

***The Developmental Consequences of Foreign Direct
Investment in the Transition from Socialism to
Capitalism: The Performance of Foreign Owned Firms in
Hungary***

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Abstract: This article examines the debate between Neoliberals and Modernization theorists on the one hand and dependency and world systems theorists on the other about the developmental impact of foreign direct investment in post-communist society. I test six hypotheses derived from this debate with logistic regression on a 1996 large-n random sample survey of Hungarian firms to see if foreign owned firms perform better than their private domestic counterparts. I then supplement these findings with three more logistic regression models of performance tested on a 1997 large-n, random sample survey of Hungarian firms. Foreign owned firms are found to have superior performance to domestically owned private firms on 6 of these indicators. Furthermore, while foreign owned firms create less demand for local producers than domestically owned firms, this is not at a level which is statistically significant. These findings support the neoliberal/modernizationist position that foreign investment creates high performing firms – which advocates claim are capable of driving the modernization of the entire post-communist economy.

Keywords: Foreign direct investment, development, performance, Hungary, transition, socialism, capitalism.

Few subjects produce such heated theoretical conflicts and polemics as the long running debate on the impact of the contact of the advanced economies of the West with the less developed regions of the world. On one side stands the modernization school, dominant in comparative social science in the 1950s and 1960s (see Rostow 1960; McClelland 1964; Apter 1965; Lewis 1948), allied with the now dominant neoclassical development economics (see Sachs 1991; Sachs and Lipton 1991; Fischer and Gelb 1991; Blanchard et al. 1993; Aslund 1995; Frydman and Rapaczynski 1994). Various members of the dependency and world systems schools, which blossomed during the Vietnam War, fiercely contest the claims of these scholars. Contact with the West and foreign direct investment (FDI) in particular, serves only to enrich the West and further "underdevelop" the poorer economies (Wallerstein 1974; Frank 1979; Amin 1974; Galtung 1971; Cardoso & Faletto 1979; Borschier & Chase-Dunn 1985; Landsburg 1979; O'Hearn 1989).

The arguments advanced in the debate between these two camps, which largely focussed on the experience of the "Third World," have resurfaced in the discussion on how best to achieve a successful transition from a planned to a market economy in the post-socialist world. While there are very few today who question whether exchange itself produces underdevelopment, strong opposition to foreign investment still exists, especially within the political field of most less developed and industrial latecomer

countries. Even in Hungary, a country which is very solicitous of foreign investment, the dependency/world system perspective is well represented in the political field. For example, a member of the center right party Fidesz – which won the 1998 election – criticized foreign investment on the grounds that “[T]he Hungarian economy is not organically connected with these new large foreign enterprises: what Hungary provides them with is not much more than space, some infrastructure, and none-too-skilled labor. Besides, the large portion of imported goods in the inputs of these foreign-owned companies is one of the reasons for our negative balance of trade.” (Records of Parliament, No. 217, Oct. 30, 1996, p.26003 – translation by Balás Varádi) A growing list of social scientists also apply the concepts developed in the dependency and world systems theory to question the developmental virtues of foreign investment in societies in transition from socialism to capitalism (Bakos 1995; Gowan 1995; Ellingstad 1997; Matzner 1996; Bailey, Sugden and Thomas 1998; Andors and Summers 1998).

The centerpiece of the neoliberal claim is that foreign direct investment can provide crucial help in modernizing the industrial order of the post-communist economies. Foreign direct investment via privatization would recreate socialist era property in its own, advanced capitalist, image. Gone would be the lumbering and inefficient (not to mention doomed to extinction) “dinosaurs.” They would be transformed into fast, relentless, fearsome, internationally competitive “sharks.” These dynamic firms, introduced into post-communist waters through privatizations and greenfield investments, could provide much of the motor for economic growth in the post-communist economy. Indeed, foreign direct investment was the U.S.

administration's answer to why there was no Marshall plan for post-communist Eastern Europe.² The dependency theory/world systems theory countercharge is that foreign investment leads to the transfer of economic control and wealth to foreign powers, ultimately leading to economic stagnation.

Advocates argue that foreign direct investment provides a vast array of benefits to recipient firms and economies. First, FDI brings crucial Western knowledge and values in the form of superior Western management techniques, business ethics, entrepreneurial attitudes, labor intensity and production techniques. Second, FDI makes possible industrial upgrading by tying firms into global research and development networks and thus technology transfer as well as by providing a great deal of investment capital. Third, FDI makes possible the growth of enterprises by providing access to crucial Western markets. This growth, in turn, provides a source of new jobs and stimulates demand for inputs from domestic suppliers. Fourth, FDI introduces new market entrants that reduces the monopolization of the recipient economy (For Eastern Europe see Sachs 1993: 3; Sachs 1995; Svetlicic, Artisien and Rojec 1993:10; Dunning 1993:30; Hamar 1994: 188; Mann 1991: 184; Zloch-Christy, 1995: 1; Csaki 1995:108; Faur 1993:204; EBRD 1995; Radice 1993; Cantwell 1994; Frydman and Rapaczynski 1994; Dobosiewicz 1992; Kozminski 1993: 35). Many of these arguments closely mirror the imagery and logic of earlier modernization theories. For example, Dobosiewicz suggests "Foreign investment and the operation of foreign enterprises can be likened to a battering-ram beating down

² See the U.S. Ambassador comment's to this end quoted in Gowan (1995: 10).

many obstacles to the introduction of a free- market economy that for over forty years the old system has chosen to ignore" (1992: xii).

In stark contrast to this assessment, the dependency/world systems advocates see foreign investment as the advance guard of a new economic imperialism. Foreign investment results in “disarticulated” development. Because of foreign ownership, the normal linkages that would develop with domestic business do not occur, and profits are exported out of the country. As a result, the gap grows between the recipient of foreign investment and the country from in which the Multination Corporation (MNC) is based and originated. This analysis has been applied to foreign investment in Eastern Europe by a growing number of authors. Ellingstad (1997) argues that foreign investment in Hungary is analogous to foreign investments in the Mexican *Maquiladora* system, and thus promotes “low-wage, low or medium skill, low value added manufacturing, with little hope for a meaningful upgrading of skills” (p.9; see also Andor and Summers 1998). Another line of critique rests in the destruction of domestic production networks by foreign investment. Matzner (1996) refers to this as “market-destroying” behavior which occurs when a foreign firm buys a domestic company, destroys local production, and sells output produced elsewhere on the domestic market. Bakos (1995: 102) adds that foreign investment exhibits a strong tendency to recreate and reinforce monopolies. Both of these positions are consistent with Inzlet’s (1994) and Bailey’s (1995) claims that foreign owned firms cut R & D expenditures.

Hypotheses

I derive 6 sets of competing hypotheses from this debate that I will test with my data. Each hypothesis has a neoliberal/modernization theory version (a) and a dependency/world systems theory version (b). These are usually one-tailed tests, although for two there is no expected difference between property forms, and these are thus two-tailed. These hypotheses are either direct tests of key mechanisms of either development or underdevelopment identified by both traditions, or logical outcomes of the combined effects of the mechanisms identified by one theoretical school or the other.

Hypothesis 1: Stimulating domestic demand

Hypothesis 1a (modernization): Foreign firms stimulate domestic demand as much as domestic private firms because they do not import more of their inputs than domestic private firms (two-tailed).

Hypothesis 1b (dependency): Foreign firms provide less stimulation of demand than domestic private firms because they import more of their inputs than domestic private firms (one-tailed).

Hypothesis 2: Profitability

Hypothesis 2a (modernization theory): Foreign firms will be more profitable than domestic private firms because of their superior efficiency and dynamism (one-tailed).

Hypothesis 2b (dependency theory): Foreign firms are less profitable than domestic private firms because they engage in transfer pricing to not pay their fair share of taxes (one-tailed).

Hypothesis 3: Increasing Revenue

Hypothesis 3a (modernization theory): Foreign firms increase their revenues more than domestic private firms because of their superior efficiency and dynamism and links to Western markets (one-tailed).

Hypothesis 3b (dependency theory): Foreign firms do not increase their revenues more than domestic private firms because they are parasitic on the domestic market (two-tailed).

Hypothesis 4: Demand for labor.

Hypothesis 4a (modernization theory): Foreign owned firms provide more new jobs than domestic private firms because they are more dynamic and pursue more restructuring than domestic private firms (one-tailed).

Hypothesis 4b (dependency theory): Foreign owned firms provide fewer new jobs than domestic private firms because they seek to replace local production by “buying markets”(one-tailed).

Hypothesis 5: Investment behavior.

Hypothesis 5a (modernization theory): Foreign owned firms are more likely than domestic private firms to invest in fixed or variable capital because of their access to Western capital and technology (one-tailed).

Hypothesis 5b (dependency theory): Foreign owned firms are less likely than domestic private firms to invest in fixed or variable capital because they seek to use low-wage, low value added labor or to simply sell commodities produced elsewhere on the local market (one-tailed).

Hypothesis 6: Labor productivity

Hypothesis 6a (modernization theory): Foreign owned firms increase labor productivity more than domestic private firms through the introduction of new technology, superior management techniques, and greater economies of scale made possible by exports to Western Europe (one-tailed).

Hypothesis 6b (dependency theory): Foreign owned firms increase labor productivity less than domestic owned firms because they seek to use low-wage, low value added labor (one-tailed).

Prior Research on Foreign Direct Investment

Cross-National Studies

There is a substantial empirical debate on the impact of foreign investment on economic development that utilizes a large scale cross-national comparative framework. These authors use aggregate indicators of foreign investment and economic development with the country as the unit of analysis – and the results from this research strategy are mixed and remain hotly contested.

Much of the research finds that foreign investment has a deleterious impact on development. Marsh (1988), Chase-Dunn (1975), and Dixon and Boswell (1996) found a strong negative association between foreign investment and the rate of growth. In contrast, Jackman (1982), Sharma (1986), and Firebaugh (1992, 1996) found that foreign investment facilitates growth. Bornschieer, Chase-Dunn, and Rubinson (1978), Bornschieer (1980), Bornschieer and Chase-Dunn (1985), Dolin and Tomlin (1980), and Kentor (1998) found that in the short-term foreign investment stimulates growth but in the long run it dampens growth. Finally, there are a number of studies which find that foreign

direct investment does not have any effect on growth (Hein 1992; Dutt 1997).

There are a number of potential problems with applying the cross-national aggregate comparison method in post-communist society. The relatively low levels of FDI in the post-communist environment, the large number of potential predictor variables, the small number of post-communist countries (25), and the lack of independence between the cases, provide a context which makes the cross-national country comparison approach particularly difficult. Moreover, it is not clear that these cross-national studies are cast at the only logically possible level of analysis for studying this issue more generally. I pursue a different logic of inquiry on a different level of analysis. Instead of correlating aggregate growth levels with aggregate foreign investment levels for many countries, I compare the performance of foreign owned firms to domestic owned firms within one country. Since most of the purported economic effects of foreign investment take place at the firm level,³ inferences about the impact of foreign investment at the firm level from macro-economic data risks succumbing to a classic ecological fallacy (Robinson 1950). For those using macro-economic data as the

³ There is a whole literature on the negative externalities of foreign investment on income inequality (Chase Dunn 1975; Bornschier 1980), fertility rates (London 1988), overurbanization (Timberlake and Kentor 1983), and rebellions (Boswell and Dixon 1990). These results could be true, even if foreign firms outperform domestic ones. If the magnitude of these negative externalities is great enough, they may override any positive economic effect created by the higher performance of foreign owned firms.

outcome variable, the unit of analysis (the enterprise) is not the unit of observation (country level aggregate statistics). Thus, at the very least, the cross-national aggregate statistics research strategy should be confirmed by firm-level studies.

Not all analysts, however, have pursued the macro-comparative strategy, as many have studied foreign direct investment in particular countries. Much of this research involves case studies of a single firm or a small number of firms in various countries, including many post-communist countries. These case studies now number in the hundreds, and while informative they suffer the obvious limitations in generalizing their findings. There have also been some quantitative analyses based in single countries. Typically, this is done with longitudinal data on the aggregate levels of investment and growth (or other outcome variables like inequality or quality of life measures) in different sub-national geographical regions. For example, Chen, Chang and Zhang (1995) find that foreign investment in China in the post-1978 reform period leads to both economic development and increasing income inequality. Khan (1997) shows that foreign investment in Vietnam leads an increase in household income and consumption. Jansen (1995) finds that foreign direct investment in Thailand had a positive effect on private investment and growth, but can have adverse balance of payments consequences. Bradshaw, Kim and London (1993) show with time series data that foreign direct investment in Korea leads to capital outflow. This strategy, while less likely to produce erroneous results than nation wide comparisons, none-the-less still risks committing the identical ecological fallacy. Furthermore, no such analyses to my knowledge have been done on Hungary or Central Europe.

Firm Comparisons

The research strategy I am employing in this study of foreign investment has been employed by analyses that compare the performance of privatized firms with state owned firms (see Boardman and Vining 1989; Pohl et al. 1997; Frydman et al. 1997; LaPorta and Lopez-de-Silanes 1997; Boubakri et al., 1997; Vining and Broadman 1992). There have also been some studies of the concentration of ownership on firm performance (see Claessens, Djankov, and Pohl 1999). My study differs from these analyses by focusing on foreign owned firms compared to domestic private firms.

Measures of Firm Performance

This literature on the performance of privatized enterprises makes it clear that there are many plausible indicators of firm performance. When measuring performance, as with any task of measurement, researchers can only measure various indicators of the underlying concept of interest (Lazarsfeld 1966). Because all indicators are imperfect and might be misleading, the more indicators the better. This is especially true when one is trying to get at a very complex variable like performance. For example, most would agree that high performing firms will make significant investments. However, if significant investments are made in a product line with declining demand, these investments would indicate poor performance. Thus, there are many potential “false positives” in measures of performance. The solution to this dilemma is to use multiple indicators. If a pattern can be seen across multiple indicators, one can have great confidence in one’s inferences (Webb et al. 1981).

Measurement of firm performance in the Finance literature frequently takes a measure of the market value of the firm as central to defining its “performance” (e.g. Ofer and Siegel 1978). This is a reasonable measure if there are deep and effective stock markets and the concomitant monitoring institutions to facilitate this activity. Post-communist stock markets do not come anywhere near Western standards, and thus this measurement of performance is not valid. The other typical way to measure performance in the sociological population ecology school is to measure firm survival rates (Hannan and Freeman 1989). However, not enough time has passed in post-communism and firms have not, generally, been allowed to go out of business entirely (Mitchell 1998). Thus, survival rates are also inapplicable to the post-communist environment.

Fortunately, there are many other possible indicators of performance. The most obvious is profitability (e.g. Frydman et al 1997; LaPorta and Lopez-de-Silanes 1997; Boubakri et al., 1997; Brada 1998; Djankov and Claessens 1997; Pohl et al 1997). Profit represents the difference between the revenues with the cost of producing them. This necessitates a combination of entrepreneurial creativity (making and selling the product) with discipline (keeping the cost of the commodity down). Still, profitability, while one measure of efficiency, is not a perfect measure, especially in the post-communist environment. In extensive fieldwork in Central Europe I have come across a good deal of manipulation of profitability for various purposes usually having to do with reducing taxes, but also sometimes involving special conditions for obtaining special loans for cooperatives. Frydman et al (1997) argue that in the transition economies the dramatic

changes in accounting methods, imperfect disclosure, and short reporting histories, make this measure even more problematic.

Perhaps a measure of performance that is less subject to manipulation by accounting methods than profitability is the growth in a firm's revenues (e.g. Frydman et al. 1997). High performing firms should be able to generate a growing amount of revenues. Furthermore, for post-communist firms, cost-cutting moves like cutting redundant labor and socialist era amenities are usually obvious, while generating new revenues in the face of world competition is far more difficult, and thus plausibly requires more entrepreneurial activity or creativity.

A similar logic suggests that another important measure of performance is the likelihood of providing new employment. In the severe "transformational depressions" most firms had to shed significant amounts of labor. However, if Schumpeterian creative destruction were going on, some of these firms should be employing new labor as restructuring occurs. This is important, since in almost all firms inherited from the communist period there was substantial hidden unemployment (a result of labor hoarding in the shortage economy (Kornai 1980)). Clearly, the easiest cost-cutting opportunity was in letting some of these "hidden unemployed" go. Thus, both efficient and inefficient firms could be expected to reduce their total workforce (Kőrösi 1998). However, the high performing firms will simultaneously be restructuring – which involves changing

production techniques, the range of commodities that are produced, and marketing structures. All of these activities most likely require hiring new labor.⁴

An intuitively important indicator often used to measure performance is investment (Lízal and Svejnar 1997). Because of the universally recognized disadvantages inherited by post-communist economies in terms of a technologically obsolete industrial structure, to a large extent the success of the transition to capitalism will be measured on the post-communist enterprises abilities to carry out expensive restructuring. Restructuring requires investment. Clearly, if foreign firms have superior access to loans and other sources of capital and technology, they will be in a position to make substantial investments.

A final measure of performance, also of great theoretical importance, is labor productivity (Pohl et al. 1997). This may be the best indicator of firm performance of all – because only increases in labor productivity allows profits, investment, and real incomes to simultaneously expand in a virtuous circle that constitutes development (see Brenner 1986; Storper 1998).

While we can identify multiple indicators of firm performance, to use these indicators as a dependent variable one must confront a potential selection bias. When comparing state owned firms to privatized firms it is possible that only the “good” firms were privatized, leaving the state with the “lemons” (Frydman et al 1997; Djankov and

⁴ In addition, we would be interested in this variable because firms that create new jobs provide a social benefit in reducing unemployment and increasing labor market mobility.

Claessens 1997). We are not concerned with state ownership in this analysis so this bias is of no particular consequence. However, there is a logical possibility of a similar selection bias in the data set with regards to foreign ownership. Foreigners may have been able to select from among the firms with the greatest potential – since foreign owned firms had the largest amount of hard currency among potential owners. The state, generally being in need of hard currency, might therefore favor foreigners. The perfect data set would have to have some type of data that could control for this bias. However, obtaining such data would be very difficult indeed. Measures that rely on financial data, like relative efficiency (e.g. Spenner et al 1998), are problematic. The “prices” upon which the earlier calculations are made are effectively fictitious – and do not represent supply and demand pressures. Minimizing “prices” in late socialism was not a measure of efficiency, because one didn’t need to cover the cost of production with sales because of the pervasiveness of soft-budget constraints (Kornai 1980; Frydman, Rapaczynski 1994: 145).

It could also be argued, however, that privatization occurred on such a massive scale in so short a time that this potential selection bias effect should be substantially reduced. For it requires time and manpower to pick the winners from the losers -- and multinationals may not have had enough time in every instance. Furthermore, foreign capital’s proclivity for taking the jewels of the industrial structure should be partially offset by: 1) the post-communist state elite’s desire to hold onto to some companies they recently made big investments in for fiscal reasons; 2) political pressure from workers and domestic managers, as well as various nationalists, to protect domestic firms from

foreign owners; and 3) foreigner's limitations on good contacts and good knowledge of local productive assets and markets. Still, ideally, one would want to control for this. I do this indirectly with the 1997 data through a set of detailed sector control variables.

Data and Measurement

The hypotheses will be tested with two firm-level large random sample surveys conducted in Hungary in 1996 and 1997. Hungary is an obvious candidate for the study of foreign investment in the transition to capitalism because it has the highest levels of foreign investment per capita in the post-communist world.⁵ There should therefore be many examples of foreign ownership that can be compared to domestically owned firms.

The 1996 data was from a survey written by János István Tóth and András Semjén and collected from November 2-30 in 1996 by the professional survey organization Tárki, the leading such institution in the country. It is a firm level survey of 293 firms sampled from all firms with more than 50 employees registered in Budapest. The 1997 survey was written by Iván Szelényi and Imre Kovacs, and conducted by Sociology doctoral students under the direction of Kovacs in the winter of 1998. It randomly samples 580 firms from the 3000 largest in the country based on revenues. Both surveys are excellent samples of Hungary's medium and large firms.

⁵ Hungary with \$1519 cumulative FDI-Inflows per capita 1989 – 1997 had more than twice as much as the next closest country, the Czech Republic's \$726, and approximately ten times the \$153 average for the post-communist world (EBRD 1998: 12).

Our confidence in the validity of the 1996 data is strengthened by the results from the 1997 data. This data set, though generally less valuable than the 1996 data in terms of the number of firm level variables, is superior in certain respects. First, the 1997 data includes retrospective measures from 1993 and 1988 of firm level variables. The retrospective data is utilized to construct performance indicators that capture change over time. This is superior to the single year of data provided by the 1996 data set.⁶ Another advantage to this data set is that it has superior information about firm activities – allowing for superior control variables. I will argue that these variables serve as a rough control on the attractiveness of the firm, thereby controlling for the possible selection bias in the data.

Measures of Performance

There are nine different dependent variables employed in the logistic regression models. These nine dummy variables are described in Table 1, which also lists their frequencies in the sample. The first six variables are recorded as dummy variables in the 1996 data set. The last three variables that use the 1997 data (increase in fixed capital, increase in labor productivity, and an increase in profits per worker) are turned into dummies from continuous variables to keep the comparison with the 1996 data set easy to interpret.

Insert Table 1 about here.

⁶ The 1996 data, however, are still very valuable because performance in one year is likely to be highly correlated with performance in the previous year

The following equations were used to calculate the measures from the 1997 data set.

Increase in Labor Productivity = Increase in Revenues/ Increase in Number of Employees per year.

Increase in Fixed Capital = Fixed Capital in 1997 - Fixed Capital in 1993 divided by total years.

Profitability = Increase in Profits per worker per year.

Measures of Ownership

The 293 cases in the 1996 data set were divided up into three mutually exclusive and exhaustive categories of ownership. If a firm had no majority owner with at least 25% of the ownership shares, that ownership pattern was classified as “no dominant owner.” If the state had at least 25% and no other category had at least 25%, the firm was deemed state owned. If foreign firms or people owned at least 25% of shares, regardless of other holdings, it was considered foreign owned (thus, all joint ventures were classified as dominated by foreign capital, even though there may well be a major Hungarian partner). If firms had at least 25% domestic private ownership, and no foreign ownership, they were labeled as private domestic. If they also had a large state share (i.e. if they were mixed public-private) they were still treated as domestic private ownership under the assumption that the new private owners ran things and that the state was a passive owner that would eventually sell out the rest of its shares.⁷

⁷ Models with more precise ownership categories (i.e. Joint Ventures and Mixed Ownership) do not add any explanatory power, nor do they effect any of the main

The measures of ownership in the 1997 data are similar to those used in the first six models. Firms were mutually exclusive and exhaustively divided up into ownership categories with at least 25% ownership. Thus there is state property, foreign property, domestic property, and a new category “other” which includes firms that reported other, unspecified, types of property.⁸ Again, joint ventures were considered foreign owned, and mixed enterprises were considered domestic private firms.

In some contexts (such as in the advanced West), if we know a firm had 25% foreign ownership, we would not have much of an idea about how concentrated that

findings. Joint-ventures behaved like foreign owned firms, and mixed firms behaved like private domestic firms.

⁸ This “other” category is treated as though it has no specific ownership content – simply because we don’t know what the “other” means. Prior experience with creating a data set with actual survey with “other” as an ownership category indicates that these firms might be certain legal forms of employee owned firms (MRP) because technically the employees do not own the company’s shares, but rather they have shares in a special legal entity that owns the firm. If the loans are repaid, after a fixed amount of time, ownership is transferred to individual employees. “Other” also probably included various domestic institutions which are neither state nor exactly private market entities. For example, the association of pharmacists owns a significant amount of pharmacies throughout the country. Thus, most of the “other” category is probably some form of non-state domestic ownership.

ownership is. It is possible that the 25% foreign ownership is divided up into 1000 different owners, while a small group of domestic private owners, perhaps with 10% of the ownership combined, might be the “real” controlling owners.

The alternative strategy for determining what type of ownership is dominant is choosing the biggest single owner (this is the strategy employed Frydman et al, 1997). However, this alternative method is still prone to the same false positives (e.g. this operationalization wouldn't catch a case where the state was the biggest owner, but five managers with 10% of the shares were the real owners). Because “control” is a relational concept it can only be ascertained on a case by case basis. The best way to avoid making errors in defining a firm's real locus of ownership rights is to conduct in-depth research on control in each firm in the sample (see Zeitlin 1974). This would be enormously time consuming and expensive – and in all likelihood would not change the substantive story because of the extremely high concentration of ownership in the post-communist economy. Fieldwork from Hungary indicates that the biggest owner is typically a very good indicator of who controls the firm – and most firms are both owned and controlled by few people or institutions (King, forthcoming). This work is corroborated by the most recent survey data in Poland and Hungary, where the average holding of a private party who is the largest owner is the majority shareholder (Frydman et al 1997:11).

Control Variables

Many things could be causally related to either the ownership variables and/or the dependent variables in the different models. An obvious candidate is the size of the firm. The bigger the firm, the more economies of scale it can capture. We would also expect

diseconomies of scale at some point, although Hungary, being a very small country, mostly has undersized firms compared to their international competitors. Most likely, economies of scale will start to taper off at some point. Thus, all the models include a variable called size, which is the natural log of the number of employees. This transformation is appropriate for skewed data like size in which there are a very small number of very large values.

The second obviously important control variable is the age of the firm. Normally, organizational theorists would expect there to be a liability of newness (Stinchcombe 1965; Nelson and Winter 1982; Hannan and Freeman 1989) -- as there are various types of start-up costs to be born when establishing a business. On the other hand, one could plausibly argue that in post-communist society this liability of newness is reversed, and there is the liability of age. Old "dinosaurs" from the socialist period are described as outdated and inherently inefficient in a market environment (see Kozminski 1993). One would expect that these old socialist firms, even after being privatized, might have inferior performance for some time. A dichotomous variable of whether the firm was founded before or after 1990 is another control for age. This should capture the "dinosaur" effect. Another measure is the firm's age in years, which should catch any liability of newness that might be present.

Equally likely to be a confounding variable as age is the firm's relation to sources of finance (see King 1997, forthcoming). Access to loans might easily explain which firms can afford to make significant restructuring moves to enhance performance. One would expect this variable to be unevenly distributed across types of owners. Arguably

state owned firms as well as foreign owned firms have superior access to finance (see King forthcoming). Thus, this variable is controlled for by a dummy variable of whether the firm used loans or not. Another variable is a dummy that captures whether firms had very heavy debt burdens, which one would expect would damage firm performance as cash that could be used for investment goes out as interest payments (World Bank 1996; Bogotec 1993; Karsai and Write 1994). This variable captures whether the firm had debts equal to half or more of its equity.

Another control that is particularly important in the post-communist context is rate of taxation. Post-communist economies have undergone a number of very quick transformations of tax codes -- and many claim that taxation is neither uniform nor fair. Furthermore, there is reason to expect that this variable is not evenly distributed among firms. For example, foreign firms in Hungary were awarded tax reductions and holidays for 5 to 10 years as incentives for investing. Thus, any observed superior performance of foreign firms might be spurious, with taxation advantages being the real cause. Taxation is a continuous variable that measures the percent of revenues that are taxed in the total tax bill.

An additional fiscal variable similarly important in the post-communist environment is the continuation of "soft budget constraints" in one form or the other. This might weaken firm performance because the market doesn't sufficiently "discipline" the firm (Schleifer and Vishny 1994). On the other hand, soft budget constraints might provide the financial flexibility necessary for investment and restructuring. This dummy

variable indicates that in the past year the firm has been late paying taxes and/or owes money to the social security fund.

A different potential confounding variable is competition from the advanced capitalist world, including the Newly Industrialized Countries of Asia. Arguably, competition with the major players in the world economic system might be expected to discipline a firm over time, leading to greater performance. Conversely, one could argue that competition with huge, technologically superior multinational producers would lead to a massive loss of markets and revenues, damaging a firm's capacity to invest and restructure (see Matzner 1996). The variable advanced competition indicates the firm had major competitors based in Western Europe, the U.S., or Asia.

The last potentially important variable that will be considered in the regression models using the 1996 data is sector. In any given year, one might expect the particularities of the specific markets in specific commodities to be a major predictor of the firm's success. Some research also indicates that sector might be important when measuring the effect of FDI. Hlavacek (1998) finds that the effects that FDI has on quality of life indicators varies by sectors. Jaffee and Stokes (1986) find that the effect of foreign investment depends on whether the investment is in extractive industries or not. The 1996 data set allows for only a broad indicator of sector. The variables measure whether the firm does manufacturing and construction (coded "production"), wholesale or retail trade (coded "trade"), or both (the excluded category in the logistic regression).

In the equations with the 1997 data set identical age and size variables were used. A new variable indicating whether the firm had been privatized or not was also

constructed. This is an important potential control variable because some have theorized a “privatization shock” (see Mertlik 1996) in which the business of preparing privatization dominates management’s time and energy, thereby putting off needed restructuring.

There are twelve dummy variables to control for sector in the 1997 data set (chemicals, textiles, construction, trade, engineering, food, financial services, other services, agriculture/fishing/forestry, transport/communication, education/science/mass media, education, and army/police). Each sector with at least 12 firms in it was measured with a dummy variable. A residual category lumped together mines, oil, paper/printing, tourism and hotels, household, and “other industry.” The suppressed category are all those additional residual sectors (electricity and public utilities and health and social services). This suppressed category is basically the permanent state sector outside of the military and police.⁹

The external validity of the data is supported by a comparison of the types of ownership between the two surveys (see Table 2). A third statistic provided by the European Bank for Reconstruction and Development is their estimate of the percent of the Gross Domestic Product originating in the “private” sector. This further bolsters our confidence in the validity of these two surveys.

Insert table 2 about here.

⁹ Of course, some of the utilities was privatized with foreign capital – so this sector isn’t completely state owned. However, even these utilities are still natural monopolies and they are still highly regulated.

Models and Methods

Logistic Regression techniques are used because the dependent variables in the models using the 1996 data consist of categorical variables. Table 3 and 4 report odds-ratios. These are exponentiated coefficients from the equations. They represent the likelihood of an independent variable covarying with the dependent variable compared to the excluded category. Thus an odds ratio of 1.5 for foreign investment means that a firm with foreign investment is 1.5 times as likely as firms with the excluded ownership category (domestic ownership) to have a positive value on the dependent variables. Odds ratios below 1 mean the independent variable is less likely than the excluded variable to covary with the dependent variable (e.g. 0.5 means it is half as likely as the excluded variable to covary with the dependent variable). In all models the excluded ownership variable is domestic private ownership.

The basic equation for the six models using the 1996 data is:

$$Y = a + \beta_1 (\text{Nodom}) + \beta_2 (\text{Statedom}) + \beta_3 (\text{Fordom}) + \beta_4 (\text{Production}) + \beta_5 (\text{Trade}) + \beta_6 (\text{Size}) + \beta_7 (\text{Pre1990}) + \beta_8 (\text{Firmage}) + \beta_9 (\text{Baddebt}) + \beta_{10} (\text{Loans}) + \beta_{11} (\text{Softbudget}) + \beta_{12} (\text{Taxes}) + \beta_{13} (\text{Advancedcomp}) + \varepsilon.$$

Where Y = the log odds of a firm being a high performer in 1996. All six models are the same except for the dependent variable (performance). Table 3 reports the odds ratios for foreign investment and the control variables for the six dependent variables from the 1996 data. Appendix A provides β s and standard errors for all of the variables as well as goodness of fit and chi-squares for all the models.

Insert Table 3 about here.

Results

As can be seen, foreign ownership is the most consistently important determinant of firm performance after controlling for a number of variables. Compared to domestic private ownership, foreign owned firms are more than two times as likely to have increased their revenues, more than twice as likely to employ new laborers, almost two times as likely to have invested in fixed capital, and more than two times as likely to have invested at least 10,000,000 HUF (about \$45,000) in 1996. These findings across four of the five direct indicators of performance makes it fairly clear that firms with dominant foreign ownership perform better than domestic owned firms, as neoliberals and modernization theorists insist.

This consistent performance across four indicators makes the strong result that foreign owned firms are less than a third as likely than domestic owned firms to be profitable all the more surprising. Profitability, after all, is traditionally held out as the best indicator of firm performance. Dependency and world systems advocates would argue that lower levels of profitability is probably the result of transfer pricing profits out of Hungary to minimize the multinational tax bill. On the other hand, many foreign owned firms received tax breaks or even tax holidays in the first 5 to 10 years of operation. As a result, they may have had an incentive to "transfer price" profits *into* Hungary during this period. What seems most likely, given the superiority of foreign

firms on the other indicators, is that that domestic owned firms are able to have superior profitability without as much investment or restructuring.

This could occur for a number of reasons. It might be because they have special information about niche markets (although this is at least partially controlled for with the variable "advanced competition"). It is also possible that superior knowledge of the local economic landscape allows them to restructure in ways that require less monetary investment than foreign firms. They may recognize new opportunities and be able to innovate much as they did under the shortage economy -- perhaps they are natural "flexible specializers" because of this inherited skill. If this were the case to a significant extent, however, we would expect domestic owned firms to perform more favorably than they do when compared to foreign owned firms on increasing their revenues. It is perhaps more likely that domestically owned firms are better able to exploit network ties forged in the socialist period. For example, they might use these connects to disproportionately receive state contracts which allow for a high rate of profit (See Stark 1990, 1992, 1996 and Stark and Bruszt 1995 for a discussion of the continuing importance of network ties formed in the socialist period in the post-socialist environment). Alternatively, it could be that the foreign owned firms enjoy such an advantage in terms of market access and investment capital that they are not as concerned with economizing as much as domestic firms. Rather, they may be focussing their activities on the growth of market share. Finally, it is also possible that profitability simply doesn't have as great validity as these other indicators of performance.

Profitability can be manipulated, but most domestic firms would have an incentive to manipulate profits *down*, to minimize taxes.

In spite of the low levels of profitability, the other indicators consistently rate foreign owned firms as the star performers of the post-communist economy. However, the story is even more favorable to the modernizationist vision when one considers the lack of significance for the different likelihood of importing a high percentage of inputs between the property forms. Those in the dependency and world systems schools insist that foreign ownership leads to underdevelopment by importing what was previously domestically produced intermediary goods. This should damage both the balance of trade, and destroy domestic demand and jobs. In Peter Evan's famous analysis of development in Brazil, the importing of inputs by multinational corporations had a disastrous impact on the economy (Evans 1979). However, while foreign owned firms were almost twice as likely than domestic firms to have more than half of the firm's inputs originate from external sources, this difference did not even approach being statistically significant.

While ownership was clearly the most important variable overall, some of the control variables were also important. As expected, size seems to matter a great deal. The larger the firm, the more likely the firm is to make investments and to hire new employees. Let us take a domestically owned firm, of the median age (four years) with the median tax rate (25%) with advanced capitalist competitors, loans, no bad debt and no soft-budget constraints, as an example. The likelihood of making an investment of at least 10,000,000 HUF for such firms in the 25th percentile (73 employees) is 43.55%, firms in the 50th percentile (120 employees) is 55.23%, and firms in the 75th percentile

(240 employees) is 71.17%. Thus, we see a clear pattern of accelerating economies of scale.

Another important variable was sector. Firms that only produced or traded performed significantly worse than firms that did both activities. This might reflect the institutional uncertainty of the post-communist economies -- where firms that can both do marketing and production may be able to respond flexibly to this uncertainty and thus have superior performance. Interestingly, with the exception of a slight negative effect of firm age on increasing firm revenues, the age of the firm does not have an effect on performance, undermining with the notion of the under-performing “dinosaur.” These results were confirmed in the analysis performed with the 1997 data.

The Model

The basic model for the equations using the 1997 data is:

$$Y = a + \beta_1 (\text{Nodom}) + \beta_2 (\text{Statedom}) + \beta_3 (\text{Fordom}) + \beta_4 (\text{Other}) + \beta_5 (\text{Size}) + \beta_6 (\text{Chemicals}) + \beta_7 (\text{Textiles}) + \beta_8 (\text{Construction}) + \beta_9 (\text{Trade}) + \beta_{10} (\text{Engineering}) + \beta_{11} (\text{Food}) + \beta_{12} (\text{FinancialServices}) + \beta_{13} (\text{OtherServices}) + \beta_{14} (\text{Agriculture}) + \beta_{15} (\text{Trasport/Communication}) + \beta_{16} (\text{Education}) + \beta_{17} (\text{Army/Police}) + \beta_{18} (\text{Privatized}) + \beta_{19} (\text{Pre1990}) + \beta_{20} (\text{Age}) + \varepsilon.$$

There are three different dependent variables: increases in profits per worker, increases in labor productivity, and increases in fixed capital. Table 4 reports odds ratios and control variables for two of these variables.

Insert Table 4 around here.

What is clear is that foreign investment is still an excellent predictor of firm performance – even when one controls for sector more fully than in the first six models. Foreign owned firms are almost twice as likely as domestic owned firms to be above average in increasing labor productivity. They are also more than 1.5 times as likely than domestic owned firms to have increased their fixed capital investments more than average. This finding also speaks to the potential selection bias discussed above through the use of the detailed sector variables. Some firms were modernized by the Communist regime prior to the revolution – and these might be more attractive to foreign capital. However, this type of investment usually went to entire sectors which were typically monopolistic. An example of this is the pharmaceutical industry, which had been the flagship industry in late socialism in Hungary and thus received major investment funds from the state in the late socialist period. Much of this sector was privatized by French Multinationals. Controlling for sector is therefore at least an approximate control for possible sample selection bias. Indeed, firms in the chemical sector are nearly 10 times as likely as the excluded sectors to have increased labor productivity more than average. Thus, if sector captures “firm potential” – foreign owned firms still have superior performance beyond any selection bias. Finally, the control for privatization is statistically significant for increasing fixed capital less than average – confirming the “privatization shock” hypothesis.

Notably, the contrary finding on profitability from the 1996 data was not supported using the 1997 data (model not shown). In this sample of larger firms, foreign owned firms are not less profitable than domestically owned firms. Thus, this supports

neither the neoliberal/modernization hypothesis nor the dependency/world systems hypothesis on profitability. Perhaps the various purported effects cancel each other out. It could also be that the negative effect of foreign ownership and profitability holds only for 1996 and 1997, and not over the period 1993-1997. Possibly, tax holidays that had been granted to some investors might have run their course, thereby prompting firms to begin transferring profits to other tax havens located in the multinational empire.

Discussion and Conclusion

If we return to the initial six competing hypotheses, we see that the evidence strongly supports the neoliberal/modernizationist position. Foreign ownership did not provide less stimulation to domestic producers of inputs than domestically owned firms (or the effect was not statistically significant). Foreign owned firms were able to disproportionately increase their revenues, hire new labor, invest in fixed and variable capital, and increase labor productivity. The only neoliberal/modernizationist hypothesis that is not supported is that foreign owned firms are more profitable than domestic firms. In one of the regression models, using the 1996 data set, the dependency/world systems theory position that foreign owned firms would be less profitable than domestic firms is supported. However, this finding was not repeated in the regression model using the 1997 data that had a full set of sector variables.

Taken together, these findings strongly support the modernization theory neoclassical position. These findings should be more reliable than the cross-national aggregate studies. The superior methodology of this study compared to most others lies in the use of firm-level data (thus eliminating possible ecological errors), the use of multiple

measures of firm performance, and the large number of control variables, including detailed sector variables. Measurements of firm performance can be tricky – and in general our confidence increases with the number of independent measures we have of a phenomenon. This paper used nine different measures of firm performance. The consistent pattern across seven of these nine indicators strongly suggests that foreign ownership contributes to developing dynamic firms – and thus positively contributes to a successful transition from socialism to capitalism.

These findings are consistent with the cross-national studies that conclude that foreign investment is positively related to growth. They are also, however, potentially still consistent with the various interpretations which see foreign investment as being negatively associated with economic development in the long run. Foreign owned firms may export large amounts of capital out of the country through profit repatriation, and they may become new monopolists. This possibility of a growing monopolization of the economy combined with a repatriation of profits may well be a recipe for stagnation in the future. We need longitudinal firm level data on these two mechanisms as a next logical step in research on this vital question. While foreign ownership theoretically might still damage the economy in the long-run, based on the data that is in, foreign ownership seems to have had a large positive effect on the Hungarian economy. What is clear is that foreign owned firms had far superior ability to access to investment capital, and had the ability to increase their revenues through exports.

This need for investment must be analyzed in a historical context. First, Eastern Europe received no Marshall plan to stimulate investment as Western Europe was granted

after World War Two (nor the spillovers from great levels of defense expenditures associated with the rearmament during the Cold War). Many sectors in these post-communist countries need massive amounts of new investments to be internationally competitive. But investment capital is extremely scarce in the post-communist environment, where domestic bank loans are usually prohibitively expensive (King, forthcoming). Foreign investment may be the best source of such capital. Second, the importance of gaining access to Western European markets can not be underestimated. All cases of successful “catching-up” in the post-World War Two period have relied on this process. Germany and Japan modernized their economies during the 1950s and 1960s by capturing an increasing share of the U.S. market, much as South Korea and Taiwan were able to capture export markets in the 1970s and 1980s, and now the Chinese in the 1990s (see Brenner 1998).

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Table 1: Measures of Performance and Descriptive

Variable	What it measures	% of Sample
Foreign Inputs (1996 Data)	More than 50% of inputs from foreign sources in 1996	13.3%
Profitability (1996 Data)	The firm was profitable in 1996	64.5%
Increase (1997 Data)	The firm was profitable from 1993-1997	65.5%
Increase Revenue (1996 Data)	The firm increased its revenue in 1996 compared to 1995	38.6%
New Employees (1996 Data)	The firm hired new employees in 1996	29.4%
Invest in Fixed Cap. (1996ata)	The firm increased its fixed capital in 1996	43.7%
Big Investment (1996 Data)	The firm invested at least 10,000,000 HUF in 1996	51.2%
Increase in Fixed Capital (1997Data)	The firm increased its fixed capital more than average from 1993-1997	50.0%
Increase in Labor Productivity (1997Data)	The firm increased its labor productivity more than average from 1993-1997	50.0%

Table 2: Descriptive Statistics of Independent and Control Variables

	1996 Data	1997 Data	EBRD estimate of GDP from private Sector 1996/1997.
Ownership Category			
No dominant	5.80%	3.40%	
State	12.63%	14.80%	
Foreign	22.87%	28.90%	
Domestic	58.70%	46.90%	
Other		6.00%	
Total Private	77.13%	71.1%	70%
Control Variables			
Pre1990	15.70%	22.51%	
Loans	49.83%		
Big Debt	8.87%		
AdvComp	52.00%		
Soft. Bud.	40.61%		
Production	18.40%		
Trade	20.6%		
Production and Trade	61.0%		
Privatized		34.19%	
Chemical		3.44%	
Textile		3.44%	

Construction	9.26%
Trade	23.20%
Engineering	8.25%
Food	5.15%
Transport	5.33%
Agriculture	3.95%
Army	4.81%
Education	3.95%
Tourism	2.41%
Financial Services	5.33%
Other Services	9.79%
Other Sectors	5.33%

Means, Medians & Standard Deviations

	Mean	Median	St. Dev.
Employees in 1996	233.24	120	380.31
Employees in 1997	519.47	100	3840.04
Firm Age in 1996	7.17	4	10.65
Firm Age in 1997	6.74	3	9.28
Taxation Rate	26.14	25	17.66

Table 3: Odds Ratios for Foreign Investment (relative to domestic private ownership) and Control Variables on Six Models

	Model 1 Foreign Inputs	Model 2 Profitable	Model 3 Increase Revenue	Model 4 New Employees	Model 5 Invest in Fixed Cap.	Model 6 Big Investment
FDI	1.818	.290***	2.340**	2.11**	1.819*	2.140*
Production	1.230	.567	.440 [†]	.847	1.190	.923
Trade	1.741	.678	.471 [†]	.250 ^{††}	.686	.979
Size	1.421	1.277	1.033	1.483**	1.280**	2.677***
Old Firm	1.493	2.110	3.307	.866	.612	.683
Firm Age	.998	.992	.956 [†]	.984	1.017	.973
Large Debt	.783	.521	1.281	.657	1.030	.973
Loans	.829	1.371	1.363	.984	1.630*	2.092**
Soft Budget	3.729	.078 ^{††}	1.301	3.933	.461	.441
Taxes(1%)	.268	.280	.717	1.203	1.156	.5638
Adv Comp	2.103 [†]	1.373	1.390	2.361 ^{††}	1.299	.771

* p <= .05 (one-tailed)

** p <= .01(one-tailed)

*** p <= .001 (one-tailed)

[†] p <= .05 (two-tailed)

^{††} p <= .01 (two-tailed)

^{†††} p <= .001(two-tailed)

Table 4: Odds Ratios for Foreign Ownership and Controls under models 7 and 8.

	Increase Labor Productivity > Avg.	Increase Fixed Capital > Avg.
FORDOM	1.987**	1.549*
SIZE	.716	1.806
CHEM	8.25 ^{††}	1.723
TEXTILE	1.636 [†]	1.723
CONSTR	2.117	1.341
TRADE	1.671	2.764
ENGIN	1.207	1.213
FOOD	2.675	1.639
TRANS	1.123	5.456 ^{††}
AGR	1.359	1.940
ARMY	.625	11.429 ^{††}
EDUC	1.743	3.956
TOURISM	.347	1.881
FINSERV	2.245	4.869 [†]
OTHSERV	2.129	3.428 [†]
OTHSEC	1.177	2.806
PRIVATIZ	.762	.426 ^{††}
PRE1990	.938	.624
AGE	.995	.996

* p <= .05 (one-tailed)

** p <= .01 (one-tailed)

*** p <= .001 (one-tailed)

[†] p <= .05 (two-tailed)

^{††} p <= .01 (two-tailed)

^{†††} p <= .001 (two-tailed)

Appendix 1: β s, S.E.s, and Odds Ratios of all models

Model 1: Dependent Variable = more than 50% of inputs are from non-Hungarian source.

Log Likelihood 176.754
 Goodness of Fit 243.946
 Pseudo R² .038

Chi-Square df
 9.588 13

Variable	B	S.E.	Exp(B)
Ownership			
No dominant State	.030	.867	.971
Foreign	-.263	.558	1.301
Foreign	-.461	.492	1.585
Controls			
Production	.145	.609	.865
Trade	-.316	.521	1.371
Size	.283	.232	1.327
Pre-1990	-.515	.681	1.674
Age	.003	.024	1.003
Bad Debt	.431	.813	.650
Loans	.329	.436	.720
Soft Budget	.049	.435	.952
Tax Rate	-.009	.012	1.009
Advanced	.577	.425	.562
Competition			
Constant	-2.444	2.288	

* p ≤ .05 (one-tailed)

** p ≤ .01 (one-tailed)

*** p ≤ .001 (one-tailed)

† p ≤ .05 (two-tailed)

†† p ≤ .01 (two-tailed)

††† p ≤ .001 (two-tailed)

Model 2: Dependent Variable = profitability

Log Likelihood	260.043
Goodness of Fit	233.072
Pseudo R ²	.245

Chi-Square	df
47.282 ^{†††}	13

Variable	B	S.E.	Exp(B)
Ownership			
No dominant	-.7848	.6718	.456
State	-.1261	.4480	.882
Foreign	-1.1719**	.4049	.273
Controls			
Production	-.8278*	.4131	.431
Trade	-.5887	.4324	.555
Size	.2675	.2090	1.307
Pre 1990	.5125	.6337	1.670
Age	-.0165	.0220	.984
Bad debt	-.6382	.5249	.528
Loans	-.0909	.3502	.913
Softbudget-1	.7635 ^{†††}	.3436	.171
constraints			
Taxrate	.0168	.0505	.983
Advanced	.0532	.3152	1.055
competition			
Constant	-3.9532 [†]	1.9196	

* p <= .05 (one-tailed)	† p <= .05 (two-tailed)
** p <= .01(one-tailed)	†† p <= .01 (two-tailed)
*** p <= .001 (one-tailed)	††† p<= .001(two-tailed)

Model 3: Dependent Variable = Growth of Revenue

Log Likelihood 294.215
 Goodness of Fit 255.028
 Pseudo R² .152

Chi-Square df
 28.887^{††} 13

Variable	B	S.E.	Exp(B)
No dominant State	-.600	.600	.549
Foreign	1.007**	.414	2.736
Controls			
Production	-.750 [†]	.386	.472
Trade	-.569	.379	.566
Size	.057	.193	1.058
Pre 1999	.543 [†]	.768	4.678
Age	-.048 [†]	.023	.953
Bad Debt	.290	.552	1.336
Loans	.222	.317	1.249
Softbudget	.155	.302	1.168
constraints			
Taxrate	-.006	.008	.994
Advanced	.296	.293	1.345
competition			
Constant	2.0630	1.865	

* p <= .05 (one-tailed) † p <= .05 (two-tailed)
 ** p <= .01(one-tailed) †† p <= .01 (two-tailed)
 *** p <= .001 (one-tailed) ††† p<= .001(two-tailed)

Model 4: Dependent Variable = Employs New Labor

Log Likelihood 258.282
 Goodness of Fit 245.796
 Pseudo R² .175

Chi-Square df
 31.774^{††} 13

Variable	B	S.E.	Exp(B)
No dominant State	-.849	.8218	.428
Foreign	.665*	.3747	1.944
Controls			
Production	-.220	.4391	.803
Trade	-1.049 [†]	.5027	.350
Size	.400 [†]	.1912	1.491
Pre 1990	.072	.5674	1.075
Age	-.015	.0219	.985
Bad Debt	-.258	.5192	.773
Loans	.178	.3444	1.195
Softbudget	.306	.3321	1.358
constraints			
Taxrate	-.006	.0095	.995
Advanced	.885	.3215	2.424
competition			
Constant	-3.8791 [†]	1.8992	

* p <= .05 (one-tailed) † p <= .05 (two-tailed)
 ** p <= .01(one-tailed) †† p <= .01 (two-tailed)
 *** p <= .001 (one-tailed) ††† p <= .001(two-tailed)

Model 5: Dependent Variable = Growth of Fixed Capital

Log Likelihood 316.889
 Goodness of Fit 243.982
 Pseudo R² .117

Chi-Square df
 22.512[†] 13

Variable	B	S.E.	Exp(B)
No dominant	-1.043	.705	.349
State	.162	.388	1.174
Foreign	.668*	.349	1.951
Production	.177	.380	1.194
Trade	-.593	.382	.552
Size	.212	.175	1.236
Pre 1990	-.448	.528	.639
Age	.011	.019	1.011
Bad debt	-.050	.484	.952
Loans	.359	.300	1.432
Softbudget constraints	-.659 [†]	.293	.517
Taxrate	-.003	.008	.997
Advanced competition	.153	.278	1.166
Constant	-2.459	1.675	

* p <= .05 (one-tailed) † p <= .05 (two-tailed)
 ** p <= .01 (one-tailed) †† p <= .01 (two-tailed)
 *** p <= .001 (one-tailed) ††† p <= .001 (two-tailed)

Model 6: Dependent Variable = Invested at least 10,000,000 HUF last year

Log Likelihood 264.194
 Goodness of Fit 236.151
 Pseudo R² .357

Chi-Square df
 76.688^{†††} 13

Variable	B	S.E.	Exp(B)
No dominant State	-1.025	.770	.349
Foreign Controls	-.459	.442	.632
Production	.949**	.402	2.583
Trade	.054	.429	1.056
Size	-.100	.415	.905
Pre 1990	.945 ^{†††}	.228	2.572
Age	-.441	.574	.644
Bad debt	-.021	.022	.979
Loans	.030	.551	1.021
Softbudget constraints	.705 [†]	.337	2.025
Taxrate	-1.180 ^{†††}	.333	.307
Advanced competition	-.021*	.009	.980
Constant	-.245	.316	.783
	-5.376 ^{††}	1.938	

* p <= .05 (one-tailed) † p <= .05 (two-tailed)
 ** p <= .01(one-tailed) †† p <= .01 (two-tailed)
 *** p <= .001 (one-tailed) ††† p <= .001(two-tailed)

Model 7: Dependent Variable is increase labor productivity more than average.

Log Likelihood 507.136
 Goodness of Fit 418.866
 Pseudo R² .202
 Chi-Square df
 68.174^{†††} 22

Variable	B	S.E.	Exp(B)
Ownership			
No dominant	.2627	.686	1.300
State	-.5992	.401	.549
Foreign	.6866**	.254	1.987
Other dominant	-.3002	.712	.741
Controls			
Size	.330 ^{†††}	.097	.719
Chemical	2.076 ^{††}	.785	7.974
Textile	.468	.716	1.596
Construction	.757	.603	2.132
Trade	.503	.558	1.654
Engineering	.067	.609	1.068
Food	1.066	.711	2.902
Transport	.100	.676	1.106
Agriculture	.372	.705	1.450
Army/police	-.469	.795	.625
Education	.535	.738	1.708
Tourism	-.872	1.221	.418
Financial services	.847	.755	2.333
Other services	.684	.616	1.982
Other sectors	.035	.749	1.036
Privatized	-.299	.272	.742
Pre 1990	-.167	.310	.846
Age	-.002	.014	.998
Constant	7.142	6.967	

* p ≤ .05 (one-tailed)

† p ≤ .05 (two-tailed)

** p <= .01(one-tailed) †† p <= .01 (two-tailed)
 *** p <= .001 (one-tailed) ††† p <= .001(two-tailed)

Model 8: Changed Fixed Capital more than average

Log Likelihood 491.549
 Goodness of Fit 407.492
 Pseudo R² .183

Chi-Square df
 58.747^{†††} 22

Variable	B	S.E.	Exp(B)
Ownership			
No dominant	.338	.823	1.402
State	-1.136**	.410	.321
Foreign	.473*	.261	1.605
Other dominant	.568	.668	.567
Size	.449 ^{†††}	.100	1.566
Chemicals	.609	.720	1.838
Textiles	.570	.783	1.767
Construction	.297	.606	1.346
Trade	.985	.554	2.679
Engineering	.205	.594	1.228
Food	.437	.731	1.548
Transportation	1.721 ^{††}	.688	5.593
Agriculture	.635	.695	1.888
Army/police	2.426 ^{††}	.826	11.310
Education	1.393	.740	4.026
Tourism	.592	.824	1.807
Finance services	1.580 [†]	.725	4.857
Other services	1.264	.623	3.540
Other sectors	1.024	.732	2.784
Privatized	-.8347	.287	.434
Pre 1990	-.4397	.328	
Age	-.0033	.014	.997
Constant	9.667	6.785	.154

* p <= .05 (one-tailed) † p <= .05 (two-tailed)
 ** p <= .01(one-tailed) †† p <= .01 (two-tailed)

*** $p \leq .001$ (one-tailed) ††† $p \leq .001$ (two-tailed)