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January 2009

Online at <https://mpra.ub.uni-muenchen.de/13685/>
MPRA Paper No. 13685, posted 01 Mar 2009 23:57 UTC

Firm Performance and Managerial Turnover: The Case of Ukraine

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Abstract

The paper studies whether and how CEO turnover in Ukrainian firms is related to their performance. Based on a novel dataset covering Ukrainian joint stock companies in 2002-2006, the paper finds statistically significant negative association between the past performance of firms measured by return on sales and return on assets, and the likelihood of managerial turnover. While the strength of the turnover-performance relationship does not seem to depend on factors such as managerial ownership and supervisory board size, we do find significant entrenchments effects associated with ownership by managers. Overall, our analysis suggests that corporate governance in Ukraine operates with a certain degree of efficiency, despite the well-known lacunas in the country's institutional environment.

Keywords: corporate governance, managerial labor market, transition, Ukraine.

JEL: G34, J40, L29.

January 2009

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1. Introduction

When economic transformation started in Eastern Europe in the late 1980s, the initial focus of both academics and policy-makers was on macro-issues, such as macroeconomic stabilization, liberalization of prices and foreign trade, as well as privatization – a standard set of Washington consensus reforms. After less than a decade, there was a remarkable shift in attention from this initial agenda to the need of filling in institutional gaps inherited by transition countries from the era of socialism (Mitra et al. 2008). In particular, there was a growing understanding that the success of the economic reform on the micro-level would to a large extent be determined by the emergence of effective institutions of corporate governance, which would promote restructuring of formerly state-owned enterprises, eventually contributing to their improved performance (Dyck 2001).

As in developed market economies, corporate governance problems facing transition countries stem from the separation of ownership and control and the divergence of interests of principals (shareholders) and agents (managers). In the absence of well-functioning governance mechanisms, as the corporate governance literature argues, managers may expropriate investors' funds, engage in empire building, or simply live an easy life (Shleifer and Vishny 1997). Among various corporate governance mechanisms that ensure managerial discipline, the managerial labor market plays a key role. In particular, performance-based compensation schemes stimulate managers to maximize profit and shareholder value, while the threat of dismissal prevents them from shirking and/or engaging in expropriation of investors' funds.

It is widely acknowledged that the corporate governance problem has had an extra dimension in transition countries. During the socialist period, managers of state

enterprises were appointed for their adherence to the state-supported ideology or because they were proficient in lobbying the government for credits and securing delivery of inputs (Shleifer and Vasiliev 1996). In the 1990s, most of these skills became of little or no value and incompetence of many managers in the emerging market environment became apparent. In other words, the countries of Eastern Europe entered the transition period with considerable mismatch between managerial talent and productive assets (Roland 2000). The lack of ability on the part of the existing managers, and their entrenchment, raised concerns about whether introducing appropriate incentives would have any positive effect on enterprise restructuring and performance. It might well be the case that the governance problems could not be resolved without replacing the incumbent pre-privatization managers in the first place (Fidrmuc and Fidrmuc 2006).

These factors explain recent interest among both academics and policy-makers in the functioning of the managerial labor market in transition countries. Managerial pay and performance, factors triggering dismissal of incumbents and those leading to the appointments of inside versus outside successors, as well as the effect of managerial turnover on enterprise performance are among the topics that have stayed high on the research agenda in the region. The empirical research remains, however, hampered by the limited availability of data, apart from a few relatively well-studied countries such as the Czech Republic and Russia (e.g., Claessens and Djankov 1999, Fidrmuc and Fidrmuc 2005, Fidrmuc and Fidrmuc 2007, Muravyev 2003a, Kapelyushnikov and Demina 2005).

Our paper focuses on corporate governance in Ukraine, a transition country that, despite recent scholarly interest, remains relatively poorly studied by economists. The country occupies a particular position among transition economies. It is the only state in

the Eastern European region that has experienced a prolonged decline from 1991 to 1999, with GDP falling by nearly 60 percent (EBRD 2001). It is also among the countries that introduced very few reforms in the course of the 1990s. In particular, Ukraine is known for slow, convoluted and politicized privatization (Estrin and Rosevear 2003). Also, a sound legal framework regulating the creation and operation of corporations – the core of the modern economies – was established in Ukraine only in 2008, with the adoption of the Law on Joint-Stock Companies. Before that, the legal basis consisted of largely outdated acts (e.g., the Law on Economic Associations) that were adopted in 1991, when the country was still a part of the USSR. The weak legal framework, combined with ineffective enforcement of law (see, e.g., Pistor et al. 2000), raised considerable concerns about the quality of corporate governance in the country. Indeed, as suggested by Schnytzer and Andreyeva (2002), Ukrainian firms in 1998 still behaved as if they were “... in a loosely reformed Soviet environment where exchange via interpersonal connections, rather than the price mechanism, determined the allocation of resources”.

In this paper we take a look at a particular aspect of corporate governance in Ukraine, the sensitivity of managerial turnover to the past performance of firms. Such an analysis can be regarded as a crude test of the overall efficiency of corporate governance in the country (Gibson 2003). Indeed, an effective corporate governance system requires that badly performing incumbents are systematically replaced by new, more skilled and better motivated, managers. In addition, we examine how managerial turnover is related to several other factors, such as managerial ownership, supervisory board size, leverage, and liquidity of firms. The role of corporate boards is of particular importance as regulations concerning board size and the exact distribution of power between corporate boards and shareholders’ meetings have been a subject of intense

debates among academics, policy-makers, and practitioners.

Using a new dataset on Ukrainian joint-stock companies, which we assemble from companies' reports to the regulator, State Commission on Securities and the Stock Market, we find evidence of an inverse relationship between past performance of companies and the likelihood of managerial turnover. This result is robust to controlling for a number of important factors, such as firm size, leverage, liquidity, supervisory board size, as well as important characteristics of chief executives, such as experience and gender. We also find that higher managerial ownership reduces CEO turnover, indicating entrenchment effects. However, there is no evidence in the data that managerial ownership affects the strength of the turnover-performance relationship. The same is true of the size of supervisory boards. Overall, our analysis suggests that Ukraine passes the crude test of the efficiency of corporate governance, despite all the institutional weaknesses accompanying the country's transition process.

The rest of the paper is organized as follows. Section 2 contains a brief review of the literature on managerial turnover – performance relationship, with a particular emphasis on the Eastern European region. The data and sample are described in Section 3. Section 4 discusses the methodological approach adopted in the study. Section 5 presents main results of the empirical analysis. Section 6 concludes.

2. Literature review

There is an extensive literature on the managerial labor market (and the relationship between managerial performance and turnover in particular) that dates back to the 1980s (Coughlan and Schmidt 1985, Warner et al. 1988, Weisbach 1988, Jensen and Murphy 1990). These and other studies have established an inverse relationship between the likelihood of managerial turnover and corporate performance in a number of developed

economies, most notably the US and the UK. Further research shows that the performance-turnover relationship is influenced by board size (Yermack 1996), board composition (Weisbach 1988), and ownership (Kang and Shivdasani 1995). Dismissals of CEOs are found to be associated with positive abnormal stock performance (Dennis and Dennis 1995), especially when outside successors are appointed as new managers (Rosenstein and Wyatt 1997).

Summarizing the available evidence, Djankov and Murrell (2002) suggest that managerial turnover is almost always effective in improving enterprise performance in Western countries. As regards transition and emerging economies, the picture is less clear-cut as many institutions of corporate governance remain underdeveloped in these countries. Indeed, a clear link between enterprise performance and managerial turnover may not exist in transition countries due to the imperfections in the protection of property rights, underdevelopment of the financial market, as well as due to the intervention by the state (Muravyev 2003b). How the managerial labor market operates in these economies remains, therefore, an interesting and important empirical question (Gibson 2003).

Despite a rapid expansion in recent years, the relevant literature remains scarce. There is some evidence suggesting the importance of new managerial human capital for enterprise restructuring and improved performance in transition countries. One of the early studies of the impact of managerial turnover on corporate performance is that by Barberis et al. (1996). Using a survey of 452 Russian privatized shops, they find that the presence of new management matters for restructuring, which is measured by shop renovations, supplier changes, store hours increases, and layoffs. Claessens and Djankov (1999) report for the Czech Republic that the appointment of new managers in 1993-1997 is associated with improvements in corporate performance measured by

profit margins and labor productivity. The result is particularly strong if new managers are selected by private owners rather than government officials. The finding that replacing a CEO in a newly privatized firm improves firm performance in the Czech Republic is confirmed in Fidrmuc and Fidrmuc (2007).

Another strand of literature looks at the relationship between past performance of firms and the likelihood of senior management turnover. For example, Gibson (2003) focuses on the link between corporate performance and CEO turnover using a sample of over 1,200 non-financial firms in eight emerging markets (Brazil, Chile, India, Korea, Malaysia, Mexico, Taiwan, and Thailand). He finds that the probability of CEO turnover rises with poor performance of firms, which suggests that corporate governance in the selected emerging markets is not ineffective. Gibson also finds that the presence of a large domestic private shareholder does not improve corporate governance.

Eriksson (2005) provides some evidence that poor corporate performance in the Czech Republic and Slovakia results in a higher likelihood of managerial turnover. Fidrmuc and Fidrmuc (2007) report a similar relationship for Czech firms, but only three to four years after their privatization. Muravyev (2003a) studies determinants of CEO turnover using a sample of over 400 privatized firms in Russia. Past performance measured by labor productivity is found to be an important factor triggering CEO replacement in underperforming firms. Furthermore, outside ownership, smaller size of corporate boards, control changes, and financial constraints are associated with higher rates of managerial turnover. Similar results are reported by Kapelyushnikov and Demina (2005), who identify three main determinants influencing CEO turnover in Russia: ownership structure, control changes, and financial performance. Interestingly, Kapelyushnikov and Demina (2005) find that outside succession is driven by poor

performance while Muravyev (2003b) suggests a higher probability of outside succession in firms with a higher return on equity.

An important issue in most of these studies of the effect of past corporate performance of firms on the likelihood of managerial turnover is the distinction between voluntary departures and forced resignations of managers (Hermalin and Weisbach 2003). Distinguishing between the different reasons for CEO change is indeed problematic, and many studies disregard these differences due to the unavailability of relevant information. The argument in favour of the approach that ignores the differences is that when a negative performance-turnover link is detected in the overall sample (e.g., covering routine turnover, voluntary leaves, and forced resignations), it is still likely to be driven by firing for poor performance. In particular, routine turnover is hardly related to performance; and it is far from obvious why poor performance should trigger voluntary departures of CEOs. It may be argued that poorly performing managers are likely to be willing to stay rather than leave their firms because their outside options are bad. Therefore, the only problem with the approach that pools all types of separations together is that the negative performance-turnover relationship becomes more difficult to establish. It may simply be not found if the bulk of all separations are routine or voluntary. Overall, there seems to be a consensus in the literature that a negative performance-turnover relationship reflects boards firing CEOs (Hermalin and Weisbach 2003).

Nevertheless, few attempts to distinguish between different reasons of CEO replacement are known in the literature. For example, Rachinsky (2002) uses publicly available information on large companies to study managerial turnover in the context of the transition economy of Russia and finds that most separations are actually not dismissals. However, as acknowledged in the mentioned study, different types of

turnover can overlap (even in the case of firing for poor performance, the officially announced reason for turnover is often neutral: health conditions, expiration of contract, etc.) and therefore the classification of turnover cases is far from objective.

As regards Ukraine, the evidence concerning the performance – turnover relationship is limited. The study by Warzinski (2003) is a notable exception in this respect. Based on survey data covering 300 Ukrainian firms, it analyzes determinants and consequences of managerial change, as well as the role of privatization and competition in improving company performance. Warzinski finds some evidence that financial difficulties in private, though not state, firms results in higher probability of CEO departure. The study also suggests that managerial change and privatization have a positive joint effect on profitability, though the individual effects appear to be insignificant.

Warzinski's study has several weaknesses stemming largely from the nature and quality of the data. First, the sample size is relatively small. Moreover, the data are obtained in two Ukrainian regions only. More importantly, the study does not use accounting information – performance is measured based on qualitative assessments of respondents, who are asked if their firms faced financial difficulties shortly before the interviews. The reliability of such subjective data on company performance raises substantial concerns about the main findings of the study.

We conclude that the evidence concerning the relationship between corporate performance and managerial turnover, and the overall effectiveness of corporate governance, remains scarce for Ukraine. Our paper contributes to filling in this gap.

3. Data and sample description

In our empirical analysis, we take advantage of a recently established database of

Ukrainian joint-stock companies, which is maintained by State Commission on Securities and the Stock Market, the country's regulator. The Commission collects essential information about companies and makes it publicly available on its website.¹ The database covers over 7,000 firms, with the earliest records available in 2001. The data contain detailed financial information about firms (annual balance sheets and income statements), information on their ownership and governance structures, industry affiliation, number of employees, location, etc. There is also a bunch of data about firms' chief executives, including names, gender, and tenure on the managerial positions.

The estimation sample for our empirical analysis is constructed from these data in several steps. First, we restrict the sample to open joint-stock companies, dropping all observations pertaining to closed joint-stock firms. One reason for such a decision is restrictions on transferability of shares in closed corporations, which may have implications for managerial turnover.² More importantly, the disclosure standard for closed joint-stock companies is somewhat more lax than for open corporations, resulting in the unavailability of essential data about the former type of firms. Second, because we want to relate changes in CEOs between the current and preceding periods to companies' performance in the preceding period, we only keep observations with complete data in the current and preceding financial years. Constructed along these lines, our final sample includes 916 companies with a total of 3,934 observations over a 5-year period from 2002 to 2006.

In the process of data collection, we attempted to trace exact reasons for changes in CEOs in Ukrainian firms. In doing so, we have been looking at publicly available

¹ The Internet address is www.smida.gov.ua, the link effective as of May 2008.

² Comparing open and closed joint-stock companies is an interesting research topic that is outside of the scope of this paper.

data sources about Ukrainian companies, such as State Commission on Securities and Stock Market's disclosure server (<http://smida.gov.ua>), corporate sites, and various mass media, most notably Interfax News Agency (<http://interfax.com.ua>). The importance of mass media in covering corporate news has grown considerably in recent years, with many cases of changes in management receiving high publicity.

A complete classification of nearly half a thousand cases of changes in CEOs that we observe in the data has proved to be a virtually impossible task, however. The principal reason for that is the unavailability of relevant information from earlier years and for smaller firms, as well as ambiguous and contradictory information in many other instances. Nevertheless, we have identified a couple of dozen cases of routine turnover of managers (due to death, health reasons, and retirement because of pension age), changes in CEOs due to bankruptcy of firms, as well as a number of cases linked to the political process, including cabinet changes. The latter is not a surprise in view of abundant evidence of important role of political factors in the Ukrainian economy (Baum et al. 2008).

In particular, we have found several instances of politically-motivated changes in CEOs in firms with considerable government ownership – “strategic” enterprises, especially among the power utilities and in the metallurgical sector. For example, managerial change in “Chornomornaftogas” in 2006 caused a stir as it clearly revealed government officials’ fight for a particularly attractive company. Interestingly, despite wide coverage of the case in mass media, the officially announced reason for managerial change was the expiration of the departing CEO’s contract. This example illustrates the tremendous difficulties in identifying the true reasons for managerial turnover in Ukraine.

Given these difficulties, we stay short of providing more details about the

reasons underlying turnover of CEOs in Ukrainian firms. Even though we are able to exclude 22 admittedly routine changes in CEOs from the final estimation sample, our paper essentially follows the standard approach in the literature that does not draw a distinction between different types of separations (Hermalin and Weisbach 2003).

4. Methodology

4.1. Performance measures

Choosing an indicator that would reliably capture all essential aspects of company performance is a non-trivial task in developed economies, and even more so in transition and developing countries. For example, Bevan et al. (1999) suggest that poor accounting standards and the underdevelopment of stock markets force researchers studying enterprise performance in transition economies to place less emphasis on indicators that are based on capital stock, assets, or equity.

In particular, the use of Tobin's Q, a traditional measure of the expected long-run performance of firms, is virtually ruled out in the transition context because of the absence, or a very limited role, of stock markets. There are also problems associated with the use of total factor productivity owing to low reliability of the capital stock data. Imprecise estimates of capital coupled with endogeneity of profit plague profitability ratios, such as return on equity.³

These difficulties lead researchers studying enterprise performance in emerging and transition countries to adopt indicators that are less common in the context of developed economies. For example, Bevan et al. (1999) consider the share of exports in sales to be a particularly useful indicator of enterprise performance in the transition

³ The biggest concern is profit if measured net of taxes because taxes are often viewed as endogenous rather than parametric (Schaffer 1998).

environment. Gibson (2003) uses accounting measures of performance such as earnings before interest and taxes scaled by assets, the change in earnings scaled by lagged assets, and growth in sales. The study by Warzinski (2003) employs a rather peculiar performance measure, a dummy that indicates if a firm faced financial difficulties in the preceding period, according to managers' subjective responses while Barberis et al. (1996) consider a bunch of restructuring indices, such as shop renovations. A number of scholars choose labor productivity as the most suitable performance measure (e.g., Earle 1998; Kouznetsov and Muravyev 2001); however, this measure is appropriate for short-term analysis only, as it is based on the implicit assumption that the level of capital remains unchanged.

Understanding the pros and cons of various measures of firm performance, as well as potential differences in their interpretation, we opt for using several indicators instead of choosing and defending a single one. In particular, our focus will be on labor productivity (LP), return on sales (ROS), and return on assets (ROA). This list deliberately omits return on equity (ROE), one of the measures that can easily be computed from the data. Such an omission is not an accident. In the data we have, there are more than 100 firms having negative equity, according to their balance sheets.⁴ Thus, in case such a firm reports losses in the last financial year, one obtains a positive value of ROE from the division of one negative number (financial loss) by another one (negative equity). Clearly, the calculated positive value has nothing to do with the actual performance of the firm. While there are credible concerns about the other measures of performance, including labor productivity, return on sales, and return on assets, we believe that the magnitude of possible accounting distortions is much smaller in these cases.

⁴ This is typical in an inflationary environment when firms that do not regularly revalue their fixed assets incur considerable losses.

4.2. Econometric models

The focus of this study is the link between CEO turnover on the one hand and firm performance on the other. The outcome in our analysis can be represented by a dichotomous variable which equals to one in case of CEO dismissal between two adjacent years and zero otherwise. Because of the binary outcome variable, we use the logit model to estimate the following CEO turnover equation:

$$C_{it} = A(\alpha + \beta * Performance_{t-1} + X_{it-1} \gamma) \quad (1)$$

where i indexes firms, t corresponds to period, C_{it} is a dummy variable for a change in CEO between years $t-1$ and t , $Performance_{t-1}$ is a measure of firm performance in period $t-1$, X_{it-1} is a vector of control variables that characterize firms and their managers, and A is the cumulative density function of the logistic distribution. The parameter of interest is β , which we expect to be negative.

Based on previous studies of determinants of managerial turnover, we include the following characteristics of firms and their managers in vector X :

- a variable measuring the size of a company's supervisory board, the organ that is empowered to monitor managers and fire them in case of poor performance. The optimal size of the board has been subject of controversy in the literature (e.g., Jensen 1993). Board size has been found an important determinant of CEO change in Yermack (1996), Borokhovich et al. (1996), and Huson et al. (2001). Hermalin and Weisbach (2003) provide an extended list of studies documenting a negative relationship between board size and corporate performance in their survey of corporate boards in developed economies.

- measures of leverage and liquidity, which are supposed to control for firms' financial constraints. High leverage and/or low liquidity are likely to rise the probability

of bankruptcy and the threat of bankruptcy may cause higher CEO turnover.

- firm size (measured by the natural logarithm of total assets or by the natural logarithm of employment). This variable is highly relevant in our analysis as larger firms may have a bigger pool of internal successors for a departing manager so that these firms face smaller costs of finding a new CEO.

- chief executives' ownership stakes. We expect that managerial ownership inhibits managerial turnover by promoting, *ceteris paribus*, entrenchment of the incumbents.⁵

- the gender of managers. There is a growing attention in the corporate finance literature to gender composition of corporate boards and the gender of chief executives (Rose 2007, Francoeur et. al. 2008,). The interest is sparked by the existence of differences between men and women, for example, in risk aversion, which may translate into different behavior as directors and managers (Schubert et. al. 1999, Stelter 2002, Coleman 2003, Igbal et. al. 2006). We hypothesize that boards may have a gender bias in evaluating CEO performance and therefore include a dummy variable indicating CEOs' gender in our econometric model.

- managerial experience (number of years of work on managerial positions) and age. Managers' experience is another important variable in our analysis that may help shed more light on the role of managerial human capital. On the one hand, managerial experience, which characterizes accumulation of professional knowledge and acquisition of managerial techniques, may be a valuable asset to the firm. On the other hand, greater managerial experience, *ceteris paribus*, implies older managers who may have insufficient ability to run firms in a market environment if much of their skills

⁵ It is worth noting that managerial ownership may be positively associated with performance as managers have stronger incentives to exert effort when their ownership stake is larger (Jensen and Meckling, 1976). This incentive effect of managerial ownership works in the opposite direction to the entrenchment effect.

were acquired in the Soviet time. We include both managerial age and experience in our regressions in order to separate these effects.

- industry and region fixed effects represented by a set of dummy variables.⁶

A potentially interesting extension of the baseline analysis comes from augmenting the econometric model with interactions of performance with a number of control variables comprising vector X . Such an extension provides evidence as to whether the strength of the performance-turnover relationship varies with different characteristics of firms, most notable ownership and board size.⁷ We conduct such an analysis interacting performance with managerial ownership, board size, and industry affiliation of firms.

In addition to the baseline specification (1), we model managerial turnover as a time-dependent event using hazard models that explicitly take into account the timing of changes in CEOs. Following Geddes and Hrishikesh (1997), the determinants of CEO tenure are estimated using the following proportional hazard model specification:

$$L(t|X) = L_0(t) \exp(\mathbf{X}\mathbf{b}) \quad (2)$$

where $L(t)$ is the base-line hazard, t is the duration of a manager's life in the company, X is a vector of explanatory variables and b is a vector of unknown parameters to be estimated. The most common methods for estimating hazard models with time varying covariates are the discrete time and Cox proportional Hazard models (Jenkins, 2004). Shumway (2001) showed that they produce similar results, but the former method is computationally more efficient.

As we want to capture the degree of tolerance, a spell could be defined as a

⁶ Industry affiliation may affect the cost of replacing CEOs as it is related to the ease of finding an outside successor. If a company belongs to an industry consisting of very heterogeneous firms, finding an outside successor may be difficult as many potential candidates may not possess adequate (firm-)specific human capital.

⁷ For example, entrenchment of managers, which is facilitated by managerial ownership, may become a particularly severe problem when it comes along with managerial incompetence.

period without CEO turnover. Since we have one exit from the spell, we estimate this model using the complementary log-log regression.⁸ The dependent variable is equal to one for the last period a CEO worked in the company and zero otherwise.

To capture the "patience" effects we employ a fully non-parametric baseline hazard function. We do this by defining dummy variables which correspond to the spell duration. For example, if the maximum survival time is four, we will have three dummy variables.

5. Regression results

5.1. Logit model

To estimate the effect of firm performance on CEO turnover we employ five specifications that differ in terms of performance indicators and control variables used. The dependent variable in all regressions is binary variable CHANGE that indicates CEO turnover between the current and preceding periods. As discussed above, our analysis focuses on three measures of performance: return on assets (ROA), which is the ratio of net profit to assets, return on sales (ROS), which is the ratio of net profit to sales, and labor productivity (LP), which is the ratio of sales to the number of workers employed.

In addition to the main regressor, which measures firm performance, our econometric models include several other characteristics of firms and of their managers. Financial constraints facing the firms are approximated with leverage (LEVERAGE), which is the ratio of short-term and long-term debt to assets (in fact, debt-to-equity ratio is inappropriate because of the above-discussed problems with measurement of equity).

⁴ The complementary log-log regression estimates the probability that an event happens to an individual in some time interval, given that the individual did not face this event in earlier periods. The logit model for such a continuous-time process is not plausible.

Liquidity (LIQUIDITY) is measured as the ratio of working capital to short-term debt. Since we expect to find a negative relationship between CEO turnover and lagged performance of firms, we use lagged values of ROA, ROS, and labor productivity, as well as of financial constraints, in the regressions.

Firm size is proxied by either the natural logarithm of assets (SIZE) or the natural logarithm of employment (SIZE_LABOR). Variable EXPERIENCE is measured as the number of years of work record on managerial positions, and variable BOARD captures the number of directors in the supervisory board. The regressions also include variable FEMALE, which is a dummy for the CEO's gender.

Table 1 shows descriptive statistics of the variables used in the empirical analysis. Rather surprisingly, Ukrainian joint stock companies appear to be, on average, unprofitable, as the mean values of ROA and ROS are negative. The other financial ratios show that firms are, on average, financially stable. In particular, the ratio of debt-to-equity is 1:2, and firms' current liabilities are covered by working capital more than three times. As regards chief executives, they are, on average, 50 years old and have 18 years of experience. Supervisory boards consist of three to four members on average.

We also compare summary statistics for two groups of firms: those that have not changed their CEOs during the whole period under study and those that have changed their managers at least once. Table 2 shows descriptive statistics for both types of firms. It turns out that firms with no change in CEO are more frequently headed by executives who are males and who are also older and more experienced compared with managers of firms in the complimentary group. In particular, the mean experience of managers is 19 years in the former group and only 16 years in the latter group.

Managerial turnover is more typical of larger firms, which also have somewhat larger supervisory boards. Firms that experience no change in managers have higher

liquidity, return on sales and return on assets, and also appear to be less leveraged. In other words, the reported financial indicators suggest a link between financial risk facing companies and managerial turnover. In particular, managers of high-leveraged firms are more likely to lose their jobs even though these firms may be more profitable, as the corporate finance literature suggests.

Overall, the univariate analysis reveals substantial differences in the characteristics of the two groups of firms. A multivariate regression analysis that follows will help to understand the interplay between these various factors and the main outcome of interest, CEO turnover.

Our baseline regression results are reported in Table 3. Columns (1), (2) and (3) show the estimation results for specifications with firm size measured by the natural logarithm of assets, and columns (4) and (5) by the natural logarithm of employment. The indicators of firm performance are ROA in columns (1) and (4), ROS in columns (2) and (5), and labor productivity (LP) in column (3).

The estimates obtained are in line with our predictions. Managerial turnover is negatively and statistically significantly related to firm performance measured by ROS, and especially ROA. In particular, an increase in ROA by three standard deviations reduces the likelihood of CEO turnover by about 6% (see columns 1 and 4). The negative correlation between ROS and managerial turnover is observed only in the specification with firm size measured by the number of employees. A change in ROS has a much smaller impact on CEO turnover than a similar change in ROA. In contrast to these performance indicators, labor productivity appears to have no statistically and economically significant effects on CEO turnover. Overall, the results are similar to the findings by Muravyev (2003a) and Kapelyushnikov and Demina (2005) for Russia and suggest a certain degree of effectiveness of corporate governance in Ukrainian

companies. In contrast to these earlier studies, our results show a greater role of financial indicators in triggering CEO turnover.

Table 3 also shows a number of interesting results related to the role of firms' financial constraints. For example, leverage has a significant positive impact on the probability of CEO turnover in all five specifications. This is consistent with Jensen (1989), who regards leverage as a crucial constraint on managerial discretion. In contrast, liquidity has no statistically or economically significant effect on CEO change.

The regression results do not show any statistically or economically significant effect of supervisory board size on the probability of CEO turnover. This is a somewhat puzzling result. Studies from other countries suggest an important role of board size and composition in monitoring and replacing CEOs, according to the survey article by Hermalin and Weisbach (2003). We, however, find that larger companies, *ceteris paribus*, are more likely to experience a change in CEO, regardless of how we measure firm size.

As regards characteristics of managers such as gender and experience, they appear to have no effect on CEO turnover in Ukrainian firms. However, managerial ownership has negative and statistically significant effect on the probability of turnover. An increase in the equity stake of the manager by 1% reduces the probability of her dismissal by 0.3%. Our study thus confirms the adverse role of managerial entrenchment, long suggested in the corporate governance literature.

We also test whether the strengths of the performance-turnover relationship varies with supervisory board size and CEO share ownership. With this purpose, we introduce interaction terms between these characteristics and firm performance. Interestingly, the coefficients of these interactions turn out to be statistically insignificant. The coefficients on the other variables remain pretty similar to those reported in the baseline

regressions.⁹

We also investigate the link between CEO turnover and the relative performance of companies (that is, relative to other firms in the same industry). The idea is that such a relative measure is a better indicator of the quality of management than firm performance per se. Indeed, company performance is subject to various shocks, which may have nothing to do with managerial decisions. For example, poor performance of a particular company may be a consequence of a decline in the whole industry, rather than a result of mismanagement. Thus, shareholders and supervisory boards may place stronger emphasis on such a relative evaluation when deciding the future of corporate executives.¹⁰

In this study, relative performance is measured as the difference between the company's performance indicator and the average performance in the relevant industry, distinguished by two-digit industry codes. The regression results for the standard logit specifications are shown in Table 4. In general, they are pretty similar to the previous estimates. The main result is that poor relative performance of a company in terms of relative ROA triggers CEO change, while the other measures of relative performance do not appear to be strong signals for the dismissal of managers.

Another interesting issue is whether firm performance has differential impacts on CEO turnover in different industries. We check this by interacting firm performance with industry dummies. The results from estimating the five familiar specifications are reported in Table 5. Note that of all industry-performance interactions, the table shows only those with statistically significant coefficients. There are a number of interesting

⁹ These results are not reported in the paper, but are available on request from the authors.

¹⁰ For a detailed discussion of relative performance evaluation, see for example, Holmstrom (1982) and Parrino (1997).

results. The negative effect of ROA on managerial turnover is observed in the construction materials and construction industries. ROS has a strong impact on managerial dismissal in the food processing, textile, construction materials, energy, and construction sectors. Strong effects of labour productivity are visible in the metallurgical and electronic tools industries. Of all these industry effects, the strongest relationship (from the statistical viewpoint) is observed in the construction materials industry. We believe that this pattern can be explained by a considerable number of firms comprising this industry as well as by its considerable homogeneity, implying that the performance of a firm provides a better signal for shareholders and supervisory boards about the quality of management than in more concentrated and less homogenous sectors.

5.2 Survival analysis

In this part of our analysis we first define a dummy variable indicating survival of managers and then use it to generate a dependent variable for the hazard model. This latter variable takes the value of one in the last period of a CEO's life in the company and zero otherwise. Next, we screen the data in order to remove observations corresponding to firms with no managerial turnover in 2001-2006 as well as firms experiencing changes in CEO in each consecutive period. This screening procedure results in a restricted sample embracing 1,246 firm-year observations.

Two further restrictions on the sample come from the left-censoring (no information about the exact date a CEO was appointed in the past) and unavailability of lagged firm-specific variables. As a result, the final sample for estimating the hazard model consists of only 633 firm-year observations.

Firm-specific variables and variables characterizing managers that enter the hazard models are constructed in the same manner as in the previous logit analysis. Specifically, the list of regressors includes measures of performance, leverage, liquidity, firm size, managerial share ownership, supervisory board size, as well as managers' gender, age, and experience. Descriptive statistics of these variables for the restricted sample of 633 observations are shown in Table 6. We expect these variables to affect CEO survival in the same manner as they affect CEO turnover in the logit model.

The results from estimating the discrete time hazards model (complementary log-log) are presented in Table 7. It should be noted that the hazard models can be treated both semi-parametrically and non-parametrically. In order to obtain consistent estimates in case the baseline hazard is poorly specified, we use the latter approach. The baseline hazard in columns (1), (2), and (3) therefore consists of the following periods: (i) one, (ii) two years, (iii) three years, and (iv) four years inclusive. A positive coefficient on a variable indicates its positive contribution to the hazard rate and a decreased survival time of a chief executive.

According to the estimates shown in Table 7, more experienced CEOs are less likely to survive in the firms. We also observe negative and statistically significant coefficients on variable LEVERAGE. This result, implying that a higher level of debt is associated with a lower likelihood of dismissal, is counterintuitive and contradicts the conventional theory. The regressions do not suggest any role of firm performance, supervisory board size, financial constraints measured by liquidity, as well as firm size on survival time. In other words, leverage and experience appear to be the only significant factors in the survival models.

One caveat in the survival analysis presented above is a rather short time interval during which we observe CEOs holding their posts. The problem stems from the fact

that we deal with a short panel; it is also exacerbated by missing data on supervisory board size and employment in 2001, which leads to the loss of observations from 2000 and 2001. The other reason for a dramatic reduction in the number of observations is the (necessary) screening procedure, which eliminates firms without CEO turnover during the whole period under study as well as firms experiencing changes in CEO during consecutive years.

The data at hand show that many firms with one or two CEO changes are tracked during three or four years only. Consequently, managerial histories are not long enough to get a sound understanding of the turnover process. Moreover, it can also be the case that firms without CEO turnover, which we had to exclude from the sample, are systematically different from the remaining firms. Indeed, the excluded firms may be more stable and of better quality in terms of corporate governance, as evidenced by regular and punctual submission of reports to the national regulator. Another peculiarity of the CEO's tenure is the observation that the "birth" of a new manager can take place in the last period. For instance, even though we are able to track most firms over five years, we cannot identify the start date for previous CEOs, who typically had much longer tenures compared with incumbents. Thus, the survival analysis faces the problem of limited timing, and we believe that the differences between the results obtained from the logit model and the hazard model can be attributed to this factor. In other words, the results obtained from different specifications of the logit model appear to be more reliable than those from the hazard model.

6. Conclusions

This paper studies the relationship between managerial turnover and firm performance in Ukraine. We use a new sample of open joint-stock companies that operated in the

country in 2002-2006, a period of robust economic growth and intensive restructuring. Our analysis is based on several specifications of the standard logit model, as well as on the discrete time hazard model. In order to mitigate distortions in measures of firm performance, which stem from deficient accounting practices, we use multiple indicators of performance: ROA, ROS, and labor productivity. In addition, we measure performance of a firm relative to other firms in the same industry, which may be a better indicator of managerial effort in the firm.

Our main result is the presence of a negative relationship between the likelihood of CEO dismissal and firm performance, especially if the latter is measured by return on assets. This suggests that corporate governance in Ukraine shows a certain degree of efficiency. We also find that larger ownership by managers reduces the likelihood of managerial turnover. The size of supervisory boards appears to play no significant role in CEO turnover. Interestingly, Ukrainian managers are financially constrained in their activities: the probability of a CEO's departure turns out to be related to the firm's leverage. We do not observe any significant effect of liquidity, however. The inclusion of interaction terms between performance measures on the one hand and supervisory board size and managerial ownership on the other hand does not provide any additional insight into the functioning of Ukraine's managerial labor market. The results from the hazard model are very weak and do not suggest any relationships between firm performance and CEOs' survival time. We attribute this to the limitations of the data available, in particular, to the fact that our panel is too short.

Our results are of particular interest in view of the ongoing changes in Ukrainian corporate law, and in particular, the recent enactment of Law on Joint-Stock Companies. According to the regulations that existed before the adoption of the new law, the right to dismiss executives belonged exclusively to the shareholder's meeting.

Supervisory boards, while having some authority to initiate management changes, had rather limited power in deciding the future of CEOs. The new law changes the balance of power in favour of supervisory boards. It also establishes a minimum size of supervisory boards. The proponents of these changes argue that they would produce more efficient response to poor performance of managers. Whether such a redistribution of power within the firm leads to better monitoring of managers and improves corporate performance may be an interesting topic for future research.

7. Acknowledgements

Financial support by the Economics Education and Research Consortium (EERC) is gratefully acknowledged (EERC Grant No. R07-0832). We are also grateful to the EERC experts as well as participants of Summer 2007 EERC Research Workshop and Summer 2008 EERC Research Workshop for helpful comments and suggestions. Our special thanks are addressed to Russell Pittman, David Brown, Oleksandr Talavera, and Yulia Rodionova. The usual caveat applies.

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Table 1. Descriptive statistics for the sample used in the logit regressions.

| Variable | Definition | Mean | Standard Deviation | Number of observations |
|------------|---|----------|--------------------|------------------------|
| CHANGE | Equals one if change take place in this period | 0.102 | 0.302 | 3,012 |
| FEMALE | Equals one if female | 0.090 | 0.287 | 3,012 |
| EXPERIENCE | Number of years of experience on executive position | 18.245 | 9.809 | 3,012 |
| AGE | CEO age | 50.319 | 8.876 | 3,012 |
| BOARD | Number of members in the supervisory board | 3.483 | 1.737 | 3,012 |
| SHARE | The share ownership of CEO | 11.733 | 18.557 | 3,012 |
| LEVERAGE | The ratio of debts to assets | 0.327 | 0.279 | 3,012 |
| LIQUIDITY | The ratio of working capital to short-term debts | 3.379 | 4.593 | 3,012 |
| SIZE | Log of firm's assets | 8.720 | 1.582 | 3,012 |
| Assets | Firm's assets | 26899.68 | 69153.21 | 3,012 |
| SIZE_LABOR | Log of employed | 4.900 | 1.259 | 3,012 |
| Employment | Number of people employed | 319.506 | 559.583 | 3,012 |
| ROA | The ratio of net profit to assets | -0.009 | 0.089 | 3,012 |
| ROS | The ratio of net profit to sales | -0.054 | 0.183 | 3,012 |
| LP | The ratio of sales to the number of employed | 62.343 | 78.403 | 3,012 |
| BOARD*ROA | Interaction of board size and ROA | -0.032 | 0.308 | 3,012 |
| BOARD*ROS | Interaction of board size and ROS | -0.180 | 0.633 | 3,012 |
| BOARD*LP | Interaction of board size and LP | 212.966 | 291.815 | 3,012 |
| SHARE*ROA | Interaction of share ownership of CEO and ROA | -0.015 | 1.236 | 3,012 |
| SHARE *ROS | Interaction of share ownership of CEO and ROS | -0.239 | 1.709 | 3,012 |
| SHARE *LP | Interaction of share ownership of CEO and LP | 556.198 | 1151.805 | 3,012 |

Table 2. Descriptive statistics of the variables, by CEO turnover.

| Variable | Firms without CEO turnover during the whole period under consideration | | | Firms with CEO turnover during the whole period under consideration | | | t |
|------------|--|--------------------|------------------------|---|--------------------|------------------------|---------|
| | Mean | Standard deviation | Number of observations | Mean | Standard deviation | Number of observations | |
| FEMALE | 0.081 | 0.273 | 2,004 | 0.108 | 0.311 | 1,008 | 2.423 |
| EXPERIENCE | 19.256 | 9.542 | 2,004 | 16.234 | 10.025 | 1,008 | -8.064 |
| AGE | 51.488 | 8.370 | 2,004 | 47.996 | 9.385 | 1,008 | -10.368 |
| BOARD | 3.409 | 1.691 | 2,004 | 3.632 | 1.816 | 1,008 | 3.335 |
| SHARE | 15.198 | 20.519 | 2,004 | 4.844 | 10.993 | 1,008 | -14.975 |
| LEVERAGE | 0.297 | 0.265 | 2,004 | 0.388 | 0.296 | 1,008 | 8.500 |
| LIQUIDITY | 3.617 | 4.747 | 2,004 | 2.906 | 4.233 | 1,008 | -4.021 |
| SIZE | 8.540 | 1.461 | 2,004 | 9.080 | 1.743 | 1,008 | 8.957 |
| Assets | 19487.137 | 55437.939 | 2,004 | 41636.519 | 88651.644 | 1,008 | 8.390 |
| SIZE_LABOR | 4.792 | 1.160 | 2,004 | 5.114 | 1.412 | 1,008 | 6.662 |
| Employment | 257.212 | 453.906 | 2,004 | 443.354 | 709.509 | 1,008 | 8.721 |
| ROA | 0.000 | 0.085 | 2,004 | -0.026 | 0.093 | 1,008 | -7.774 |
| ROS | -0.042 | 0.174 | 2,004 | -0.078 | 0.197 | 1,008 | -5.122 |
| LP | 56.986 | 68.852 | 2,004 | 79.992 | 93.701 | 1,008 | 5.312 |
| BOARD*ROA | -0.003 | 0.292 | 2,004 | -0.089 | 0.329 | 1,008 | -7.333 |
| BOARD*ROS | -0.141 | 0.605 | 2,004 | -0.259 | 0.679 | 1,008 | -4.857 |
| BOARD*LP | 188.880 | 249.833 | 2,004 | 260.850 | 356.402 | 1,008 | 6.403 |
| SHARE*ROA | 0.089 | 1.382 | 2,004 | -0.132 | 0.861 | 1,008 | -4.628 |
| SHARE *ROS | -0.218 | 1.849 | 2,004 | -0.283 | 1.390 | 1,008 | -0.987 |
| SHARE *LP | 700.665 | 1254.331 | 2,004 | 268.983 | 844.496 | 1,008 | -9.860 |

Note: The last column shows the test for the equality of means in two groups of firms.

Table 3. Regression results from the logit model.

| | (1) | (2) | (3) | (4) | (5) |
|------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| FEMALE | -0.001 (0.015) | -0.003 (0.016) | -0.003 (0.016) | -0.003 (0.015) | -0.003 (0.016) |
| EXPERIENCE | -0.000 (0.001) | -0.000 (0.001) | -0.000 (0.001) | -0.000 (0.001) | -0.000 (0.001) |
| AGE | -0.000 (0.001) | -0.000 (0.001) | -0.000 (0.001) | -0.000 (0.001) | -0.000 (0.001) |
| BOARD | 0.001 (0.003) | 0.001 (0.003) | 0.001 (0.003) | 0.001 (0.003) | 0.001 (0.003) |
| SHARE | -0.003*** (0.000) | -0.003*** (0.000) | -0.003*** (0.000) | -0.003*** (0.000) | -0.003*** (0.000) |
| LEVERAGE | 0.038* (0.018) | 0.058*** (0.019) | 0.062*** (0.019) | 0.042** (0.019) | 0.059*** (0.019) |
| LIQUIDITY | 0.000 (0.001) | 0.000 (0.001) | 0.000 (0.001) | 0.001 (0.001) | 0.001 (0.001) |
| SIZE | 0.009*** (0.004) | 0.006** (0.004) | 0.006 (0.004) | | |
| ROA | -0.227*** (0.055) | | | -0.218*** (0.054) | |
| ROS | | -0.031 (0.023) | | | -0.042* (0.024) |
| LP | | | -0.000 (0.000) | | |
| SIZE_LABOR | | | | 0.012*** (0.004) | 0.011*** (0.004) |
| Number of observations | 3017 | 3016 | 3013 | 3013 | 3012 |
| Log likelihood | -914.405 | -920.657 | -922.931 | -913.802 | -919.049 |
| Pseudo R ² | 0.081 | 0.072 | 0.072 | 0.081 | 0.074 |

Note: The dependent variable equals to one if there is CEO turnover in a given year and zero otherwise. The table reports marginal effects after logit estimation. Cluster-robust standard errors are in brackets. Marginal effects are estimated around mean points. The intercept, region and industry dummies are included in the regressions but not reported. *, **, *** correspond to 10, 5, and 1% level of significance, respectively.

Table 4. Regression results from the logit model: relative performance measures.

| | (1) | (2) | (3) | (4) | (5) |
|------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| FEMALE | -0.001 (0.015) | -0.003 (0.016) | -0.003 (0.016) | -0.003 (0.015) | -0.003 (0.016) |
| EXPERIENCE | -0.000 (0.001) | -0.000 (0.001) | -0.000 (0.001) | -0.000 (0.001) | -0.000 (0.001) |
| AGE | -0.000 (0.001) | -0.000 (0.001) | -0.000 (0.001) | -0.000 (0.001) | -0.000 (0.001) |
| BOARD | 0.001 (0.003) | 0.001 (0.003) | 0.001 (0.003) | 0.001 (0.003) | 0.001 (0.003) |
| SHARE | -0.003*** (0.000) | -0.003*** (0.000) | -0.003*** (0.000) | -0.003*** (0.000) | -0.003*** (0.000) |
| LEVERAGE | 0.038* (0.018) | 0.058** (0.022) | 0.061*** (0.019) | 0.042** (0.019) | 0.060*** (0.022) |
| LIQUIDITY | 0.000 (0.001) | -0.000 (0.001) | 0.000 (0.001) | 0.001 (0.001) | 0.000 (0.001) |
| SIZE | 0.009** (0.004) | 0.006 (0.004) | 0.006 (0.004) | | |
| ROA_relative | -0.227*** (0.055) | | | -0.217*** (0.053) | |
| ROS_relative | | -0.025 (0.111) | | | -0.026 (0.109) |
| LP_relative | | | -0.000 (0.000) | | |
| SIZE_LABOR | | | | 0.012*** (0.004) | 0.009* (0.005) |
| Number of observations | 3,017 | 3,017 | 3,013 | 3,013 | 3,013 |
| Log likelihood | -914.407 | -923.081 | -922.976 | -913.803 | -922.111 |
| Pseudo R ² | 0.081 | 0.072 | 0.072 | 0.081 | 0.072 |

Note: The dependent variable equals to one if there is CEO turnover in a given year and zero otherwise. The table reports marginal effects after logit estimation. Cluster-robust standard errors are in brackets. Marginal effects are estimated around mean points. The intercept, region and industry dummies are included in the regressions but not reported. *, **, *** correspond to 10, 5, and 1% level of significance, respectively.

Table 5. Regression results from the logit model: differences across industries.

| | (1) | (2) | (3) | (4) | (5) |
|------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| FEMALE | -0.001 (0.016) | -0.000 (0.016) | -0.004 (0.011) | -0.002 (0.016) | -0.001 (0.016) |
| EXPERIENCE | 0.000 (0.001) | -0.000 (0.001) | -0.000 (0.000) | 0.000 (0.001) | -0.000 (0.001) |
| AGE | -0.000 (0.001) | -0.000 (0.001) | -0.000 (0.000) | -0.000 (0.001) | -0.000 (0.001) |
| SHARE | -0.003*** (0.000) | -0.003*** (0.000) | -0.002*** (0.000) | -0.003*** (0.000) | -0.003*** (0.000) |
| BOARD | 0.001 (0.003) | 0.001 (0.003) | 0.001 (0.002) | 0.001 (0.003) | 0.001 (0.003) |
| LEVERAGE | 0.039** (0.018) | 0.052*** (0.018) | 0.044*** (0.013) | 0.044** (0.018) | 0.055*** (0.018) |
| LIQUIDITY | 0.000 (0.001) | 0.000 (0.001) | -0.000 (0.001) | 0.000 (0.001) | 0.000 (0.001) |
| SIZE | 0.010*** (0.004) | 0.008** (0.004) | 0.006** (0.003) | | |
| ROA | -0.134 (0.083) | | | -0.119 (0.080) | |
| ROAind6 | -0.987** (0.489) | | | -1.050** (0.486) | |
| ROAind12 | -0.931* (0.512) | | | -0.905* (0.505) | |
| ROS | | 0.049 (0.034) | | | 0.036 (0.035) |
| ROSind2 | | -0.926** (0.446) | | | -0.882** (0.450) |
| ROSind3 | | -84.575* (46.754) | | | -78.012* (46.489) |
| ROSind6 | | -0.909*** (0.279) | | | -0.901** (0.280) |
| ROSind11 | | -0.427** (0.212) | | | -0.406* (0.211) |
| ROSind12 | | -0.984** (0.392) | | | -0.946** (0.392) |
| LP | | | 0.000 (0.000) | | |
| LPind7 | | | 6.242*** (0.475) | | |
| LPind8 | | | -0.028** (0.011) | | |
| SIZE_LABOR | | | | 0.012*** (0.004) | 0.011*** (0.004) |
| Number of observations | 3,017 | 3,016 | 3,013 | 3,013 | 3,012 |
| Log likelihood | -909.670 | -909.568 | -914.734 | -909.051 | -908.630 |
| Pseudo R ² | 0.085 | 0.083 | 0.080 | 0.086 | 0.084 |

Note: The dependent variable equals to one if there is CEO turnover in a given year and zero otherwise. The table reports marginal effects after logit estimation. Cluster-robust standard errors are in brackets. Marginal effects are estimated around mean points. The intercept, region and industry dummies are included in the regressions but not reported. Interactions between performance measures and industry dummies are included for all the dummies; however, the table only shows the statistically significant ones. Ind2 refers to Food Production, ind3 – Textile, ind6 – Construction Materials, ind7 – Metallurgy, ind8 – Electronic Tools, ind11 – Energy, ind12 – Construction. *, **, *** correspond to 10, 5, and 1% level of significance, respectively.

Table 6. Descriptive statistics for the sample used in the survival analysis.

| Variable | Mean | Standard Deviation | Number of observations |
|------------|----------|--------------------|------------------------|
| FEMALE | 0.126 | 0.333 | 633 |
| SHARE | 5.301 | 11.333 | 633 |
| EXPERIENCE | 17.848 | 10.185 | 633 |
| AGE | 49.730 | 9.618 | 633 |
| BOARD | 3.588 | 2.019 | 633 |
| LEVERAGE | 0.370 | 0.309 | 633 |
| LIQUIDITY | 3.183 | 4.342 | 633 |
| SIZE | 8.988 | 1.808 | 633 |
| Assets | 46132.54 | 113015.8 | 633 |
| SIZE_LABOR | 4.946 | 1.475 | 632 |
| Employment | 436.536 | 813.884 | 633 |
| ROA | -0.033 | 0.100 | 633 |
| ROS | -0.078 | 0.207 | 632 |
| LP | 82.233 | 133.199 | 633 |

Table 7. Cloglog estimates of the survival function.

| | (1) | (2) | (3) |
|------------------------|--------------------|--------------------|---------------------|
| FEMALE | -0.210 (0.449) | -0.240 (0.455) | -0.240 (0.454) |
| SHARE | -0.004 (0.012) | -0.007 (0.021) | -0.003 (0.021) |
| EXPERIENCE | 0.053** (0.021) | 0.052** (0.021) | 0.051** (0.021) |
| AGE | -0.020 (0.019) | -0.019 (0.019) | -0.018 (0.018) |
| BOARD | 0.001 (0.087) | 0.010 (0.088) | 0.005 (0.086) |
| LEVERAGE | -1.055* (0.586) | -1.091* (0.580) | -1.191** (0.555) |
| LIQUIDITY | 0.002 (0.030) | 0.002 (0.030) | 0.006 (0.029) |
| SIZE | -0.190 (0.116) | -0.187 (0.115) | -0.193 (0.119) |
| ROA | 1.344 (1.277) | | |
| ROS | | 0.574 (0.568) | |
| LP | | | 0.001 (0.001) |
| Number of observations | 487 | 632 | 633 |
| Log likelihood | -124.078 | -123.801 | -124.342 |

Note: The dependent variable equals to one in the last period of CEO's "life" and zero otherwise. The table reports the results from the non-parametrical complementary log-log model. Cluster-robust standard errors are in brackets. The intercept, region, industry and "patience" dummies are included in the regressions but not reported. *, **, *** correspond to 10, 5, and 1% level of significance, respectively.