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ENDOGENOUS OWNERSHIP STRUCTURE: FACTORS AFFECTING THE POST-PRIVATISATION EQUITY IN THE LARGEST HUNGARIAN FIRMS

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Using a data set for the 162 largest Hungarian firms during the period of 1994–1999, this paper explores the determinants of equity shares held by both foreign investors and Hungarian corporations. Evidence is found for a post-privatisation evolution towards more homogeneous equity structures, where dominant categories of Hungarian and foreign owners aim at achieving controlling stakes. In addition, focusing on firm-level characteristics we find that exporting firms attract foreign owners who acquire controlling equity stakes. Similarly, firm-size measurements are positively associated with the presence of foreign investors. However, they are negatively associated with 100% foreign ownership, possibly because the marginal costs of acquiring additional equity are growing with the size of the assets. The results are interpreted within the framework of the existing theory. In particular, following Demsetz and Lehn (1985) and Demsetz and Villalonga (2001) we argue that equity should not be treated as an exogenous variable. As for specific determinants of equity levels, we focus on informational asymmetries and (unobserved) ownership-specific characteristics of foreign investors and Hungarian investors.

Keywords: ownership structure, corporate control, foreign investors, privatisation, Hungary

JEL classification index: G32, G34, P31

1. INTRODUCTION: ENDOGENOUS EQUITY

Much of the existing literature takes ownership variables as given, i.e. considers them exogenous. This approach has been typical for most of research on privatisation outcomes in the former state-owned enterprises in Central and Eastern Europe and the former Soviet Union (FSU). Thus, in the economics of transition research, arguments based on agency theory within a partial equilibrium framework have played by far the predominant role, with the development and testing of models describing the impact of the newly created structures of corporate governance on firm performance using large samples and statistical methods. A ma-

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jor theme of this research is that ownership change would create new incentives and impose new control structures upon the management of the former state-owned enterprises (SOEs), therefore forcing them to engage in restructuring strategies aimed at efficiency improvement (Boycko et al. 1995). A most important research issue is the question how newly privatised companies respond to internal and external factors causing organisational restructuring.

However, different theoretical models and empirical studies have provided conflicting answers to this question (Megginson – Netter 2001; Djankov – Murrell 2000; Havrylyshyn – McGettigan 2000; Bonin 1998). In particular, there is a disagreement about the effects of new ownership structures on the extent and speed of enterprise restructuring. For example, managerial ownership has been found to have both positive (e.g., Aukutsionek et al. 1998; Filatotchev et al. 2000) and negative (e.g., Aghion – Blanchard 1998; Blasi et al. 1997) effects on the likelihood of restructuring actions. Similarly, existing research on post-privatisation restructuring has identified ambiguity in the role of outside ownership. Outside investors have been found to have both positive (e.g., Pohl et al. 1997) and neutral effects (e.g., Aukutsionek et al. 1998) on the extent of restructuring and performance. Case-study evidence from large firms in Slovakia presented by Djankov and Pohl (1998) indicated that rapid consolidation of outside ownership promoted enterprise restructuring after the initial privatisation stage. Carlin and Aghion (1996) argued that privatisation boosted "reactive" restructuring, using evidence from both Russia and Hungary, yet foreign ownership was required for "deep" restructuring. However, a number of other publications have provided more ambiguous results. For example, applying frontier production function estimation technique, to data from Hungarian and former Czechoslovakian industrial firms, Brada et al. (1997) found no significant relationship between privatisation and improvements in enterprise efficiency. Frydman et al. (1997) concluded that product restructuring was not affected by differences in ownership structure using survey data from mid-sized firms in the Czech Republic, Poland and Hungary. A number of studies of ownership effects on firm restructuring and performance in the FSU provide similar results: differences in ownership structure and corporate governance variables such as board composition were not consistently related to the extent and speed of strategic changes at the firm level in Russia (Blasi et al. 1997; Earle 1998; Filatotchev et al. 1996), and also in Ukraine and Belarus (Estrin et al. 1998; Filatotchev et al. 2000).

The ambiguity of results may indicate that the underlying theoretical assumptions are not entirely satisfactory. Some authors point out that in economies in transition, privatisation seems to set in motion a process of ownership adjustment where ownership concentration and structure may be an outcome of various firm-specific factors such as size, performance, industrial affiliation, etc., as well as the firm's operating environment (Filatotchev et al. 2001a; Filatotchev – Mickiewicz 2001). This dissenting strand in literature draws from Demsetz and Lehn (1985) and Jensen and Warner (1988), who argue and find evidence for treating equity composition as endogenous. This has been recently reinforced by Demsetz and Villalonga (2001), who bring econometric evidence showing that the equity structure is determined by past performance and firm-level characteristics. Diversity in equity structures may be considered as the equilibrium result, where different ownership structures are optimal for different categories of firms. In addition, the response of equity structures to firm-level characteristics is also affected by the characteristics of the capital-market framework. Shleifer and Vishny (1997), La Porta et al. (1997, 1998, 1999, 2000a, 2000b), and Filatotchev and Mickiewicz (2001) not only provide theoretical models but also empirical evidence suggesting that concentrated ownership and equity levels that guarantee control rights are an equilibrium response to imperfect capital markets. Yet, only a few studies on post-privatisation outcomes in transition economies consider equity as endogenous. In a longitudinal study of 150 privatised companies in Russia, Aukutsionek et al. (1998) identified a selection bias when outside investors bought into relatively successful companies, which confirms that cross-sectional studies of privatisation effects on restructuring and performance are questionable from the theoretical and empirical points of view.

The *purpose of this article* is to investigate if the assumption of endogenous equity and control structures may explain the post-privatisation ownership adjustment in Hungary, one of the most dynamic transition economies. Certain aspects of the Hungarian privatisation are unique to the region. The government has implemented "gradualist" privatisation in contrast to mass "give away" voucher schemes.[1] The procedure was a slow, case-by-case sale process. Yet, unlike "mass privatisation" and other forms of "non-equivalent" privatisation, the proceeds were used to improve the budget position and decrease the country's debt burden. Furthermore, this form of privatisation attracted foreign investors – indeed, Hungary is now one of the major destinations in the region for an inflow of capital. In fact, the level of privatisation revenues per capita and FDI inflow are strongly correlated as demonstrated by EBRD (2000). Hungary is a transition economy characterised by both the highest privatisation revenues and inflow of FDI per capita.[2]

[1] Hunya (1997) argues that mass privatisation schemes were used in those countries where the denationalisation of the former state-owned firms was the primary objective and governments faced potential problems with political support for privatisation. In addition, mass privatisation schemes might have inflationary impact via the wealth effect.

[2] For a review of Hungarian privatisation programmes and the role of foreign direct investment, see: Frydman et al. (1993a), Halpern – Wyplosz (1998), Voszka (1999a, 1999b), Oszlay (1999), Mihályi (2000), Iakova (2000), OECD (2000).

In this paper, using a data set for the 162 largest firms (1994–1999), we show that the equity structures converge towards high homogeneity. Equity stakes held by foreign and Hungarian corporations are significantly related to factors such as the firm's size, export orientation, past performance and industry affiliation.

The paper is organised as follows: The following section provides a theoretical review discussing possible determinants of equity structure, and develops a number of hypotheses. Next, an empirical account of the evolution of ownership structures towards higher homogeneity is proposed. The subsequent sections present methodology and econometric results for the determinants of equity levels. Conclusions are drawn in the last section. Tables and figures are presented in the *Annex*.

2. FACTORS AFFECTING EQUITY COMPOSITION

As already discussed, a number of authors have suggested that a firm's characteristics may determine its ownership structure. The relevant indicators include size, investment needs, industry, location, export potential, etc. In other words, a firm's ownership structure is an equilibrium response to an individual firm's operating characteristics and its competitive environment (Short 1994), and the direction of causality between ownership and firm characteristics is not entirely resolved by papers using cross-sectional variations in ownership. In particular, Dyck (2000) suggests that the lack of promising investment projects is perhaps a greater problem in developing and transition economies than differences in ownership structures. Firms with attractive investment opportunities may have issued new equity whereas firms with unattractive investment opportunities may have had no need to do so. Thus, resulting equity structure is implied by the investment opportunity, not vice versa.

A fast growing literature on optimal ownership structures of firms depending on the levels of "private benefits of control" (e.g., Grossman – Hart 1988; Harris – Raviv 1988) has also extended research beyond the conventional US/UK environment and has recently become a focal point of theoretical and policy debates. This research is particularly important for countries where protection of minority investors is relatively weak and where expropriation of minority shareholders by the controlling shareholders is extensive. However, the willingness of controlling shareholders to expropriate minority investors is constrained by their financial incentives. Following the agency framework developed by Jensen and Meckling (1976), a number of authors link these incentives with equity ownership by controlling shareholders, which enhances their interest in a non-distortionary distribution of dividends. Other things equal, ownership concentration should lead to lower expropriation, and, as a result, countries with poor investor protection would typically exhibit more concentrated control of firms than do countries with good investor protection (La Porta et al. 2000a). Dyck (2000) suggests that dispersed ownership structures in transition economies are unstable and relatively costly, and provides evidence that countries that had dispersed ownership at the time of privatisation, such as the Czech Republic, report steady increases in concentration over time. This evidence is consistent with the assumption that concentration may be a substitute for legal protections in providing the functions of corporate governance (La Porta et al. 1998), and, therefore, is an endogenous factor.

International business research has also generally acknowledged an endogeneity of ownership structures when considering factors affecting equity investment by foreign firms in domestic companies. This research is focused on the competitive advantage of the investing firm, relative to other firms located in the host country. In addition, as markets have become more liberalised, there is a growing need for firms to engage in FDI in order to protect their existing or specific advantages, or to acquire new dynamic ownership advantages. Building on a resource-based view of the firm, Dunning (2000) examines the firm's internal capabilities and resources in terms of their ability to maintain and upgrade these advantages, and their ability to locate their value added activities in countries, which allow them to create and acquire new specific advantages (Kogut – Chang 1991).

In addition, the internalisation theory suggests that the "greater the net benefits of internalising cross border intermediate product markets, the more likely a firm will prefer to engage in foreign production itself" (Buckley – Casson 1976, p. 164). Dunning recommends a reassessment of the static organisational theory and an integration of transaction-based and innovation-based theories of the firm. In line with this, Ethier and Markusen (1996) argue that new trade theory considers neither internalisation and enforcement of contracts, nor the fact that multinational enterprises are often linked to knowledge-based capital, which can easily, at a little cost be transported to other locations, relative to physical capital. In addition, the same authors adopt a model which employs the association between FDI and the high-tech sector, along with a factor for choice of how the firm services a foreign market, including exporting, licensing and establishing a subsidiary. This allows them to present the international equilibrium, which determines both the pattern of specialisation and the market mode. One of their important findings is that the desire to protect knowledge-based capital may promote direct investment, as opposed to licensing. Moreover, this issue is most critical not just in the high-tech sector, but specifically in relation to firms, which may create competition to the investing companies in the international markets, e.g., local firms with significant export potential. Therefore, in the long term, the transfer of knowledge without ownership may result in enhanced competition against investors. High transaction costs of the arm's length technology transfer lead to direct investment rather than subcontracting (Buckley – Casson 1998). Additionally, transaction costs may be higher and the protection of intellectual property via contracts can be relatively more difficult in a transition country where the legal framework is still undergoing a process of reform and reinforcement.

This argument is consistent with the view that foreign investment is likely to flow to those "newer, …faster growing and more profitable industries" (Penrose 1956, p. 216). Using and extending the Porter diamond (1990) for surveying the 145 largest industrial corporations, Dunning and Lundan (1998) show that FDI is flowing to knowledge-intensive and high-tech sectors. Similarly, Dahlquist and Robertsson (2001) find that in Sweden FDI is attracted to the engineering, chemicals and pharmaceutical industries, and is underrepresented in the paper and pulp sectors.

A different strand of literature considers informational asymmetries as a factor affecting the structure of foreign investment in a significant way. In particular, Kang and Stulz (1997) examined the home equity bias in Japan. By using the Merton hypothesis (1987), they showed that investors invest in securities they know about. Kang and Stulz found a positive relation between foreign ownership and exporting by local firms. Similarly, in a recent study of foreign ownership in Sweden, Dahlquist and Robertsson (2001) find that foreign investors are drawn towards firms with a presence on international markets. As heavy exporters are usually known abroad, export intensity can be a proxy for this international profile factor. In the transition context, surveying emerging economies Lankes and Venables (1997) found that 71% of foreign investors claimed that the main function of FDI was to export from the region. Mihályi (2000) made a similar assumption in his study on FDI in Hungary: foreign strategic investors assist the growth of exports, which induces macroeconomic stability. More generally, Mihályi stresses the importance of the integration of enterprises into a network of transnational corporations (TNCs).

Informational asymmetries may explain not only why exporting firms are typically preferred by foreign investors, but also the preference for larger firms, as more information is available on them. The bias towards larger firms is confirmed by Dahlquist and Robertsson (2001). Yet firm size may be a characteristic which attracts FDI for several other reasons. For example, foreign equity holders may be attracted to larger firms due to the advantages associated with economies of scale and scope. Kang and Stulz (1997) found in the Japanese case of foreign ownership that foreign investors tend to gravitate towards large firms. Those authors argue that size is a proxy for several positive attributes: it is often associated with international standing, transparency and liquidity of shares, and widespread ownership.

Performance is also expected to be a possible factor in determining the level of foreign equity of a firm. The Dahlquist and Robertsson (2001) study reveals that foreign investors exhibit a preference for firms performing better, and their cross-section and pooled analyses show that firms with higher current ratios[3] are associated with foreign equity, as it reflects the firm's ability to meet short-term payment requirements. Also, Kang and Stulz (1997) document that foreign investors hold disproportionately more shares of firms with good accounting performance, measured by return on assets. Yet, the attractiveness of returns is conditional on risk, Dahlquist and Robertsson (2001) demonstrate that foreign investors show a weaker preference for risky firms with high past returns than individual investors. Again, another important qualification relates to general characteristics of host countries. In a transition economy environment, financial performance measures may not prove satisfactory indicators of future results. Moreover, they may be less significant for strategic investors, who dominate in such environment.

3. HYPOTHESES

On the basis of existing research and characteristics of the institutional framework discussed above, we derived the following set of hypotheses:

(1) The equity structures evolve towards higher homogeneity, with the dominant role of foreign direct investors.

(2) (a) FDI is concentrated in companies where informational asymmetry is relatively low, which implies that larger companies will have relatively higher equity ownership by foreign investors.
(b) On the other hand, size may prevent foreign investors from acquiring dominant stakes.[4]
(We wish to test these two hypotheses separately – namely, for the impact of size on foreign investors' presence and for the impact of size on dominant stakes of foreign investors.)

(3) Both presence and high equity stakes of foreign investors is associated with high export intensity. Conversely, the opposite is likely to be true for domestic corporations.

[3] Current ratio is defined as current assets/current liabilities.

[4] A different interpretation is also possible: retaining presence of some minority shareholders may be beneficial in providing access to additional owner-specific expertise.

Two potential explanations relate to exports, between which we cannot distinguish on the basis of the data set. The first focuses on the informational barriers – exporting companies are more visible. This is the same theoretical argument which relates to size (Ia). The second argument is related to the assumption that foreign owners have specialised export-enhancing resources, which they want to protect while acquiring future gains from investment.

Conversely, we expect that in case of domestic-market-oriented companies (e.g., companies with a lower export intensity), 100% foreign ownership is less likely, as foreign investors will seek access to specialised knowledge of Hungarian corporations, creating links via joint equity.

(4) Foreign investors will acquire large equity stakes in companies characterised by a high level of productivity in the past. Again, this may be linked to the informational asymmetry problem. Unlike domestic investors, it is more difficult for the foreign investors to assess the net present value of the company on the basis of more idiosyncratic information.

4. ADJUSTMENT TOWARDS HOMOGENEOUS OWNERSHIP STRUCTURES

As acknowledged elsewhere, previous studies on corporate governance problems in transition and emerging economies experienced problems in obtaining representative samples, accurate data and longitudinal information (Hoskisson et al. 2000). When research was based on firm-level data that have been obtained through questionnaire surveys and interviews, the analysis suffered from a low level of data reliability and ambiguity in the measurements of various constructs (Estrin – Wright 1999). To avoid these problems, we used in our research the database of the 162 largest Hungarian manufacturing companies during the period of 1994–1999. The financial and economic data correspond to publicly available information, in particular to data published annually in the Hungarian magazine *Figyelő*. The majority of firms in this sample undergo a regular audit by foreign audit firms, and they publish annual reports that provide key economic and financial indicators. In addition, this database was supplemented by the records on equity holdings by different classes of owners, which was collected as part of the ACE-Phare Project P-981048-R by a team at the Hungarian Academy of Sciences co-ordinated by Péter Vince in early 2001.

To assess the direction of evolution in ownership structures, we computed time-paths for two indicators:

- the unweighted (aritmetic) average share of foreign owners in firm's equity:

$$\frac{\sum_{i=1}^{n} \frac{f_{\mathrm{i}}}{e_{\mathrm{i}}}}{n} \text{ and,}$$

- the weighted average share of foreign owners in equity, which is equivalent to the total share of foreign owners in aggregate value of equity (capital) is:

$$\sum_{i=1}^{n} w_{\mathrm{i}} \frac{f_{\mathrm{i}}}{e_{\mathrm{i}}} = \frac{\sum_{i=1}^{n} f_{\mathrm{i}}}{\sum_{i=1}^{n} e_{\mathrm{i}}} ,$$

where n represents the total number of companies, e_{i} relates to the total value of a firm i equity, f_{i} represents the value of equity held by foreign investors in a firm i, and w is defined as: $w_{\mathrm{i}} = \frac{e_{\mathrm{i}}}{\sum e_{\mathrm{i}}}$.

In this study, we focus on internationalisation by local firms rather than adopting the more usual foreign firms' perspective (see Filatotchev et al. 2001b for an extensive discussion of this issue). Therefore, we do not differentiate between different types of foreign owners, such as, for example, financial institutions as opposed to industrial partners/investors. However, the identity of the owners may have important corporate governance effects (Filatotchev – Mickiewicz 2001), and we intend to pursue this avenue of research in the future.

Figures 1–4 presented in the Annex illustrate the evolution of the ownership structure between 1994–1999, showing both shares of different categories of owners in total capital of all companies and equally weighted average shares of different categories of owners. Due to earlier privatisation, the share of state equity in the largest Hungarian firms decreased to about one-third of the pre-privatisaton stock, already by 1994. The process of privatisation continued during the next few years, and, as a result, the government share became negligible by the end of the 1990s *(Figure 4)*. In 1999, there remained only one company in the sample which had not been privatised. In addition, there are just a few companies with minority government stakes to be privatised later, and one company for which the government retained "long-run" minority equity holdings, implying that its equity is not expected to be sold in the foreseeable future. State share in total capital was higher than the average (equally weighted) share at the beginning of the period. This indicates that larger companies were privatised slower than the smaller ones.

Foreign investors continued to be the main beneficiaries of the privatisation process. An average share of *foreign owners* in equity was 56% already in 1994 (first of the indicators, as defined above), and their share in total capital amounted to 44% (second indicator). The difference between the two implies that foreign capital was initially flowing to small companies, which is simply a result of the initial privatisation choices. Yet, as the privatisation process continued, the share of foreign equity in total capital increased to 73%, and the equally weighted average to 69%. Thus, the equilibrium result for this class of owners indicates a preference for larger companies. It is interesting to notice that the share of foreign investors has not changed after 1997, meaning that foreign investors consolidated their holdings. The average share even decreased marginally in 1999 *(Figure 1)*. When the evolution of foreign ownership and state ownership during the period is taken together, it is reasonable to suggest that foreign investors achieved their equilibrium level of equity holdings. This kind of adjustment towards final equilibrium makes the period of 1994–1999 an interesting one to analyse.

The second important group of investors who participated in the privatisation process were *Hungarian domestic enterprises*. Their holdings are much lower than those of foreign investors, however they visibly played a far more active role at later stages of privatisation than earlier. This is confirmed by the fact that their average holdings increased from 16.5% to 22.5% between 1994 and 1999. Their share in total capital increased as well, but at a less dramatic pace, from 11.5% to 13.0%. Again, the difference between the two indicators results from higher shares of domestic corporations in smaller companies. Overall, the significance of domestic corporations (typically: relational investors) rose during that period *(Figure 3)*.

Finally, one more interesting class of ownership is insider equity. As may be seen from *Figure 2*, equity holdings of insiders in Hungary were very small, as opposed to some other neighbouring economies, Poland in particular.[5] Moreover, the average share of insiders decreased significantly in the recent period, from 1.7–1.8% in the period of 1995–1997 to just above 1% in 1999. The share in total capital of all companies is even lower and was amounted to 0.6% in 1999. This indicates a stronger presence of insiders equity in smaller companies.

The evolution of shares in total capital and average shares of equity for different classes of owners suggest interesting post-privatisation ownership dynamics that can be identified at the disaggregated level. This is illustrated by *Figures 5–8*. First, *Figure 5* presents a comparison of the distribution of foreign investors equity shares for 1994 and 1999. The structure in the latter year is far more dichotomous – firms with either 100% or zero foreign ownership domi-

[5] On the role of insiders in Polish privatisation, see Mickiewicz and Baltowski (2003 forthcoming).

nate. *Figure 7*, a scatter diagram comparing foreign investors' shares in 1994 and 1999 at the same companies, helps to trace back how this situation evolved. Points close to the diagonal represent companies where the share of foreign owners remained similar over the period. Few foreign firms decreased their equity holdings, including four which withdrew completely (represented by points on the horizontal axis). However, the increase in equity dominates, which is reflected by the distribution on the scatter diagram skewed towards the upper left corner. Note that foreign investors increased their holdings up to 100% after 1994 in many of the firms where they already had majority stakes. In addition, there were several new entries, as reflected by points on the vertical axis. Yet, these firms were different in terms of initial equity levels acquired by foreign owners.

Similarly, *Figures 6* and *8* may be used to illustrate the equity acquisition strategy by domestic corporations as owners. Here the pattern of change is different, but the trend towards more homogenous structures is also present. When 1994 is compared with 1999 *(Figure 6)*, the similar proportion (the majority of companies) have no investment by Hungarian enterprises. However, for those, which have Hungarian investors, the holdings by Hungarian corporations increase significantly. This is also reflected by the 1994–1999 scatter diagram *(Figure 8)*. However, it is also worth noting that the group of companies with zero holdings by Hungarian corporations is not the same in 1994 and 1999 – this is reflected in a significant number of points being located on both horizontal and vertical axes. It is clear that Hungarian corporations were more active in adjusting their investment structure, and the direction of adjustment differ for various groups of firms. Again, the scatter diagram is skewed towards the upper left corner, which means that the increase in equity is more frequent, yet it is noticeable that a number of other investors sold their holdings entirely, as represented by the points on the horizontal axis. Thus, the general direction of change is consistent with the first group of investors (foreign) – i.e. it reflects adjustment towards a more homogeneous structure of ownership. Therefore, an interesting research question remains: which factors affected the levels of equity ownership chosen by the investors?

5. VARIABLES AND ESTIMATION METHODS

As clear from the data characteristics presented in the previous section, we encounter a serious non-normality problem in terms of the distribution of share ownership. This is easily confirmed by standard tests of normality. For our main variable of interest, the share of foreign capital in equity, the Kolmogorov–Smirnov test (with Lilliefors significance correction) detects divergence from normality, which is highly significant at the 0.001 level.

This non-normality problem prevents us from using the OLS regressions as an estimation method. Therefore, two alternative methods of estimation, logistic regression and ordinal regression were employed.

Logistic regression fits our analysis, as it is used when an outcome variable is a dichotomous or categorical one, which Greene (2000) refers to as a "qualitative response" model (p. 811). Logistic regression involves predicting the probability of the outcome variable, given known, values of the explanatory variables. As a result the logistic regression equation takes the form, which we shall subsequently estimate:

$$\mathrm{P(Y)} = \frac{1}{1+e^{-z}} \quad \text{where} \quad z = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_\mathrm{n} X_\mathrm{n} + \varepsilon_\mathrm{i}\,.$$

The parameters are estimated using the maximum likelihood method.

A useful statistic, for which significance levels are reported in *Table 1*, is the Wald statistic, this has a chi square distribution, and informs us if the beta coefficient for an independent variable is significantly different from zero.

In order to analyse the usefulness of the model we can also refer to the results tables, which show how many cases are correctly classified (labelled "overall accuracy classification" in *Table 1*).

Here, we defined five categorical variables, to be used in subsequent estimations:

For00du: indicator corresponding to the companies with (non-zero) presence of foreign investors amongst equity holders
For50du: indicates companies with majority holdings by foreign investors
For100du: indicates companies with 100% foreign ownership
Hen00du: relates to companies with presence of Hungarian corporations
Hen50du: indicates companies with majority holdings by Hungarian corporations

We did not test for 100% ownership by Hungarian corporations, as the number of such companies is too small for the results to be meaningful.

The levels chosen for the categorical variables are not accidental, but reflect levels which are important from the point of view of corporate control. 50% ownership represents a controlling shareholding, and 100% ownership level excludes any minority shareholders. We used 50% ownership as a cut-off point, since this provides an approximation of a controlling stake of a particular group of shareholders (Filatotchev et al. 2001a). This is a very crude proxy for full control, and in highly developed capital markets a much lower stake can already provide a voting majority when the remaining share ownership is widely dispersed (for example, the UK Listing Authority requires firms to disclose all ownership stakes that are larger than 3% because of potential control issues). However, our data did not allow us to desegregate share ownership at individual level, and, therefore, we used share ownership of particular groups of shareholders instead. Interestingly, we also tried 75% and 90%, the two levels which according to Hungarian law give additional rights to dominant owners, such as excluding minority shareholders from the automatic right to be represented on the board and from access to all financial information on demand. Both proved to be significant, but the results were weaker as compared with those listed above.

Available software (SPSS version 10.0) also allowed us to use *ordinal regression,* which is a similar process to the logistic regression procedure described above, except that in this case we have more than two outcome variables (defined below).[6]

The design of the ordinal regression is based on the methodology of McCullagh (1980) and allows one to model the dependence of a polytomous ordinal response on a set of predictors (independent variables). The model makes the assumption that the response is numerical and that the alternative outcomes are ordered.

To assess the usefulness of the model, a variety of measures are used such as the McFadden's R squared and Nagelkerke's R squared.

The same thresholds were used here as defined above (plus one additional threshold for foreign investors, at ownership level equal to 90%), to create *five ordinal groups* for foreign ownership (*For*):

$For = 0$
$0 < For < 50\%,$
$50\% \le For < 90\%,$
$90\% \le For < 100\%,$
$For = 100\%$

Similarly, we defined *three ordinal groups* for the domestic corporations:

$Hen = 0,$
$0 < Hen < 50\%,$
$50\% \le Hen$

[6] An alternative methodology would be to use the multinomial logit, yet this would fail to account for the ordinal nature of the outcome or dependent model (Greene 2000, p. 875). Yet the particular problem with the alternative approach was that annual variation in dependent ownership variable is low.

As will be demonstrated, the results of the two methods are similar. However, we believe that separate logistic regressions are important, as the second method (joint ordinal regression) masks important non-linearities in the impact of some independent variables, size in particular.

Selected independent variables correspond to the hypotheses formulated above. Following a design used by Demsetz and Villalonga (2001) we use averages of past values (in our case averages for 1994–1998), as we assume that investors rely on past information in their decisions concerning equity levels.[7]

We use a standard measure of the company size, which is:[8]

LOGASTav = logarithm of total assets.

The significance of export is measured by export intensity, defined as:

XINTav = export revenue / total revenue from sales.

In addition to the above, we introduced two performance measurements. First, we used a financial performance indicator specified as:

ATPASTav = return on assets = after tax profit / total assets.[9]

Taking into account possible inaccuracies in the measurement of assets, we also included another indicator of performance, which we expected to be more important as a potential indicator of the long-term net present value. The variable is a proxy of (average) labour productivity, defined as:

LOGPRav = LOGSALav – LOGEMPav = LOG (Sales/Employment).

In addition, we introduced a set of control variables. The first one is a share of sales of a given company in its sector's total sales (*SECSALav*). To calculate this variable, we combined our data with the data set for sectoral sales in Hungary, developed by WIIW Institute in Vienna (for 1994–1998). The second variable is a dummy for greenfield foreign investment (*BVG*). By introducing this variable we intended to verify that the difference between greenfield and brownfield investment mode had a systematic impact on the levels of equity chosen by dominant foreign owners.

[7] We also experimented with alternative approach, pooling all observations, and using independent variables lagged by one year, with fixed year effects, omitting the first year in addition to one year lost due to using lagged independent variables. The results are similar to those obtained from our chosen specification, and they are available on request from the authors.

[8] See for instance Dhawan (2001).

[9] We also experimented with returns on sales. No results were affected. Both are correlated (see below) and we use the one, which is more standard in literature, for our specifications. Results with alternative specifications are available on request.

Possible owner-specific effects that attract foreign investors may also be related to sectoral characteristics. We capture those by sectoral dummies, as specified below, where figures relate to corresponding NACE codes.

Two traditional / low-tech sectors:
15 = food products (*Food*)
16, 17, 19 = other traditional, including textile *(Text)*

Three resource- / scale-intensive sectors:
20, 21 = wood and paper products (*Woodpap*)
23–25 = petroleum, chemicals, plastic (*Chem*)
26–28 = minerals and metals (*Met*)

Two high-tech sectors:
29–32 = machinery (*Mach*)
34 = automotive (*Auto*)

And a *residual category* (omitted in estimations to avoid perfect multicollinearity):
22, 36, 37 = other.

The primary reason for clustering NACE groups into more aggregate categories was to avoid variables with a low number of observations.

We also experimented with another aggregated classification of sectors, related to the distinction between "high-tech", "resource- and scale-intensive" and "traditional" sectors (Mickiewicz et al. 2001; Landesmann 2000). All other variables were robust to change in specification, while the aggregate sectoral dummies were insignificant, so we do not report those specifications. Even if negative, the result is interesting. It highlights that there is no sufficient evidence to indicate that the levels of equity shares held by foreigners are higher in "high-tech" sectors, as could be derived from some strands in literature, as discussed in Section 2.

One additional problem we encountered with the data relates to the presence of missing values. By using Little's multivariate test of MCAR (Chi square = 372.48, $p < 0.000$) we can reject the hypothesis that the data are missing in a completely random pattern. This suggests that techniques such as the EM algorithm are appropriate, as opposed to case-wise deletion. Therefore, all subsequent estimations are based on the data set produced by the EM technique.

Before the final choice of the model, we also checked for multicollinearity effects, using a Pearson correlation matrix (detailed results available on request).

Focusing on the most significant correlations (0.001 level), we identified three clusters:

- Size variables (assets, sales and employment) are highly correlated. This justifies our decision to choose assets as the most standard single measure of size.
- The two financial measures (return on sales and return on assets) are highly correlated. We chose the return on assets for estimation, as it appears to be widely used.
- Predictably, employment and sales are strongly correlated with our proxy for labour productivity, which is derived as a ratio of the two. Again, this provides an additional argument for the exclusion of employment and sales, as we have no specific hypotheses related to these two.

6. ESTIMATION RESULTS

In the Tables of the Annex, we present the results of five specifications for individual logistic regressions related to the chosen threshold levels and two joint ordinal regressions for both foreign investors and domestic investors.

The first three logistic regressions relate to the determinants of foreign investors' presence,[10] majority share (i.e. above 50%) and 100% ownership, correspondingly. The next two models present estimation for presence and majority share of Hungarian domestic corporations. Finally, models 6 and 7 present two ordinal regressions, for foreign share in equity and for domestic corporations' share in equity, correspondingly. The ordinal regressions combine several levels of ownership together as an ordinal variable, taking into account only the levels, which have specific economic meaning, as discussed above (i.e. zero, 50%, 90%, 100%).

Both methods of estimation yield similar results, except where a variable changes sign for different levels of equity (this relates to size variable in particular). Unlike joint ordinal regressions, individual regressions for different levels are capable to detect those differentiated effects.

Several results emerge from these estimations:

- The size of the company (as measured by assets) seems to have a positive impact on the decision of foreign owners *to enter* (the corresponding variable is marginally insignificant, see *Table 1*). On the other hand, the same variable

[10] In this specification, we did not include the dummy for greenfield investment. Here, the variable is spurious, as by definition it is perfectly correlated with the presence of foreign owners.

becomes clearly significant with the opposite sign, for determinants of *100% foreign ownership*. Of those two, the second (negative) effect seems to be relatively stronger. This is reflected by the negative and statistically significant sign for joint ordinal regression *(Table 2)*. It is interesting to notice that for Hungarian corporate investors, the size of the company is a highly significant factor associated with their presence. On the other hand, its impact becomes inconclusive at the 50% level. We could not test for 100% in this case, as there were too few companies with this type of ownership structure. The joint test of ordinal regression results in an insignificant coefficient *(Table 3)*. Thus, we find strong supporting evidence for hypothesis IIa (positive impact of size, attracting Hungarian corporations) and some support for Ib (size having negative impact on high levels of equity).

- We expected that export intensity might be either an indicator of the firm's higher visibility (lower information barriers) or an indicator of export orientation and presence in foreign markets, where foreign investors have owner-specific advantages. In other words, foreign investors may be attracted by companies characterised by significant export intensity. Our interpretation of this relates to the necessity to protect the transfer of the owner-specific knowledge and to secure ownership against possible competition from exports, given that transaction costs are high. On the other hand, it is clear that domestic corporations specialise in companies which are more oriented toward the domestic market. In all four models relating to foreign investors (*Tables 1* and *2*), the corresponding coefficients for export intensity are consistently significant with expected signs (positive). Moreover, it is also interesting to note, that the higher levels of significance relate not to the presence, but to the cases of 50% and 100% equity levels by foreign investors (comp. *Table 1*, coefficients for *XINTAV*). It is clear that the issue of control is important in case of exporting companies. On the other hand, Hungarian corporations tend to be attracted to companies with lower export intensity, but in this case the link is weaker.
- The variable representing financial indicators is consistently highly insignificant. It appears that in this economic environment, past financial indicators alone are not providing decisive information on the net present value of the companies. Thus, they do not affect investment decisions by foreign investors. On the other hand, past values of labour productivity seem to be good indicators of performance, which is positively associated with higher levels of FDI. In all models, coefficients are highly significant, again with expected signs (positive for foreign investors). It is worthwhile to note that the highest significance level is related to 100% ownership by foreign owners. This indicates that they aim for exclusion of any outside ownership in companies characterised by highest levels of past performance. As a mirror image of the

results for foreign investors, the higher past values of labour productivity have negative impact on both presence and majority share in ownership by domestic corporations (*Tables 1* and *3*). Yet, we should be careful when interpreting this particular outcome. It may be simply indicative of the more general problem faced by any comparative research on ownership variables and demonstrate the limitations of partial equilibrium analysis. Namely, the choices and actions by different classes of owners are never independent from each other. In the particular context of an open transition economy, with relatively fast privatisation process, the investors face a disequilibrium situation with underpriced equity. Additionally, being not restricted in terms of access to financial capital, foreign investors have clear advantage over domestic investors. This phenomenon relates in particular to the early stage of the privatisation process. Given that handicap, foreign owners may have a first-mover advantage, choosing the preferred companies. Thus, the capital-market situation could be described by a specific bidding model, with foreign owners acting first due to their access to financial capital. This interpretation is particularly relevant for the group of companies we analysed, i.e. the largest Hungarian manufacturing firms. If this interpretation is correct, the results for the Hungarian domestic corporations are affected by the choices made by foreign investors and should be treated with caution.

- None of the models can identify any significant difference between greenfield and brownfield foreign investment projects. The mode of entry has no visible impact on the chosen levels of foreign ownership.
- Strategic focus on companies with a strong position on the domestic market has impact neither on presence nor on the higher control levels of the two classes of investors discussed. This can be explained as a corollary of the result related to export intensity. Significance of the second fact explains why the position of the company on the domestic market is not important.

7. DISCUSSION AND CONCLUSIONS

Our study examined corporate governance and ownership dynamics in a transition economy. The paper helps to fill gaps in relation to longitudinal studies, multi-industry samples and large newly privatised manufacturing firms. It is also novel in the internationalisation literature context, with its focus on local firms, rather than on foreign firms' internationalisation. Although the focus is on Hungary, variation in governance regimes (La Porta et al. 1997) suggests scope for international analyses of the links between governance, firm-level characteristics and exporting.

Our analysis demonstrates that the ownership structure of Hungarian firms is moving towards a higher degree of homogeneity and concentration. Institutional investors, both foreign and domestic, are emerging as two dominant classes of owners.

Moreover, the econometric results are consistent with the assumption that the equity levels are endogenous. Our estimations of equity shares held by both foreign investors and domestic corporations are consistent with the literature reviewed in the theory section of this paper. There it is suggested that ownership structure may be an equilibrium response to a firm's operating characteristics and the external environment.

This study also confirms some recent developments in the international business research that suggests that equity investment by foreign firms in transition economies may be driven by a number of strategic factors. In particular, informational asymmetry may be a barrier to foreign investment. This is the reason why larger companies are chosen by foreign investors where greater amount and superior quality information is available. A similar argument relates to export-intensive companies, albeit this second result may also be interpreted in terms of the effort of foreign investors to protect knowledge transfer, assuming that foreign investors wish to prevent their joint venture from becoming a competitor to them in the international market.

In addition, foreign investors are both entering and building up high controlling stakes in companies characterised by high labour productivity. On the other hand, past financial results are not important. This is consistent with the literature on transition economies, which argues that financial indicators might be misleading, therefore labour productivity is a better proxy for expected future performance in such an environment (see Bornstein 2000 for an overview). Again, the fact that foreign investors are attracted to companies characterised by previous positive results in terms of performance, can be explained by the presence of informational asymmetry: foreign investors have to rely on available past information.

However, the novelty of our approach may lie elsewhere. In our empirical section, we focused on three important threshold levels of equity holdings: greater than zero, majority, and 100%. We demonstrated that the logic of equity investment decisions, i.e. relevant factors, are different for each threshold. One particularly interesting finding relates to the fact that while size is a factor attracting presence of foreign owners, it makes acquiring a 100% stake difficult. We obtained a similar result for Hungarian corporations, as size becomes insignificant, once we consider a higher equity level.

There is a number of limitations in our research that helps to map out some possible avenues of future analysis. This study experienced problems in obtaining representative samples, accurate data and longitudinal information that are common problems in transitional and emerging economies (Hoskisson et al. 2000). Further studies using different samples of enterprises would help with validation and may provide deeper understanding of the dynamics of the corporate control evolution. Measuring outcomes may be premature, and definitive conclusions concerning the link between ownership structure, exporting and performance may need to await further progress with transition. This study focused on the largest firms, and further research might compare (medium and small size) *de novo* and smaller privatised firms as well as examine how strategies and entry modes of investors differ from developed market contexts. Improvements in data quality and larger samples may facilitate full structural equation modelling of the complex interrelationships between ownership structure, performance and internationalisation (exporting in particular). Finally, our analysis was focused on the aggregated groups of shareholders. The corporate governance effects of identities of particular shareholders may be another important direction of future research (Filatotchev – Mickiewicz 2001).

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ANNEX

TABLES ON ESTIMATION RESULTS

Table 1

Bivariate logistic regressions

Model	1	2	3	4	5
Dependent variable	FOR>0	FOR>50%	FOR=100%	HEN>0	HEN>50%
Independent variables					
ATPASTAV	–.452	–.388	–1.753	2.466	–.002
	(2.507)	(2.146)	(1.869)	(1.825)	(2.322)
XINTAV	2.164**	2.018**	1.862**	–1.268*	–1.866*
	(1.057)	(.877)	(.809)	(.773)	(.977)
LOGASTAV	.554	.118	–.617***	.629***	–.056
	(.348)	(.257)	(.240)	(.229)	(.285)
LOGPRAV	.828**	.933***	.933***	–.866***	–.995**
	(.409)	(.354)	(.301)	(.296)	(.406)
SECSALAV	.002	.003	–.001	.002	–.004
	(.007)	(.011)	(.003)	(.003)	(.022)
FOOD	–1.850	–1.421	–.747	–.115	.393
	(1.220)	(1.377)	(1.079)	(.813)	(.842)
TEXT	5.278	5.489	2.081	–2.589*	–7.223
	(24.55)	(14.958)	(1.521)	(1.350)	(24.585)
WOODPAP	–1.440	–.533	1.589	–2.685**	–.465
	(1.628)	(1.591)	(1.289)	(1.343)	(1.367)
CHEM	–.688	–1.131	–.167	–.710	–.493
	(1.304)	(1.269)	(1.055)	(.851)	(.938)
MET	–2.249*	–1.798	.204	–1.260	–.295
	(1.277)	(1.308)	(1.121)	(.881)	(.961)
MACH	–1.614	1.854	1.845	–1.509	–.971
	(1.525)	(1.387)	(1.376)	(.991)	(1.208)
AUTO	–1.410	1.034	.211	–.621	.590
	(1.741)	(1.558)	(1.445)	(1.107)	(1.274)
BVG		.487	.184	–.419	–.255
	(.614)	(.528)	(.525)	(.664)	
Constant	–4.388	–2.425	.358	–.739	3.167
	(2.929)	(2.413)	(1.977)	(1.782)	(2.381)
Omnibus tests of model coefficients (Chi-square)	25.4	36.6	43.5	41.0	28.2
Significance	0.013	0.001	0.000	0.000	0.008
Overall accuracy of classification	80.2%	73.9%	70.8%	72.7%	77.6%

Notes: S.E. in parantheses.
* significant at 0.10 level, ** significant at 0.05 level, *** significant at 0.01 level (Wald).

Table 2

Ordinal regression. Dependent variable: share of foreign investors in equity (groups: FOR = 0, 0 < FOR < 50%, 50% < FOR < 90%, 90% < FOR < 100%)

Variables	Estimate	Std. Error	Wald	Sig.
ATPASTAV	–1.150	1.547	.553	.457
XINTAV	1.539	.656	5.499	.019
LOGASTAV	–.391	.182	4.629	.031
LOGPRAV	.816	.246	11.055	.001
SECSALAV	4.526E-04	.001	.176	.675
[TRAD=.00]	–9.322E-02	.904	.011	.918
[HT=.00]	1.226	1.162	1.112	.292
[FOOD=.00]	.414	.900	.212	.645
[TEXT=.00]	–2.464	1.434	2.951	.086
[WOODPAP=.00]	–1.865	1.158	2.596	.107
[CHEM=.00]	.158	.848	.035	.852
[MET=.00]	–5.507E–03	.895	.000	.995
[MACH=.00]	–1.721	1.019	2.854	.091
[AUTO=.00]	–.514	1.087	.223	.636

Notes: Model Fitting Information: Chi-Square 42.9, df 14, significance: 0.000, Link function: logit, Pseudo R-Square: Cox and Snell 0.233, Nagelkerke 0.251, McFadden 0.101.

Table 3

Ordinal regression. Dependent variable: equity share of Hungarian institution, investors (ordinal variable; groups: HEN = 0, 0 < HEN < 50%, 50% < HEN)

Variables	Estimate	Std. Error	Wald	Sig.
ATPASTAV	.722	1.679	.185	.667
XINTAV	–1.029	.722	2.027	.155
LOGASTAV	.166	.197	.712	.399
LOGPRAV	–1.035	.284	13.283	.000
SECSALAV	–1.343E-02	.028	.232	.630
[TRAD=.00]	.164	.997	.027	.869
[HT=.00]	.249	1.243	.040	.841
[FOOD=.00]	–1.058	.964	1.207	.272
[TEXT=.00]	1.352	1.460	.857	.355
[WOODPAP=.00]	.555	1.216	.208	.648
[CHEM=.00]	–.169	.974	.030	.863
[MET=.00]	.188	1.019	.034	.854
[MACH=.00]	.187	1.070	.031	.861
[AUTO=.00]	–1.502	1.138	1.742	.187

Notes: Model Fitting Information: Chi-Square 37.5, df 14, significance: 0.001, Link function: logit, Pseudo R-Square: Cox and Snell 0.207, Nagelkerke 0.239, McFadden 0.115.

FIGURES

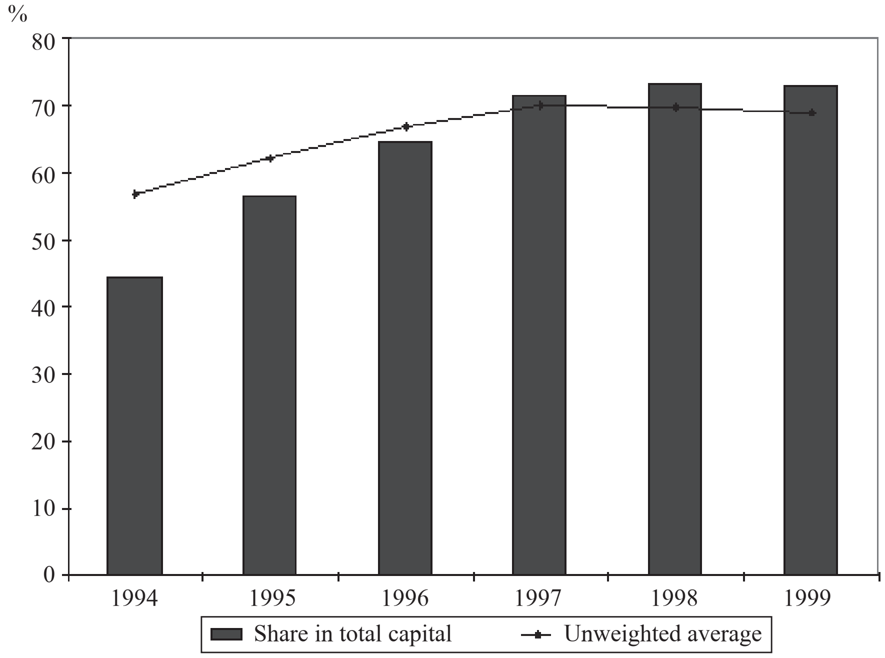

Figure 1. The evolution of share of foreign equity in Hungarian firms, 1994–1999

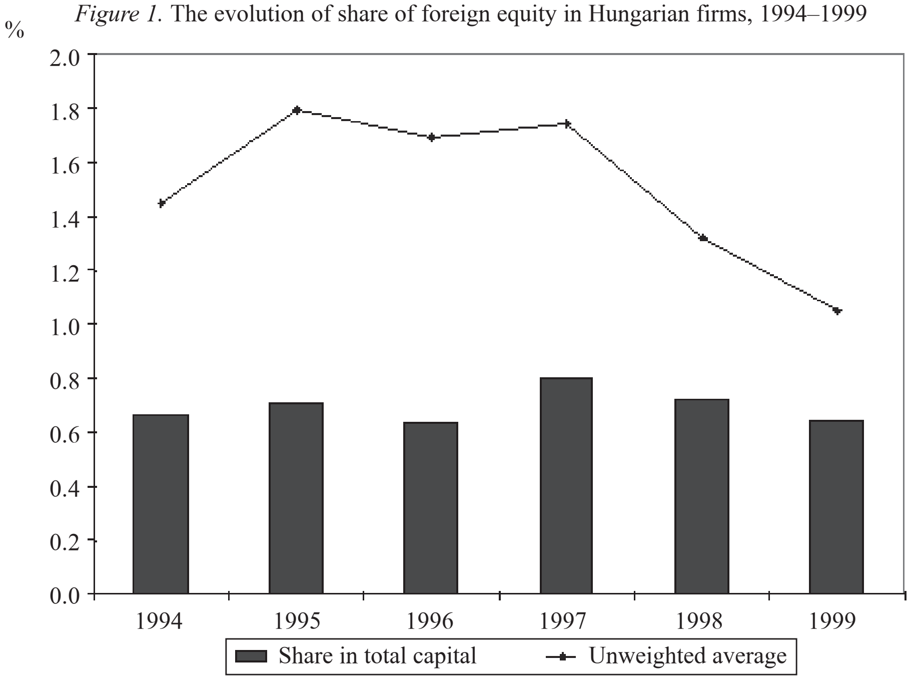

Figure 2. The evolution of share of insiders in Hungarian firms, 1994–1999

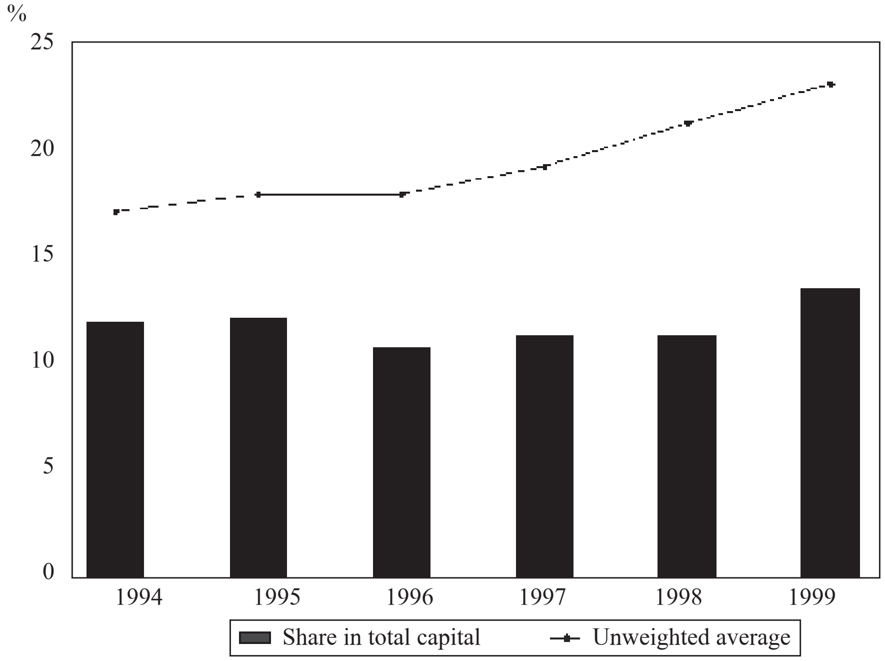

Figure 3. The evolution of share of domestic enterprises equity in Hungarian firms, 1994–1999

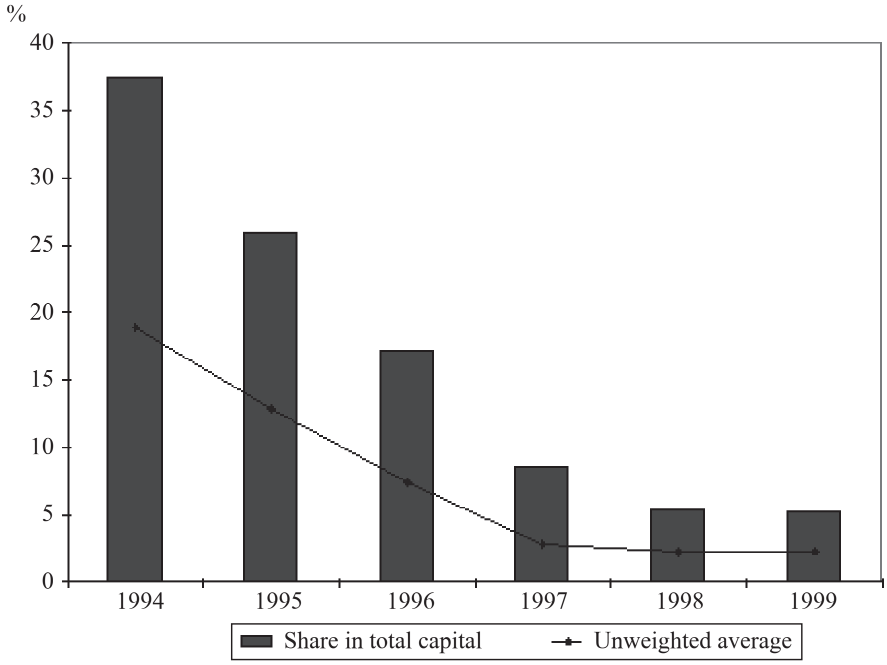

Figure 4. The evolution of share of state equity in Hungarian firms, 1994–1999

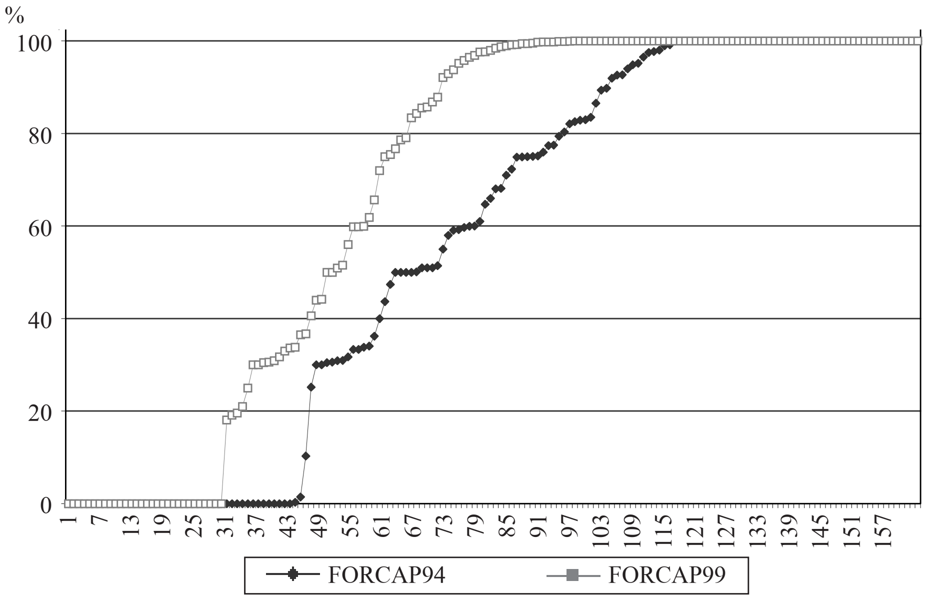

Figure 5. Distribution of foreign capital share in equity, 1994–1999

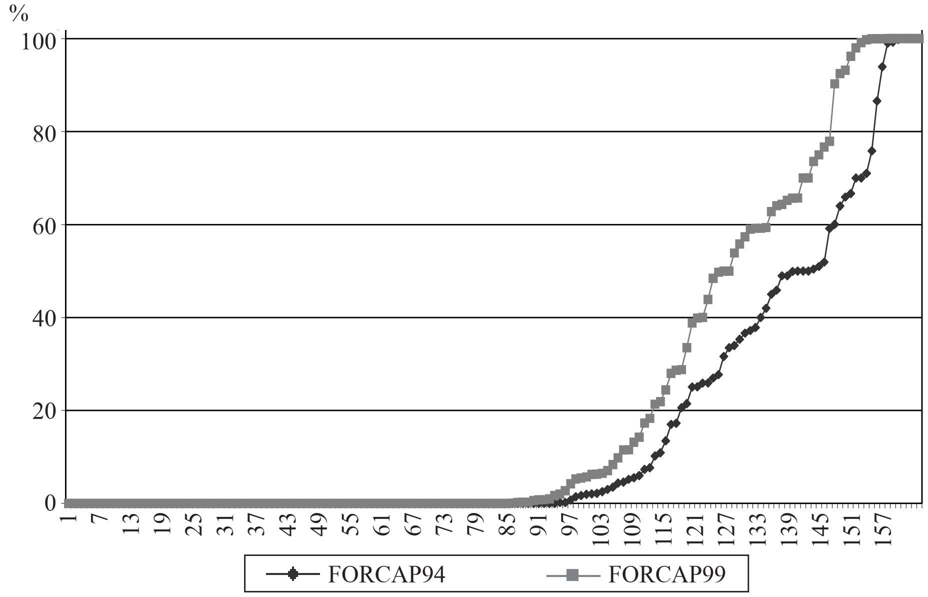

Figure 6. Distribution of Hungarian enterprises' share in equity, 1994–1999

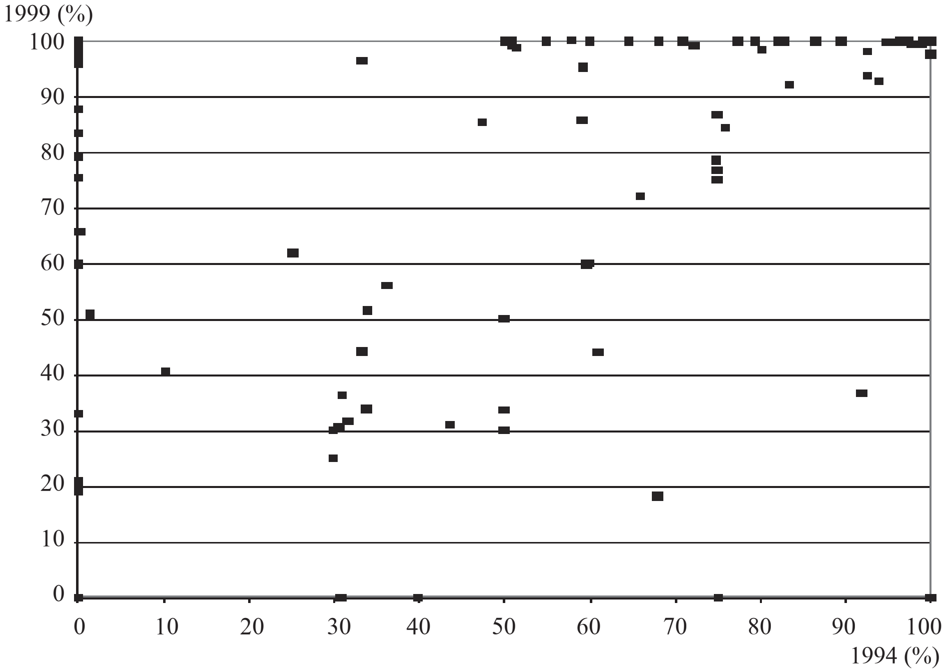

Figure 7. Scatter diagram: share of foreign capital in equity, 1994 and 1999

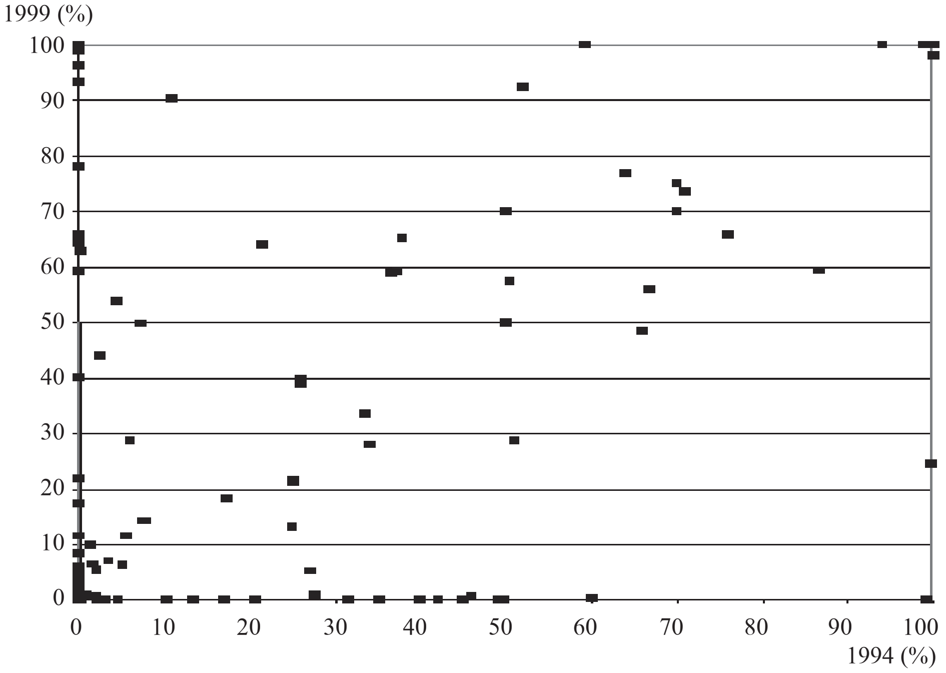

Figure 8. Scatter diagram: share of Hungarian institutional investors in equity, 1994 and 1999