote direct entry and j a JV. The technology of production and distribution depends upon mode choice in the following way. If firm i decides to enter the market directly (i.e. by establishing a wholly owned subsidiary), it requires α_i units of labor for producing each unit and β_i units for distributing it. Thus, under direct entry firm i's marginal cost equals

$$c_i^e = \alpha_i + \beta_i \tag{1}$$

By definition, under a JV, firm i must share some rents with its local partner. Let firm i's share of the total profit of the JV be given by θ, where $\theta \in [0,1]$.[5] The advantage of forming a JV is that the local partner brings knowledge and expertise about the host country market which lowers the unit labor requirement in distribution to $\delta\beta_i$, where $\delta \in [0,1]$.[6] The smaller is δ, the lower a JV's unit cost of distribution. Thus, under a JV, firm i's unit cost is given by

$$c_i^j = \alpha_i + \delta\beta_i \tag{2}$$

In order to generate technological asymmetry between foreign investors assume that $\alpha_1 \leq \alpha_2$ and $\beta_1 \leq \beta_2$. Note that, holding constant the mode of entry, firm 1 has a lower marginal cost than firm 2.

Now consider the following market entry game. In the first stage, each firm chooses between the two modes of entry (JV versus direct entry). Next, both firms compete in quantities (Cournot-Nash competition). Firm i's profit function at the output stage is given by $\pi_i(q_i, q_{-i}) = (p(q) - c_i)q_i$ and the associated first order condition for profit maximization can be written as:

$$\frac{\partial \pi_i(q_i, q_{-i})}{\partial q_i} = p + p'q_i - c_i = 0 \tag{3}$$

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[5]Since in our data set we we do not have information regarding the equity structure of JVs, we leave θ as an exogenous parameter.

[6]Note that δ is intended to represent more generally the contribution of the local partner to the joint venture. Such contribution may take the form not only of access to distribution networks but also knowledge of local tastes, suppliers and legislation as well as an improved ability to navigate through the bureaucratic maze in the host country.

Solving the above first order conditions yields the equilibrium in the product market. Let the pair (x, y) denote the regime where firm 1 chooses entry mode x and firm 2 chooses entry mode y, where $x, y = e, j$. Further, let π_1^{ey} denote firm 1's equilibrium profit under regime (e, y) and $\theta\pi_1^{jy}$ under regime (j, y). Similarly, interpret firm 2's payoffs π_2^{xe} and $\theta\pi_2^{xj}$.

Since firm 1 is more efficient than firm 2, it is always the case that $\pi_1^{ey} \geq \pi_2^{xe}$ and $\theta\pi_1^{jy} \geq \theta\pi_2^{xy}$: under the same entry mode, firm 1 has higher total profit than firm 2. Of course, it need not be the case that firm 1 has higher profit when it chooses direct entry and when firm 2 chooses a JV. This ranking depends upon the parameters of the model.

To describe the sub-game perfect equilibrium of this model, we need two definitions. Denote the change in firm i's profit that results from it switching from direct entry to a JV given that its rival adopts direct entry by u_i:

$$u_1 \equiv \theta\pi_1^{je} - \pi_1^{ee} \text{ and } u_2 \equiv \theta\pi_2^{ej} - \pi_2^{ee} \tag{4}$$

Each firm can gain market share at the expense of its rival by forming a JV and lowering its marginal cost. Of course, to do so a firm must forsake some of the total profit of the JV to the local partner. Only when the benefit of forming a JV is higher than the cost is $u_i > 0$. We will say that *firm i has a unilateral incentive for a JV iff* $u_i > 0$.

Let Δ_i denote the change in firm i's profit that results from it switching from direct entry to a JV given that its rival forms a JV:

$$\Delta_1 \equiv \theta\pi_1^{jj} - \pi_1^{ej} \text{ and } \Delta_2 \equiv \theta\pi_2^{jj} - \pi_2^{je}. \tag{5}$$

A firm has a motive for forming a JV in response to a JV by its rival because it too can lower its cost and regain some of its lost market share. The function Δ_i measures the strength of this motive. We will say that *firm i has a competitive incentive for a JV iff* $\Delta_i > 0$. Using the two sets of incentives functions, the sub-game perfect equilibrium of the model can be described in a succinct way:

Proposition 1: *The equilibrium mode choice of the two firms is as follows: (i) Both firms choose direct entry (e, e) iff $u_i \leq 0$; (ii) firm 1 chooses direct entry*

while firm 2 a JV (e, j) *iff* $\Delta_1 \leq 0$ *and* $u_2 > 0$; *(iii) both firms choose a JV* (j, j) *iff* $\Delta_i \geq 0$; *and (iv) firm 1 chooses a JV and firm 2 direct entry* (j, e) *iff* $u_1 > 0$ *and* $\Delta_2 < 0$.

Our main interest is in relating a firm's preferred mode of entry to its technological capability relative to its rival. To this end, we examine how the likelihood of a particular regime being an equilibrium changes with a change in the underlying technology of the two firms. The 'likelihood' of a regime is measured by the area of the parameter space over which that regime emerges as an equilibrium. For example, if we say that a change in some underlying parameter makes it more likely that a firm has a unilateral incentive for a JV, we mean that the parameter space over which the function u_i is positive increases.

To facilitate analytical derivations and comparisons of the incentives functions, assume that the demand function is linear: $p = a - bq$.

Proposition 2: *An increase in a firm's marginal cost (caused either due to an increase in α_i or β_i) makes it more likely that a firm has a unilateral as well as a competitive incentive for a JV. Similarly, an increase in the marginal cost of its rival makes it less likely that the firm has a unilateral or a competitive incentive for a JV.*[7]

A corollary to the above result can also be stated:

Corollary 1: *Whenever firm 1 has unilateral incentive for a JV, so does firm 2. Furthermore, the regime (j, e) where firm 1 chooses a JV and firm 2 direct entry does not constitute an equilibrium.*

The rough intuition behind the above result is that whenever firm 1 prefers a JV to direct entry, firm 2 does as well. Thus, we cannot have an equilibrium in which only the efficient firm forms a JV. Figure 3 illustrates a typical equilibrium pattern in (δ, θ) space.[8] In this figure, we plot the zero contours for the incentive functions u_2 and Δ_1. The other incentive functions are omitted from this figure since they are not needed to describe the equilibrium mode choice. For example,

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[7]For proofs of proposition 2 and corollary 1, see the appendix.

[8]The parameters used for this figure are: $a = 10$, $\alpha_1 = 1$, $\beta_1 = 1$, $\alpha_2 = 2$, and $\beta_2 = 2.5$. There is nothing special about these parameter values except that they give a clean figure. The propositions and corollaries stated in the paper hold for all permissible parameter values.

the function u_1 is not plotted since it lies below all the other three functions and does not play a critical role in determining the equilibrium mode choices of firms. Furthermore, the fact that u_1 lies below Δ_2 implies that if the efficient firm has a unilateral incentive for a JV, the inefficient firm has a competitive incentive to do the same thereby ruling out (j, e) as an equilibrium entry regime.

Two properties of Figure 3 are worth noting. First, the zero contours for all incentive functions are upward sloping. This common property of all zero contours follows from the model's fundamental trade-off: as the local partner's contribution becomes *less* valuable (i.e. as δ increases) each firm requires a higher share θ of the JV's total profit if it is to remain indifferent between a JV and direct entry. Second, higher profit contours lie in the South-East region: an increase in θ and a decrease in δ make a JV more attractive relative to direct entry.[9]

Figure 3 can be divided into three regions. Above the zero contour for the u_2 function, (e, e) is the equilibrium. In this region, δ is large and θ is small so that the local firm receives a large share of the total profit of the JV even though it does not make a valuable contribution to the JV. As a result, in this region, direct entry is the dominant mode of entry for both firms. In the region between the zero contours for the u_1 and Δ_2 functions, (e, j) is the equilibrium: here, the contribution of the local partner is not large enough for firm 1 to opt for a JV whereas it is sufficient to induce firm 2 to choose a JV. Finally, in the region below the zero contour for the Δ_2 function, (j, j) is the equilibrium: here the local firm's expertise really counts and the profit share of firms is large.

The model presented above shows how the incentives of firms to choose JVs over direct entry vary with their technological capabilities. In a broad sense, *the main empirical prediction of the model is that the more technologically sophisticated a firm is relative to its rivals, the less likely it is to enter the market via a JV.* We now turn to an econometric verification of this prediction.

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[9]As should be clear, the model has many exogenous parameters and figures corresponding to figure 3 can be drawn in the space of other parameters as well. Figure 3 has been drawn in the (δ, θ) space because both of these parameters lie between 0 and 1 thereby allowing a clean representation of equilibrium.

4 Empirical Evidence

In this section we test the main prediction of the theoretical model. The empirical work is described in three steps. We first present some summary statistics; then discuss our econometric specification and report our regression results.

4.1 Summary Statistics

As noted earlier, the data set used in this study is based on the European Bank for Reconstruction and Development (EBRD) survey of foreign investors supplemented with the information obtained from the Worldscope database. In January 1995, a brief questionnaire was sent out to all companies (about 9,500) listed in Worldscope. Responses were obtained from 1,405 firms which reported whether they had undertaken investments in Eastern European transition economies and the successor states of the Soviet Union (total of twenty-one countries). Further details about the survey and the data are given in appendix II.

Table 1 presents the breakdown of entry modes chosen by foreign investors in our sample for each of the host countries. Note that JVs outnumber direct entries in most host countries and constitute fifty-nine percent of all projects.

Table 2 presents the percentage of foreign investors who chose a given entry mode in each industry in our sample. The figures indicate that JVs were the dominant form of investment in a majority of industries. However, it is striking that in the drugs, cosmetics and health-care products sector only twelve percent of all projects were JVs, while direct entries accounted for eighty-eight percent of investments. Similarly, wholly owned projects constituted eighty-four percent of all investments in the beverage sector. It is worth noting that drugs, cosmetics and health-care products sector are the most R&D-intensive industry in our sample, while the beverage sector relies heavily on advertising and investments in marketing.

Table 3 compares the average R&D intensity of investors engaged in direct entry with that of investors sharing ownership in each three digit SIC sector. The sectors are grouped into high, medium and low technology category, following the classification used by Blomström, Lipsey and Ohlsson (1991).

As Table 3 indicates, in all but one high technology industry, investors undertaking direct entry are on average more R&D intensive than those sharing ownership. For instance, in the drugs sector, the average value of R&D spending is equal to 15.7 percent of sales in the case of direct entry and 10.6 percent in the case of JVs. For the communications equipment, the corresponding figures are 13.3 and 5.6 percent. And in the case of electronic components and accessories 5.6 and 3.4. In medium technology industries, which include industrial chemicals, motor vehicles, household appliances, etc., in half of the sectors in which both modes are present, investors entering a host country directly are characterized by higher level of R&D efforts. The average R&D outlays are equal to 3.8 percent of sales for direct entry and 3.2 for JVs. In low technology sectors, this is true in ten out of sixteen cases. In each of the three groupings, the average R&D intensity of firms entering directly is higher than that of firms engaged in JVs.

4.2 Econometric specification

Denote a firm by i and a country by k and define a binary variable JV_{ik} such that

$$JV_{ik} = \begin{cases} 1 \text{ if } JV_{ik}^* > 0 \\ 0 \text{ if } JV_{ik}^* \leqslant 0 \end{cases}$$

where JV_{ik}^* is unobserved and it determines the attractiveness of a JV relative to direct entry to firm i while investing into country k. We further posit that

$$JV_{ik}^* = W_i \Theta + \beta t_i + \delta_k + \varepsilon_{ik}$$

where t_i is an index of technological sophistication of firm i, W_i is the vector of other firm-specific determinants of the mode choice and δ_k captures country fixed effects. The above equation is estimated using a probit model with the dependent variable taking on the value of one if the project undertaken by firm i in country k is a JV and zero if it is direct entry. Our model predicts that $\beta < 0$.

The choice of explanatory variables employed in the estimation is driven by the predictions of our model as well as by the earlier empirical literature. All variables, with the exception of regional experience which comes from the survey, are taken from Worldscope and are for 1993 (or the closest year for which the

information is available). Further details about each of the variables is given in the data appendix.

Technological Sophistication: To capture the sophistication of an investor's technology we use the ratio of its R&D intensity relative to the average value in its industry.

One caveat of using relative R&D expenditure as a proxy for technological sophistication is that R&D intensity is not a perfect measure of a firm's success in innovative activities. Furthermore, in low technology sectors differences between (small in general) R&D activities may not have strong effects. Sophistication in terms of marketing skills and ownership of brand-names may be far more important in some industries. To allow for this possibility and to explicitly account for the model's predictions regarding marketing/distribution costs, we also control for the investor's advertising intensity relative to the industry average.

To capture how important these intangible assets are for a particular industry, we include the average values of R&D- and advertising-intensity at the industry level. This allows us to take into account both *intra* and *interindustry* effects.[10]

Firm Size: Stopford and Wells (1972) observe that smaller multinationals, which are likely to possess fewer intangible assets, tend to take lower equity positions in their foreign subsidiaries. Moreover, Blomström and Zejan (1991) suggest that smaller firms are less willing to take higher risks and are, therefore, more likely to enter a host country through a JV. Thus, we control for firm size and expect to find that it is negatively correlated with the probability of a JV.

Production Diversification: As Asiedu and Esfahani (2001) note, although a multinational may be well endowed in intangible assets, their role in its investment projects may be limited if these assets are spread over a wide range of industries. Following their suggestion, we control for production diversification and expect to find a positive sign on its coefficient implying that diversification is positively correlated with the probability of a JV.

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[10]Note that the earlier literature usually employed either firm or industry level proxies for intangible assets. Asiedu and Esfahani (2001) included a firm specific measure of all intangible assets (proxied by the ratio of sales to tangible assets) as well as industry level R&D intensity. None of the earlier studies controlled for intraindustry effects explicitly.

Regional Experience: Our model assumes that a JV partner contributes skills complementary to those of a foreign investor. The more familiar a foreign investor with the region, the lesser its need for a local partner. On the other hand, greater familiarity with a particular region may lower the cost of finding a suitable JV partner. Thus, the impact of regional experience on the propensity to seek a JV is unclear. To control for regional experience we include a dummy variable taking on the value of one if a firm had a trading relationship with the region before 1990 and zero otherwise.

International Experience: As Anderson and Gatignon (1988) and Blomström and Zejan (1991) show, firms with greater experience in foreign operations in general may be more adept in monitoring and dealing with local employees and thus may be less likely to share ownership. Since what matters is not just the country or region specific knowledge but overall international experience, we measure international experience by the share of foreign sales in a firm's total sales.

Host Country Characteristics: The choice between full and shared ownership is also likely to be influenced by a variety of host country characteristics (see Asiedu and Esfahani, 2001). Since the investigation of these issues is not of immediate interest to this study, we control for host country specific factors with dummy variables for destination countries.

4.3   Results

Next we turn to the regression results. Recall that in our probit model, the dependent variable equals one if investor i has engaged in a JV with a local partner in country k, and zero if the project is a direct entry. Thus, the number of observations is equal to the number of projects undertaken in the region by all firms in the sample. The estimated results are presented in Table 4 in terms of marginal effects.

The standard errors, listed in parentheses, are clustered for observations pertaining for the same company. As predicted, the results indicate that firms possessing more sophisticated technologies relative to the industry average are less

likely to engage in JVs and prefer to retain full ownership of their investment projects (column 1). The same is true of firms with above average investment in marketing and brand names (column 2). Both coefficients are statistically significant and remain so even when both proxies are entered into the same equation (column 3). As a robustness check, in column 4 we include dummies for three-digit SIC sectors and drop sector specific variables. The coefficient on technological sophistication bears the same sign and remains significant while the coefficient on relative advertising intensity loses its significance.

As for other explanatory variables, as anticipated, we find that JVs are more likely to take place in industries where intangible assets play a less prominent role (i.e., industries characterized by lower spending on R&D and advertising). Further, they are more likely to be undertaken by smaller and more diversified firms. Regional and international experience do not appear to have a statistically significant impact on the decision regarding the mode of entry.

One could argue that our empirical analysis suffers from a selection bias since we only consider projects that took place and ignore firms that decided against investment in a particular country or in the whole region. Thus, as a further robustness check, we estimate a two-stage model where the first stage (Investment decision) describes the decision to invest and the second stage (Ownership decision) examines the choice of mode of entry. The dependent variable in the first stage is equal to one if firm i has undertaken FDI in country k and zero otherwise. In addition to all the determinants of the mode of entry described in the previous section, the first stage includes controls for host country characteristics commonly found in studies of FDI determinants.[11] These are: market size (proxied by population size), purchasing power of local consumers (captured by GDP per capita), quality of business environment (measured using the EBRD ratings of progress in transition process), corporate tax rate, openness to trade (defined as the sum of exports and imports divided by the GDP) and distance between source and host country.

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[11]See Wheeler and Mody (1992) and a survey of the literature on the determinants of FDI by Markusen (1995).

The second stage includes all the variables used in the simple probit model plus two controls pertaining to host countries: transition progress and distance between the source and the host country. We expect to find a negative coefficient on the former variable, as the more advanced the host country in the reform process, the less need for help from a local partner to navigate through the bureaucracy in order to obtain the necessary permits and deal with tax authorities. Similarly, the smaller the distance between the home and host country, the more familiar are foreign investors with the ways of doing business in their investment destination and thus again less need for a JV partner.

We estimate the two equations described above simultaneously by maximum likelihood (probit with sample selection), correcting standard errors for correlation between observations for the same firm. The number of observations in the first equation (Investment decision) is equal to the number of firms in the sample, multiplied by the number of destination countries covered by the data set less observations with missing values. In the ownership decision equation, the number of observations is equal to the total number of FDI projects in the sample.

The results, presented in the first three columns of Table 5, lend support to our hypothesis. In Table 5, the top panel contains the findings from the second stage (Ownership decision) and it confirms that firms with more sophisticated technologies and marketing techniques are averse to sharing ownership and prefer to enter a host country directly. As before, the data indicate that joint ventures are less common in high R&D and advertising-intensive industries and among larger investors. Furthermore, there is some, albeit not very strong, indication that more diversified firms as well as those with less international experience tend to undertake joint ventures rather than enter directly. As expected, the data suggests that joint ventures are a less attractive option in economies more advanced in the transition process where doing business is likely to be easier. Finally, regional experience and distance between the source and host country do not appear to have a statistically significant impact on the ownership choice.

The Investment equation, presented in the lower panel of Table 5, also produces the expected results. The findings indicate that larger firms and those

operating in advertising-intensive industries are more likely to undertake FDI. The same is true of firms familiar with the region, possessing international experience and less diversified companies.[12] In terms of host country characteristics, economies that are larger and more advanced in the transition process are more attractive investment destinations. Similarly, less distant countries and those more open to trade and offering lower corporate tax rates are more successful at attracting FDI. On the other hand, GDP per capita, which may be a proxy for labor costs, does not appear to have impact on the investment decision.

As noted in our data appendix, firms which engaged in FDI in the region are over-sampled in our data set. Therefore, as an additional robustness check we reestimate the two-stage model restricting our sample to investors, i.e., firms with at least one investment in the countries considered in the study. An additional benefit of this restriction is that we reduce the number of zeros on the left hand side of the equation, as the original data set contains many firms that have not undertaken any investment projects in the region. These results, shown in the last three columns of Table 5, do not differ significantly from those obtained from the full sample. The variables of interest, technological and marketing sophistication, retain their signs, magnitudes and significance levels thus again lending support to our hypothesis.

5 Conclusion

The choice of entry mode by foreign investors has been of interest to both policy makers and researchers in the field of international business. Developing country governments are especially interested in the technology and know-how transfer that results from FDI. To be able to assess the potential magnitude of such benefits, it is important to understand preferences of different types of investors with respect to the entry mode. This study sheds some light on this issue by analyzing the intraindustry determinants of entry modes chosen by foreign firms entering transition economies of Eastern Europe and the successor states of the Soviet Union in the early 1990s.

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[12]More diversified firms may be under less pressure to search for new markets.

Our empirical work is motivated by a simple theoretical model that allows for competition between asymmetric foreign investors. The model predicts that a relatively efficient foreign investors are less likely to choose JVs and more likely to enter directly. The empirical results supports this prediction. Thus, policies influencing FDI entry mode may affect technological content of the investment projects and generate different implications for the extent of potential spillovers to the host economy.

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6 Appendix I

Here, we report all of the analytical derivations and provide proofs for our results. Using the first order conditions for Cournot competition

$$\frac{\partial \pi_i(q_i, q_{-i})}{\partial q_i} = p(q) + p'(q)q_i - c_i = a - bq_{-i} - 2bq_i - c_i = 0$$

we can easily calculate the equilibrium output levels:

$$q_i^{xy} = \frac{a - 2c_i^x + c_{-i}^y}{3b} \tag{6}$$

where $i = 1, 2$ and $x, y = e, j$.

Furthermore, the equilibrium profit of a firm under regime (x, y) is equal to square of its quantity. For example,

$$\pi_1^{ej} = b \left[q_1^{ej} \right]^2 \text{ and } \pi_2^{ej} = \theta b \left[q_2^{ej} \right]^2 \tag{7}$$

Thus, we have

$$u_1 = \left[\sqrt{b\theta} q_1^{je} \right]^2 - \left[\sqrt{b} q_1^{ee} \right]^2$$
$$= \left(\sqrt{\theta b} q_1^{je} + \sqrt{b} q_1^{ee} \right) \left(\sqrt{\theta b} q_1^{je} - \sqrt{b} q_1^{ee} \right)$$

so that

$$u_1 > 0 \text{ iff } e_1 \equiv \sqrt{\theta} q_1^{je} - q_1^{ee} > 0. \tag{8}$$

Using the equilibrium quantity levels given in equation (6), we can describe the two incentive functions in terms of exogenous parameters. For example, $u_1(.) > 0$ iff

$$e_1 \equiv \sqrt{\theta}(a - 2(\alpha_1 + \delta\beta_1) + \alpha_2 + \beta_2) - (a - 2(\alpha_1 + \beta_1) + \alpha_2 + \beta_2)$$
$$= (1 - \sqrt{\theta})(-a + 2\alpha_1 - \alpha_2 - \beta_2) + 2\beta_1(1 - \sqrt{\theta}\delta)$$

We can similarly show that

$$u_2 > 0 \text{ iff } e_2 \equiv \sqrt{\theta} q_2^{ej} - q_2^{ee} > 0. \tag{9}$$

and

$$\Delta_1 > 0 \text{ iff } d_1 \equiv \sqrt{\theta} q_1^{jj} - q_1^{ej} > 0$$

Finally,

$$\Delta_2 > 0 \text{ iff } d_2 \equiv \sqrt{\theta} q_2^{jj} - q_1^{je} > 0.$$

As for the case of u_1, we can describe the above incentive functions in terms of exogenous parameters using equations (6), (1), and (2).

6.1 Proof of proposition 2

Note that

$$\frac{\partial e_i}{\partial \alpha_i} = \frac{\partial d_i}{\partial \alpha_i} = \frac{2(1-\sqrt{\theta})}{3} > 0 \text{ and } \frac{\partial e_i}{\partial \beta_i} = \frac{\partial d_i}{\partial \beta_i} = \frac{2(1-\delta\sqrt{\theta})}{3} > 0$$

and,

$$\frac{\partial e_i}{\partial \alpha_{-i}} = \frac{\partial d_i}{\partial \alpha_{-i}} = -\frac{1(1-\sqrt{\theta})}{3} < 0 \text{ and } \frac{\partial e_i}{\partial \beta_{-i}} = \frac{\partial d_i}{\partial \beta_{-i}} = -\frac{1(1-\sqrt{\theta})}{3} < 0$$

6.2 Proof of corollary 1

From equations (8) and (9), we know that corollary 1 holds iff

$$e_2 - e_1 > 0$$

Substituting for the equilibrium output levels, we can show that

$$\frac{\partial(e_2 - e_1)}{\partial \theta} = -\frac{3(\alpha_2 - \alpha_1) + (\beta_2 - \beta_1)(1 + 2\delta)}{6\sqrt{\theta}} < 0$$

i.e. $e_2 - e_1$ is decreasing in θ. Furthermore, at $\theta = 1$, we have

$$e_2 - e_1\big|_{\theta=1} = \frac{2(\beta_2 - \beta_1)(1 - \delta)}{3} > 0$$

Thus, it must be that $e_2 - e_1 > 0$ for all θ. Since e_2 is strictly bigger than e_1, there surely exist parameter values for which only firm 2 has a unilateral incentive for a JV.

To prove the second statement of the corollary, it is enough to show that if $u_1 > 0$, then $\Delta_2 > 0$. We know that

$$\frac{\partial(d_2 - e_1)}{\partial \theta} = \frac{3(\alpha_1 - \alpha_2) - (1 + 2\delta)\beta_2 + 3\delta\beta_1)}{6\sqrt{\theta}} < 0$$

i.e. $d_2 - e_1$ is decreasing in θ. Furthermore, at $\theta = 1$, we have

$$d_2 - e_1\big|_{\theta=1} = \frac{2(\beta_2 - \beta_1)(1 - \delta)}{3} > 0$$

Thus, it must be that $d_2 - e_1 > 0$ for all θ. In other words, if firm 1 has a unilateral incentive for a JV, firm 2 will have a competitive incentive for a JV. As a result, the regime (j, e) cannot be an equilibrium.

7   Appendix II: Data

A. Survey

The respondents of the 1995 EBRD survey were asked to classify each of their existing or planned projects as a JV with a local partner, acquisition, or greenfield entry. For the purpose of this study, we classify all greenfield and acquisition projects not associated with JVs as direct entry. In other words, if a respondent listed more than one form of entry mode, the observation was classified as a JV if one of these forms was "JV with a local partner," and direct entry otherwise.

As a robustness check, we also used an alternative classification in which we created a separate observation for each entry mode reported by a respondent. Then we estimated a probit model with the dependent variable taking on the value of unity for JVs and zero for greenfield projects. The results on the variables of interest (i.e., R&D and marketing intensities) were very similar to those presented in Table 4. Further, we also estimated a multinomial logit model with the dependent variable representing the three entry modes and a multinomial logit model with three entry modes plus the option of not investing at all. In both cases, the results on the impact of intangible assets on the choice between greenfield projects and JVs lent support to our hypothesis.

It is likely that firms which perceived the survey as more relevant (for instance, firms that had invested or considered investing in transition economies) were more likely to respond. To check this hypothesis, the list of major foreign investors in Poland compiled by the Polish State Investment Agency (PAIZ, 1995) was examined. Poland was chosen for this exercise since it was the most popular destination country in the sample. Out of 329 firms on the list 118 received the EBRD survey and fifty percent of them responded, as opposed to the overall response rate for the survey equal to about fifteen percent. Statistical tests indicated that the means of firm specific variables in the respondent and non-respondent groups were not significantly different from each other. Thus among the investing firms, the decision to respond to the survey was not systematically related to firm characteristics. Unfortunately, it was not possible to identify which among the firms that did not respond to the survey were not interested in undertaking investment in Eastern Europe and the former Soviet Union. There is no reason, however, to suspect that in the case of these firms, the decision to answer the survey was systematically related to their characteristics. Therefore,

the data set can be treated as if the investing firms had been oversampled. This did not, however, affect our results from the probit specification outlined above as it is estimated using information on actual investment projects and thus pertains to investing firms only.

The survey did not ask about the date when each investment was undertaken. Since the magnitude of FDI inflows to transition countries was marginal before 1989 and the survey was conducted in January 1995, the information collected pertains mostly to the period 1989-94. Further, to the best of our knowledge, none of the countries in the sample had legislation specifically forbidding full ownership by foreign investors. For instance, in the USSR a presidential decree issued as early as October 1990 allowed foreign wholly owned companies to be established in the form of branches or subsidiaries. The decree also created the legal basis for foreign investors to buy out existing Soviet enterprises as these were privatized (McMillan 1996, p. 50). In Hungary, Act XXIV of 1988 on the Investment of Foreigners in Hungary allowed non-Hungarian companies to own equity up to 100 per cent (WTO, 1998). In Poland, the 1988 Law on Economic Activity with the Participation of Foreign Parties permitted 100 per cent foreign equity participation (GATT, 1992). It is possible, however, that in practice permissions for fully owned projects may had been denied in some economies during the period covered by our sample. To control for this possibility, we included host country dummies in our model.

Since restrictions on the extent of foreign ownership may have been present in extractive sector and services, we excluded firms in the coal, gas and oil industry from our sample. We also dropped projects in service industries, such as, banking, insurance, telecommunications, accounting and public relations services, etc. In addition to possible restrictions on FDI, including these sectors would also pose some difficulties with measuring the endowment of intangible assets.

Note that our analysis assumes that all foreign investors have the option of engaging in a JV with a local partner, should they want to do so. In other words, the supply of local JV partners is not constrained and the observed entry patterns are determined entirely by foreign investors' demand. Considering that the aggregate FDI inflows into transition economies were quite small during the period covered by our sample, this assumption is quite realistic.

B. Other Data Sources

All firm-specific explanatory variables used in the analysis, with the exception

of regional experience which comes from the survey, were taken from the commercial database Worldscope and are for 1993 (or the closest year for which the information is available). Note that the variables pertain to the characteristics of the parent companies, *not* their particular subsidiaries in the regions. Details of variable definitions are listed below.

Firm Size: log of firm sales in millions of US dollars.

Relative Technological Sophistication: Firm R&D intensity/Average R&D intensity in the industry.

R&D intensity is measured by R&D expenditure expressed as a percentage of total sales. To calculate industry averages (at the three digit SIC industry classification) we use figures for all firms listed in Worldscope in a given industry, not just firms included in our sample. Thus, these values correspond to the average R&D intensity of major firms operating in developed countries in a given industry.

Relative Marketing Sophistication: Firm advertising intensity/Average advertising intensity in the industry.

Advertising intensity is defined as the ratio of Sales, General, and Administrative expenditure to total sales, which is a standard proxy used in the literature. The industry average is again calculated at the three-digit SIC level.

Product Diversification: the number of four digit SIC codes describing a firm's activities.

International Experience: the share of foreign sales in a firm's total sales. Ideally, we would like to use the share of foreign assets in a firm's total assets. However, using this measure would severely reduce the size of our sample. The share of foreign sales is highly correlated with the share of foreign assets (correlation of .82). Thus, our proxy for international experience seems reasonable.

Population Size, GDP per capita: both variables enter in log form, pertain to 1993 and come from EBRD (various issues).

Transition Indicators: The transition indicators rate the progress of a country's reforms in the following areas: price liberalization and competition, trade and exchange system, large-scale privatization, small-scale privatization, enterprise restructuring, and banking reform. See EBRD (1994, p. 11) for a

detailed description. In the empirical analysis, a simple average of the EBRD indicators is used.

Openness to trade: log (Exports + Imports)/GDP is calculated using figures from the World Bank World Development Indicators.

Corporate tax rate: expressed in percentages, corresponds to the highest rate applicable in the host country. Source: PriceWaterhouseCoopers.

Distance: log distance between the capital cities expressed in kilometers. The following source countries are included in the sample: United Kingdom, United States, Germany, France, Finland, Switzerland, Denmark, Norway, Netherlands, Austria, Sweden, Belgium, Canada, Japan, Australia, Italy, Greece, Ireland, Portugal, Singapore, Spain, Brazil, Malaysia, South Africa and South Korea.

FIGURE 1. Technological sophistication index of investors undertaking JVs vs. direct entry by host country

28

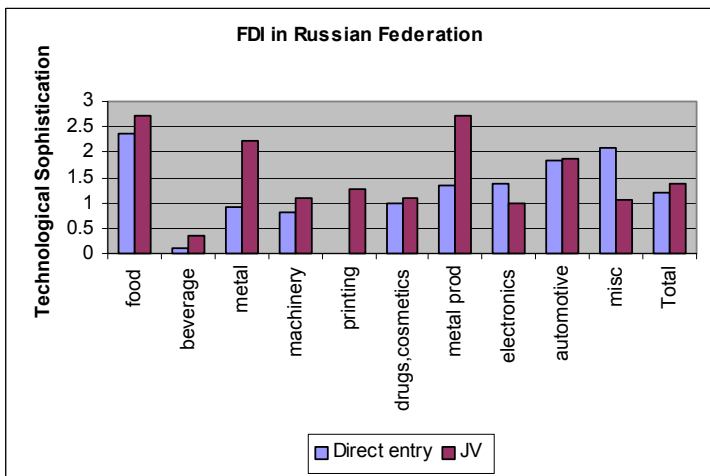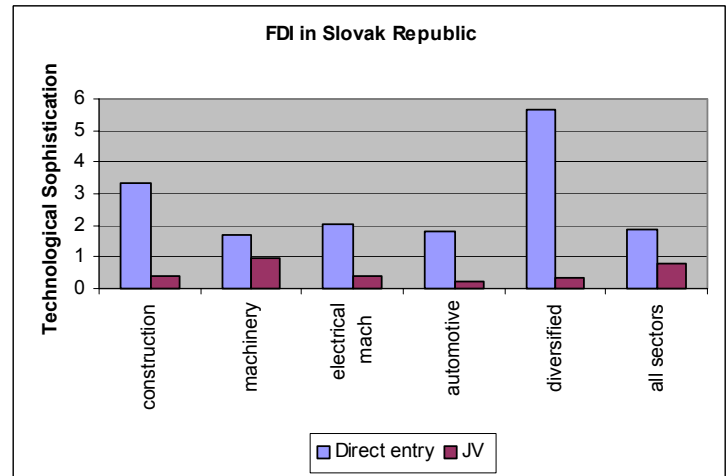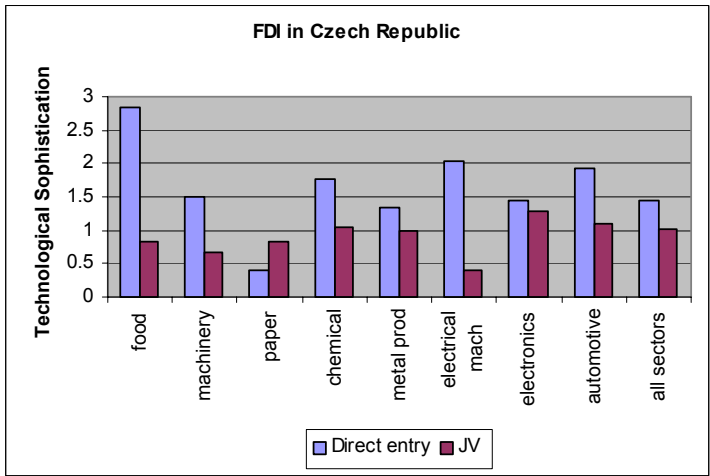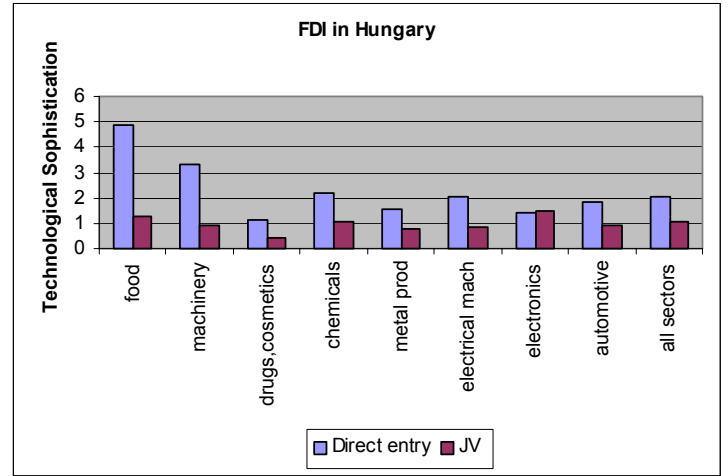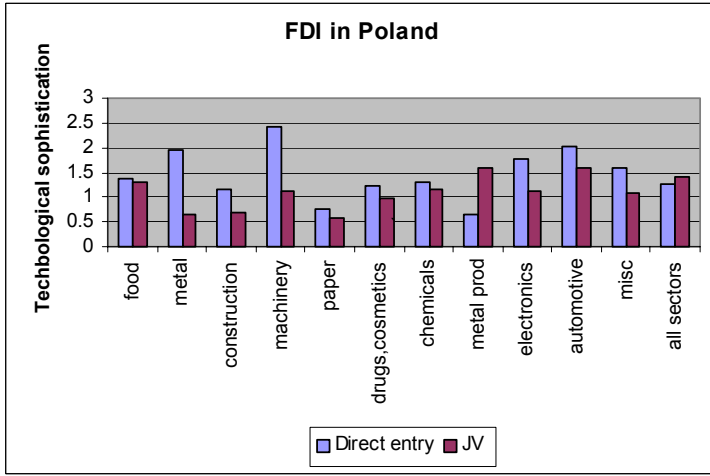FIGURE 2. Technological sophistication index of investors undertaking JVs vs. direct entry
by industry

FDI in Food Sector

FDI in Machinery Sector

FDI in Electronics Sector

FDI in Automobile Sector
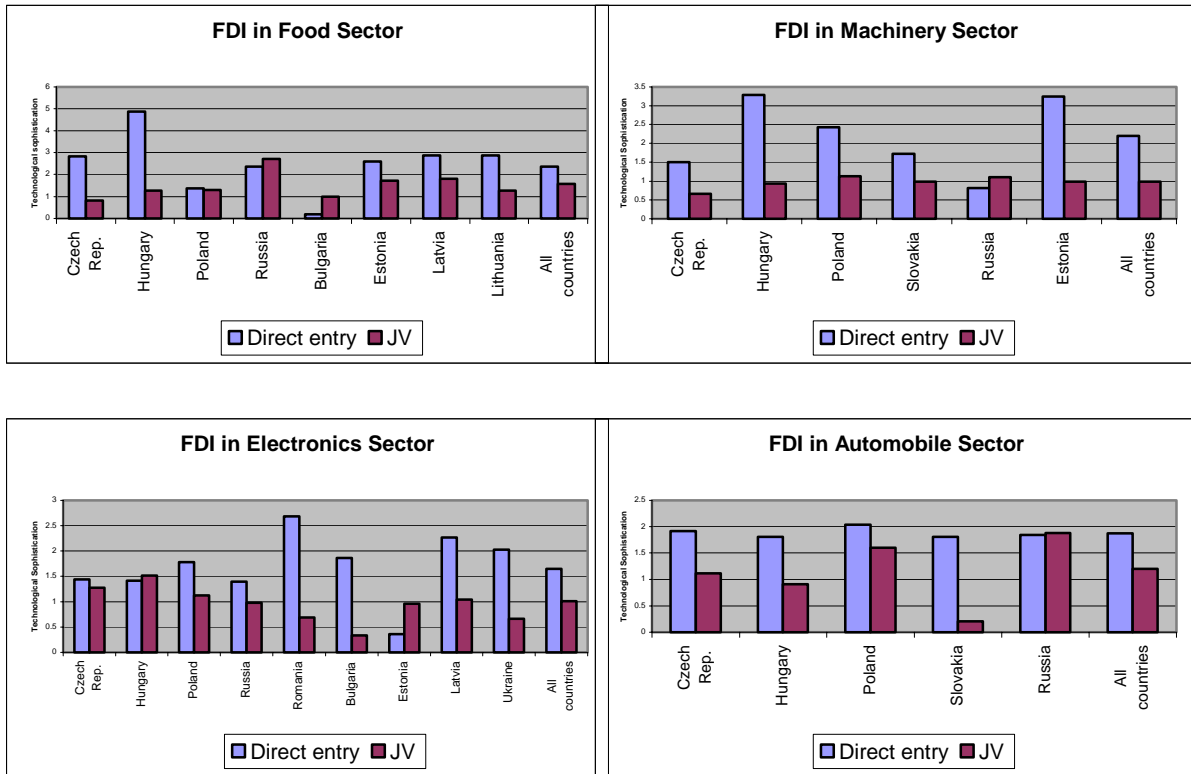
FIGURE 3: Equilibrium Mode Choice
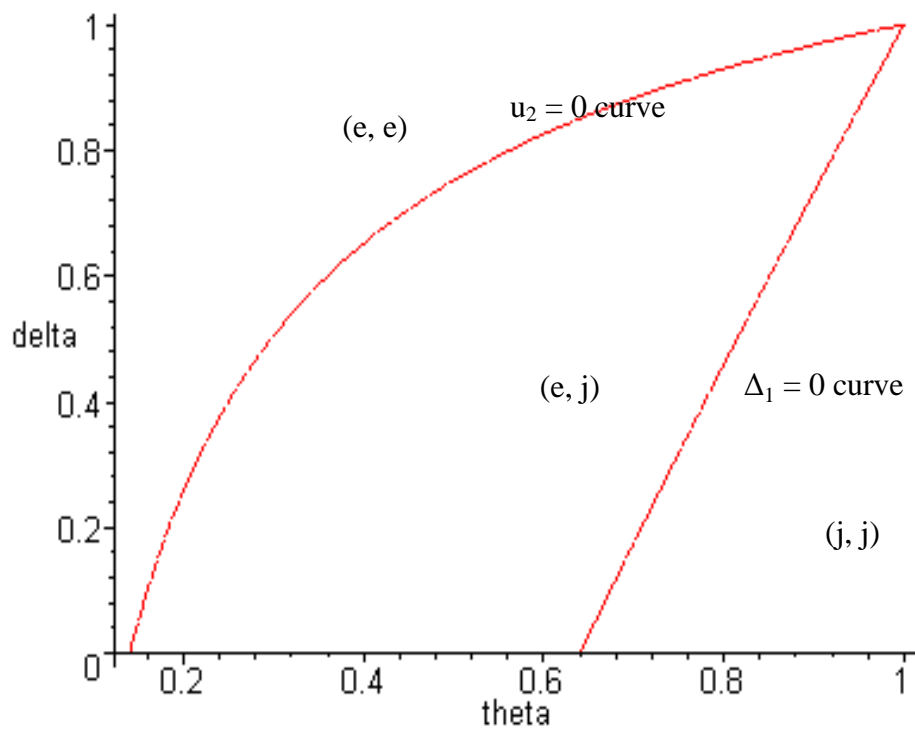
TABLE 1. Entry modes chosen by investors in the sample

Host country	Direct entry	JV	Total
Russia	29	72	101
Poland	45	60	105
Czech Rep.	47	43	90
Hungary	41	37	78
Slovak Rep.	16	22	38
Ukraine	5	17	22
Estonia	8	16	24
Romania	10	14	24
Bulgaria	11	10	21
Latvia	6	10	16
Slovenia	3	10	13
Kazakhstan	6	8	14
Lithuania	5	6	11
Croatia	4	6	10
Belarus	3	4	7
Georgia	2	4	6
Uzbekistan	1	4	5
Albania	1	3	4
Macedonia FYR	1	2	3
Azerbaijan	1	1	2
Moldova	0	1	1
Total	245	350	595

TABLE 2. Industry breakdown of entry modes chosen by investors in the sample

Industry	Direct entry as % of all projects in the industry	JVs as % of all projects in the industry	Total no. of projects in the industry
Recreational products	100.0	0.0	5
Drugs, cosmetics & health care products	87.9	12.1	58
Beverages	84.2	15.8	19
Electrical	67.7	32.3	31
Apparel	50.0	50.0	2
Printing & publishing	50.0	50.0	4
Metal products	42.1	57.9	19
Food	40.4	59.6	57
Automotive	40.0	60.0	25
Textiles	40.0	60.0	5
Metal	33.3	66.7	27
Machinery & equipment	32.2	67.8	90
Electronics	32.1	67.9	78
Aerospace	22.2	77.8	9
Chemicals	22.0	78.0	59
Paper	19.0	81.0	21
Diversified	4.8	95.2	21
Tobacco	0.0	100.0	5
Total	41.5	58.5	595

TABLE 3. R&D intensity of FDI projects in 3 digit SIC industries

High technology sectors	SIC code	JVs	Direct entry	All
Drugs	283	10.62	**15.71**	15.23
Measuring and controlling devices	382	9.94	9.08	9.61
Aircraft and parts	372	7.48	**9.44**	8.08
Communications equipment	366	5.60	**13.31**	7.06
Medical instruments and supplies	384	4.58	**5.07**	4.99
Electronic components and accessories	367	3.39	**5.63**	4.14
Computer and office equipment	357	4.09		4.09
Search and navigation equipment	381	3.20		3.20
Average		6.36	**12.67**	9.54

Medium technology sectors	SIC code	JVs	Direct entry	All
Refrigeration and service machinery	358		7.26	7.26
Electric distributi equipment	361	7.26		7.26
Hose, belting, gasket and packing	305	6.00	6.00	6.00
Plastics materials and synthetics	282	4.65	**4.86**	4.71
Special industry machinery	355	4.22	**5.68**	4.70
Industrial inorganic chemicals	281	4.09	**6.23**	4.46
Motor vehicles and equipment	371	3.91	**4.49**	4.17
Railroad equipment	374	1.49	**4.60**	3.05
Household audio and video equipment	365	5.79	1.03	2.93
Metalworking machinery	354	2.68	2.56	2.66
Soap, cleaners and toilet goods	284	2.60		2.60
General industrial machinery	356	2.30		2.30
Ship and boat building and repair	373	2.14		2.14
Engines and turbines	351	2.11	2.11	2.11
Construction and related machinery	353	1.83	**2.49**	2.03
Industrial machinery, nec	359		1.75	1.75
Misc. manufactures	399	1.59	1.59	1.59
Misc. chemical products	289	1.31		1.31
Misc. plastic products, nec	308	1.22	0.11	1.11
Farm and garden machinery	352	0.00	**3.68**	0.74
Electric lightning, wiring equipment	364	0.67		0.67
Rubber and plastics footwear	302	0.00	0.00	0.00
Average		3.21	**3.76**	3.35

Low technology sectors	SIC code	JVs	Direct entry	All
Printing trade services	279		5.25	5.25
Preserved fruits and vegetables	203	4.24		4.24
Broadwoven fabric mills, wool	223	4.00		4.00
Nonferrous rolling and drawing	335	1.54	**5.11**	3.16
Heavy construction, exc. highway	162		2.70	2.70
Electrical work	173	2.67		2.67
Copper ores	102	1.75	**2.84**	2.29
Cutlery, handtools and hardware	342	2.22	**2.28**	2.27
Nonresident building construction	154	1.25	**2.94**	1.93
Misc. food and kindred products	209		1.86	1.86
Sugar and confectionery products	206		1.83	1.83
Misc. metal ores	109	1.73		1.73
Manifold business forms	276	1.43		1.43
Misc. textile goods	229	1.40		1.40
Clay, ceramic and refractory minerals	145	1.35		1.35
Secondary nonferrous metals	334		1.34	1.34
Primary nonferrous metals	333	1.23	1.23	1.23
Iron ores	101		1.21	1.21
Misc. converted paper products	267	0.21	**1.34**	1.15
Misc. nonmetallic mineral products	329	0.76	**2.43**	1.13
Metal cans and shipping containers	341	1.20	0.79	0.99
Blast furnace and basic steel products	331	0.93		0.93
Meat products	201	0.79	**0.91**	0.85
Grain mill products	204	0.68	**1.10**	0.72
Glass and glassware pressed or blown	322		0.65	0.65
Misc. wood products	249	0.63	0.63	0.63
Paper mills	262	0.60	**0.67**	0.61
Dairy products	202	0.57		0.57
Highway and street construction	161	0.55		0.55
Fabricated structural metal products	344	0.00	**0.82**	0.55
Paperboard containers and boxes	265	0.44	0.33	0.40
Carpets and rugs	227		0.36	0.36
Cement, hydraulic	324	0.28		0.28
Fats and oils	207	0.15	0.15	0.15
Beverages	208	0.35	0.13	0.15
Gold and silver ores	104	0.00		0.00
Commercial printing	275		0.00	0.00
Average		0.87	**1.76**	1.28

TABLE 4. Results of a probit model - JV vs. direct entry

	(1)	(2)	(3)	(4)
Relative R&D	-0.055*		-0.069*	-0.187*
	(0.033)		(0.041)	(0.100)
Industry R&D	-0.039***		-0.058***	
	(0.012)		(0.019)	
Relative Advertising		-0.166**	-0.244**	-0.317
		(0.085)	(0.120)	(0.232)
Industry Advertising		-0.007**	<.001	
		(0.003)	(0.004)	
Diversification	0.037*	0.022	0.043**	-0.057
	(0.021)	(0.022)	(0.022)	(0.043)
Reg. Experience	0.096	0.098	0.141	0.192
	(0.101)	(0.102)	(0.107)	(0.155)
Int'l Experience	-0.002	-0.002	-0.001	-0.005
	(0.002)	(0.002)	(0.002)	(0.003)
Firm Size	-0.051*	-0.062**	-0.086**	-0.063
	(0.031)	(0.028)	(0.035)	(0.059)
Host dummies	yes	yes	yes	yes
Industry dummies	no	no	no	yes
obs. P.	0.60	0.56	0.57	0.51
pred. P.	0.61	0.57	0.57	0.52
No of obs.	439	424	345	243
Pseudo R^2	0.14	0.13	0.21	0.41
Log Likelihood	-255.07	-254.04	-185.61	-98.75

Dependent variable is equal to one for JVs and zero for direct entry. The results are presented in terms of marginal effects evaluated at the sample mean. All models include a constant term which is not reported. Standard errors (clustered on firm) are listed in parentheses. *** significant at 1% level, ** significant at 5% level, * significant at 10% level. <.001 denotes coefficients with absolute value below .001

TABLE 5. Results of a two-stage model

	All firms			Investors only		
Ownership Decision						
Relative R&D	-0.160**		-0.176*	-0.157**		-0.173*
	(0.079)		(0.103)	(0.079)		(0.103)
Industry R&D	-0.102***		-0.129***	-0.103***		-0.130***
	(0.032)		(0.047)	(0.032)		(0.047)
Relative ADV		-0.357*	-0.565*		-0.357*	-0.549*
		(0.219)	(0.307)		(0.219)	(0.307)
Industry ADV		-0.017**	-0.003		-0.017**	-0.002
		(0.007)	(0.009)		(0.007)	(0.009)
Diversification	0.075	0.050	0.102*	0.075	0.051	0.104*
	(0.052)	(0.058)	(0.054)	(0.052)	(0.058)	(0.054)
Reg. Experience	0.223	0.243	0.296	0.265	0.257	0.356
	(0.257)	(0.268)	(0.284)	(0.251)	(0.261)	(0.277)
Int'l Experience	-0.008**	-0.007	-0.004	-0.008*	-0.007	-0.004
	(0.004)	(0.005)	(0.006)	(0.004)	(0.005)	(0.006)
log (Firm Size)	-0.145*	-0.154**	-0.230***	-0.132*	-0.150**	-0.219**
	(0.079)	(0.076)	(0.088)	(0.078)	(0.074)	(0.087)
log (Distance)	-0.145	-0.063	-0.031	-0.176*	-0.073	-0.064
	(0.107)	(0.103)	(0.116)	(0.106)	(0.099)	(0.113)
Transition index	-0.490***	-0.404***	-0.421***	-0.495***	-0.402***	-0.428***
	(0.143)	(0.135)	(0.149)	(0.148)	(0.137)	(0.153)

Investment Decision	All firms			Investors only		
Relative R&D	-0.003		-0.008	-0.043		-0.043
	(0.031)		(0.040)	(0.031)		(0.043)
Industry R&D	0.026		-0.010	**0.039***		-0.006
	(0.020)		(0.024)	**(0.023)**		(0.031)
Relative ADV		0.065	**0.212***		0.100	0.128
		(0.077)	**(0.126)**		(0.090)	(0.119)
Industry ADV		**0.014***	**0.016***		**0.015***	**0.016***
		(0.003)	**(0.004)**		**(0.003)**	**(0.004)**
Diversification	**-0.059***	-0.041	-0.056	**-0.079***	**-0.072***	**-0.089***
	(0.033)	(0.027)	(0.037)	**(0.028)**	**(0.026)**	**(0.033)**
Reg. Experience	**0.265**	**0.324***	**0.403***	0.016	0.064	0.107
	(0.127)	**(0.119)**	**(0.157)**	(0.135)	(0.122)	(0.174)
Int'l Experience	0.003	**0.003***	0.002	0.002	0.002	0.003
	(0.002)	**(0.002)**	(0.003)	(0.002)	(0.002)	(0.003)
log (Firm Size)	**0.207***	**0.194***	**0.202***	**0.163***	**0.174***	**0.171***
	(0.031)	**(0.029)**	**(0.033)**	**(0.036)**	**(0.030)**	**(0.037)**
log (Distance)	**-0.427***	**-0.383***	**-0.407***	**-0.318***	**-0.263***	**-0.284***
	(0.068)	**(0.066)**	**(0.076)**	**(0.060)**	**(0.056)**	**(0.067)**
Transition index	**0.518***	**0.514***	**0.603***	**0.777***	**0.771***	**0.910***
	(0.108)	**(0.106)**	**(0.119)**	**(0.122)**	**(0.120)**	**(0.136)**
log (Population)	**0.512***	**0.479***	**0.538***	**0.691***	**0.648***	**0.754***
	(0.035)	**(0.035)**	**(0.039)**	**(0.051)**	**(0.050)**	**(0.059)**
log (GDP per capita)	0.078	0.076	0.017	0.049	0.044	-0.039
	(0.066)	(0.068)	(0.073)	(0.078)	(0.080)	(0.089)
Corporate tax rate	**-0.014***	**-0.017***	**-0.020***	**-0.022***	**-0.026***	**-0.031***
	(0.004)	**(0.004)**	**(0.004)**	**(0.005)**	**(0.005)**	**(0.006)**
log (Openness to trade)	**0.411***	**0.219**	**0.430***	**0.630***	**0.384***	**0.702***
	(0.100)	**(0.104)**	**(0.113)**	**(0.140)**	**(0.146)**	**(0.159)**
rho	-0.200***	-0.062***	-0.218***	-0.155***	-0.039***	-0.171***
	(0.165)	(0.185)	(0.189)	(0.146)	(0.158)	(0.165)
No. of obs.	7,707	8,589	6,258	2,982	3,171	2,352
Censored	7,267	8,164	5,912	2,542	2,746	2,006
Uncensored	440	425	346	440	425	346
Wald Stat	37.0	25.5	42.8	35.5	24.6	41.4
Prob Wald > 0	0.00	0.00	0.00	0.00	0.00	0.00
Log likelihood	-1,445.6	-1,446.4	-1,117.9	-1,138.4	-1,139.2	-863.9

In the Investment decision equation, the dependent variable is equal to one if firm i has undertaken investment in country k and zero otherwise. In the Ownership decision equation, the dependent variable takes on the value of one for JVs and zero for direct entry. All models include a constant term which is not reported. Standard errors (clustered on firm) are listed in parentheses. *** significant at 1% level, ** significant at 5% level, * significant at 10% level.