

THE EVOLUTION OF OWNERSHIP STRUCTURE, PATH DEPENDENCY AND ENTERPRISE PERFORMANCE USING DYNAMIC PANEL DATA MODELS

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Abstract

The present paper focuses on privatised firms in Albania, where the evolution of ownership structure has not been studied before. The paper responds to two specific questions: (i) is the evolution of ownership path dependent, i.e., does ownership structure in the past affect ownership now?; and (ii) what influences the evolution of ownership structure of privatised firms. We use the information from an enterprise survey conducted in 2003 and the dynamic panel data techniques to identify the relative importance of previous ownership structure as well as other firm-specific variables.

Keywords: Ownership and control, privatisation, corporate governance, corporate conflict index

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1. Introduction

One of the questions attracting the attention of scholars of enterprise behaviour has been: why do we observe ownership concentration in some companies and dispersed ownership in others. There are great divergences in the pattern of ownership of firms in different countries around the world. The dispersed ownership pattern is predominant in the US and the UK while the concentrated ownership pattern is more common in Europe and developing countries. The differences in the legal framework between countries and path dependency are thought to explain different ownership structures around the world.

However, we also observe differences in ownership concentration within a country and also within the same industry. These differences in ownership structures and their impact on corporate performance have been and still are at the centre of a major economic debate. Empirical results on this issue reflects the complexity of the relationship between ownership and performance- with many of them predicting a positive relationship, others a negative or no relationship. In this paper we investigate this relationship, especially the evolution of ownership structure, path dependency and firm performance, for a sample of privatised firms in Albania.

The results of previous studies are closely related to the particular estimation method used. If ownership structure is treated as exogenous, the relationship is positive and significant. When ownership structure is treated as endogenous and dealt with through IV techniques, then the results change indicating no significant relationship between ownership and

performance. But these results are unreliable because of the lack of information about instruments. Later, when panel data techniques were employed, the authors did not (or could not) adjust for heteroskedasticity and autocorrelation – and again ended up with inefficient estimators. Using the work of Baum, Schaffer and Stillman (2003) and the dynamic panel data modelling of Arellano and Bond (1991) and Arellano and Bover (1995), this paper tries to deal with some of the problems of previous studies and generate more reliable and efficient empirical results.

The paper is organised as follows: In the next section we discuss the theoretical and empirical literature on the relationship between ownership and performance in developed market economies. In section 3, we briefly examine the literature on countries in transition. Here we also discuss the main problems and shortcomings of different econometric techniques used in previous studies and also explain the advantages of using new GMM techniques. Our empirical results using several techniques are presented in section 4. In section 5 we provide some concluding remarks.

2. Ownership structure and firm performance

The debate on the relationship between ownership concentration and firm performance has a long history, going back to Berle and Means (1932). The separation of ownership and control, and the associated agency cost, implies that with the diffusion of ownership amongst a large number of shareholders, there will be greater opportunity for managerial

discretion with self-seeking managers using their increased control to pursue self-interested policies. In developed market economies, however, there is a range of market-based mechanisms which aim at ensuring that managers do not engage in such policies. Given that these mechanisms may not operate effectively in some circumstances (e.g., in developing countries or countries with weak law enforcement), ownership concentration has developed as an alternative mechanism for ensuring that shareholders can exercise effective control over their firm. Ownership concentration makes effective shareholder monitoring feasible and prevents managerial expropriation (Shleifer and Vishny, 1986 and 1997).

While the above literature concentrates on the benefits of ownership concentration, the last few years have witnessed the emergence of a new literature highlighting the cost of this process. Ownership concentration results in reduced managerial initiative, lower market liquidity and increased opportunities for the expropriation of minority shareholders (Holmstrom and Tirole, 1993; Aghion and Tirole, 1997; Jensen and Smith, 2000; Burkart, et al., 1997; LaPorta et al. (1999); Burkart and Panunzi, 2001). This literature has led to the conclusion that shareholders may indeed benefit from the dispersion of share ownership and allowing the managers to engage in managerial initiative without the fear of interference by large shareholders. They would rely largely on the information from the stock market which would be more liquid, and produce more reliable information, in the absence of concentrated ownership.

The empirical work on the subject concentrated on the impact of ownership concentration (often managerial ownership concentration) on firm performance. Morck, et al. (1988), McConnell and Servaes (1990), Himmelberg, et al. (1999) and Holderness, et al. (1999), e.g., all found that ownership had a statistically significant, though non-monotonic, effect on firm performance. Generally their results show that there is a positive relationship between ownership concentration and performance at low and high levels of concentration and a negative relationship at the intermediate levels (*see endnote 1*).

In their seminal work of over twenty years ago, Demsetz and Lehn (1985) looked at the relationship between ownership concentration and firm performance from a completely new perspective. They argued that ownership concentration is the outcome of the optimising behaviour by shareholders and is influenced by firm, industry and environmental characteristics such as the firm's performance, the particularities of the industry, amenity potential, the benefits of control, the volatility of the environment, etc. For the first time, therefore, Demsetz and Lehn attempted to model and estimate the determinants of ownership concentration. Using a sample of 511 large U.S. firms, they showed that there was no systematic relationship between ownership concentration and

firm performance, thus rejecting the idea that ownership concentration contributes to a better performance of firms.

The main contribution of Demsetz and Lehn (1985) to the debate was to highlight the endogeneity of ownership structure and how this and the firm performance were determined in the same process. However, despite raising the issue of endogeneity, they used OLS estimates to argue their case, ignoring the fact that OLS estimation would produce biased results in the presence of endogeneity. Indeed all the influential studies, referred to earlier, suffered from this problem.

Furthermore, although Demsetz and Lehn raised the issue of endogeneity, they did not include firm performance as an explanatory variable in the determination of ownership structure. It took another 16 years before Demsetz and Villalonga (2001) proposed to resolve the endogeneity problem by using the instrumental variable technique (or a two stage least square model, 2SLS) in the estimation process. By using a sub-sample of 223 firms from their 1985 study, they investigated the relation between the ownership structure (the fraction of shares owned by the five largest shareholders as well as that owned by the management) and the performance of these companies, with ownership treated as an endogenous variable. They found that neither measures of ownership structure had a significant effect on firm performance, thus confirming their earlier results and pointing out that while diffused ownership may involve some agency problems, it also yields compensating advantages that offset such costs. Although the employment of 2SLS technique was a major innovation in the development of this debate, Demsetz and Villalonga's important study suffered from a number of important econometric problems that remained unresolved for a long time: the instruments were not identified, they were not theoretically justified, and there was no attempt to find out (or test) if these instruments were appropriate for the purpose.

3. Ownership structure and firm performance in transition economies

With the development of the transition process and the rapid evolution of ownership structure following the privatisation of formerly state owned companies, the scholars were presented with the opportunity not only to try to examine the impact of ownership concentration on firm performance under the new transition conditions but also to study the evolution of ownership structure and factors influencing this evolution in transition countries. Claessens, et al. (1997) investigated a sample of 706 firms listed on the Prague Stock Exchange for the period 1992-1995. Using a Random Effect model they found that concentrated ownership (treated as exogenous) was significantly associated with higher performance (measured by Tobin's Q and profitability). A later

study by Claessens and Djankov (1999), with a sample of 706 Czech firms, draws the same conclusion (also using a Random Effect model). They also tried to control for the endogeneity of ownership concentration (though not by means of a standard 2SLS procedure) and their results provided weak support for their previous findings, i.e., that ownership concentration positively and significantly affects performance.

Empirical studies relating to firms in the former Soviet Union show similar, though not as strong, results. Djankov (1999) examined the effect of ownership structure on enterprise restructuring (with labour productivity growth as one of the measures of restructuring) for 960 privatised manufacturing enterprises in six newly independent states (Georgia, Kazakhstan, the Kyrgyz Republic, Moldova, Russia and the Ukraine) over the 1995-1997 period. Using the OLS technique he found that ownership concentrated by foreign investors, at levels above 30% of total shares, was positively associated with labour productivity growth. The relation between managerial ownership and productivity growth was non-monotonic (positive at less than the 10% and above the 30% stakes and negative in the intermediate range). Similar results were obtained by Pivovarsky (2001) who investigated cross sectional data for 376 medium and large enterprises in the Ukraine in 1998. The results showed that ownership concentration (as measured by the shares of the top ten shareholders and the Herfindahl index) positively affected firm performance.

The dominant view that, because of the weakness of the legal framework and other corporate governance mechanisms, ownership concentration remains the only effective mechanism for alleviating the principal-agent problem has been questioned by a number of authors. Grosfeld and Tressel (2001), e.g., investigated the impact of ownership concentration on 200 non-financial companies in Poland over the period 1991-1998 (longer than most of the previous studies). Using the Generalised Method of Moments (GMM) (Arellano and Bond technique), they also found a U-shaped relationship between ownership concentration and firm performance- positive at low and high levels of concentration (less than 20% and more than 50% respectively) and negative at intermediate levels (*see endnote 2*). These results reflect the trade-off between managers' entrenchment and their incentive alignment. When the costs of ownership concentration exceed its benefits, it will have a negative effect on firm performance.

Kocenda and Valachy (2001), using a Random Effect technique, found that ownership concentration (measured by the share of the largest owner and the share of the largest five owners) had no significant impact on firm performance in a sample of 543 Czech firms over the 1996-1999 period. They acknowledged the endogeneity of ownership structure and the autocorrelation problem (of performance measures) and used the first difference of ownership indices and

growth of performance measures to deal with these problems. However when Kocenda and Svejnar (2002) investigated a larger sample of 1,539 medium and large Czech firms for the same period, they obtained somewhat different results. The dispersed ownership (shown by a dummy variable indicating that no group of owners has 10% or more shares) has a higher positive effect on profit than either majority ownership (the largest owner having more than 50%), blocking minority ownership (the largest owner having between 33% and 50%), or legal minority (the largest owner having between 10% and 33%). They also provide evidence that the effect of the single largest owner does not vary with the concentration of ownership.

The majority of studies undertaken for TEs are focused on the impact of ownership structure on firm performance. However, there are a number of other studies which investigate the evolution of ownership structure and its determinants including firm performance. Earle and Estrin (1997), Jones and Mygind (1999), Grosfeld and Hashi (2001) and Grosfeld and Hashi (2004) are examples of such studies. These studies use mainly panel data sets and probit/tobit or multinomial logit techniques and deal also with the hypothesis of path dependency of ownership structure. Their results on the impact of firm performance on ownership structure are mixed-no relationship, positive or negative relationship.

The majority of these studies continued to treat ownership structure and firm performance as exogenous, thus ignoring the principle established since Demsetz and Lehn. Most of the studies discussed here (except Claessens and Djankov, 1999 (*see endnote 3*)) do not address the endogeneity issue and therefore their results will be subject to endogeneity bias (*see endnote 4*). Those using panel data techniques (and therefore trying to take into account the time dimension of the process of concentration too) suffered from a different set of problems. Despite their important advantages, panel data techniques are also associated with a number of problems. As panel data involves both cross section and time series data, difficulties and problems may arise from dealing with both cross section characteristics (e.g., Heteroskedasticity) as well as time series characteristics (e.g., autocorrelation). If Heteroskedasticity and autocorrelation are present in the model, then the estimator is still consistent but no longer efficient which makes the inference difficult.

The essential point raised by the present paper is that the relationship between ownership concentration, firm performance and other firm and environmental characteristics, is strongly dependent on the empirical method used. If ownership structure is treated as exogenous, the relationship is positive and significant, though biased. When the endogeneity is dealt with through IV techniques, the results indicating no significant relationship between ownership and performance but, as there is never any information about instruments, these results are not

reliable. When panel data technique was used, there was no mention of any adjustment for heteroskedasticity and autocorrelation, and the estimators were inefficient estimators.

The work by Baum, Schaffer and Stillman (2003) and the wider application of new econometric techniques (in particular dynamic panel data modelling) opened up new possibilities for the estimation of the relationship. Baum, et al. point out that the Generalised Methods of Moments (GMM) techniques are better alternatives for models with endogenous explanatory variables and heteroskedasticity and autocorrelation problems. GMM with Kernel based estimation and GMM with cluster-robust option produce heteroskedasticity and autocorrelation consistent (HAC) statistics which, according to Cushing and McGarvey (1999), are necessary for statistical inference and efficient parameter estimation. Furthermore, and more importantly, these procedures produce important diagnostic tests for the instruments (*see endnote 5*). Both techniques produce the necessary diagnostics for testing the validity of the instruments used, i.e., the partial R-squared, the F-statistic of excluded instruments and the Hansen J-statistic. The partial R-squared shows the correlation between the excluded instruments (variables which do not appear in the second stage) and the endogenous variable in the first-stage regression, while the F-statistic can be used to test of the joint significance of excluded instruments. Bound, et al. (1995) suggest that both partial R-squared and F-statistic should be reported in any instrumental variable estimation as a 'useful guide' for the quality of this estimation process. The Hansen J-statistic, developed by Hansen (1982) as an extension of the Sargan test, is a test of over-identifying restrictions, i.e., whether the excluded instruments are exogenous and also correctly excluded from the regression. The rejection of the null hypothesis casts doubt on both model specification and the validity of the instruments (Hayashi, 2000; Baum, et al., 2003) (*see endnote 6*).

The dynamic panel data models (or lagged dependent variable models) developed by Arellano and Bond (1991) and Arellano and Bover (1995) offer a new opportunity to estimate the ownership concentration-firm performance relationship while dealing with heteroskedasticity and autocorrelation problems as well as the appropriateness of the instruments. In these models, the lagged values or the lagged values of the first differences of endogenous variables are used as instruments. These are modern techniques which take into account the problem of autocorrelation by including dynamics (lagged values of the dependent variable) in the model. Including a lagged dependent variable in the model, according to Bond (2002), is necessary for the correct specification of the model. In other words, the omitted variables (dynamics in our case) may cause misspecification of the model. In addition, the inclusion of a dynamic element in the model is, of course, interesting also

from the theoretical point of view as we can test if the ownership structure is path dependent. In other words, we can investigate if the previous ownership structure has any effect on ownership structure in subsequent periods.

4. Empirical work

In this paper we aim to estimate the evolution of ownership in a sample of privatised firms in Albania over a six year period, using a variety of estimation techniques, and demonstrate the sensitivity of the model to the choice of the estimation method.

The Data

The data used here was obtained by means of an enterprise survey carried out in 2003 in Albania. Initially we had aimed at surveying all 97 firms privatised in the mass privatisation programme (MPP) during 1996-97 period (*see endnote 7*). But we found that the number of surviving mass privatised firms was only 37 (*see endnote 8*). Therefore, we decided to extend the survey and include additional firms which had been privatised through other methods (*see endnote 9*). We succeeded in tracing some of these firms by working with local officials in several districts in Albania who provided us with the needed information on the new names of these firms and their current status. We succeeded in tracking down and collecting the relevant information for 12 additional firms (from seven administrative districts in Albania) which were willing to cooperate and give us the necessary information. The majority of them (9) were privatised before 1997 and the rest (3) after 1997.

The Model

On the basis of the empirical work by Demsetz and Lehn and others, we estimate the evolution of ownership structure on the basis of the following model:

$$OWNCON_{it} = \alpha + \beta_1 PERF_{it} + \beta_2 OWNCON_{it-1} + \sum_{k=1}^2 \eta_k DOM_{kit} + \sum_{j=1}^m \chi_j X_{jit} + \varepsilon_{it}$$

$OWNCON_{it}$ stands for ownership concentration of firm i in year t , measured by (a) the share of the single largest owner (LC1), and (b) the share of the three largest owners (LC3) (*see endnote 10*). $PERF_{it}$ is the firm performance (labour productivity) (*see endnote 11*). DOM_{it} are dummy variables which indicate the type of the dominant shareholder (two in our case, 'individuals' and 'other firms', with other smaller categories such as the management, employees and the state forming the base group), while X_{it} is a vector of other firm characteristics including size, capital intensity, the type of dominant owner, firm-specific risk, sector of origin, time elapsed since privatisation, method of privatisation, and corporate conflict.

The model is similar to that used in previous work on the subject (*see endnote 12*), with the exception that we have included the lagged dependent variable on the right hand side (to introduce an

element of dynamics and path dependency in the model). From the standpoint of the endogeneity discussion, the most relevant observable factor influencing ownership structure is firm performance. The type of dominant owner is also expected to influence ownership structure as different types of owners (state, individuals, other firms, managers, etc.) have different objectives and types of behaviour. As far as firm characteristics are concerned, we include the same variables as in other studies. Firm size is expected to be an important characteristic with influence on the owners' decision to hold larger or smaller stakes in a company. Larger firms have larger capital resources which imply a higher market value for a specific fraction of their ownership rights and, according to Demsetz and Lehn (1985) the 'potential cost' of holding shares in large firms will be lower with more diffuse ownership. Capital intensity is another factor which may influence ownership structure. Firms' investments in fixed capital (sometimes referred to as 'hard capital') are observable and easy to monitor. Thus, firms with a high proportion of fixed capital are generally expected to have a lower level of managerial ownership. Firm-specific risk is also thought to be a factor affecting the concentration of ownership. However, its impact on ownership concentration (positive or negative) depends on the existing structure of ownership and whether the firms under investigation are from established market economies or transition economies.

Sector specificity is another factor that may influence the ownership structure of firms because, given the nature of their activities including large size, large set-up costs and sector specific uncertainty, some sectors are more likely to have more dispersed ownership than others. In order to see if there is any difference between ownership structure of firms privatised earlier and those privatised later we use a variable to show the impact of the time elapsed since the firm was privatised. In order to check the importance of a conflictual environment in the firm on the ownership structure we have developed, and include, a 'corporate conflict index' (CCI) as a broad indicator of the level of conflict (*see endnote 13*).

Estimation Methods

We have estimated the above model using five different types of estimation methods. Initially, we estimate the model using a standard panel data technique, treating firm performance as an exogenous variable. Then we estimate the model by using the standard random effect IV technique where firm performance is treated as endogenous (*see endnote 14*). Next, we use the two GMM techniques discussed in the previous section, GMM with kernel based estimation and GMM with cluster robust option, where firm performance is treated as endogenous and instrumented. Finally, we use a dynamic panel data model (which is also a GMM technique), developed

by Arellano and Bover (1995) which can estimate the equation in levels (*see endnote 15*). The results of the five estimation techniques are present in Table 1 (*see endnote 16*). The precise meaning of the variables and their measurements are explained in Table 2 in the Appendix

At first glance, the five regressions seem to have produced some similar results in terms of significant and insignificant variables. In particular, the lagged value of the dependent variable is positive and highly significant showing that ownership concentration in our sample firms is path dependent irrespective of the estimation procedure used. In the last three regressions (all GMM techniques), the presence of dynamics explains much of the variation of the dependent variable, overshadowing other variables (*see endnote 17*). The sizes of the coefficients are, of course, different in different regressions - with the coefficients in the last three regressions being 3 to 4 times larger than those of the first two regressions. When GMM techniques are used the results are largely the same in terms of size, significance and sign of coefficients.

In the first two estimation techniques (Random Effect and IV Random Effect) the results are very similar despite the fact that the first one treats performance as an exogenous variable. Apart from the lagged dependent variable there are a number of other significant variables such as the types of the dominant owners, capital intensity, years since privatisation (*see endnote 18*), method of privatisation, the standard deviation of profits (a measure of the volatility of the firm's environment) and the Corporate Conflict Index. These variables have the expected sign.

However, the results of these two procedures are not reliable due to their serious shortcomings: the estimates are biased because of the use of an endogenous variable; statistics are not heteroskedasticity and autocorrelation consistent; and it is not possible to test the validity of instruments for the IV regression.

Moving on to the two GMM regressions in third and fourth columns, these options are clearly superior to the first two models as they have instrumented the endogenous variable. However, the diagnostics (Hansen J statistic) show that the instruments are not exogenous or there is a specification problem. Furthermore, the test of endogeneity indicates that LCI_{t-1} is also endogenous (in addition to the performance variable) and should be instrumented in order to produce consistent results. However, this is not possible because, given our limited data set, finding appropriate additional instruments for a second endogenous variable is very difficult.

The problem of endogeneity of the lagged dependent variable can not be resolved by using these techniques. In such cases dynamic panel data models may offer a solution. The Arellano and Bover (1995) technique generates the instruments itself according to the users' specification of the variables that should be instrumented and the lagged limits. In the 'default'

position this technique uses a relatively large number of instruments which sometimes (especially when more than one variable is to be instrumented) approaches the sample size. Using more instruments in the GMM techniques increases efficiency but,

according to Arellano and Bover (1995), the excessive number of instruments (compared to the sample size) in finite samples may bias the results. In estimating this model, we used the options available to reduce the number of instruments.

Table 1. Determinants of ownership concentration (LC1)

Independent variables	Dependent variable: share of the largest owner (LC1)				
	Random Effect	IV Random Effect	GMM With Kernel	GMM with cluster	Arellano & Bover model
LC1 _{t-1}	0.272 *** (2.92)	0.270 *** (7.92)	0.813 *** (9.76)	0.790 *** (9.21)	0.928 *** (6.47)
Ln Labour productivity	0.060 (0.70)	0.239 (1.41)	0.095 (0.71)	0.114 (0.65)	-0.001 (-0.01)
<i>Types of dom. owner</i>					
Individuals	1.120 *** (3.49)	1.226 *** (3.46)	0.414 (1.26)	0.509 (1.19)	0.232 (0.49)
Other firms	0.344 ** (2.17)	0.452 * (1.72)	0.174 (1.05)	0.157 (0.80)	0.072 (0.53)
<i>Other variables</i>					
Fixed Assets	0.001 (0.62)	0.001 (0.85)	0.001 (0.64)	0.001 (0.60)	0.001 (0.68)
Ln Fixed Assets to labour ratio	0.147 * (1.63)	0.064 (0.49)	0.113 (1.24)	0.115 (1.04)	0.042 (0.40)
Ln Fixed Assets to labour ratio-sq	-0.058 ** (-2.45)	-0.061 *** (-2.91)	-0.023 (-0.78)	-0.021 (-0.65)	-0.007 (-0.38)
Fix. Investment to fixed assets ratio	0.008 (0.60)	-0.097 (-0.21)	1.020 (1.56)	0.964 (1.43)	0.015 (0.27)
St. Deviation of Profit	0.019 (1.37)	0.005 (0.34)	-0.010 (-0.70)	-0.011 (-0.56)	-0.002 (-0.08)
Manufacturing sector	0.027 (0.08)	0.150 (0.40)	0.105 (0.52)	0.127 (0.50)	0.009 (0.03)
Years since privatisation	0.470 ** (2.35)	0.481 *** (4.20)	0.270 ** (1.97)	0.326 ** (2.39)	0.210 ** (2.17)
Method of privatisation	-1.656 *** (-2.53)	-1.631 *** (-3.71)	-0.294 (-0.77)	-0.206 (-0.46)	0.285 (1.06)
Corporate Conflict Index	-0.918 * (-1.59)	-0.842 * (-1.75)	-0.704 (-1.18)	-0.743 (-1.16)	-0.165 (-0.35)
Constant	-1.572 (-1.01)	-1.693 * (-1.73)	-1.374 (-1.59)	-1.844 ** (-2.29)	-1.653 *** (-3.23)
<i>Instruments</i>					
Ln depreciation	na	√	√	√	Na
Age of managers	na	√	√	√	Na
R-sq (not adjusted)	0.75	0.75	0.88		
Partial R-sq	na	na	0.20		
F test of excluded instruments	na	na	10.26 ***		
Hansen J	na	na	2.72*		
M1 ^a	na	na	na		-1.69 *
M2 ^a	na	na	na		-0.75
F or Wald test of overall significance	180.05 ***	18.01 ***	149.07 ***	156.88 ***	77.66 ***
No. of observations	201	191	191		

Notes: t-statistics in parenthesis; * Significant at 10%; ** Significant at 5%; *** Significant at 1%. ^aM1 and M2 are tests for the first and second order autocorrelation of residuals.

The Hansen J-statistic, which tests the orthogonality of instruments, is not significant, showing that instruments are exogenous and the model is correctly specified. There are two other tests, M1 and M2, which test for the first and second order autocorrelation of residuals. Lagged values (or differences) of dependent variables are used as

instruments and therefore if the residuals are autocorrelated the instruments used are not valid. Hence M1 and M2 also test the validity of instruments (Mangan, et al., 2005). In the first test (M1), the null hypothesis (that there is no first-order autocorrelation) should be rejected if first-order autocorrelation is present, thus justifying the use of dynamic panel data

models. In order for the instruments to be valid, the null hypothesis in the second test (M2) (that there is no second order autocorrelation) should be accepted. The diagnostic tests in the table indicate that instruments are valid, even though M1 is only marginally significant which may question the use of dynamics. As mentioned previously, in finite samples the large number of instruments may generate biased results and the user should reduce this number as much as possible (in our estimation process, 21 instruments have been used). However, there is no diagnostic to test the redundancy of instruments (whether the instrument has increased the efficiency of estimates or not) and help the user to specify the right instruments. This is an area needing further improvement.

Overall, the use of the dynamic panel data model opens new possibilities for the investigation of the determinants of the ownership structure especially for firms in TEs. The relationship between lagged values and the dependent variable (ownership concentration) could be strong in years after privatisation as we observe a significant evolution of ownership (in terms of concentration) of these firms 6 years after privatisation. However, the fact that both coefficients of lagged dependent variables in Table 1 are less than 1 (though close to 1), indicates that the model is stationary. In such models, according to Stewart (2005), the impact of a shock will be temporary. In other words this relationship may not be as strong (in terms of the size of coefficients) after 10 or more years as ownership of these firms and the markets in which they operate become more settled and stable.

The main difference between the models estimated in this section and those in previous studies is the use of the lagged dependent variable as an explanatory variable. The reason for its exclusion in previous studies has largely been the inability of researchers to deal with lagged dependent variable models. Although Arellano and Bond and Arellano and Bover developed their work in the last 10-15 years, this work is beginning to be used by applied economists only in recent years (e.g., Mangan, et al., 2005). As we have already pointed out this variable is significant in all the five regressions in Table 1 and therefore its elimination from previous studies is likely to have resulted in mis-specification of the model. If we exclude the lagged dependent variable from the estimations in Table 1, we would notice that: firstly, other variables become significant and, secondly, the overall explanatory power of these models is reduced (compare the R^2 statistics in Tables 1 and 4). These results are presented in Table 4 in the Appendix. Firm performance, e.g., becomes significant and positive in the second regression (IV Random Effect). Capital intensity (fixed assets to labour ratio), and/or its squared term, the privatisation method, and the corporate conflict index become significant in some or all of the regressions – as in previous studies. The essential point is that when econometric problems associated with previous

studies are dealt with, and the model is specified properly, most of these variables become insignificant.

Sample Selection Bias

When the sample is not randomly drawn from a larger population, sample selection bias may arise. This means that standard estimators and tests may result in misleading inferences (Verbeek, 2000). In order to deal with non-responses or missing observations (which is an example of self-selection rule and a cause of selection bias) of different firms, we re-interviewed the firms in the sample until the missing observations were completed. However, according to Mátyás and Sevestre (1996), almost all samples based on interviewing micro-economic units suffer from some selection problems which are likely to be more serious in panel data.

There is a potential selection bias problem, discussed by Weiss and Nikitin (1998), concerning the relation between firm's performance and ownership composition. If during the privatisation process some types of owners were better informed than others about the performance of firms to be privatised, they would have been over represented in better performing firms. The majority of companies in our sample have been privatised through the Mass Privatisation Programme (MPP). During that process employees and ex-employees participated in the privatisation of more than 80% of companies. Indeed, in our sample employees are present as owners in 23 out of 45 companies, although they are dominant only in a few (3 firms in 1997). Also managers, who could have been better informed about the firms before the privatisation process, are dominant in only a small number of firms (4 in 1997).

Weiss and Nikitin (1998) proposed to use firm specific dummy variables or the initial ownership structure and changes in the firms' performance (instead of levels) in order to reduce the bias in estimated coefficients (*see endnote 19*). Given the small number of firms where employees and managers are dominant, we think that this particular selection bias is not a problem in our case. We did consider using the "growth", instead of the "level", of performance indicators but this reduced the number of observations with possible consequences for the robustness of the estimation process (because of reduced degrees of freedom) (*see endnote 20*).

The firms in Albania had to meet certain criteria in order to be included in the MPP scheme: to be in operation, to have a good or reasonable financial performance, and not to be heavily indebted. However, not all firms that were privatised under the MPP scheme actually met these criteria. Financial problems, especially in the aftermath of the shock in 1997 made it difficult for many firms to survive regardless of their ownership structure. Some of them ceased production activities in order to use their facilities for more profitable purposes, again

regardless of their ownership structure. We have to acknowledge the possibility of some selection bias as we are left with only 37 out of 97 mass privatised firms and are not able to explore the relationship between ownership structure and firm performance of firms that did not survive.

5. Concluding remarks

The literature on the impact of ownership structure on firm performance in mature market economies has produced ambiguous results. This has been partly due to the recognition and inclusion of *benefits* as well as *costs* of ownership concentration and partly depending on whether or not ownership structure has been treated as an endogenous variable. In the context of TEs, in general, the literature seems to have been more conclusive. The absence (or weakness) of other mechanisms for corporate control seems to have left the primary monitoring role to ownership concentration. However, here, most studies have treated ownership structure as an exogenous factor in the investigation of its relation with firm performance. A number of studies have raised the issue of endogeneity and acknowledged its existence but have not dealt with it sufficiently. Some of these have used a 2SLS technique, and panel data sets, but still suffer from a number of shortcomings related to the validity of instruments and the treatment of heteroskedasticity and autocorrelation.

In this paper we investigate the evolution of ownership structure in a panel of privatised firms in Albania and demonstrate the role of the estimation technique used. In addition to the standard methodology using panel data techniques with or without the two stage least squares procedure, we use the more recently developed GMM techniques as well as the Arellano and Bover dynamic panel data technique to deal with endogeneity, heteroskedasticity and autocorrelation problems simultaneously. Another issue, which has not been received much attention in previous empirical studies, is the path dependency of ownership structure. This is especially important in TEs where institutions and legal protection of shareholders are weak and market-based control mechanisms are not well developed. In this paper, we include a lagged dependent variable in the estimated regression. We provide sufficient evidence to support the view that the evolution of ownership structure in the Albanian privatised firms is path dependent and also endogenous irrespective of the estimation method used. For the sample under consideration, there is also no statistically significant relationship between ownership concentration and firm performance, thus confirming Demsetz and Lehn and Demsetz and Villalonga's results. For other explanatory variables, although there are several significant variables with standard techniques, their significance disappears when we use more robust techniques which deal with the econometric problems mentioned earlier.

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Appendices

Corporate Conflict Index

The Corporate Conflict Index is constructed on the basis of the following 6 statements:

		1997-2000		2001-2002	
		1	0	1	0
1	The company has not paid dividends during the period.				
2	The company arranged redemption of some shares.				
3	The company sold some shares to workers.				
4	The company arranged new share issues during the period.				
5	There are shareholders owning more than 50% of shares.				
6	More than two general shareholders meeting took place during the period.	Yes	No	Yes	No

The questions indicate the presence or absence of actual or potential conflict in the firm. Positive answers are assigned the values of one and negative answers the value of zero. The construction of this index is based on the work of Turuntseva, et al. (2004) though some of the questions were altered for our survey. The Corporate Conflict Index is a weighted average index with weights calculated as follows:

where p_k is the proportion of firms showing the k -th corporate conflict characteristic. The reason for such weighting, as Turuntseva, et al. (2004) argue, is to apply higher weight to rarer situations (where p_k is small) which are associated with

$$w_k = \log \frac{1}{p_k}$$

higher levels of conflict. The mean value of the index is 0.54 and the minimum and maximum values are 0 and 0.96 respectively.

Table 2. The description of variables used

Variables	Description
LC1	The share of the largest owner which measure ownership concentration. The logarithmic transformation of this variable from bounded to an unbounded is given in section 4 in footnote no.4.
LC3	The share of the largest three owners, which is another measure of ownership concentration.
Ln Labour Productivity	The natural logarithm of sales per employee ratio and is used as a measure of firm performance.
Individuals	A dummy variable equal to 1 if 'individuals' are the dominant owners and 0 otherwise. This variable is a measure of the types of dominant owners.
Other firms	A dummy variable equal to 1 if 'other firms' are the dominant owners and 0 otherwise. This variable is also a measure of the types of dominant owners.
Fixed assets	A measure of firm size
Ln Fixed assets to labour ratio	The natural logarithm of fixed assets to labour ratio and is used to measure capital intensity.
Ln Fixed assets to labour ratio squared	The squared term of Ln fixed assets to labour ratio.
Fixed investment to fixed assets ratio	The ratio of investments in fixed capital to fixed capital and is an indicator of the opportunities for discretionary projects by managers.
Standard deviation of profit	A measure of firm-specific risk. The calculation of standard deviation of profit and in each year is based on the figures of previous years. However, 1997 and 1998 figures are the same because we do not have any information for profit and sales of our sample firms before 1997.
Manufacturing sector	A dummy variable equal to 1 if the firm belongs to the manufacturing sector and 0 otherwise.
Years since privatisation	Number of years elapsed since privatisation of the firm.
Method of privatisation	A dummy variable equal to 1 if the firm has been privatised during the mass privatisation programme and 0 otherwise.
Corporate Conflict Index	An indicator of the presence of conflicts in the firm.
Ln depreciation	The natural logarithm of depreciation used as an instrumental variable to instrument firm performance.
Age of managers	The average age of managers of the firm and is also used to instrument firm performance.

Table 3. Determinants of ownership concentration (LC3_t)

Independent variables	Dependent variable: share of the largest three owners (LC3 _t)				
	Random Effect	IV Random Effect	GMM with Kernel	GMM with cluster	Arellano & Bover model
LC3 _{t-1}	0.205 ** (2.27)	0.189 *** (5.59)	0.836 *** (10.35)	0.816 *** (9.24)	0.909 *** (9.44)
Ln Labour productivity	0.044 (0.64)	0.396 ** (2.30)	0.202 (0.90)	0.233 (0.76)	-0.175 (-0.78)
<i>Types of dom. owner</i>					
Individuals	1.746 *** (4.62)	2.005 *** (5.92)	0.549 * (1.88)	0.620 * (1.77)	0.249 (0.58)
Other firms	0.379 *** (3.14)	0.587 ** (2.44)	0.150 (0.80)	0.097 (0.47)	-0.004 (-0.02)
<i>Other variables</i>					
Fixed Assets	0.001 ** (1.88)	0.001 ** (2.19)	0.001 (0.03)	0.001 (0.12)	-0.001 (-0.17)
Ln Fixed Assets to labour ratio	0.247 *** (3.22)	0.022 (0.18)	0.013 (0.16)	0.006 (0.05)	0.123 (0.72)
Ln Fixed Assets to labour ratio-squared	-0.056 *** (-3.47)	-0.062 *** (-3.33)	-0.021 (-0.90)	-0.021 (-0.76)	-0.026 (-0.69)
Fix. Investment to fixed assets ratio	0.025 (0.97)	0.456 (1.19)	0.671 (1.01)	0.651 (0.86)	0.021 (0.25)
St. Deviation of profits	0.008 (0.79)	-0.001 (-0.06)	-0.008 (-0.50)	-0.006 (-0.30)	0.010 (0.37)
Manufacturing sector	-0.123 (-0.35)	-0.114 (-0.28)	0.192 (0.90)	0.245 (0.94)	0.080 (0.43)
Years since privatisation	0.572 *** (3.03)	0.558 *** (4.52)	0.228 (1.60)	0.288 * (1.93)	0.241 *** (2.13)
Method of privatisation	-1.496 ** (-2.20)	-1.276 *** (-2.75)	-0.092 (-0.26)	-0.033 (-0.08)	-0.083 (-0.10)
Corporate Conflict Index	-0.637 (-1.43)	-0.490 (-1.10)	-0.245 (-0.48)	-0.201 (-0.36)	0.111 (0.21)
Constant	-1.524 (-1.03)	-1.535 (-1.48)	-1.155 (-1.33)	-1.653 ** (-2.09)	-1.565 ** (-2.39)
<i>Instruments</i>					
Ln depreciation	na	√	√	√	na
Age of managers	na	√	√	√	na
R-sq (not adjusted)	0.70	0.71	0.90	0.92	na
Partial R-sq	na	na	0.16	0.16	na
F test of excluded instruments.	na	na	6.06 ***	2.80 **	na
Hansen J	na	na	2.645 *	2.080	2.85
M1 ^a	na	na	na	na	-1.65 *
M2 ^a	na	na	na	na	-1.18
F or Wald test of overall significance	326.70	18.40 ***	311.10 ***	257.72 ***	126.35 ***
No. of observations	201	191	191	191	201

Notes: t-statistics in parenthesis; * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

^aM1 and M2 are tests for the first and second order autocorrelation of residuals.

Table 4. Determinants of ownership concentration without a lagged variable

Independent variables	Dependent variable: share of the largest owner (LC1 _i)			
	Random Effect	IV Random Effect	GMM with Kernel	GMM with cluster
Ln Labour productivity	0.364 (1.55)	0.893 *** (3.97)	0.382 (1.18)	0.391 (0.81)
<i>Types of dom. owner</i>				
Individuals	1.157 ** (2.19)	1.618 *** (4.04)	2.642 *** (3.46)	2.653 ** (2.27)
Other firms	0.649 ** (2.42)	0.948 *** (2.75)	0.496 (1.26)	0.500 (-0.88)
<i>Other variables</i>				
Fixed Assets	0.001 (0.60)	0.001 (1.38)	0.001 (0.78)	0.001 (0.61)
Ln Fixed Assets to labour ratio	-0.018 (-0.11)	-0.304 * (-1.75)	0.483 ** (2.18)	0.476 (1.46)
Ln Fixed Assets to labour ratio squared	-0.120 *** (-2.64)	-0.120 *** (-4.36)	-0.128 *** (-2.63)	-0.126 * (-1.80)
Fix. Investment to fixed assets ratio	0.019 (0.88)	-0.583 (-1.17)	1.226 (1.02)	1.210 (1.82)
St. Deviation of profits	0.020 (1.26)	-0.008 (-0.37)	-0.109 *** (-3.61)	-0.110 ** (-2.35)
Manufacturing sector	-0.032 (-0.06)	0.101 (0.15)	-0.314 (-0.80)	-0.316 (-0.53)
Years since privatisation	0.498 *** (2.53)	0.534 ** (2.49)	0.519 *** (4.19)	0.518 *** (2.82)
Method of privatisation	-2.422 *** (-2.67)	-2.023 *** (-2.63)	-1.870 *** (-2.62)	-1.856 * (-1.69)
Corporate Conflict Index	-1.348 * (-1.78)	-0.661 (-0.93)	-4.242 *** (-5.22)	-4.253 *** (-3.60)
Constant	-0.609 (-0.46)	-1.368 (-0.77)	0.227 (0.36)	0.341 (0.26)
<i>Instruments</i>				
Ln depreciation	na	√	√	√
Age of managers	na	√	√	√
R-sq (not adjusted)	0.49	0.42	0.63	0.63
Partial R-sq	na	na	0.22	0.22
F test of excluded instruments	na	na	11.47 ***	5.42 ***
Hansen J	na	na	0.136	0.059
M1 ^a	na	na	na	na
M2 ^a	na	na	na	na
F or Wald test of overall significance	56.17 ***	6.34 ***	12.91 ***	6.11 ***
No. of observations	235	223	223	223

Notes: t-statistics in parenthesis; * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Endnotes

¹ For example, Morck, et al. (1988) investigated the relationship between management ownership (combined shareholding of all board members with a minimum stake of 0.2 %) and the market valuation of the firm (measured by Tobin's Q). They investigated a sample of 371 Fortune 500 firms and found a non-monotonic relationship between managerial ownership and firm performance. Tobin's Q increases when managerial ownership is less than 5% or more than 25%. But the surprising result was the decrease of Tobin's Q when managerial ownership was between 5 and 25%. According to them managers' entrenchment or the non-value maximising behaviour of managers might be the reason for the decrease in Tobin's Q. Following the work by Morck, et al. (1988), McConnell and Servaes (1990) also studied the effect of insiders' (officers and

directors) ownership on the Tobin's Q for a sample of 1,173 firms for 1976 and another sample of 1,093 firms for 1986. They also used the same technique as Morck, et al. (1988) and found that there is a non-linear relation between performance and insider ownership.

² The results are similar to Djankov (1999) though the thresholds are different.

³ Claessens and Djankov (1999) deal with the endogeneity but not by a standard IV technique. They use a rather unknown two-step procedure: regressing the initial ownership concentration (immediately following voucher privatisation) on ownership concentration at the end of the period, and using the residuals of these regression in the main equation as a new measure of ownership concentration.

⁴ Grosfeld and Hashi (2001 and 2004) raise the endogeneity issue but deal with it by regressing the concentration ratio in 1999 on the average value of a number of variables over the 1996-98 period.

⁵ Both GMM with kernel-based estimator and GMM with cluster robust option are available in the 'IVREG2' procedure (a user written programme) in the STATA package and can also be used with panel data.

⁶ The GMM estimator, however, has poor small sample properties (Baum, et al., 2003). In such cases and if the error is homoskedastic the simple IV estimator is preferred vis-à-vis GMM. Furthermore, with small samples, it is difficult to find good instruments, in terms of complying with the required criteria. If the instruments are weak, then the estimator is biased in the same direction as the OLS and using GMM produces no better results.

⁷ For details of the mass privatisation programme in Albania, see Hashi and Xhillari (1999).

⁸ The rest of the firms had closed down, been destroyed, ceased operation or had split into parts with none of the parts working.

⁹ Collecting information on these companies proved to be difficult too because, in Albania, there is no comprehensive list of the firms privatised through other methods in any government agency or ministry. The documents relating to the privatisation programme were destroyed during the civil unrest of September 1998 when a number of government buildings were set ablaze. Furthermore, the majority of companies privatised before 1997 were divided into the so-called "objects" and then privatised. Often, the part which had inherited the previous operating processes changed its name or operations immediately, or a few years after privatisation.

¹⁰ Both measures of ownership concentration are bounded numbers, therefore following Demsetz and Lehn (1985), Demsetz and Villalonga (2001) and others, we have transformed the bounded number to an unbounded one by the following logarithmic transformation: $LC1 = \ln[C1/(100-C1)]$, and similarly for LC3.

¹¹ We also examined the possibility of a lagged relationship (instead of levels) between ownership concentration and firm performance, but the results were largely the same in terms of sign, significance and size.

¹² The model is based on Demsetz and Villalonga (2001), Himmelberg, et al. (1999), Grosfeld and Hashi (2004) and Shehaj (2006).

¹³ The Corporate Conflict Index is constructed on the basis of the existence of a number of conflictual situations in a firm. The method of construction of the index is explained in the Appendix.

¹⁴ The results of Fixed and Random Effect models are largely the same. But because the Fixed Effect model does not allow "time invariant" variables and also limits the number of instruments (because some instruments are time invariant) we decided to use the Random Effect model. Furthermore, as Wooldridge (2002) argues, the Fixed Effect estimates can be inaccurate if there are important variables in the model with low variation over time (such as dummy variables indicating the types of dominant owners and corporate conflict index).

¹⁵ The other, related Arellano and Bond (1991) model was not used as it is based on first differences and therefore requires a larger time dimension.

¹⁶ Because of the space limitation, the results with the share of the largest three shareholders (LC3) as the dependent variable are shown in Table 3 in the Appendix.

¹⁷ The high concentration of ownership in countries like Albania is largely due to the weakness of other mechanisms of control and especially the legal and institutional environment. We did control for the impact of legal environment on the concentration of ownership by using a variety of EBRD indicators for Albania. However, the variable was not significant, we believe, because its value did not vary much during the period of analysis.

¹⁸ 'Years since privatisation' is the only control variable, apart from the lagged dependent variable, that remains significant even in the GMM techniques. We did use interaction terms between this variable and other control variables in the model (firm performance, firm size capital intensity) but the results were similar to what is presented in Table 1.

¹⁹ They argue that the better informed buyers of shares of a company, were better informed about the level of performance at that time, but had no information how this performance will change.

²⁰ The diagnostics of the regressions using changes were poor, most probably due to the reduced number of observations.