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CEO tenure and firm growth: A conditional analysis

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Abstract

This paper investigates the influence that CEO tenure may have on firm growth. We hypothesize that the effect of CEO tenure is conditional on the firm's growth rate. The empirical analysis reveals that the effect on growth is negative in high-growth firms and positive in low-growth firms. These findings are consistent with the view that long CEO tenure is beneficial in a more stable environment, but detrimental under rapidly-changing circumstances.

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1. Introduction

Growth is a primary concern to shareholders since it opens the path to higher profits and boosts firm value (Cowling, 2004; Coad, 2007; Coad, 2010). As a matter of fact, McConnell and Muscarella (1985) find evidence that announcements of increases in capital expenditures are associated with significant increases in share prices. But how can firms achieve higher growth rates? Economic principles suggest that growth can be sustained through innovation and operating efficiency.

Innovation promotes firm growth by accelerating the development of new products. It also helps firms to identify new applications for their existing products. Grossman and Helpman (1994) argue that investments in knowledge play a critical role in the long-run growth process. A large body of evidence demonstrates the link between innovation and firm growth. García-Manjóna and Romero-Merino (2012) emphasize that the effect of R&D on sales growth is especially critical in high-technology industries. Furthermore, Audretsch (1995) points out that innovation is a critical determinant of firm survival in industries where innovative activity is significant.

Operating efficiency is another critical contributor to long-term firm growth. By producing more efficiently, firms can take market share away from their competitors. Besides, investors can hold back the growth of less efficient firms by restricting their access to capital. They can also encourage efficient firms to take over the productive assets of their less efficient rivals. In this regard, Maksimovic and Phillips (2001) show that industry-level productivity increases mainly through the transfer of assets from less efficient to more efficient producers.

In this paper, we examine the heretofore-unexplored question of whether firm growth is related to CEO tenure. The literature suggests both a positive and a negative relationship. On the one hand, long-tenured CEOs are expected to have a deeper understanding of the firm's resources and links to its environment. This should help the firm to achieve greater operating efficiency and therefore to grow faster. On the other hand, Miller (1991) explains that longer-tenured CEOs become complacent and tend to cling to outdated paradigms. As a result, they become less open to change and less prepared to innovate and sustain the growth of their firms. On balance, it would seem that these two effects balance each other.

However, the firm's context also needs to be taken into account. In rapidly-growing firms, efficiency is less of a priority than the ability to innovate and come up with new products. In that sense, short-tenured CEOs would seem to bring greater benefits due to their greater openness to new ideas. In slow-growing firms, by contrast, efficiency is critical to the firm's success. Since growth is more likely to come at the expense of competitors, having a long-tenured CEO with a thorough knowledge of the firm's operations and an ability to identify areas of improvement has clear benefits.

OLS regression is not suitable for testing this type of contingent effect. More specifically, linking the effect of CEO tenure to the firm's growth rate would involve including the dependent variable on the right-hand side of the equation, which would make it impossible to estimate. To overcome this problem, we use quantile regression. By estimating the relation at a range of points of the conditional growth rates distribution, quantile regression is able to reveal the differing effect of CEO tenure in high-growth and in low-growth firms.

Consistent with our hypothesis, we find that at higher quantiles (i.e. for high-growth firms) the effect of CEO tenure is significantly negative, while at lower quantiles (i.e. for low-growth firms) the effect is significantly positive. The results hold using sales growth, asset growth and capital expenditures as proxies for firm growth. We argue that reverse causality is unlikely to be the reason for these results.

2. Data and methodology

2.1. Data

Our analysis is performed using a large sample of Australian firms listed on the Australian Stock Exchange (ASX) over the period from 2001 to 2011. The financial data are from Aspect Huntley's Fin-Analysis, which is the main source of information regarding Australian firms. Nonfinancial information, including CEO tenure, is sourced from SIRCA's corporate governance database. Industry affiliation is based on CRIF codes. Consistent with previous studies, we exclude utilities and financial firms and drop observations with any missing data. The final sample consists of 2,545 firm-year observations representing 508 distinct firms that, on average, remain in the sample for slightly more than 5 years.

2.2. Methodology

In line with Lee (2014) and others, firm growth is measured by the percentage change in sales over the previous year. As alternative measures, we use assets growth and capital expenditures. Asset growth is also measured by the percentage growth in total assets, while the flow of capital expenditures is scaled by sales. CEO tenure, the key explanatory variable, is the number of years the CEO has held that position in the firm.

To isolate the effect of CEO tenure, the regression model includes four firm characteristics that have been demonstrated to influence firm growth: firm size, firm age, growth opportunities and financial leverage.

Research suggests that firm age is the most important factor affecting firm growth (Evans, 1987; Dunne and Hughes, 1994; Becchetti and Trovato, 2002). Barba Navaretti et al. (2014) show that the negative effect of age is particularly significant among high-growth firms. As they grow older, firms exhaust their ability to find new markets and sustain high-growth rates. In particular, their investments in R&D tend to generate less growth (Coad et al., 2016).

The effect of firm size on growth appears to be more disputed. The resource-based approach predicts that since they have access to more resources, large firms are more likely to achieve higher growth rates. In line with this view, a few studies report a positive relation between firm size and growth. However, the vast majority find a negative relation (Evans, 1987; Dunne and Hughes, 1994; Barba Navaretti et al., 2014; Coad et al, 2016).

Another critical variable is the extent of the firm's growth opportunities. Firms with more growth options are expected to grow faster. In contrast, leverage is expected to restrain firm growth since highly-levered firms are likely to run into greater difficulty in funding their investments (Lang et al., 1996; Becchetti and Trovato, 2002).

In addition to the above firm characteristics, we include three board-related variables: board size, board independence and duality. Since these variables affect board decision processes (Judge and Zeithaml, 1992; Coles et al., 2008), they are likely to influence the firm's operating efficiency and innovation capacity, and therefore its growth rate. Their inclusion helps to avoid attributing the influence of board characteristics to CEO tenure.

CEO age is also included to distinguish the physiological effects of aging from the psychological effects induced by a longer tenure. Finally, a set of industry and year dummies complete the regression model.

$$\begin{aligned} \textit{Firm growth} = {} & \beta_1 \textit{CEO tenure} + \beta_2 \textit{Firm age} + \beta_3 \textit{Firm size} + \beta_4 \textit{Growth opportunities} \\ & + \beta_5 \textit{Leverage} + \beta_6 \textit{Board size} + \beta_7 \textit{Board independence} + \beta_8 \textit{Duality} \\ & + \beta_9 \textit{CEO age} + \gamma' \textit{Year} + \rho' \textit{Industry} + \epsilon \end{aligned}$$

Table 1: Sample statistics

Sales growth (asset growth) is the percentage change in sales (total assets) over the previous year. Capex is capital expenditures. CEO tenure is the number of years the CEO has been holding that position. Board size is the number of directors. Board independence is the fraction of independent directors on the board. Duality is a dummy indicating that the CEO is also the chairman of the board. Firm size is measured by the natural log of total assets. Firm age is the number of years the firm has been listed. Tobin's Q is the proxy for growth opportunities. Leverage is debt over total assets.

	Mean	St-Dev.	Q25	Q50	Q75
Sales growth	0.2534	0.8633	-0.0625	0.0947	0.3859
Asset growth	0.1473	0.5836	-0.0509	0.0758	0.2803
Capex/ sales	0.0213	0.0254	0.0123	0.0271	0.0366
CEO tenure	3.1683	2.1787	1	3	4
CEO age	51.811	7.553	46	52	57
Board size	5.7729	2.1351	4	5	7
Board independence	0.5701	0.1687	0.5	0.6	0.7
Duality	0.1116	0.3149	0	0	0
Firm size	18.743	2.2801	17.175	18.678	20.377
Firm age	15.303	12.502	6	12	20
Tobin's Q (log)	0.4995	0.7016	0.0456	0.3823	0.8624
Leverage	0.1511	0.1541	0.0008	0.1103	0.2618

The model is estimated using both OLS and quantile regressions. As indicated earlier, quantile regression is able to reveal heterogeneity in the relation between firm growth and CEO tenure by evaluating the effect of the independent variables at different quantiles of the conditional growth rates distribution (Johnston and DiNardo, 1997; Koenker, 2005). In contrast, OLS regression estimates the average effect for the average firm, and thus ignores any heterogeneity in the relationship. Coad and Rao (2008) use quantile regressions to uncover that investments in innovation are critical to the growth of high-growth firms, but not for other firms; while OLS estimates suggest the absence of any innovation effect. In line with their analysis, we estimate the effect of CEO tenure at the 10^{th}, 25^{th}, 50^{th}, 75^{th}, and 90^{th} quantiles of firm growth.

3. Results and discussion

3.1 Sample description

The descriptive statistics for the sample are presented in Table 1. CEO tenure is on average 3.4 years, which is one of the shortest in the world. In this respect, the *Australian Business Review* recently observed that "Aussie chiefs find it tough and brief at the top". CEO age is about 51.8 years on average. A quarter of CEOs is younger than 46 while another quarter is older than 57. In line with ASX recommendations, a large majority of firms have separate leadership structures and a majority of independent directors. More precisely, CEO duality is observed in less than 11% of all firms, while only 30% of boards are not filled with a majority of independent directors.

Table 2 provides the correlation between the variables. While understandably correlated, the three growth proxies appear to behave distinctively with their pairwise correlation reaching at most 26.4%. CEO tenure displays a weakly negative correlation with all the growth proxies. Some firm characteristics appear to be strongly associated with firm growth. For instance, large and highly-levered firms tend to have a typically lower growth profile. In contrast, firms with higher growth opportunities are clearly associated with higher growth rates.

Table 2: Correlation matrix

All the variables are defined in Table 1.

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Sales growth	[1]	1											
Asset growth	[2]	0.2639	1										
Capex/ sales	[3]	0.1459	0.2125	1									
CEO tenure	[4]	-0.0401	-0.0211	-0.0185	1								
CEO age	[5]	-0.0624	-0.0731	-0.0337	0.2331	1							
Board size	[6]	-0.1552	-0.0813	-0.1938	0.0455	0.1345	1						
Board indep.	[7]	-0.1152	-0.0693	-0.0959	0.0648	0.0921	0.4344	1					
Duality	[8]	0.0359	-0.0317	0.0370	0.0498	0.1500	-0.1722	0.1292	1				
Firm size	[9]	-0.1585	0.1087	-0.1973	0.1737	0.1836	0.6910	0.3920	-0.2039	1			
Firm age	[10]	-0.0525	-0.0674	-0.0393	0.1433	0.1634	0.1660	0.1575	0.0056	0.2262	1		
Tobin's Q	[11]	0.1616	0.2942	0.2196	0.0134	-0.0275	-0.1008	-0.0387	0.0443	-0.1718	-0.0552	1	
Leverage	[12]	-0.1275	-0.1189	-0.2535	0.1163	0.0831	0.2515	0.2066	-0.0543	0.3737	0.1023	-0.1694	1

Firm size is often strongly correlated with other firm characteristics. More specifically, large firms tend to have older, longer-serving CEOs. They are also less likely to appoint the CEO as chairman of the board. Given their greater complexity and need for advice, larger firms tend to have larger boards with a higher proportion of independent directors (Coles et al., 2008). These two board characteristics exhibit a strong positive correlation with each other. Likewise, CEO age and tenure are positively correlated.

3.2 Effect of CEO tenure on sales growth

Table 3 presents the results of quantile and OLS regressions of sales growth on CEO tenure. The results show that the effect of CEO tenure varies with the quantile at which it is estimated. In the lower quantiles, CEO tenure appears to have a significantly positive influence on sales growth. At the 10^{th} quantile, for instance, the increase in sales growth associated with an additional year in CEO tenure is 1.9%. The effect of CEO tenure decreases and becomes significantly negative as we move towards the higher quantiles. At the 90^{th} quantile, the difference in sales growth associated with an additional year in CEO tenure is -4.5%. These opposite effects tend to offset each other and explain the negligible effect obtained in the OLS regression.

These findings support the hypothesis that the effect of CEO tenure is conditional on the firm's growth rate. The strong negative effect of CEO tenure in high-growth firms suggests that the detrimental effect of a longer-serving CEO is more costly in high-growth firms because of the critical importance in those firms of being able to quickly switch to new paradigms (Miller, 1991). Meanwhile, accumulated experience appears to be less beneficial given the unrelenting changes brought by high growth rates. In contrast, the positive effect of CEO tenure in firms characterized by low growth rates may be the result of a greater opportunity for CEOs to deploy their experience in a steadier environment (Henderson et al., 2006).

Firm size appears to have the same contrasting effect on growth. The impact is positive at the lower end of the growth spectrum, but negative at the higher end. A possible explanation is the existence of diseconomies of scale in high-growth firms as they increase in size. In contrast, low-growth firms may benefit from a bigger size to buy out smaller competitors and boost their sales. Leverage displays a similar effect. At the lower end of the growth spectrum, leverage can help to prevent a wasteful use of internal cash flows (Jensen, 1986). Hence, a better use of the firm's resources that supports its growth. But in high-growth firms, leverage may discourage risk-taking and thus slow down growth.

Four variables are seen to have a rather negative effect on sales growth: CEO age, firm age, board size, and board independence. To explain the negative influence of CEO age, Child (1974) underlines that younger managers can exert greater physical and mental effort, thus promoting change and growth in their companies. Regarding the influence of firm age, a common argument is that older firms tend to be less innovative (Coad et al., 2016). Using an argument grounded in group decision-making, Cheng (2008) infers that firms with larger boards are more conservative.

In the case of board independence, the main idea is that it is used to achieve greater monitoring which may constrain the firm's ability to grow. As expected, sales growth is significantly related to the presence of growth opportunities. In addition, the strength of the relationship is particularly clear in the higher growth quantiles.

Table 3: Regression of sales growth on CEO tenure

All the variables are defined in Table 1. Year and industry dummies are included but nor reported. ***, **, * indicate significance at the 1%, 5% and 10% level.

		Quantile of sales growth				
	OLS	10th	25th	50th	75th	90th
CEO tenure	-0.0188	0.0190 ***	0.0079 *	-0.0015	-0.0105 **	-0.0450 **
	(-1.12)	(3.12)	(1.80)	(-0.63)	(-2.06)	(-2.15)
CEO age	-0.0131 **	-0.0024	-0.0026 **	-0.0024 ***	-0.0066 **	-0.0151 *
	(-2.31)	(-1.27)	(-2.12)	(-2.88)	(-2.35)	(-1.74)
Board size	-0.0451	-0.0225 ***	-0.0189 ***	-0.0132 ***	-0.0113	0.0191
	(-1.23)	(-2.91)	(-4.65)	(-2.97)	(-1.06)	(0.62)
Board indep.	-0.6964	-0.0960	-0.0021	-0.0896	-0.2751	-1.2149 **
	(-1.68)	(-0.99)	(-0.03)	(-1.20)	(-1.63)	(-2.51)
Duality	0.1640	-0.0011	-0.0339	-0.0071	0.1626	0.5863
	(1.22)	(-0.02)	(-0.73)	(-0.18)	(1.36)	(0.94)
Firm size	-0.0639	0.0902 ***	0.0539 ***	0.0114	-0.0309 **	-0.1561 **
	(-1.42)	(7.92)	(5.20)	(1.62)	(-2.32)	(-2.55)
Firm age	-0.0061 *	-0.0032 ***	-0.0012 **	-0.0014 ***	-0.0022 *	-0.0047
	(-1.84)	(-2.67)	(-2.34)	(-3.20)	(-1.67)	(-1.60)
Tobin's Q	0.4350 ***	-0.0040	0.0369	0.1038 ***	0.2437 ***	0.5905 ***
	(3.00)	(-0.13)	(1.64)	(5.03)	(4.04)	(2.62)
Leverage	-0.4321	0.1491 *	-0.0135	0.0031	-0.1514	-0.8528 **
	(-1.24)	(1.80)	(-0.18)	(0.06)	(-0.80)	(-2.21)
R^2 / Pseudo R^2	0.1010	0.1110	0.0303	0.0138	0.0534	0.2227

3.3 Robustness checks

We validate the conditional effect of CEO tenure on growth by using two alternative proxies: asset growth and capital expenditures to sales. The results, unreported but available upon request, support the claim that the effect of CEO tenure depends on the quantile at which the model is estimated. In the lower quantiles, the effect is significantly positive, while in the higher quantiles, the effect is significantly negative.

Using the percentage change in total assets, the impact on growth is about -1% at the 10th quantile and +2.5% at the 90th quantile. The effect of the other variables appears to be more consistent across quantiles. CEO age, firm age, leverage, board size and board independence are associated with a significant negative effect. In contrast, firm size and Tobin's Q appear to have a significant positive effect. This greater consistency is reflected in OLS estimates that are more significant.

With growth measured by capital expenditures to sales, model fit is less good. The variables that retain their significance are: firm size, firm age and leverage, with a negative sign, and growth opportunities, with a positive sign. Most importantly, the effect of CEO tenure is positive in the lower growth quantiles and negative in the higher growth quantiles. Hence, the results substantiate the idea that CEO tenure can be both beneficial and detrimental to firm growth; and that the effect depends on the firm's growth rate.

One potential concern is that the effect on firm growth is not due to the CEO's tenure, but rather caused by the firm's behavior. In fact, one may observe the same results if firms with very high growth rates change their CEOs more frequently (and similarly for firms with very low growth rates). To dismiss this argument, we analyze the effect of firm growth on the likelihood of CEO turnover. To account for the distinct effect depending on the firm's growth rate, the coefficient on firm growth is allowed to take different values on either side of the median. The control variables include firm size, leverage, Tobin's Q, board size, independence, duality, CEO age and tenure, and industry and year dummies.

The logit regression, which we do not report to save space, indicates that the likelihood of CEO turnover decreases as firm growth increases in the right side of the distribution, but is unaffected by firm growth in the left side of the distribution. Hence, reverse causality does not appear to be the explanation for the conditional relation between CEO tenure and firm growth. Consistent with Brickley (2003), we also find that CEO age and tenure are associated with a higher probability of a CEO change. On the other hand, duality appears to entrench CEOs and make them less susceptible to be removed.

4. Conclusion

Firm growth is a critical issue for investors and policymakers alike. Researchers have long striven to identify the drivers of corporate growth around the world, focusing essentially on the role of innovation. This study is the first to underline the role of CEO tenure.

Using a large sample of Australian firms over the period 2001 to 2011, we show that sales growth, asset growth and capital expenditures to sales are all related to the length of CEO tenure. More importantly, the relation is shown to be conditional on the firm's growth. In high-growth firms, CEO tenure appears to have a negative effect on growth. This result may be due to the lower ability of CEOs to embrace new paradigms the longer they have been on the job (Miller, 1991). In low-growth firms, CEO tenure appears, on the other hand, to be associated with a positive effect on growth. The explanation may be that long-tenured CEOs make the most of their experience in a stable environment.

These conditional effects are concealed from standard OLS analysis, which provides the average effect on the average firm. In comparison, quantile regression is able to reveal the heterogeneous effect of CEO tenure by examining the effect at different quantiles of the conditional growth distribution. Contrary to the negligible effect suggested by the OLS estimates, CEO tenure can have a significant impact on growth. Firms would be well-advised to change their CEOs more often if they are rapidly growing; but can keep their CEOs longer if their business is growing at a slower pace.

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