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THE EVOLUTİON OF OWNERSHİP, INNOVATİON AND FİRM PERFORMANCE: EMPİRİCAL EVİDENCE FROM MACEDONİA

Abstract

The aim of this paper is to investigate the relationship between ownership evolution, innovation activities and firms performance using firm-level data on 60 privatised enterprises in Macedonia for the period 2001-2010. To examine the nature of this relationship we will develop a model relating the determinants of ownership and performance and apply it to the original dataset collected by the author. Specifically, the investigation will respond to several questions such as the impact of ownership structure and innovation activities undertaken by firms, competition from other firms, sector, location, age, size and other firm characteristics on the firm performance. The main contribution of this empirical work is reflected in the application of new and advanced econometric techniques such as two-step GMM kernel and enhanced CUE (GMM) estimations to the analysis of changes in performance resulting from the change in ownership in Macedonia. By investigating this relationship we provide sufficient evidence to support the view of significant ownership-performance relationship of privatised firms in Macedonia.

Keywords: ownership evolution, innovation activities, productivity

1. INTRODUCTION

In all transition economies, the transfer of ownership to the private sector resulted in an initial dispersion of ownership amongst a large number of new owners, followed by a gradual concentration of ownership and a change in the type of dominant owner. The privatisation process was expected to change the incentive structure of the privatised firms, alter the behaviour of the management, make the firms more dynamic, and eventually lead to an improvement in their performance. The aim of this study is to explore the process of evolution of ownership structure and its impact on the performance of firms in Macedonia.

Many studies investigating the relationship between ownership change and firm performance have already been published. Three major surveys, Megginson and Netter (2001), Djankov and Murrel (2002) and Estrin et al. (2009), have reviewed most of these studies. Megginson and Netter (2001) assess the overall impact of privatisation in the transition and non-transition economies. Djankov and Murrel (2002) review over one hundred academic studies to sum up the experiences of the TEs of Central and Eastern Europe in the decade of 1990s. Estrin et al. (2009) evaluate the effects of privatisation in TEs and China, using additional studies not covered in the previous surveys.

The empirical literature on ownership-performance relationship covers two main dimensions of ownership change: concentration of ownership and the type of the dominant owner emerging in the post-privatisation period. The question of whether or not concentrated ownership is more conducive to performance improvement than dispersed ownership has received much attention in the ownership-performance literature. However, a consensus has not been reached over the nature of the relation yet. As for the type of dominant owner, there is also much discussion as to what type of dominant owner (government, insider owners, domestic outsider owners or foreign owners) will be more able to engage in restructuring measures and improve the performance of firms.

One of the benefits expected from the privatisation processes is its fundamental role in establishing new set of organizational dynamics that promote innovation and a change in production technology. The novelty of this study is that it extends ownership structure-firm performance models by incorporating the innovation behaviour of firms.

In the area of ownership-performance relationship the literature has generated surprisingly diverse findings and many results are questionable because of the failure of some researchers to control adequately for endogeneity of ownership and the selection bias. The issue of the endogeneity of ownership structure was raised by Demsetz (1983) and Demsetz and Lehn (1985) who point out that the owners of a firm adjust their ownership of shares according to the performance and other characteristics of the firm. As pointed by Demsetz and Villalonga (2001), studies that have failed to take endogeneity into consideration produce biased estimation. Therefore, the more recent literature on this relationship have been addressing these issues (Kapopoulos and Lazaretou, 2007;

Hashi and Shehaj, 2007). Furthermore, the theoretical and empirical evidence indicates that firms were not chosen to participate in the privatisation process at random. In TEs some firms were privatised earlier than others. This fact raises the issue of the selection of the firms to be privatised. Therefore, in studying the effects of privatisation, potential selection bias brought about by strategic sequencing needs to be understood and controlled for.

To examine the nature of this relationship we will develop a model relating the determinants of ownership and performance and apply it to the dataset of 60 firms over a ten year period. Specifically, the investigation will respond to several questions such as the impact of ownership structure and innovation activities undertaken by firms, competition from other firms, sector, location, age, size and other firm characteristics on the firm performance. The main contribution of this empirical work is reflected in the application of new and advanced econometric techniques such as two-step GMM kernel and enhanced CUE (GMM) estimations to the analysis of changes in performance resulting from the change in ownership in Macedonia, something which has not been applied before.

By investigating this relationship we provide evidence to support the presence of a significant ownership-performance relationship in privatised firms in Macedonia. The results also indicate that in Macedonia the ownership structure, be it diffused or concentrated, is impacted by innovation activities, nationality of owners, and other firm characteristics. Furthermore, being concerned with the impact of innovation activities on ownership structure and firm productivity our results indicate that the innovation activities undertaken by firms after privatisation are significant factors.

The study is structured as follows. The next section discusses the model specification and the measurement of the variables involved. Section 3 provides a statistical overview of the overall sample. Section 4 presents a statistical overview of the data on the evolution of ownership. The empirical results are elaborated in Section 5, first by providing empirical estimations of determinants of ownership and then continuing with their impact on firm performance. Section 6 summarises the findings and concludes.

2. MODEL SPECIFICATION AND THE MEASUREMENT OF VARIABLES

The investigation of the relationship between ownership structure and firm performance is based on two models (Demsetz and Villalonga, 2001): (i) we estimate how ownership structure is affected by firm characteristics, including firm performance; and (ii) we investigate the extent to which the performance of firms is influenced by ownership structure. The general models to be estimated can be written in the following form:

$$Ownership\ Structure_{it} = \alpha_{it} + \beta_1 Performance_{it} + \sum_{j=1}^{m} \gamma_j X_{jit} + \varepsilon_{it} \qquad (1)$$

$$Performance_{it} = \alpha_{it} + \beta_2 Ownership\ Structure_{it} + \sum_{j=1}^{n} \delta_j X_{jit} + \vartheta_{it} \qquad (2)$$

Subscripts i and t refer to the company and year respectively, while subscript j indicates the j-th exogenous variable in the two equations. Ownership structure shows the percentage of shares of a company owned by the largest shareholder; performance is indicated by either labour productivity or net profit margin. X represents a vector of firm characteristics such as innovation activities, size, age, industry, restructuring activities, etc.

The first model supposes that firm performance and other firm characteristics would influence ownership concentration. Better performing firms would experience more concentrated ownership, since owners (or potential owners) would want to acquire more shares in order to take control of the firm. The second model considers the effect of ownership concentration and other firm characteristics on firm performance. The relationship between ownership concentration and firm performance is based on the hypothesis that large shareholders will help increase the profitability of the firm by closer monitoring and the amelioration of the agency problem. Despite much research in the field, the question remains whether large owners contribute to the solution of agency problem- or exacerbate it- in different environments.

The main concern in the literature is the cost of the separation of ownership and control, or the agency cost. Empirical studies investigating this relationship focus on the advantages of ownership concentration, but they do not provide consistent results (Claessens and Djankov, 1999; Hanousek, Kocenda and Svejnar, 2007; Grosfeld and Hashi, 2007; and Balsmeier and Czarnitzki, 2010, among others). Dispersed ownership in large firms increases the principal-agent problem due to asymmetric information and uncertainty while ownership concentration is expected to improve firm performance due to increased monitoring by owners and the consequent improvement in the quality of managerial decision. On the other hand, Grosfeld and Hashi (2001) have pointed out that high concentration may also have a negative effect on firm performance because of: (i) its excessive control and restraining impact on managerial initiative; (ii) the lower levels of stock liquidity associated with high concentration that weakens the informational role of the stock market; and (iii) ownership concentration is costly for the large shareholders because it limits risk diversification.

The measurement and the variables employed in the model, namely firm performance, ownership structure, innovation activities and other control variables are discussed in detail in the following sub-sections.

2.1. Firm performance measures

The empirical work in this field of research (Demsetz and Lehn, 1985; Himmelberg et al., 1999; Demsetz and Villalonga, 2001; Grosfeld and Hashi, 2001; Jones et al., 2005; Brown et al., 2006; Hashi and Shehaj, 2007) uses a wide range of measures to quantify the firm performance. Generally, in the empirical studies two different measures of firm performance are employed: (i) market measures, such as Tobin's Q, and (ii) accounting measures, such as return on assets, return on equity, return on sales, etc. Demsetz and Villalonga (2001) highlight the difference between these two measures in two respects, as shown in Table 1. Demsetz and Lehn (1985) employ accounting profit rate to measure firm performance (the post-tax accounting profit-to-book value of equity).

Table 1 The difference between accounting measures and Tobin's Q

	Time perspective	Who measures the performance
Accounting profit rate	Backward looking	Accountants
Tobin's Q	Forward looking	Investors

The choice of a performance indicator in the TE literature mainly depends on the availability of the data. The fact that not many companies are listed on the stock exchanges of TEs makes the use of Tobin's Q as a measure of performance almost impossible. It has therefore been necessary for most studies to employ accounting measures. Other studies have used labour productivity as an indicator of economic performance.

For the empirical investigation of the ownership-performance relationship in Macedonia, we follow this literature and employ two performance indicators based on the firms' balance sheets for the years 2001-2010, i.e., (i) labour productivity as the sales to number of employees ratio and (ii) net profit margin as the net profit to sales ratio. Further, from the balance sheets we create variables such as total assets to number of employees, labour cost to sales, percentage of capital to total assets, etc. which we use as other firm characteristics (section 3 provides the descriptive statistics for the variables).

2.2. Ownership structure variables

As with firm performance, a wide range of measures of ownership structure have also been applied in the literature. Most of studies investigation the issue follow Demsetz and Lehn (1985), by using the percentage of shares owned by the largest 5 or 20 shareholders and a HHI-type index. Demsetz and Villalonga (2001) use fraction of shares owned by the management and the fraction of shares owned by the largest shareholding interest, arguing that using both of them gives a more accurate picture of the complexity of interests represented by a given ownership structure.

Grosfeld and Hashi (2001) focus on two dimensions of ownership structure, the concentration of ownership (measured by the share of the largest shareholder) and the type of dominant owner (other companies, investment funds, individuals, portfolio companies, banks and the state). A recent study, Hanousek et al. (2011), proposes several ownership concentration categories by defining different types of majority and minority groups. This is the approach used in the present study. The first category is the absolute dominance type, with the largest owner owning more than 50 percent and others owning less than 10 percent, i.e. no other significant owners. The second category reflects a monitored dominant owner in which there is a dominant owner (owning more than 50 percent of shares) but there are also other significant owners (owning at least 10 percent of shares), thus large enough to be able to exercise some monitoring of the dominant owner. The third category is a 'jointly controlling minority' category, where two or three minority owners together own more than 50 percent of shares. The last category, dispersed ownership, represents a situation in which none of the shareholders owns more than 10 percent of shares.

Three different dimensions of the evolution of ownership will be employed for the investigation of ownership structure in this study: (i) concentration of ownership measured as the share of the largest shareholder and the share of the three largest shareholders; (ii) the presence or absence of a dominant owner, comprising of the four specific ownership concentration categories identified in the previous paragraph - absolute dominance, monitored dominance, jointly controlling minority and dispersed ownership; and (iii) the type of dominant owner indicating whether the owner is ethnic Macedonian, ethnic Albanian or foreign.

2.3.   Measures of innovation activities and other variables

A variety of measures of innovation activities have been used in the literature - research and development (R&D) spending, the number of patents, the number of new products introduced in a year, the percentage of sales resulting from the new products, to name a few. Following Schumpeter's definition of innovation (1939, p. 84), we employ new product and new process generated by firms, as in Love et al. (1996), Chudnovsky et al. (2006), Griffith et al. (2006), Commander and Svejnar (2007), Falk (2008) and Ghosh (2009). This information is extracted from the SPEM 2001-10, the response to a question on whether the firm had introduced a new, or significantly improved, product, service or process after privatisation.

Several other variables are used to measure the relationship between ownership structure, innovation activities and firm performance. Specifically, these are the control variables consisting of firm characteristics such as firm size, age, year of privatisation, industry group, restructuring index, the volatility of firms' environment, and the founder/manager's education level and gender.

We measure firm size by the number of employees of the firms as responded in the questionnaire. Firms' age is measured by the number of years the firm has been in operation. In the questionnaire the respondents were asked to indicate the year when the company started its operation. By subtracting the year of the establishment from the current year in panel we get the variable as an indicator of the firm's age. Similarly, we generate the variable of years since privatisation. This would enable us to examine the effect of the time since privatisation.

Another variable that might have an impact on the concentration of ownership and its firm performance is the technological intensity of the industry in which a firm is operating. We follow the Eurostat definition for the classification of components of the manufacturing industry on the basis of their technological intensity (using NACE Rev. 2 at 2-digit level as the basis of classification), grouping different activities into high-technology, medium high-technology, medium low-technology and low-technology industries. Similarly Eurostat classifies the service sector as knowledge-intensive services (KIS) or as less knowledge-intensive services (LKIS).

A firm's restructuring activities is another variable that has an impact on its performance, and potentially on its ownership structure (restructured firms are more desirable to own). The enterprise survey (SPEM 2001-2010) contained several questions on restructuring activities of firms in areas such as product innovation, assets, staff, finance and management undertaken after privatisation. These questions were qualitative questions and the respondents were asked to rank them on a scale from zero to five. Given the multidimensional nature of the restructuring process, the factor analysis technique ('factor' command in STATA 11) was used to combine the answers to these questions and generate the 'restructuring index' variable which is used as one of the variables in the regression analysis.

3.   STATISTICAL OVERVIEW OF THE SAMPLE

For the empirical analysis of this study we employ primary firm-level panel data for 60 privatised firms in Macedonian for the period 2001-2010. The panel dataset of 60 firms in ten years consists of two types of variables, i) time-invariant – the questionnaire variables and ii) time-variant – the financial statements of the firms and their ownership evolution in ten years.

The descriptive statistics of the financial data and the relationship between the firm performance indicators and different firm characteristics are presented in Table 2 which provides an overview of the development of the financial variables through years.

Table 2 Average values of the financial variables for the sample, 2001-10

Year		Labour Productivity (in millions of denar per worker)	Net Profit Margin (%)	Leverage	Total Assets Turnover (Sales to Total Asset)
2001	Average	2.6	-3.1	2.9	.89
2002	Average	2.9	1.0	5.3	.86
2003	Average	3.0	-9.4	11.4	.81
2004	Average	3.0	-6.6	15.3	.82
2005	Average	3.6	-9.6	18.1	1.09
2006	Average	4.9	-9.3	12.1	.84
2007	Average	4.6	-285.0	13.2	.92
2008	Average	5.6	-23.6	34.6	.79
2009	Average	4.5	-34.8	16.7	.79
2010	Average	4.9	-65.4	83.7	.90
2001-2010	Average	4.0	-62.4	21.4	.88
	No of obs	563[a]	567	568	506

[a] The number of observations is smaller than 600 because there are some missing observations in the financial dataset.

Labour productivity has been increasing over time with the highest point reached in 2008. The average of net profit margin remains negative through the years of analysis. The leverage ratio has also increased over time.

The following figures present some cross tabulations of firm characteristics and how they are related to firm performance. Figure 1 shows the relationship between the innovation activities of firms in different technological classifications and their labour productivity.
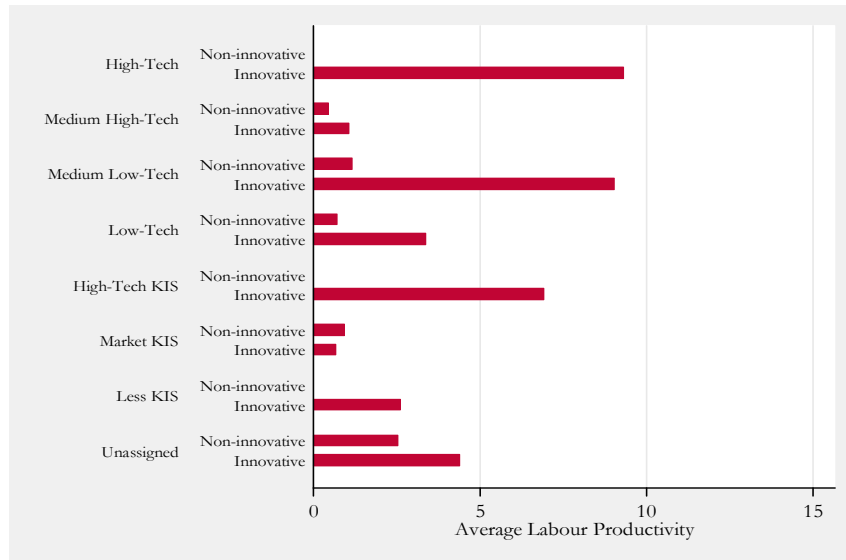
Figure 1 Labour productivity and innovativeness by technological intensity of firms (in million denar per worker)

Firms in the group of high-technology manufacturing or high knowledge intensive services seem to perform better than other firms. Also, innovative firms seem to be performing better than non-innovative firms across the sample. Interestingly, there are no non-innovative firms in the high-technology and high-tech KIS industry. Figure 2 presents the average labour productivity of sample firms for firms of different size, innovativeness and ownership concentration.
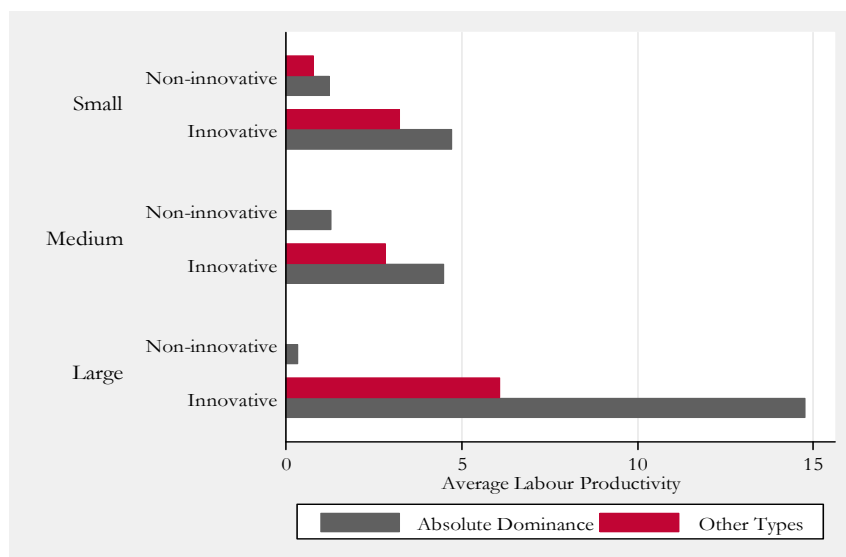
Figure 2 Firms' performance and innovativeness by size and type of
ownership concentration (in million denar per worker)

As it can be noticed, larger firms tend to have higher concentration
(absolute dominance) and perform better than small and medium size firms.
Further, all the firms that have introduced new products and/or processes after
privatisation tend to have more concentrated ownership and perform better than
non-innovative firms. Generally we notice that better performing are large firms
that have undertaken innovation activities, and this is the case irrespective of
whether the firm has an absolute dominance structure or not. In the next section
we continue with the statistical overview of the evolution of ownership structure.
Two different dimensions of the process of evolution of ownership are analysed:
(i) concentration of ownership and (ii) the type of the dominant owners.

4. EVOLUTION OF OWNERSHIP STRUCTURE: STATISTICAL OVERVIEW

In this section we provide the descriptive statistics of the dynamics of
the ownership data, i.e. the evolution of ownership concentration, five different
ownership concentration categories, and different types of ownership structure.
Further, the relationship between ownership structure and the other variables of
our analysis such as firm performance, innovation activities, and other firm

characteristics are also explored. Table 3 shows the percentage share of all large shareholders owning more than 5% of shares. Data is provided for the seven largest shareholders.

Table 3 Average holding of largest shareholders holding more than 5% of shares

Year		Largest Owner	2nd Largest Owner	3rd Largest Owner	4th Largest Owner	5th Largest Owner	6th Largest Owner	7th Largest Owner
2001	Mean	50.6	16.1	9.3	7.3	5.8	5.7	5.4
	No of companies	46[a]	22	8	4	3	3	2
2003	Mean	54.9	20.7	11.1	6.4	5.6	5.2	5.1
	No of companies	53	27	10	4	2	2	1
2004	Mean	55.8	21.4	11.2	6.4	5.6	5.3	0
	No of companies	55	28	10	4	2	2	0
2005	Mean	54.9	21.0	11.6	6.3	5.5	5.1	0
	No of companies	59	31	12	6	1	1	0
2006	Mean	55.8	19.7	11.9	6.8	5.9	5.1	0
	No of companies	59	35	17	8	5	1	0
2007	Mean	56.9	18.6	11.5	8.1	6.2	5.1	0
	No of companies	59	33	19	10	7	1	0
2008	Mean	56.3	18.7	11.8	8.2	6.4	5.5	0
	No of companies	58	34	21	11	7	2	0
2009	Mean	57.2	18.7	12.0	8.5	6.4	5.5	0
	No of companies	58	34	20	10	7	2	0
2010	Mean	57.3	18.8	11.7	8.3	6.6	5.5	0
	No of companies	58	36	20	11	6	2	0
2001 – 2010	Mean	55.6	19.4	11.5	7.6	6.2	5.4	5.3
	No of companies	505	280	137	68	40	16	3

[a] The number of companies in the 'Largest Owner' column gives the number of observations and it differs from the size of the sample because of the missing data. The 2002 ownership data is also missing.

One can observe that at the beginning of the period (year 2001) the average percentage of shares owned by the single largest owner was already quite large (50.6) and it has increased over time (to 57.3), thus indicating that the ownership of firms has become more concentrated through time. Further, with the exception of 2001 and 2003 where there were companies with 7th largest owners holding more than 5% of shares, the great majority of companies from 2004 onwards did not even have a seventh owner with 5% of shares in the company, meaning that the number of shareholders with more than a 5% stake in companies has reduced.

It is important to mention here that there are no firms in which there is a combined ethnic Macedonian and Albanian owners in the sample. There are few cases with monitored minority or dispersed ownership meaning that ethnic Albanian firms have evolved faster to more concentrated ownership compared to ethnic Macedonian firms. However this is the case only for a small number of firms since out of the overall privatised firms only a dozens of them have ethnic Albanian ownership (there might be a few more cases where they own less than 5% of shares). Figure 3 presents the average labour productivity as performance indicators for different types of ownership and their innovating activities.
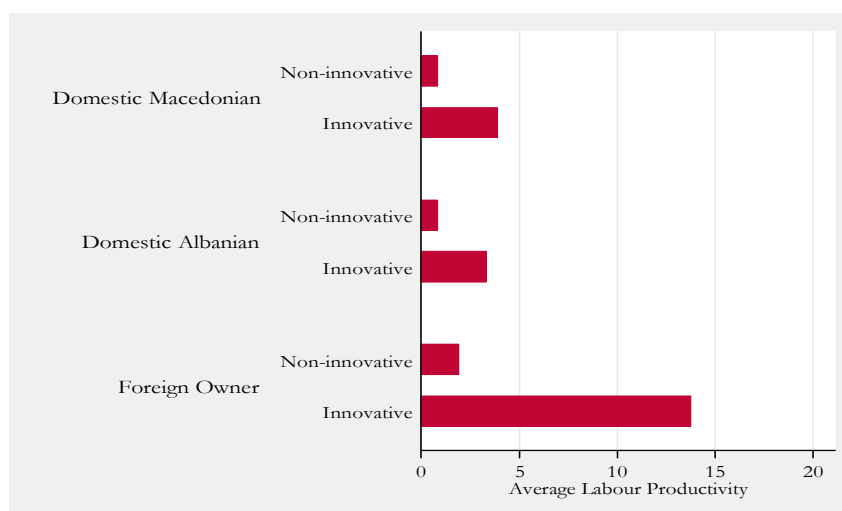

Figure 3 Average labour productivity by type of dominant ownership and innovativeness, 2001-2010 (in million denar per worker)

It can be noticed that foreign innovative firms have better performance than all other firms. In general firms that undertake innovation activities in all ownership types perform better than those which have not undertaken any innovation activities irrespective of the nationality of dominant owners. Innovative firms under ethnic Macedonian ownership perform better than firms under ethnic Albanian ownership.

Overall, the statistics suggest that better performing firms are large firms which belong to high-technology or KIS sector, and have undertaken innovation activities after privatisation. Considering ownership concentration, foreign owned firms in the absolute dominance category perform better than other ethnic ownership groups and other concentration categories.

5.   EMPIRICAL RESULTS

We are now going to investigate the two models specified in section 2 (equations (1) and (2) empirically. Firstly, the two dimensions of the evolution of ownership: (i) concentration of ownership and (ii) the type of the dominant owners are estimated. Secondly, the extent to which the performance of firms is influenced by ownership structure, innovation activities and other firm characteristics are explored.

The early literature on the ownership-performance relationship employed OLS method of estimation and thus resulted in biased estimates because of the assumption of exogeneity (Demsetz, 1983; Demsetz and Lehn, 1985; Demsetz and Villalonga, 2001; Grosfeld and Hashi, 2003). Following Wintoki et al. (2010) we are going to control for three potential sources of endogeneity which are highlighted in the literature, namely (i) unobserved heterogeneity, (ii) simultaneity and (iii) dynamic endogeneity, which need to be taken into account.

In order to compare the improvements gained from the enhanced techniques of the IV/GMM we first estimate the models with pooled OLS method as the baseline analysis. To deal with the endogeneity of labour productivity and the share of the largest owner, we will use instrumental variables (IV), by finding instruments which satisfy the two key assumptions (i) the instrumental variable must be uncorrelated with the error term but (ii) must be correlated with the independent variable. The instruments considered are the natural logarithm of depreciation as proxy for capital input and managers age as proxy for the quality of management. Both appear to be valid instruments and satisfy the test of redundancy. We further continue with the enhanced routines for IV/GMM estimation presented by Baum et al. (2007) which produce statistics that are robust in the presence of heteroskedasticity and autocorrelation, such as GMM kernel and the GMM continuously updated estimator (CUE) of Hansen et al. (1996), applied to panel specification.

The empirical results of the estimated models are presented on table 4 and 5. Firstly, we estimate the effect of the determinants of ownership concentration using the share of the largest owner (LogC1) as dependent variable. Second, we investigate the impact of ownership concentration, innovation activities and other firm characteristics on firm performance, with labour productivity as a measure of performance.

Table 4 provides the results from three different estimation techniques of the share of the largest owner (LC1) on firms performance variable, labour productivity (LNLP) , Innovation activities (INNOV), nationality and ethnicity of the dominant shareholder (Dommac and FRGN), type of ownership (INDIVIDUAL), firm size (size), firm age (LNAGE), capital intensity (LNCI), the leverage ratio (LEVERAGE), the volatility of firm's environment (StROA), years since privatisation (YsinceP), restructuring index (RI) and technological intensity category of the firm's industry (HighTech, MedHTech, MedLTech, HTKIS).

Firm performance may determine the shareholders' decision to increase or decrease their shareholding in a company. One can expect that shareholders might be more interested in increasing their holdings in firms that are not performing well in order to have more control on the management and obtain some of the benefits of control by improving the firm's performance. But on the other hand risk-averse shareholders might look for risk diversification and thus reduce their holdings in poorly performing firms. The impact of firm performance on shareholders' decision to concentrate their holdings is therefore ambiguous. However in the transition context, having in mind the high level of uncertainty and poor legal protection, shareholders are more likely to increase their shareholding in better performing firms. The results, using different techniques, are similar - indicating a positive and significant performance-ownership relationship. This means that better performing privatised firm in Macedonia tend to have more concentrated ownership.

Table 4 Determinants of ownership concentration in different models

Model	IV/2SLS	2 step-GMM kernel	CUE estimation
Independent Variables	*Dependent Variable: The share of the largest owner (LC1)*		
LNLP	1.00*** (0.167)	1.01*** (0.296)	1.01*** (0.174)
INNOV	-1.32*** (0.247)	-1.33*** (0.407)	-1.33*** (0.259)
Dommac	-1.37*** (0.231)	-1.38*** (0.406)	-1.38*** (0.207)
FRGN	-0.58 (0.362)	-0.58 (0.613)	-0.59* (0.319)
INDIVIDUAL	-0.92*** (0.162)	-0.92*** (0.281)	-0.93*** (0.155)
size	2.89*** (0.635)	2.87*** (1.068)	2.89*** (0.649)
size2	-0.76*** (0.154)	-0.75*** (0.273)	-0.76*** (0.160)
LNAGE	-21.33***(2.141)	-21.35*** (4.050)	-21.44*** (2.226)
LNAGE2	2.95*** (0.294)	2.96*** (0.572)	2.97*** (0.312)
LNCI	-4.23*** (1.541)	-4.12 (2.848)	-4.18** (1.764)
LNCI2	0.15*** (0.053)	0.15 (0.099)	0.15** (0.062)
LEVERAGE	0.02 (0.123)	0.02 (0.167)	0.01 (0.102)
StROA	-0.01 (0.121)	-0.01 (0.111)	-0.01 (0.118)
YsinceP	0.00 (0.015)	0.00 (0.029)	-0.00 (0.017)
RI	0.52*** (0.086)	0.52*** (0.171)	0.52*** (0.088)
HighTech	-4.01*** (0.456)	-4.01*** (0.754)	-4.00*** (0.390)
MedHTech	-1.01*** (0.359)	-1.00* (0.560)	-1.00*** (0.315)

MedLtech	-0.62*** (0.237)	-0.63 (0.478)	-0.63** (0.256)
HTKIS	-2.09*** (0.601)	-2.08*** (0.773)	-2.09*** (0.434)
Instruments:			
LNdep	√	√	√
ManAGE	√	√	√
Observations	393	393	393
R-squared	0.476	0.475	0.476
Adjusted R-squared	0.449	0.448	0.439
F statistic	20.59	10.36	22.28
Cragg-Donald Wald F statistic	66.28	18.19	45.02

Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Shareholders' interest in increasing or decreasing their holdings may also vary among innovative and non-innovative firms. The introduction of new product and/or process is usually considered as risky, due to the possibility of the failure of the innovation (the product not accepted in the market, high costs, etc.) which makes innovation less attractive for risk-averse shareholders. On the other hand, such high levels of risk are also coupled with high potential returns, which make innovative firms particularly attractive for shareholders to increase their holdings. In other words the impact of innovation activities on shareholders decision to concentrate their shares is ambiguous. The regression results show negative and significant coefficient for innovation activities when using share of the largest shareholder as the dependent variable. This means that innovative firms are more likely to decrease the level of concentration of ownership. Owners might find these firms in Macedonia as more risky and thus reduce their shares. When the share of the three largest shareholders is employed as dependent variable innovation activities have significant negative coefficient, thus the same applies regardless which variable is used.

The level of ownership concentration may depend on different types of largest shareholder (Grosfeld and Hashi, 2004). Corporation may have more incentives to concentrate their shares as compared with individuals. The ethnicity and nationality of the dominant owners is another important factor that may affect ownership concentration. The first two models (IV/2SLS and two-step GMM-kernel) show insignificant coefficients for foreign owners (indicating that the foreign ownership concentration is the same as with Albanian owners but higher than Macedonian owners. However, foreign ownership appears to be negative and only marginally significant when applying the CUE estimations, indicating that we have sufficient evidence to say that foreign owned firms tend to be less concentrated than domestic Albanian firms. The impact of the dominant ethnic Macedonian ownership is negative and significant in all three different estimations, which implies that it is smaller than the impact of dominant Albanian owners (the base category). These results indicate that ethnic Macedonian owned firms tend to be less concentrated than the ones with dominant ethnic Albanian ownership. The individual variable has a negative and significant coefficient thus

we can conclude that individuals have fewer incentives to concentrate their shares than companies.

Another determinant of ownership concentration is firm size. Larger firms are less likely to be highly concentrated because of wealth limitation and risk aversion. It is more costly to acquire large portions of equity in larger companies, and shareholders are more interested to diversify their shares thus would not prefer to invest large fraction of their wealth in one firm. Nevertheless, in the uncertain environment of TEs, large and older firms are perceived by shareholders as more stable and better known thus they may be interested in increasing their shareholdings in these firms. The impact of firm size on the ownership concentration is thus ambiguous.

The three techniques result in positive and statistically significant coefficient for firms' size. The squared value with negative sign shows that the increase is non-linear i.e. there is an inverse U-shaped relation between the two. This is in accordance with our expectations that in an uncertain environment such as in Macedonia large firms are perceived as more stable and better known, thus the shareholders are more interested to increase their shares (but of course only up to a point, after which they would decrease their holdings).

The effect of leverage on ownership concentration may be ambiguous. High leveraged firms are more risky thus risk-averse owners may wish to avoid increasing their shareholding in them (Demsetz and Lehn, 1985). On the other hand, firm leverage may also be considered a complementary monitoring mechanism (as it can induce monitoring by lenders) and in this sense the shareholders may increase the level of ownership concentration. The three estimation techniques result in insignificant coefficient thus we have insufficient evidence to confirm that firm leverage has any effect on shareholdings in the company. Furthermore, the two other control variables, firm volatility and years since privatisation are insignificant. We have insufficient evidence to confirm that firms that have been privatised at the beginning of privatisation process tend to have more concentrated ownership than those privatised more recently.

We control for the technological intensity of the industry to which the firm belongs. High-technology firms are more likely to be less concentrated because of risk aversion. High-technology, high-technology KIS, medium-high-technology and medium-low-technology firms show to have negative and significant signs, meaning that they tend to have less concentrated ownership compared to low-technology and low-technology KIS firms.

We now continue with the second model. The variables employed are the same as in the previous model (1), but in this specification we examine the impact of ownership structure (share of the largest shareholder LC1) and other firm characteristics on firm performance. The results of the regression analysis generated from three different methods (IV, GMM kernel and CUE GMM) are presented in Table 5.

Table 5 Determinants of firm performance in different models

Model	IV/2SLS	2 step-GMM kernel	CUE estimation
LC1	0.99***(0.165)	0.99***(0.292)	1.35***(0.259)
INNOV	1.31***(0.199)	1.32***(0.375)	1.48***(0.295)
Dommac	1.37***(0.291)	1.37**	1.20***(0.376)
FRGN	0.57(0.351)	0.58(0.634)	0.91*(0.484)
INDIVIDUAL	0.92***(0.186)	0.91***(0.353)	0.92***(0.256)
Size	-2.87***(0.661)	-2.85***(1.000)	-4.80***(0.845)
size2	0.75***(0.162)	0.75***(0.248)	1.27***(0.211)
LNAGE	21.19***(3.169)	21.15***(5.438)	24.92***(4.593)
LNAGE2	-2.93***(0.428)	-2.93***(0.740)	-3.38***(0.613)
LNCI	4.20***(1.414)	4.09(2.654)	3.25*(1.975)
LNCI2	-0.15***(0.050)	-0.14(0.094)	-0.12*(0.070)
LEVERAGE	-0.02(0.123)	-0.02(0.169)	-0.11(0.141)
StROA	0.01(0.120)	0.01(0.108)	-0.09(0.152)
YsinceP	-0.00(0.015)	-0.00(0.029)	-0.01(0.021)
RI	-0.51***(0.121)	-0.51***(0.194)	-0.32*(0.109)
HighTech	3.99***(0.637)	3.97***(0.987)	4.08***(0.710)
MedHTech	1.00**(0.440)	0.99(0.691)	1.33**(0.525)
MedLtech	0.62***(0.208)	0.62(0.383)	0.14(0.247)
HTKIS	2.07***(0.650)	2.06**(0.869)	1.79***(0.606)
Observations	393	393	417
R-squared	0.067	0.071	-0.821
r2_a	0.0190	0.0240	-0.903
r2c	0.0666	0.0713	-0.821
F	15.94	9.128	13.74
df_m	19	19	18
Widstat	19.94	5.963	14.64

Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

We find consistent results across the three estimation techniques reported in Table 5. They all show that performance is statistically dependent on ownership structure and type of ownership. The three estimation techniques are consistent with previous studies that show significant effect of ownership structure on firm performance.

The table shows a positive and significant relationship between innovation activities and labour productivity. This is suggesting that when accounting for endogeneity in the regressors, together with HAC standard errors, the relationship between innovation activities and firm performance does not

change. In accordance to our expectations more innovative firms tend to perform better than the non-innovative ones.

The variable Dommac, i.e., dominant ethnic Macedonian ownership, is positive and significant for the three estimation techniques. Foreign ownership appears to be significant only when the CUE estimations are applied. When the CUE estimation technique is applied, the positive significant sign for dominant ethnic Macedonian owners and Foreign owners, indicate that these firms perform better than dominant Albanian owned firms (dummy base category).

All the three estimation techniques show negative and significant coefficient for the variable firm size, indicating that as firms get smaller their performance improves. The positive sign of the size squared variable indicates that there is a U shaped non-linear relationship.

Capital intensity is another control variable that has been used in the performance equation (Himmelberg, et al., 1999). The results show positive and significant coefficient with the IV/2SLS and CUE estimation techniques, but insignificant with the two-step GMM technique. The relationship becomes negative significant for the squared term (again insignificant for two-step GMM) though with smaller coefficient meaning that capital intensity increase will improve labour productivity up to a point, beyond which it will cause a decrease in productivity.

The firm leverage is insignificant in all the estimations. Thus, we have insufficient evidence to conclude that leverage affects firm performance. The same situation is found for the volatility variable and years since privatisation. Furthermore, CUE estimates result in positive and significant coefficients for the manufacturing and service industry based on technological and knowledge intensity. This indicates that high-technology firms and knowledge intensive services perform better than low-technological and knowledge intensity activities.

6.   CONCLUSIONS

This study investigated (i) the main determinants of ownership structure and (ii) the impact of ownership structure on the firm's performance in privatised firms in Macedonia. The statistical overview of the overall sample shows that ownership concentration has increased over time and that more concentrated, large and innovative, firms perform better.

For the empirical analysis three different estimation techniques are applied to the dataset of 60 firms over a 10 year period in Macedonia in order to deal with endogeneity, heteroskedasticity and autocorrelation problems. We treat both ownership concentration and performance as endogeneous variables. The first estimation findings support the view that the firm productivity significantly

affects ownership concentration (two-step GMM estimations appears to have insignificant coefficient). Other variables such as innovation activities, nationality or ethnicity of the dominant owner (ethic Macedonian, ethnic Albanian orforeign ownership), type of ownership (individuals or companies), size, years since privatisation and the technological intensity of the industry in which the firms operate have significant impact on ownership structure.

With the second investigation, the impact of ownership structure on firm performance, we provide evidence that ownership structure has a statistically significant impact on firm performance. Further, the results indicate that innovation activities, firm size and restructuring are the main factors (significant in the three estimation techniques) that influence the productivity of privatised firms.

Finally, some important findings can be identified from the empirical results. Firstly, the results of the regressions differ slightly depending on the model used, but there is sufficient evidence to support the significant positive ownership-performance relationship. Secondly, being concerned with the ownership structure and the impact of innovation activities on firm productivity we are able to conclude that the innovation activities undertaken by firms after privatisation are significant factors. Finally, the relation between ownership structure and labour productivity in Macedonia is also related to the ethnicity of the dominant owners indicating that ethnic Albanian firms tend to be more concentrated but less performing than Macedonians firms.

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