FIRM OWNERSHIP STRUCTURES: DYNAMIC DEVELOPMENT

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Abstract:
This paper analyzes development of the ownership structures in Czech voucher-privatized firms during 1996 – 1999. The period can be characterized by increasing ownership concentration uniformly across all categories of owners with exception of banks. Within frequent changes uncovered by cluster analysis, higher ownership concentration was found to preserve itself. In general, investment funds and portfolio companies recorded the highest average concentration increase. Industrial companies and individual owners were found to be the most stable type of owner. Sector perspective shows that while in 1996 the firms do not exhibit excessive differences among sector specific attributes with respect to the proportion of stake held, in 1999 they do.

Keywords: ownership structure, ownership concentration, privatized firms, industry sectors

JEL Classification: G320, G340, L220, P520

1. Introduction

After the demise of command system, the Central and Eastern European countries were left with inefficient economic structure. One of key issues to deal with this problem was the privatization of state property. Indeed, after a decade of transition private firms have produced a sheer majority of gross domestic product in the Czech Republic. The growth of private sector was enabled through privatization of state firms in large-privatization, mainly by voucher method. The natural question that arises is how these firms developed over time with respect to their ownership. The changes in ownership concentration and overall ownership structure of the voucher-privatized firms are the focus of our research.

The two waves of the voucher privatization took place from 1991 to 1994. The early post-privatization period following the end of voucher privatization, in the years 1994 and 1995, was when the post-privatization ownership structure in Czech companies took shape. During the so-called third wave of privatization, which took place mostly during 1995 and continued into 1996, changes in the ownership structure

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of companies were happening very frequently and extremely rapidly.[1] Investors, including the Privatization Investment Funds (PIF), were reshaping their initial immediate post-privatization portfolios of acquired companies. This was done with two purposes on mind: first, to optimally diversify their portfolios, and second, to concentrate their ownership in specific firms and industries.

The process was quite chaotic and highly unregulated by legal provisions. Frequently investors, and especially PIFs, simply engaged in direct swaps of shares. Direct (off-market) share trading was also very common. Less frequently, an exchange of shares was carried out through a sell-buy operation on the market. The process was extremely dynamic and often legally questionable.

As initial evidence we present an account of the overall evolution of ownership during the years from 1993, when the first wave was concluded, to 1999. It is presented only as a background for further detailed analysis. The ownership data set of Czech firms listed on the Prague Stock Exchange (PSE) for the years 1993 – 1999 was compiled from the commercial database Aspekt. Due to the limitations in the original data-sources, there is no single firm for which we have ownership data for all seven consecutive years. Thus, the following account covers all firms for which data on the ownership structure were available. The description does not deal exclusively with firms privatized in the voucher scheme, but attempts to provide a sketch of trend in ownership concentration for a relatively large representative sample of Czech firms.

Despite this limitation we can get a fairly good notion about the primary changes in ownership structure by using the following ownership concentration measures: the percentage of the equity owned by the single largest owner (C1), the percentage of the equity owned by five largest owners (C5), and the Herfindahl Index of ownership concentration (H). Herfindahl – Hirschman index was developed independently by Hirschman (1945) and Herfindahl (1950). This index is calculated as the sum of the squared shares of each owner. Table 1 below presents the evolution of mean values of three different ownership concentration indices.[2]

Table 1
Evolution of Mean Values of Three Ownership Concentration Indices

Year	No. of observations	C1 (Mean)	C5 (Mean)	H (Mean)
1993	2,357	55.88	94.02	0.52
1994	3,146	58.16	94.72	0.54
1995	3,635	60.07	95.36	0.56
1996	1,966	42.04	60.53	0.27
1997	2,024	46.54	64.89	0.32
1998	1,566	48.17	65.16	0.32
1999	897	51.60	67.22	0.36

Note: C1 measures the percentage of the equity owned by the single largest owner and C5 that held by the five largest owners. H stands for the Herfindahl index of ownership concentration.

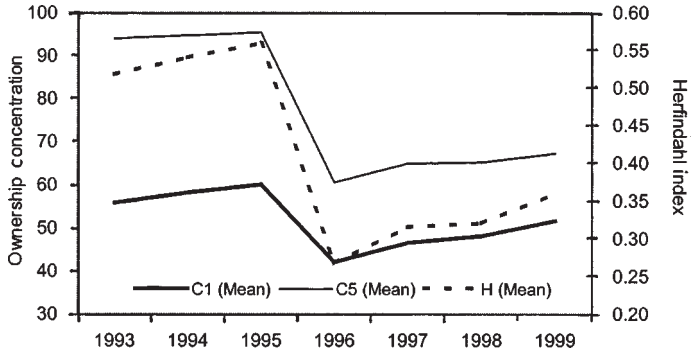
Figure 1 depicts the evolution of the means of C1, C5 and the Herfindahl index during the 1993 – 1999 period. It clearly shows an initial increase in ownership con-

1) Hashi (1998) raised concerns about a financial oligarchy controlling a considerable part of the economy and exercising undue influence over the market structure.

2) In the literature, a higher concentration index for the ten largest owners (C10) is sometime calculated. Since C5 reaches quite high values in our case (63 % on average), we omitted C10 index since it would not provide any additional insight.

centration, followed by a drop in concentration from 1995 to 1996. This is even more accentuated in the evolution of C5. This index dropped from 94 per cent to 67 per cent. Moreover, the Herfindahl index, which is more sensitive to the ownership concentration, fell from 0.52 to 0.36. Such a picture is in line with the development of the "third wave" of privatization presented above.

Figure 1
Evolution of Ownership Concentration (in %)



Note: C1 measures the percentage of the equity owned by the single largest owner and C5 that held by five largest owners. H stands for Herfindahl index of ownership concentration.

After 1996 the concentration started to increase again, although at a slower pace, as it commenced to reflect economic reasons of owners for the future development of firms. In the next section we analyze changes in ownership structure that may also affect firms' performance. To investigate relationship between ownership and performance is beyond the scope of this paper, though.[3)]

2. Ownership Evolution: Data, Concentration, and Structure

In the previous section we provided a brief description of the overall state of ownership concentration in the Czech Republic during the 1990s. Now we concentrate on analyzing a broad scope of issues associated with the evolution of ownership structures after 1995, when the voucher privatization scheme was officially concluded. Since our goal is to examine the changes in the ownership structure of firms involved in the voucher privatization, we focus our attention on these firms and supply some comparison with firms that did not fall under the scheme.

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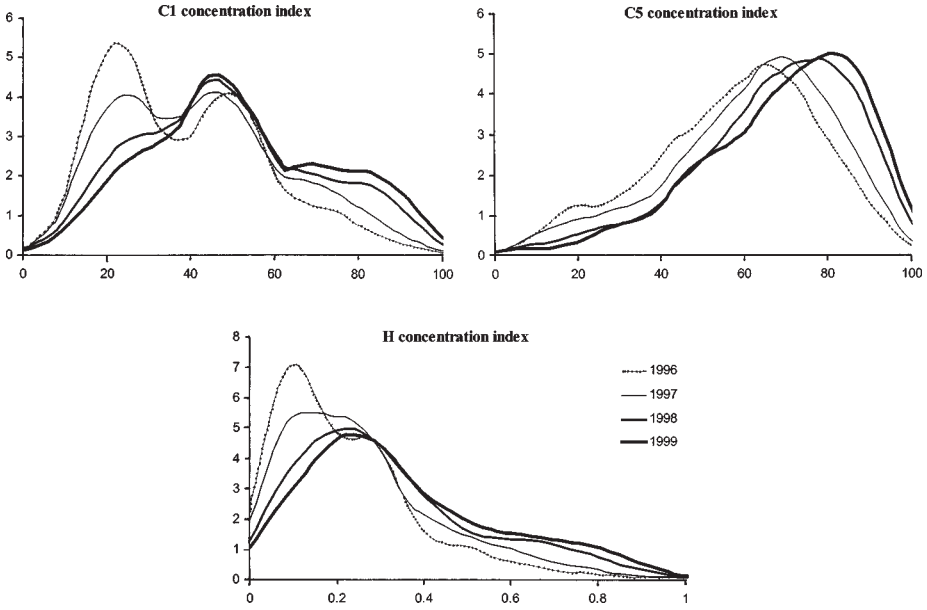
3) The reason why ownership concentration is important is that the ownership structure may affect economic performance of firms. It is standard wisdom that dispersion of ownership has an adverse effect on performance of the firm. Schleifer and Vishny (1997) survey research on corporate governance, with special attention to ownership concentration in corporate governance systems around the world. McConnel and Servaes (1990) examine the impact of ownership structure on company economic performance in the largest European companies. On the other hand, studies by Coase (1988) or Demsetz and Lehn (1985) argue that the relationship between ownership concentration and corporate performance is spurious. Claessens and Djankov (1999) found that the more concentrated the ownership, the higher the firm's profitability and labour productivity. Therefore, understanding of changes in ownership structure could ease dispute whether ownership structure affects performance. For more details on ownership-performance issue in case of the Czech firms see Kočenda (2002).

Using solely mean of ownership concentration for any conclusions about changes in ownership structure would be simplistic, and we could lose a lot of interesting information. Thus, as an additional tool for our analysis, we use density functions of ownership concentration indices to paint a broader picture of ownership structure and its changes during the period from 1996 to 1999.

The data were compiled from the commercial database Aspekt and the Fund of National Property of the Czech Republic. We reduced our sample of firms to those for which we have overlapping ownership data for years 1996 – 1999. The data sample then contains 750 firms, of which 645 were privatized under the voucher scheme and 105 firms were not. The voucher-privatized firms in the sample were involved in the first, second, or both waves of the voucher privatization. The sample thus contains yearly ownership data for near to 40 % of the 1664 firms that were privatized within the voucher scheme.

The voucher scheme did not fulfill its main mission to cut ownership link among the state and firms since a large amount of the residual state property was left after the voucher scheme ended and a large potential control of the state persisted over substantial part of economy. During the years 1996 – 1999 the share positions of the State in the (already) voucher privatized companies remained large and only recently and slowly residual state property begun to diminish (see Kočenda, 1999). The complicated web of interlocking and non-transparent ownership structures emerged after the privatization was officially completed and thus the Czech Republic does not offer a clear data environment to work with.[4] The point may be illustrated by a situation when a bank and an Investment Privatization Fund (IPF) that is owned by such a bank belong among five largest owners. In such a situation the two

Figure 2
Density Functions of Concentration Indices: Voucher-Privatized Firms (in %)



4) Obstacles with using transition countries' data are widely discussed by Hanousek and Filer (2002).

owners would surely act together – for example at the general assembly meeting – and thus should be understood as a coalition. Such coalition is naturally reinforced by the presence of the state having a major stake in a bank. There are also less obvious cases of interlocking ownership which, however, cannot be dealt with due to the nature of available data and that are very difficult to measure as well (see Turnovec, 1999).

Figure 2 presents plots of densities of concentration indices C1 (single largest owner), C5 (five largest owners) and H (Herfindahl index) for 645 firms involved in voucher privatization. Each line represents a different year. All plots are the non-parametric densities, using the Epanechnikov kernel (1969). The horizontal axis shows ownership concentration from 0 to 100 % and the vertical axis shows frequency of a firm with given ownership concentration in a sample. Ownership concentration measured by C1 resembles a bi-modal distribution since it exhibits two prominent regions where concentration occurs. In 1996 a high percentage of firms falls in the left region (0 to 35 %⟩, and their proportion gradually decreases thereafter. In particular, the number of firms with C1 in the interval (0 %, 35 %⟩ decreased from 317 firms in 1996 to 151 firms in 1999. The second region centers around value of 50 %. The number of firms around this second hump has slightly increased during the four-year period. In general, from Figure 2 it can be seen that in year 1996 the density of C1 more or less resembled a bimodal distribution, but over the four-year period it has moved in the direction of a normal distribution. Overall, the mean value of C1 in our sample increased from 38.9 % to 52 %, as documented in Table 2.

Figure 2 also shows that the density function of the C5 index has gradually shifted to the right, indicating the clear increase in ownership concentration of the five largest shareholders. Table 2 complements the above figure as it shows how the mean value of the C5 index increased from 57.4 % in 1996 to 69.2 % in 1999.

Both sets of previous findings are fully confirmed by the evolution of the Herfindahl (H) index that serves as an alternative measure of ownership concentration with respect to the C1 and C5 indices. The density of the H index has become flatter, and Table 2 shows that its mean value has gradually increased from 0.22 in 1996 to 0.35 in 1999.

Table 2
Ownership Concentration Indices: Voucher Privatized Firms

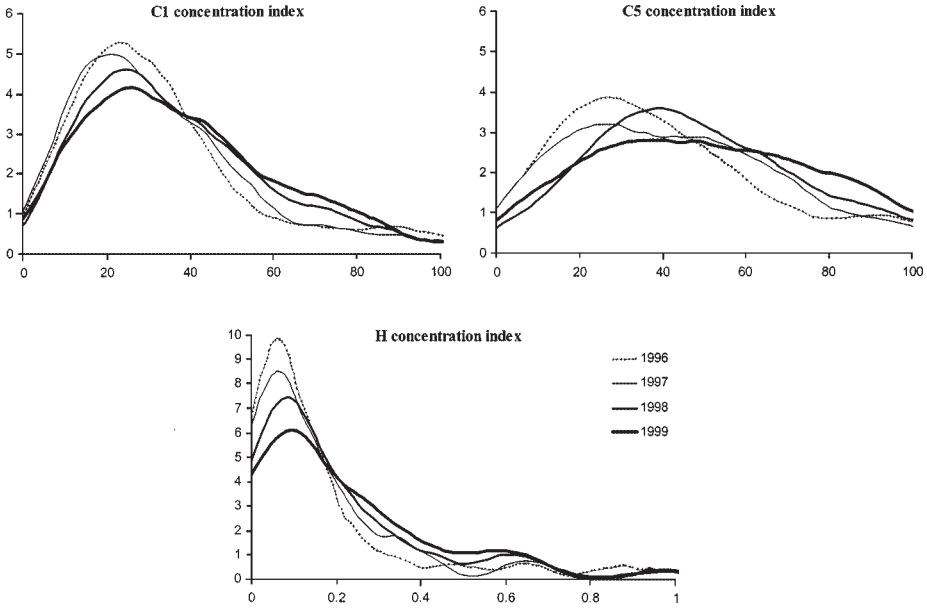
Concentration index (year)	Number of observations	Mean	Std. deviation
C1 (1996)	645	38.91	19.28
C1 (1997)	645	42.80	20.38
C1 (1998)	645	48.62	21.51
C1 (1999)	645	51.82	21.79
C5 (1996)	645	57.40	19.90
C5 (1997)	645	61.29	19.95
C5 (1998)	645	67.04	19.44
C5 (1999)	645	69.17	19.10
H (1996)	645	0.22	0.16
H (1997)	645	0.26	0.18
H (1998)	645	0.32	0.21
H (1999)	645	0.35	0.22

Note: C1 measures the percentage of the equity owned by the single largest owner and C5 that held by five largest owners. H stands for Herfindahl index of ownership concentration.

In our sample of 645 firms involved in voucher privatization, there were 433 firms that were privatized during the first wave, 91 firms privatized during the second wave, and 121 firms that were privatized sequentially during both waves. In order to distinguish any possible characteristics that might be specific to either the first or second wave of voucher privatization we computed similar sets of statistics, as well as densities, for the three sub-samples of firms. However, we found any specific characteristics to be insignificant, and we do not report them. Based on this result we do not distinguish in our further analysis whether a given firm was involved in the first, second, or both waves of voucher privatization. The decisive parameter remains whether a firm was involved in voucher privatization or not.

Following our previous results we investigate whether there are any similarities in the density functions of concentration indices and their evolution over time between voucher privatized firms and those that were not involved in voucher scheme. Figure 3 presents density functions of ownership concentration indices of firms that were not involved in voucher privatization (105 firms). Similarly to Figure 2 each line represents a different year. All plots are the non-parametric densities, using the Epanechnikov kernel (1969). The horizontal axis shows ownership concentration from 0 to 100 % and the vertical axis shows frequency of a firm with given ownership concentration in a sample.

Figure 3
Density Functions of Concentration Indices: Firms not in Voucher-scheme (in %)



The density functions in Figure 3 markedly differ from those presented in Figure 2. The shape of the C1 density was found to be similar to the density of the student *t*-distribution. It is important to note that it has no bimodal shape, in contrast to voucher-privatized firms. All three plots of concentration indices suggest that the most pronounced change occurred in 1998. In other years the changes were rather limited. Moreover, the density function of C5 becomes flatter and flatter each year, and

in 1999 index C5 is roughly uniformly distributed over the interval (0,100). This is in sharp contrast with the skewed density of the C5 in the case of the voucher-privatized firms.

As in the case of voucher-privatized firms, Table 3 complements the results presented in Figure 3 for the firms that did not belong to the voucher scheme part of the sample. Table 3 shows that ownership concentration increased over four years, albeit not to the same extent as in the voucher scheme group. The mean value of the C1 index has increased from 32.85 % in 1996 to 37.96 % in 1999, and that of the C5 index from 39.67 % to 50.32 % respectively.

Table 3
Ownership Concentration Measured by C1 Index: Firms not in Voucher Scheme

Concentration index (year)	Number of observations	Mean	Std. deviation
C1 (1996)	105	32.85	22.16
C1 (1997)	105	32.57	21.53
C1 (1998)	105	36.44	22.15
C1 (1999)	105	37.96	22.15
C5 (1996)	105	39.67	24.84
C5 (1997)	105	42.73	25.33
C5 (1998)	105	47.74	24.76
C5 (1999)	105	50.32	27.05
H (1996)	105	16.87	0.22
H (1997)	105	17.23	0.21
H (1998)	105	20.24	0.21
H (1999)	105	22.09	0.22

Note: C1 measures the percentage of the equity owned by the single largest owner and C5 that held by five largest owners. H stands for Herfindahl index of ownership concentration.

Although both samples of firms (those involved in voucher privatization and those that were not) are different in size, we can see that voucher-privatized firms have persistently higher means of ownership concentration. Further, voucher privatized firms were subject to more pronounced – and less regular – changes in ownership concentration.

3. Dynamics of Ownership: Concentration Clusters

Based on the results documented in Figure 2 and Table 2 a following important conclusion emerges. Voucher-privatized firms experienced the largest change in ownership concentration within the part of the sample made up of firms in which the single largest investor held a stake of 15 to 35 %.

Plots of the density functions of C1 indices (Figure 2) show that concentration indices were clustered within certain intervals. In the next part of our analysis, we will describe the definition, though intuitive, of three such clusters. Then we will study how firms, or rather their C1 indices, move across these clusters. Such an approach will allow us to broaden the picture of changes in ownership structure and concentration.

As was noted, the largest change in ownership concentration occurred among firms whose value of C1 was in the interval of (0 %, 35 %⟩. From Figure 2 there can

be seen that the densities of the value of C1 for respective years reach their local minimum between 30 and 40 %, with an average of 34.2 %. Thus, we set the upper boundary of the first cluster at 35 %. The lower boundary was set at zero. Setting the lower boundary at a point different from zero (say 5 or 10 %) would have no significant influence on our conclusion; on the other hand, with a lower boundary of zero we are able to cover the whole distribution range. Using a similar argument based on the existence of another local minimum allows us to set the upper boundary of the second cluster at 63 % per cent. The third upper boundary lies at 100 % by definition. The C1 indices are thus divided into three clusters for each year. The first cluster contains firms whose C1 value is in the interval of ⟨0 %, 35 %⟩, the second cluster contains firms whose C1 value lies in the interval (35 %, 63 %⟩, and the third, last, cluster contains the remaining firms, with their C1 in the interval (63 %, 100 %⟩.

Now we will study in detail how firms are moving across these clusters. Transition matrices in Table 4 present changes in clusters between two consecutive years. We can see that each year more or less the same patterns. Roughly 70 % (72, 66, 74) of the firms whose C1 value was in the first cluster in the first year remained in the same cluster in the following year. In about 22 % (22, 25, 19) of the firms, the C1 value increased and in the next year they moved to the second cluster. The remaining firms originally in the first cluster (6, 9, 8) moved to the third cluster. Moreover, it is clear that firms in higher clusters have a strong tendency to remain in them. In other words, only 70 per cent of the firms from the first cluster remained in the same cluster, but almost 90 per cent of the firms in the third cluster remained there.

Table 4
Transition Matrix of C1 Concentration (in %)

Period 1996 – 1997

Cluster in 1996 \ Cluster in 1997	1	2	3
1	72	22	6
2	13	70	17
3	5	8	87

Period 1997 – 1998

Cluster in 1997 \ Cluster in 1998	1	2	3
1	66	25	9
2	6	77	18
3	1	9	90

Period 1998 – 1999

Cluster in 1998 \ Cluster in 1999	1	2	3
1	74	19	8
2	4	84	12
3	1	5	94

The evolutionary process described above can be viewed as the transition from one cluster to another. The exact calculations of transition probabilities from one year to another are calculated and presented in Table 5. When we multiply this transition matrix by itself we get the change in the number of firms belonging to a particular cluster after three consecutive years (two transitions). If we wish to calculate the overall change (from year 1996 to 1999) in the number of firms belonging to a particular cluster, we would multiply the transition probability matrix by itself three times (T*T*T). Such an operation would yield a prediction of changes in clusters that

would, in fact, not be critically far from the actual empirical findings (these are presented in Table 6).

Table 5
Transition Probabilities among Three Clusters

		Cluster in current year		
		1	2	3
Cluster in previous year	1	0.694	0.239	0.067
	2	0.087	0.749	0.163
	3	0.014	0.079	0.906

Table 6
Total Transition Matrix of C1 Concentration: 1996 – 1999 (in %)

		Cluster in 1999		
		1	2	3
Cluster in 1996	1	40	39	21
	2	10	53	37
	3	2	19	79

The overall, empirically observed, change in clusters during the years 1996 – 1999 is presented in Table 6. We can see that only 40 % of firms that belonged to the first cluster in 1996 remained in this cluster in 1999, 39 % of the firms in that cluster in 1996 moved to the second cluster by 1999, and the remaining 21 % ended in the third cluster. 53 % of all firms whose C1 value was in the interval (35 %, 63 %⟩ in 1996 remained in this cluster, 37 % per cent of them moved to the higher cluster, and the remaining 10 % moved to the first cluster. 79 % of firms that were in the third cluster in 1996 remained in this category, 19 % of them moved to the second cluster and the remaining 2 % dropped down to the lowest, first cluster.

4. Changing Places: Types of Owners

We complement the above analysis of changes in ownership concentration by an analysis of changes in the type of the single largest owner of a given firm. In our data set we distinguish six types of owners: industrial companies, banks, investment funds, individual owners, portfolio companies, and the state.[5] Here we will analyze the evolution of the mean ownership position of the single largest owner, using the above typology. Table 7 shows the mean and standard deviation of the C1 index. The computed mean is an arithmetic average of all shares of owners belonging to a particular group of owners, and is calculated only for those firms in which this group appears as the single largest owner.

We can see an increase in the mean value of C1 for all types of owners from 1996 to 1999, except for bank category. The mean value of C1 (for firms in which an industrial company is the single largest owner) is for a year 1996 the highest among all other categories (46.7 %) and remained so until 1999. Investment funds have the lowest mean value of the C1 in 1996. However, in 1999 the mean values of the C1 in these firms reach values comparable with those firms with other types of owners. In general, the highest average concentration increase between 1996 and 1999 was recorded in the case of firms with investment funds (from 27.9 to 45.9, i.e. 64 % increase) and portfolio companies (from 38.8 to 55.2, i.e. 42 % increase) as the single largest owners. A decrease in mean holding can be observed in the case of banks (from 38.5 to 34.8, i.e. 10 % decrease).

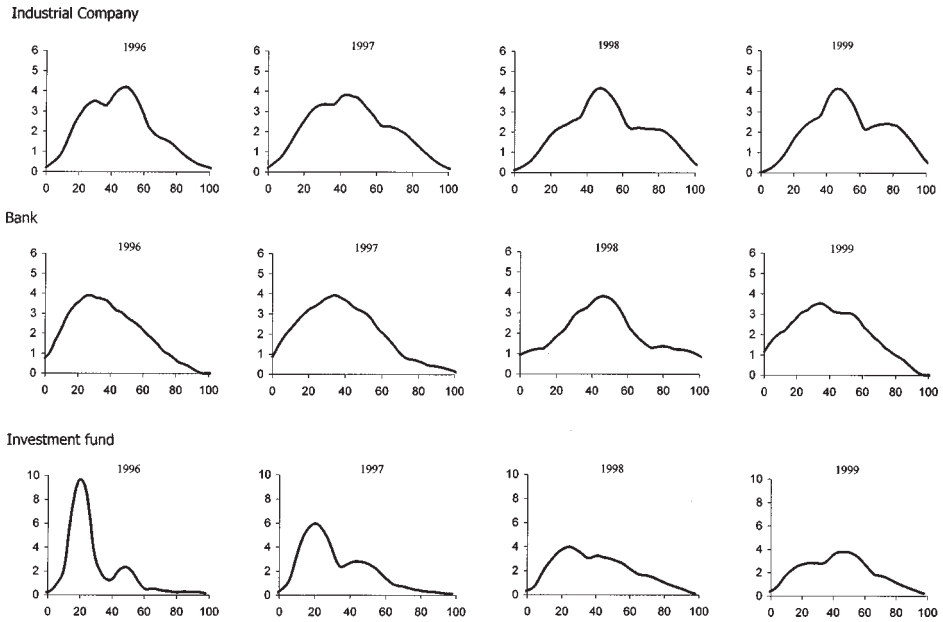
5) The difference between an investment fund and a portfolio company is defined as follows. An investment fund buys shares of a certain company in order to exercise voting rights and to acquire profit from the company later. On the other hand, the portfolio company buys shares of a certain firm to sell these shares for a higher price in order to realize a capital gain. The portfolio company does not attempt to exercise voting rights or extract corporate profits.

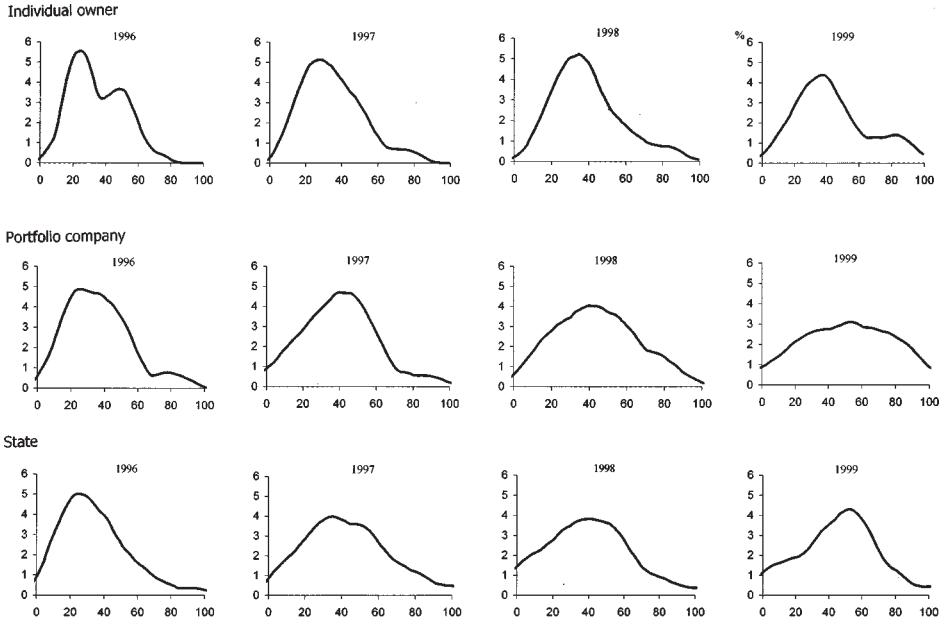
Table 7
Ownership Position of the Particular Types of Single Largest Owner

Type of the single largest owner	Descriptive statistics for C1 index of respective owner type					
	Year	Num. of obs.	Mean	Std. dev.	Min.	Max.
Industrial company	1996 1999	294 399	46.65 55.75	19.16 20.91	5.82 5.49	99.02 99.30
Bank	1996 1999	19 8	38.54 34.77	20.45 13.04	9.15 17.61	75.98 49.90
Investment fund	1996 1999	145 94	27.92 45.92	15.43 20.71	3.00 5.64	88.34 90.53
Individual owner	1996 1999	89 109	35.12 44.64	15.18 22.68	2.86 0.36	69.09 92.22
Portfolio company	1996 1999	38 18	38.79 55.17	17.79 23.83	11.62 17.17	85.64 91.02
State	1996 1999	60 17	33.44 42.99	18.44 20.43	1.03 5.00	89.55 72.63

Since the mean share has only limited explanatory power, Figure 4 presents the entire densities of ownership concentration by category of single largest owner over four consecutive years. As before, all plots are the non-parametric densities using Epanechnikov kernel (1969). The horizontal axis shows ownership concentration

Figure 4
Densities of Ownership Concentration by Category of Single Largest Owner (C1) (in %)





from 0 to 100 % and the vertical axis shows frequency of a firm with given ownership concentration in a sample.

We can see that over the time the shapes of the distributions change decisively. An increase in C1 is clearly visible in the movement of the humps from left to right. When we recall Figure 2 we can state that the two-hump density distribution of ownership concentration is caused by the presence of this pattern in the ownership positions of industrial companies, investment funds, and individual owners. The disappearance of this bi-modal shape is the most prominent feature in the case of investment funds. Stakes of the state exhibit the largest tendency to increase over time, while their number decreases. This is in accord with the aim of the state to sell residual state property but to maintain power in companies of special interest.

Table 8 summarizes information about changes with respect to the type of the single largest owner between 1996 and 1999. We identify the following trends. Industrial firm is the most stable type of the single largest owner, followed by an individual owner. In 78 % of firms whose single largest owner in 1996 was an industrial company, the same was true in 1999. An individual owner was in a same position in a case of 58 % of firms. The least stable type of owner is the portfolio company. Only 5 % of firms with such dominant owners in 1996 still had them in 1999. The industrial company category is the owner category that recorded by far the largest ownership gains. The evidence is presented by increases recorded in the first column of the table.

Table 8
Changes in Ownership Concentration by Type of a Single Largest Owner (1996 – 1999, in %)

Type of the single largest owner in 1996	Type of the single largest owner in 1999						
	Industrial company	Bank	Invest. fund	Individual owner	Portfolio company	State	Total
Industrial company	*78*	0	7	10	3	2	100
Bank	53	*11*	21	10	5	0	100
Investment fund	57	2	*31*	8	2	0	100
Individual owner	34	0	6	*58*	2	0	100
Portfolio company	45	0	34	16	*5*	0	100
State	48	3	12	12	3	*22*	100

5. Concentration and Industry Sectors

In this section we explore a question whether there are any differences among firms with respect to industry sectors complemented with two degrees of ownership concentration. The parameter of the single largest owner type is suppressed here. Based on our earlier discussion we divide firms into two groups. The first group contains firms where a single largest owner holds less than 35 % (lower concentration) and the second group those where this stake is larger than 35 % (higher concentration). The firms are then divided according to 19 sector categories of the Prague Stock Exchange. Table 9 presents the data in compact form for years 1996 and 1999.

From the Table 9 we can derive two sets of observations. First set is based on the per cent proportions of firms with both lower and higher ownership concentration. In both years the firms in our sample exhibit tendency to group into four sectors. These are: construction and building materials, mechanical engineering, trade, and services. The four sectors alone represent about 52 % of firms in our sample. Since our sample covers almost half of the firms privatized under voucher scheme we do not attribute this finding to either a selection bias or a coincidence. The cluster resembles, rather to a large extent, a composition of the Czech GDP if represented by loose definition of sectors of production.

The second set of observations is derived from intertemporal comparison of lower and higher ownership concentration alone. With the exception of the firms in four mentioned sectors there are no essential differences in proportions of firms where a single largest owner holds a stake below or above 35 % threshold. In 1996 the sector of construction does not exhibit excessive differences in sector specific attributes with respect to the proportion of stake held by a single largest owner. Services, mechanical engineering, and trade, on the other hand, do: services and mechanical engineering firms show positive correlation of their proportion within the sample with higher ownership concentration, while opposite is true for trade.

Table 9
Distribution of Firms by a Single Largest Owner Across Sectors

Prague Stock Exchange Sector Category	1996				1999			
	Lower concentration		Higher concentration		Lower concentration		Higher concentration	
	Num. of firms	in %	Num. of firms	in %	Num. of firms	in %	Num. of firms	in %
Agriculture	17	6.67	13	4.64	5	4.31	25	5.97
Food production	15	5.88	15	5.36	7	6.03	23	5.49
Production of beverages & tobacco	5	1.96	6	2.14	1	0.86	10	2.39
Mining	1	0.39	3	1.07	0	0	4	0.95
Textiles	15	5.88	15	5.36	10	8.62	20	4.77
Wood and paper industry	7	2.75	11	3.93	2	1.72	16	3.82
Chemicals, pharmaceuticals & rubber	8	3.14	12	4.29	0	0	20	4.77
Construction and building materials	**36**	**14.12**	**40**	**14.29**	**26**	**22.41**	**50**	**11.93**
Metallurgy and metal processing	10	3.92	15	5.36	4	3.45	21	5.01
Mechanical engineering	**35**	**13.73**	**45**	**16.07**	**15**	**12.93**	**65**	**15.51**
Electrical engineering & electronics	15	5.88	8	2.86	9	7.76	14	3.34
Utilities	8	3.14	2	0.71	1	0.86	9	2.15
Transportation & telecommunication	9	3.53	12	4.29	2	1.72	19	4.53
Trade	**29**	**11.37**	**23**	**8.21**	**16**	**13.79**	**36**	**8.59**
Finance & banking	2	0.78	0	0	0	0	2	0.48
Services	**32**	**12.55**	**49**	**17.5**	**16**	**13.79**	**65**	**15.51**
Glass, ceramics & jewelry	7	2.75	3	1.07	2	1.72	8	1.91
Investment funds	0	0	0	0	0	0	0	0
Others	4	1.57	8	2.86	0	0	12	2.86
Total	255	100.00	280	100.00	116	100.00	419	100.00

Note: Lower concentration denotes firms where the single largest owner holds less than 35 per cent. Higher concentration denotes firms where the single largest owner holds more than 35 per cent. Since investment funds were by-product of the voucher privatization and thus no fund could enter the scheme as a unit to be privatized, the Table 9 contains only zeros with respect to this sector.

The situation was radically different in 1999. Factor specific attributes with respect to the proportion of stake held by a single largest owner were present for all four sectors and their differences, if compared with 1996, widened. Mechanical engineering and services exhibited positive correlation of their proportion within the sample with higher ownership concentration. Construction and building materials, and trade exhibited an opposite relationship, and dominated the area of lower ownership concentration.

6. Conclusion

Years 1996 – 1999 can be characterized by increasing ownership concentration since ownership concentration indices used, namely C1, C5 and Herfindahl index, exhibit uninterrupted growth in their values. Inspection of densities of ownership

concentration further suggests that important changes in ownership concentration happened among three distinctive intervals that characterize degree of ownership. Such finding was then confirmed by cluster analysis. We found that firms were moving in between clusters quite often, though, the higher the concentration, the more likely the firm remains in the same cluster. Higher concentration thus works as self-preserving.

When inspecting a particular type of owner we found that investment funds and portfolio companies (as single largest owners) exhibited highest average concentration increase between 1996 and 1999. The only negative change was observed in case of banks. More detailed information reveals that industrial company is the most stable type of the single largest owner, followed by individual owner. The least stable type of the owner is portfolio company. Further we related ownership structure with industry sectors. We conclude that while in 1996 the firms do not exhibit excessive differences among sector specific attributes with respect to the proportion of stake held by a single largest owner, in 1999 they do.

We analyzed development of the ownership structures in Czech voucher-privatized firms during the period 1996 – 1999. According to our knowledge, possibly due to obstacles with data accessibility, such an analysis had not been done before. Therefore, we presented a reference article to fill such a gap.

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