The ownership-performance puzzle: agency issues in small and medium-sized family firms

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Summary

Using a cross sectional sample of 2,865 family firms from the 1998 NSSBF database, we examine the relationship between family ownership and financial performance for small and medium-sized family firms with a chained-interaction model in which we combine ownership dispersion proxies with several moderating governance, management and family variables. Our results suggest that ownership dispersion has a positive influence on performance *when* the family firm is in the "cousin consortium" generational stage, giving support to predictions put forth by agency cost models in private family firms (Schulze et al., 2003). Our results also suggest that the zero agency-cost base case as described by Jensen and Meckling (1976) is in fact no zero agency cost case due to ignored agency costs in family firms.

Keywords: ownership, performance, SME, family firm

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1. Introduction

Since Berle and Means (1932) started the contemporary discussion about the relationship between ownership structure and performance, several authors have investigated the effect of ownership dispersion or concentration on different important output variables of the firm such as leverage or financial firm performance. Theoretical arguments for the ownership structure/performance debate are principally grounded in agency theory. According to one specific view within agency theory, stronger ownership concentration mitigates the conflict of interest between owners and managers because a larger shareholder has greater incentives to monitor the management team. Consequently, larger ownership concentration should have a positive effect on financial firm performance. Contrary to the classic view of a widely held corporation by Berle and Means (i.e. characterized by strong ownership dispersion among many small shareholders), La Porta et al. (1999) found that in many countries around the world, corporations do have large controlling shareholders. Moreover, these controlling shareholders often seem to be a family. This opposite view of the ownership structure of corporations directed the attention more towards another type of agency conflict namely that of concentrated shareholders (Fama and Jensen, 1983). When ownership and control are concentrated, this would bring about the risk of controlling shareholders extracting private benefits from the firm at the expense of small minority shareholders (Demsetz, 1983; Villalonga and Amit, 2006). The empirical question which agency effect dominates is still an open one as studies about the ownership/performance relationship showed mixed results (e.g. Demsetz and Villalonga, 2001; Claessens et al. 2002; Dalton et al., 2003; Cheung and Wei, 2006; Villalonga and Amit, 2006).

Recently, the increasing awareness of the predominance of family ownership around the world (La Porta et al., 1999; Burkart et al., 2003) directed research about ownership/performance relationships more towards the impact of family ownership. Translating the two opposite agency problems in a family ownership context, *benefits* of concentrated family ownership appear when the large undiversified equity position and control of management and directors places the family in an excellent position to influence and monitor the firm. Furthermore, family shareholders have longer investment horizons and as such, a higher investment efficiency (Anderson and Reeb, 2003). Agency *costs* of concentrated ownership would include executive management positions limited only for family members (Anderson and Reeb, 2003), managerial entrenchment (Gomez-Mejia et al.,

2001) and free riding such as the use of firm's resources for personal benefits and privileges of family members (Schulze et al., 2003).

Ultimately, the influence of family ownership on firm performance and the precise balance of agency costs and benefits of concentrated ownership seems to be an empirical issue. Empirical studies concentrating on family ownership are rather scant and from recent dates (Anderson and Reeb, 2003; Anderson and Reeb, 2004; Maury, 2006; Villalonga and Amit, 2006; Barontini and Caprio, 2006; Lee, 2006). These studies conclude that family ownership in general and under certain specific circumstances - such as with a (founding) family CEO - could be considered as an effective organizational structure. Unfortunately, these studies are only executed on samples of public (family) firms. This focus on public firms[4] excludes some very specific ownership types described in agency theory such as the zero agency-cost base case (Ang et al., 2000), consisting of a firm owned solely by a single owner-manager which is very common in private (family) firms. In addition, according to traditional agency theory, privately held and family-managed firms are often considered as a low agency cost case (Jensen and Meckling, 1976; Fama and Jensen, 1983). Nevertheless, Schulze et al. (2001) question this view and argue that agency costs could also be high as private ownership lacks disciplining of the market for corporate control and could lead to inefficiencies of the labor market. Furthermore, Schulze et al. (2003) argue that parental altruism in family-managed firms on the one hand could temper self-interest ("bright side of altruism") but on the other hand, could also change the incentive structure of the firm such as perquisites and privileges for family members ("dark side of altruism"). Which type of agency problem is dominant in private family firms is contingent upon ownership dispersion (Lubatkin et al., 2005). Empirical evidence for public family firms indeed reveals that family ownership has a value enhancing effect but only when combined with specific types of family control and management (Villalonga and Amit, 2006). Evidence for private family firms is still lagging behind. A recent noteworthy exception is the study of Westhead and Howorth (2006) who investigated on a sample of UK private family firms the ownership - management – performance relationship. They found for the firms in their sample that management rather than ownership structure is related to performance measures.

[4] An exception is the study by Keasey et al. (1994) which also concentrates on private firms. Keasey et al. (1994) examine the relationship between firm performance and the proportion of shares owned by directors for a sample of small and medium-sized companies including private firms in the UK. The results suggest the existence of a curvilinear relationship between firm performance and the percentage of equity held by the board of directors. The return on assets of firms is found to increase as director ownership increases up to a maximum at 68.2% of ownership, after which it then decreases as director ownership approaches 100% of equity.

Using a cross sectional sample of 2,865 family firms from the 1998 National Survey of Small Business Finance (NSSBF), we examine the relationship between family ownership and financial performance for small and medium-sized family firms and extend the results of recent studies by Villalonga and Amit (2006) and Westhead and Howorth (2006). The firms in the NSSBF survey are predominantly privately owned giving us the opportunity to investigate a wider spectrum of ownership types (e.g. "zero agency-cost base case" described in Ang et al. 2000) which were seldom investigated in the ownership/performance literature. In line with studies of Villalonga and Amit (2006), Miller and Le Breton-Miller (2006) and Gibb Dyer (2006), we take into account several specific governance characteristics including family control, family ownership and family management. Moreover, Westhead and Howorth (2006) argue that family firms may not be regarded as a homogeneous group of firms as several 'types' of family firms seem to exist. Distinctions between these several types of family firms could be made based on particular dimensions of the 'family effect' such as agency costs, family assets or family liabilities (Gibb Dyer, 2006).

In this study, we investigate the ownership – performance link by interacting ownership with several dimension of the 'family effect'. More specific, our analysis examines the moderating influence of active family control through the CEO position (Andersen and Reeb, 2003), founder CEO vs. descendent CEO (Villalonga and Amit, 2006; Barontini and Caprio, 2006) as well as generational influences (Villalonga and Amit, 2006; Westhead and Howorth, 2006). The fact that family firms are considered as a very heterogeneous group of organizations also drives our method of analysis. We estimate a *chained-interaction model* (Kam and Franzese, 2005) in which we combine ownership dispersion proxies with these several moderating governance, management and family variables. Finally, our results shed more light on the validity of competing agency explanations of ownership dispersion in private family firms such as the balance of the "bright" and "dark" side of altruism.

This paper proceeds as follows. In section 2, we review agency theory and ownership dispersion in a family firm context. Section 3 describes the data and empirical methodology. In section 4, we present and discuss the results. In section 5, we report some robustness checks. Section 6 concludes the paper.

2. Theoretical background

2.1 Family firms and agency costs

In the academic literature, divergent views exist about the impact of family ownership and control on agency costs stemming from the separation of ownership and control. At one extreme, agency models (e.g. Jensen and Meckling, 1976; Ang et al. 2000) assume that the effects of concentrated ownership and owner-management will lead to a minimized or even zero level of agency costs. Given significant shareholdings, family owners will possess the incentive, power and information to control their managers, thereby reducing free-rider agency costs and boosting returns (Anderson and Reeb, 2003). Moreover, managers and large family shareholders are often the same persons, and therefore, the residual claimants bear (nearly) all of the costs and receive (nearly) all of the benefits of their actions. In addition, self-interest by family agents is assumed being tempered by kinship and parental altruism (= utility function in which the welfare of individuals is positively linked to the welfare of others) (Schulze et al., 2003).

However, once a family has enough ownership for unchallenged control, it can begin to abuse its power by taking resources out of the business (Claessens et al., 2002). In this case, a major owner may serve as a poor de facto 'agent' for the minority owners: the large shareholder may use its controlling position in the firm to extract private benefits at the expense of the small shareholders (Morck and Yeung, 2003; Villalonga and Amit, 2006). Some researchers have argued that family-dominated businesses are more apt to be characterized by extraordinary dividend payouts, entrenched managers and a redistribution of wealth from employees to the family (Burkart et al., 2003). Other authors argue that restricting executive talent to a labor pool of family members can be problematic. Shleifer and Vishny (1997) suggest that one of the greatest costs that large shareholders can impose is remaining active in management even if they are no longer competent or qualified to run the firm. Anderson and Reeb (2003) suggest that the family's role in selecting managers and directors can create impediments for third parties in capturing control of the firm, suggesting greater managerial entrenchment and lower firm values relative to non-family firms.

Schulze et al. (2001) develop an agency framework based on the behavioral economics assumption and conclude that private ownership, because it isolates firms from the discipline of external markets, and owner management expose firms to agency threats ignored by the model of Jensen and Meckling (1976). Lubatkin et al. (2005) argue that a combination of private ownership and owner-management in private firms threaten owner-managers with

self-control problems. Private firms are more vulnerable to self-control problems than public firms because private firms' large-block-holding owner-managers enjoy almost unchallenged discretion over the use of their firm's assets. Moreover, these authors argue that parental altruism - instead of mitigating agency problems in family firms - can adversely affect the ability of the firm's owner manager to exercise self-control. Lubatkin et al. (2005) argue that the behavioral consequences of family firm governance are contingent on the dispersion of the firm's ownership.

2.2 Generational evolution and ownership dispersion in family firms

One common feature of family firms is the generational evolution. Several models of this generational evolution have been described but the model of Gersick et al. (1997) is one of the most widely accepted in the field. Generational evolution and ownership dispersion seem to be often entwined. Based on the model of Gersick et al. (1997), Lubatkin et al. (2005) distinguish between three types of family firms based on three broad stages of ownership dispersion over generations: (1) the controlling-owner family firm where the founder/owner/manager also exercises the rights of control (Jaffe and Lane, 2004), (2) a sibling partnership, where ownership is in hands of several members of a single generation and (3) a cousin consortium where ownership is further fractionalized when it is passed on to third and later generations. Schulze et al. (2003) discuss the agency consequences when equity in a family firm is distributed among family shareholders instead of among outside shareholders. They argue that dispersed family ownership in the controlling owner stage could result in free riding of family insiders on the controlling owner's equity. This problem further increases in the sibling partnership stage but decreases in the cousin consortium which reduces agency costs in this last ownership stage. Schulze et al. (2003) argue that in the cousin consortium stage – although more family members involved could increase the likelihood of conflicts - more *outside* family members (not employed by the firm) become shareholder and hence, behave more as rational diversified investors.

In addition, Miller and Le Breton-Miller (2006) discuss stewardship explanations of the relationship between generations and performance. They argue that family firms which intend to include further generations stimulate stewardship attitudes. These firms are expected to focus more on long term returns and survival, build up a strong reputation and preserve tacit knowledge inside the firm through executive apprenticeship programs and the cultivation of a strong corporate culture (Miller and Le Breton-Miller, 2006, p.82).

Empirical evidence concerning the direct relationship between generations and performance for public firms is provided by Villalonga and Amit (2006). These scholars find that family ownership creates value only when the founder is also the CEO of the family firm or chairman of the board with a hired CEO. When a descendant serves as CEO, firm value seems to be destroyed. The authors also find that the negative effect of descendant-CEOs is entirely attributable to second-generation family firms. The incremental contribution of third-generation firms to their performance measure is positive and significant, which suggests a non-monotonic effect of generation on firm value.

Consistent with the arguments of Schulze et al. (2003), we hypothesize a positive/negative relationship between ownership dispersion/concentration and firm performance when the family firm is in a later generational stage (cousin consortium) and when the family firm is also family managed. Although several studies investigated the effect of these individual components on performance, the several interactions between these variables in the context of private family firms were – as far as our knowledge – never investigated.

3. Method

3.1. Data set

Our analysis is based on the database of the 1998 'National Survey of Small Business Finance' (NSSBF). This survey, conducted five-yearly by the Federal Reserve Board of Governors and the U.S. Small Business Administration, collects information on small businesses (fewer than 500 employees) in the US. This survey collects data from a sample of 4,637 firms which can be considered representative of the 5.3 million nonfarm, nonfinancial SMEs in the US. The NSSBF database provides us with the necessary information on firm, management and ownership characteristics. Since the focus of this study are family firms, 3,039 firms of the NSSBF database were retained. In our study, a firm is defined as a family firm if more than 50% of the firm is owned by a single family. After the removal of outliers and missing values, we ended up with a sample of 2,865 family firms.

3.2. Variables

A common measure for performance (e.g. Lskavyan and Spatareanu, 2006; Maury, 2006; Haniffa and Hudaib, 2006; Anderson and Reeb, 2003; Claessens and Djankov, 1999) used as *dependent* variable in this study is the return on assets before taxes (ROA).[5]

The *independent* variables consist of several ownership, management and firm characteristics. As ownership characteristics, we use two proxies for ownership concentration: the percentage ownership of the main shareholder (CONCENTR) and the number of owners (NOW). The responsibility for the day-to-day management of the firm is measured by a dummy variable MGR ('1' for a family manager being a partner, owner or stockholder of the firm; '0' for a hired employee/paid manager). The NSSBF database also allows us to incorporate a dummy variable GEN which proxies for the generational stage of the family firm. This variable measures the difference between "controlling owner stage" plus "sibling partnership" ('1') and "cousin consortium" ('0'). As discussed in the previous paragraph, Schulze et al. (2003) argue that ownership dispersion in the "controlling owner" and "sibling partnership" stage increases agency problems. On the contrary, ownership dispersion in the "cousin consortium" stage decreases the agency problems. From table 2, we learn that according to our measure, only 6% of the firms[6] in the sample seem to be in a generational stage in which the family firm is inherited. At first sight, these firms could be considered to be second or later generation firms. But 6% is a rather limited number for second and later generational firms and suggests that our measure needs to be interpreted in another way. When the founder is still a partner – such as asked in the questionnaire - we could assume the firm as in the "controlling owner" stage. Probably, this is not a correct assumption because even in a sibling partnership, the founding partner is often still a partner in the firm. Therefore, we have arguments to assume that the category ('1') rather comprises the firms in the "controlling owner" and the "sibling partnership" stage while category ('0') comprises the firms in a "cousin consortium" stage. Although this dummy variable is a rather raw measure of generational dispersion, it is a close approximation for the generational stage effects in the hypothesis of Schulze et al. (2003).

[5] ROA was calculated by dividing firm's income *after* all expenses excluding taxes have been deducted by total assets. ROA before deduction of taxes was used due to the fact that our database includes several organisational forms (sole proprietorships, S-corporations, C-corporations, partnerships). Only C-corporations pay *corporate* income taxes, while the other organisational forms pay *personal* income taxes not reported in the NSSBF survey. In order to compare the performance for all firms on an equal basis, we use in this study ROA before corporate income taxes.

[6] Category '1' also includes family firms which are purchased (19% of the sample firms) by one or more of the current family partners. These firms are considered as 'controlling founder' or 'sibling partnership' stage firms.

Moreover, we take into account several interaction effects considered relevant in this study. In the first chained interaction model, we concentrate on the percentage ownership of the primary shareholder. In this model, we include the interaction between ownership percentage of the primary owner and (1) the number of owners (CONCENTR_NOW), (2) management (MGR_CONCENTR) and (3) generation (GEN_CONCENTR). In the second chained interaction model, we concentrate on the number of owners to measure the ownership dispersion. Analogous to the first interaction model, we interact the number of owners (NOW) with the other ownership and governance variables of the model. We construct the interaction variables CONCENTR_NOW, MGR_NOW and GEN_NOW.

Finally, we also *control* in each model for firmage (AGE), firmsize (LNASSETS), leverage degree measured by total debt over total assets (LEVERAGE), organisational form[7] and the two digit SIC code[8]. Table 1 and table 2 report descriptive statistics of the entire sample as well as for the subsample of C-corporations. The average firm has total assets of $1,144,417, is more than 14 years old and has a strong ownership concentration. More than 90% of the firms are led by a family manager and even more than 94% of the firms is in the founder-manager generational stage.

Table 1 – Descriptive statistics

	Entire sample of family firms (n=2,865)				**Only C-corporations** (n=619)			
Variable	*Mean*	*Std.dev.*	*Min.*	*Max.*	*Mean*	*Std.dev.*	*Min.*	*Max.*
Total assets	1,144,417	4,709,400	15	99,912,000	2,217,332	6,934,436	50	88,816,594
Age of the firm (AGE)	14.4	11.5	0	97	17.49	12.38	1	81
Ownership concentration (CONCENTR)	86.9	22.7	1	100	76.9	26.0	1	100
Number of owners (NOW)	1.8	3.7	1	97	3.1	7.3	1	97
Leverage	1.4	15.1	0	733.3	1.2	4.5	0	85.5
Return on assets before taxes (ROA)	1.4	3.9	-7.9	42.3	0.8	2.6	-6.5	26.7

[7] We include 9 dummy variables for each organisation form distinguishing between sole proprietorships, partnerships, LLP with tax filed as partnerships, LLP with tax filed as corporation, S-corporations, C-corporations, LLC with tax filed as partnerships and LLC with tax filed as sole proprietor.

[8] Following Ang et al (2000), we include 48 two digit SIC codes, after leaving out those SIC codes including less than 6 firms. This has ended in the removal of 30 firms (spread among 10 two digit SIC codes). Our final sample consists of 2,865 family firms.

Table 2 – Percent distributions of firms in the sample

Variables	*% of the sample*	
	Entire sample of family firms (n=2,865)	**Only C-corporations** (n=619)
Family management (MGR)		
1 (family management)	90.6%	85.8%
0 (hired employee/paid manager)	9.4%	14.2%
Generation (GEN)		
1 (controlling owner/sibling partnership)	94.3%	91.6%
0 (cousin consortium)	5.7%	8.4%
Ownership concentration (CONCENTR)		
25% or less	1,6 %	2.9%
50% or less	16.4 %	27.3%
75% or less	24.8%	43.9%
95% or less	27.5%	50.1%
Number of owners (NOW)		
1	71.6%	48.6%
2	17.6%	27.3%
3	4.2%	9.5%
4	2.4%	5%
5	1.4%	2.6%
>5	2.8%	6.9%

3.3. Method

Even though interaction models are quite common in different disciplines of research, the interpretation of these models is often flawed and inferential errors are common (Brambor et al., 2006; Kam and Franzese, 2005). Consequently, large portions of our empirical knowledge in different domains (e.g. corporate goverance) seems to be based on misinterpretations. By means of our study we want to contribute to the performance-governance literature avoiding any of these misinterpretations. In an interactive model, the effects of any independent variable x on the dependent variable y is not any single constant. The effects depend on the *coefficients* of x and xz, the interaction term as well as on the *value* of z.

In this study, we measure the standard linear-interactive models using OLS. The results of these regressions are reported in table 3. Afterwards, we focus on calculating the marginal effects using derivatives to describe the effects of the variable of interest at various

meaningful levels of the other variables (Kam and Franzese, 2005). The standard deviations are recalculated, based on the variance-covariance matrix of the coefficients estimates in order to verify whether the variables in our study, incorporating the interactions that might occur, show significant results. Results of these calculations are reported in table 4-1 till table 4-4 for the first chained interaction model and in table 5-1 till table 5-4 for the second chained interaction model.

4. Results

The regression results are presented in table 3. Looking only at the model while not taking into account any interaction effects might be misleading. Beside some control variables none of the variables under study would at first sight appear to be significant in explaining the performance of family firms. Also, based on the chained interaction models, one might be inclined to conclude that few variables of interest show a significant effect.

However, the calculations reported in the several tables 4 and 5 suggest that the picture is more complicated than that. Taking into account the specific hypothesis tests reported in tables 4 and tables 5, it becomes clear that our conclusions are much more refined than was possible with regression results in table 3. Beside the results of the OLS estimation for the whole sample, we also report the results on a subsample of family firms organized as C-corporations, that are obliged to pay corporate income taxes. The owners of the other family firms in our sample have to pay *personal* income taxes instead. These results enable us to compare our results to Ang et al. (2000).

Table 3 – OLS estimation of the determinants of profitability (ROA before assets) of family firms

Variables	Model without interaction effects	Chained interaction model 1[1]	Chained interaction model 2[1]
Ownership characteristics			
CONCENTR	-0.0062 (0.0039)	-0.0193 (0.0134)	-0.0066 (0.0042)
NOW	0.0300 (0.0199)	0.0144 (0.0446)	0.0728 (0.0725)
Management characteristic			
MGR	-0.3957 (0.2466)	0.6173 (0.8867)	-0.4997* (0.2649)
Generation			
GEN	-0.4440 (0.3095)	-2.4268 *** (0.8511)	-0.0987 (0.3504)
Interaction effects			
CONCENTR_NOW		0.0003 (0.0008)	0.0004 (0.0008)
MGR_CONCENTR		-0.0118 (0.0100)	
GEN_CONCENTR		0.0257** (0.0103)	
MGR_NOW			0.0385 (0.0416)
GEN_NOW			-0.1031** (0.0508)
Control variables			
LNASSETS	-0.6477*** (0.0388)	-0.6529*** (0.0389)	-0.6536*** (0.0390)
AGE	0.0221 *** (0.0063)	0.0222*** (0.0063)	0.0220*** (0.0063)
LEVERAGE	0.0021 (0.0046)	0.0019 (0.0046)	0.0019 (0.0046)
Constant	9.8779 (1.4380)***	10.8269 (1.7585)***	9.7242 (1.4556)***
Number of obs.	2,865	2,865	2,865
F value	7.15***	6.95***	6.92***
R^2	0.1385	0.1408	0.1403

[1]The chained interaction model 1 measures ownership dispersion by the percentage ownership of the primary shareholder; chained interaction model 2 measures ownership dispersion by the number of owners.

*, **, *** significant at the 10%, 5% and 1% level respectively (two-tailed test). Robust asymptotic standard errors reported in parentheses. The regression also includes dummy variables to represent the 9 organisational types described in footnote 7. We also controlled for the industry by including dummy variables for the two digit SIC code (see footnote 8). (Results not reported)

When we look at the analysis of table 4-1, we see that ownership concentration as measured by the percentage ownership of the primary owner has a negative influence on performance when the family firm is in a later generation (‘cousin consortium’). This result is significant independent on the number of owners when the firm is led by a family manager and also significant when the firm is not led by a family manager and has maximum 6 owners. For C-corporations, this negative influence of ownership concentration applies to ‘cousin consortiums’, irrespective of the number of owners or family/outside management. The

analysis in table 5-1 supports these conclusions. A stronger ownership dispersion as measured by the number of owners has a positive significant influence on performance when the family firm is in hands of a later generations and this seems to be almost irrespective of the percentage ownership of the main owner. For C-corporations, we find similar results. These findings nuance the results of Ang et al. (2000) who found that the number of (nonmanaging) shareholders increases the agency costs. Our results support the theoretical ideas of Schulze et al. (2003) that more outside family members in later generations behave more as rational investors and hence, agency problems such as free riding of family insiders on the controlling owner's equity will decrease, finally resulting in a positive impact on firm performance. The results in table 4-1 and 5-1 also shed more light on the specific nature of agency problems in family firms. Miller and Le Breton-Miller (2006; p83) state that 'there are many daunting challenges as the generations progress and the number of family members multiplies'. The potential for conflicts such as succession problems (Davis and Harveston, 2001) or disagreement about the dividend policy (Schulze et al., 2003) increases as generations progress. Our results suggest that in such a situation, non active family shareholders play an important role as mediator, arbitrator or peacemaker (Davis and Harveston, 2001) and decrease potential agency conflicts.

Higher ownership dispersion in later generations thus seems to mitigate several specific conflicts in family firms. We further scrutinize the agency consequences of generational evolution with ownership dispersion on financial performance in table 4-3 and table 5-3. The results in table 5-3 suggest that when there is higher ownership dispersion, family firms in the 'controlling owner' or 'sibling partnership' generational stage have a lower performance than family firms in later generational stages. Moreover, the significance of the negative effect is higher when equity is dispersed among more owners. The same results appear when looking at the subsample of C-corporations. Although we cannot differentiate between active and non active family members, this result suggest that ownership dispersion in the controlling owner stage is related to the inclusion of more *active* family agents ('the children'). Agency problems emerging from the potential for free riding of the children and the constraints on monitoring and disciplining by parents due to an altruistic mind setting increase when more active family members are involved. In later generations, the opposite seems to be true. Ownership dispersion then seems to be related to more non active family shareholders which directs the focus more towards economic objectives, a higher level of monitoring and more operational efficiency. Table 4-3 shows similar results. When the main owner has less than 75% of the share (or less than 70% in case of C-corporations), family firms in the controlling

owner stage have a significant lower performance than family firms in a later generational stage.

The results in table 4-2 and table 5-2 suggest that family management has an opposite impact on family firms organized as C-corporations compared to the whole sample of family firms. For the whole sample, we find that family firms led by a family manager holding a large ownership share (>=80%) (table 4-2) or being accompanied by few other owners (table 5-2) have a significant lower profitability. This finding contradicts at first sight the results of Ang et al. (2000) based on the same database. However, Ang et al. (2000) only look at C-corporations. Our results confirm that, at the subsample of C-corporations, family management indeed has a positive impact on the profitability if the number of owners does not exceed 8 and the main owner has more than 85% of the shares. Ang et al. (2000) find that agency costs are higher when an outsider manages the firm. Our results suggest that current knowledge about the height and role of agency costs in small firms is incomplete: the population under study has to be kept in mind when interpreting and generalizing the results. By concentrating on the population of family firms, we show that relationships and interactions between ownership, management and family variables and performance could be driven by specific agency costs linked at family characteristics of the firm. Hence, our finding supports the 'dark side of altruism' proposition, as was worked out by Schulze et al. (2003) and Lubatkin et al. (2005): the agency costs of fractional ownership may not outweigh the costs caused by free riding, the granting of perquisites and privileges to family members or providing employment to incapable family members. The lack of power/control by other (minority) shareholders exacerbates the costs associated with altruism.

The results in table 4-4 further refine our prior conclusions and suggest that the number of owners has a significant positive effect on the performance if the largest shareholder has an ownership share of minimum 45% and maximum 60%. An equal spread of ownership over all shareholders nor a large ownership concentration is profit enhancing. Table 5-4 confirms these results: the ownership concentration has a significant negative effect on the firm performance.

Finally, the control variables, firmsize and firmage appear to have a significant effect on profitability. Larger firms, measured by the natural logarithm of total assets, have a significant lower profitability (on a 1% significance level). On the other hand, older firms would have a higher profitability. Leverage appears not to have any significant effect.

Table 4-1 – Chained interaction model 1: hypothesis test of whether ownership concentration affects the profitability of family firms

	∂y/∂CONCENTR[1]	*Std. dev.*[2]	*t-stat.*		*∂y/∂CONCENTR*[3]	*Std. dev.*	*t-stat.*
Entire sample of family firms				**Only C-corporations**			
MGR=0 & GEN=1				*MGR=0 & GEN=1*			
NOW=1	0.0066	0.0098	0.681	NOW=1	-0.0018	0.0122	-0.015
NOW=2	0.0069	0.0098	0.711	NOW=2	-0.0019	0.0122	-0.160
NOW= 5	0.0079	0.0102	0.768	NOW= 5	-0.0023	0.0124	-0.189
NOW=10	0.0093	0.0122	0.764	NOW=10	-0.0030	0.0134	-0.224
MGR=0 &GEN=0				*MGR=0 &GEN=0*			
NOW=1	-0.0190	0.0133	**-1.428***	**NOW=1**	-0.0375	0.0176	**-2.130****
NOW=2	-0.0187	0.0132	**-1.416***	**NOW=2**	-0.0376	0.0176	**-2.136****
NOW= 6	-0.0175	0.0135	**-1.296***	**NOW=5**	-0.0380	0.0175	**-2.171****
NOW=9	-0.0166	0.0142	-1.162	**NOW=10**	-0.0386	0.0180	**-2.144****
MGR=1 &GEN=1				*MGR=1 &GEN=1*			
NOW=1	0.0051	0.0042	-1.191	NOW=1	0.0043	0.0052	0.828
NOW=2	-0.0048	0.0043	-1.129	NOW=2	0.0042	0.0052	0.812
NOW=5	-0.0039	0.0051	-0.763	NOW=5	0.0038	0.0054	0.699
NOW=10	-0.0024	0.0083	-0.291	NOW=10	0.0031	0.0072	0.439
MGR=1 &GEN=0				*MGR=1 &GEN=0*			
NOW=1	-0.0308	0.0102	**-3.019*****	**NOW=1**	-0.0313	0.0130	**-2.409*****
NOW=2	-0.0305	0.0101	**-3.019*****	**NOW=2**	+0.0314	0.0129	**-2.437*****
NOW= 5	-0.0296	0.0102	**-2.901*****	**NOW= 5**	-0.0318	0.0127	**-2.507*****
NOW=10	-0.0281	0.0117	**-2.400*****	**NOW=10**	-0.0325	0.0131	**-2.480*****

*, **, *** significant at the 10%, 5% and 1% level respectively (one tailed).

[1] $\partial y/\partial$CONCENTR= -0.0193+0.000297*NOW -0.0118*MGR+0.0257*GEN

[2] Std dev. is based on the variance-covariance matrix (not reported) and is calculated for each line in the above table based on the following formula:

=(CONCENTR*CONCENTR) + (GEN (1,0)*GEN_CONCENTR*GEN_CONCENTR) + (NOW (1,…)*CONCENTR_NOW*CONCENTR_NOW) + (2*GEN(1,0)*GEN_CONCENTR*CONCENTR) + (2*NOW(1,…)*CONCENTR_NOW*CONCENTR) + (2*GEN (1,0)*NOW(1,…)* GEN_CONCENTR * CONCENTR_NOW) + (MGR(1,0)²*MGR_CONCENTR*MGR_CONCENTR) + (2*MGR(1,0)* MGR_CONCENTR*CONCENTR) + (2*MGR(1,0)*NOW(1,…)*MGR_CONCENTR* CONCENTR_NOW) + (2*MGR(1,0)*GEN(1,0)*GEN_CONCENTR*MGR_CONCENTR)

[3] $\partial y/\partial$CONCENTR= -0.03737-0.0001313*NOW +0.00618*MGR+0.03567*GEN

For the other hypotheses, the calculation was done analogously.

Table 4-2 – Chained interaction model 1: hypothesis test of whether family management affects the profitability of family firms

	∂y/∂MGR[1]	*Std. dev.*	*t-stat.*		*∂y/∂MGR*[2]	*Std. dev.*	*t-stat.*
Entire sample of family firms				**Only C-corporations**			
CONCENTR=10%	0.4993	0.7906	0.6315	CONCENTR=10%	-0.0357	0.995	-0.035
CONCENTR=50%	0.0273	0.4275	0.0638	CONCENTR=50%	0.2115	0.5356	0.394
CONCENTR=75%	-0.2677	0.2653	-1.009	CONCENTR=75%	0.3660	0.3350	1.092
CONCENTR=80%	-0.3267	0.2511	**-1.301***	**CONCENTR=85%**	0.4278	0.3153	**1.356***
CONCENTR=100%	-0.5627	0.2903	**-1.938****	**CONCENTR=100%**	0.5205	0.3760	**1.384***

*, **, *** significant at the 10%, 5% and 1% level respectively (one tailed).
[1] $\partial y/\partial MGR = 0.6173-0.0118*CONCENTR$
[2] $\partial y/\partial MGR = -0.0975+0.00618*CONCENTR$

Table 4-3 – Chained interaction model 1: hypothesis test of whether the generation affects the profitability of family firms

	∂y/∂GEN[1]	*Std. dev.*	*t-stat.*		*∂y/∂GEN*[2]	*Std. dev.*	*t-stat.*
Entire sample of family firms				**Only C-corporations**			
CONCENTR=10%	-2.169	0.755	**-2.870*****	**CONCENTR=10%**	-2.664	0.879	**-3.028*****
CONCENTR=50%	-1.137	0.412	**-2.755*****	**CONCENTR=50%**	-1.240	0.471	**-2.629*****
CONCENTR=75%	-0.493	0.306	**-1.608***	**CONCENTR=70%**	-0.528	0.397	**-1.327***
CONCENTR=80%	-0.364	0.308	-1.183	CONCENTR=75%	-0.350	0.404	-0.864
CONCENTR=100%	0.151	0.389	0.388	CONCENTR=100%	0.540	0.570	0.946

*, **, *** significant at the 10%, 5% and 1% level respectively (one tailed).
[1] $\partial y/\partial GEN = -2.4268+0.02578*CONCENTR$
[2] $\partial y/\partial GEN = -3.020 + 0.0356*CONCENTR$

Table 4-4 – Chained interaction model 1: hypothesis test of whether the number of owners affects the profitability of family firms

	∂y/∂NOW[1]	*Std. dev.*	*t-stat.*		*∂y/∂NOW*[2]	*Std. dev.*	*t-stat.*
Entire sample of family firms				**Only C-corporations**			
CONCENTR=10%	0.0173	0.0369	0.469	CONCENTR=10%	0.0108	0.0275	0.392
CONCENTR=30%	0.0322	0.0238	**1.352***	CONCENTR=50%	0.0056	0.0157	0.358
CONCENTR=50%	0.0292	0.0191	**1.531***	CONCENTR=75%	0.0023	0.0247	0.095
CONCENTR=65%	0.0337	0.0247	**1.364***	CONCENTR=100%	-0.0009	0.0387	-0.024
CONCENTR=75%	0.0366	0.0309	1.186				
CONCENTR=100%	0.0441	0.0499	0.883				

*, **, *** significant at the 10%, 5% and 1% level respectively (one tailed).
[1] $\partial y/\partial NOW = 0.0144+0.000297*CONCENTR$
[2] $\partial y/\partial NOW = 0.0122-0.0001313*CONCENTR$

Table 5-1 – Chained interaction model 2: hypothesis test of whether the number of owners affects the profitability of family firms

	∂y/∂NOW[1]	*Std. dev.*[2]	*t-stat.*		*∂y/∂NOW*[3]	*Std. dev.*	*t-stat.*
Entire sample of family firms				**Only C-corporations**			
MGR=0 &GEN=1				*MGR=0 &GEN=1*			
CONC[2]=10%	-0.0265	0.049	-0.537	CONC[2]=10%	0.0046	0.038	0.122
CONC=50%	-0.0113	0.031	-0.359	CONC=50%	-0.0025	0.025	-0.101
CONC=75%	-0.0018	0.037	-0.049	CONC=75%	-0.0070	0.029	-0.239
CONC=10%	0.0077	0.052	0.148	CONC=10%	-0.0116	0.041	-0.283
MGR=0 &GEN=0				*MGR=0 &GEN=0*			
CONC=10%	0.0706	0.067	1.136	**CONC=10%**	0.1091	0.055	**1.981****
CONC=25%	0.0823	0.062	**1.338***	**CONC=50%**	0.1019	0.049	**2.089****
CONC=75%	0.1013	0.061	**1.647****	**CONC=75%**	0.0974	0.052	**1.865****
CONC=100%	0.1108	0.072	**1.530***	**CONC=100%**	0.0929	0.060	**1.540***
MGR=1 & GEN=1				*MGR=1 & GEN=1*			
CONC=10%	0.012	0.040	0.300	CONC=10%	0.0058	0.029	0.200
CONC=50%	0.0272	0.027	1.003	CONC=50%	-0.0014	0.023	-0.061
CONC=75%	0.0367	0.038	0.960	CONC=75%	-0.0059	0.032	-0.180
CONC=100%	0.0462	0.0562	0.822	CONC=100%	-0.0104	0.046	-0.223
MGR=1 & GEN=0				*MGR=1 & GEN=0*			
CONC=10%	0.1151	0.0547	**2.104****	**CONC=10%**	0.1103	0.046	**2.403*****
CONC=50%	0.1303	0.0482	**2.703*****	**CONC=50%**	0.1031	0.044	**2.332*****
CONC=75%	0.1398	0.0564	**2.478*****	**CONC=75%**	0.0985	0.051	**1.928****
CONC=100%	0.1493	0.0707	**2.111****	**CONC=100%**	0.0940	0.062	**1.519***

*, **, *** significant at the 10%, 5% and 1% level respectively (one tailed).

[1] $\partial y/\partial NOW = 0.0728+0.00038*CONCENTR+0.0385*MGR-0.1031*GEN$

[2] CONC is the abbreviation for CONCENTR

[3] $\partial y/\partial NOW = 0.111-0.000181*CONCENTR+0.00114*MGR-0.1045*GEN$

Table 5-2 – Chained interaction model 2: hypothesis test of whether family management affects the profitability of family firms

	$\partial y/\partial MGR^1$	*Std. dev.*	*t-statistic*		$\partial y/\partial MGR^2$	*Std. dev.*	*t-statistic*
Entire sample of family firms				**Only C-corporations**			
NOW=1	-0.4612	0.252	**-1.826****	**NOW=1**	0.4276	0.320	**1.334***
NOW=2	-0.4227	0.246	**-1.712****	**NOW=2**	0.4287	0.313	**1.367***
NOW=4	-0.3457	0.256	**-1.349***	**NOW=5**	0.4322	0.311	**1.386***
NOW=5	-0.3072	0.270	-1.135	**NOW=8**	0.4356	0.337	**1.289***
NOW=10	-0.1147	0.403	-0.284	NOW=10	0.4379	0.3678	1.190

*, **, *** significant at the 10%, 5% and 1% level respectively (one tailed).
[1] $\partial y/\partial MGR = -0.4997+0.0385*NOW$
[2] $\partial y/\partial MGR = -0.4265+0.00114*NOW$

Table 5-3 – Chained interaction model 2: hypothesis test of whether the generation affects the profitability of family firms

	$\partial y/\partial GEN^1$	*Std. dev.*	*t-statistic*		$\partial y/\partial GEN^2$	*Std. dev.*	*t-statistic*
Entire sample of family firms				**Only C-corporations**			
NOW=1	-0.2018	0.329	-0.612	NOW=1	-0.1126	0.435	-0.258
NOW=2	-0.3049	0.316	-0.965	NOW=2	-0.2171	0.419	-0.518
NOW=3	-0.4080	0.309	**-1.316***	**NOW=5**	-0.5306	0.395	**-1.341***
NOW=5	-0.6142	0.322	**-1.905****	**NOW=10**	-1.0531	0.454	**-2.320****
NOW=10	-1.1290	0.462	**-2.439*****				

*, **, *** significant at the 10%, 5% and 1% level respectively (one tailed).
[1] $\partial y/\partial GEN = -0.0987-0.1031*NOW$
[2] $\partial y/\partial GEN = -0.0081-0.1045*NOW$

Table 5-4 – Chained interaction model 2: hypothesis test of whether the ownership concentration affects the profitability of family firms

	$\partial y/\partial CONCENTR^1$	*Std. dev.*	*t-stat.*		$\partial y/\partial CONCENTR^2$	*Std. dev.*	*t-stat.*
Entire sample of family firms				**Only C-corporations**			
NOW=1	-0.0062	0.0039	**-1.558***	NOW=1	0.0010	0.004	0.228
NOW=2	-0.0058	0.0039	**-1.486***	NOW=3	0.0007	0.004	0.149
NOW=3	-0.0054	0.0040	**-1.341***	NOW=5	0.0003	0.005	0.064
NOW=4	-0.0050	0.0044	-1.157	NOW=10	-0.0006	0.007	-0.085
NOW=10	-0.0028	0.0082	-0.339				

*, **, *** significant at the 10%, 5% and 1% level respectively (one tailed).
[1] $\partial y/\partial CONCENTR = -0.0066+0.00038*NOW$
[2] $\partial y/\partial CONCENTR = 0.00121-0.00018*NOW$

5. Robustness checks

In order to verify the robustness of our results reported in the previous section, we carried out a robustness check by using industry adjusted return on assets (before tax deduction). The results of the robustness checks are reported in appendix 1. The industry adjusted ROAs were calculated based on the industry averages of the return on assets of the *entire* population of small and medium sized firms, including non family firms, incorporated in the NSSBF 1998.

Comparing appendix 1 (table 6 and table 7) with table 4 and table 5, the results appear to be similar with the exception of the results on family management at C-corporations. Using industry adjusted ROAs, family management seems to have any significant effect on the financial performance. Contrary to the results of Ang et al. (2000) and our results in table 4-2 and table 5-2, the significant positive effect of family management would disappear when using industry adjusted ROA as a dependent variable. However, for the entire sample, being a mix of different organisation forms, our robustness check confirms the significant negative effect of family management on financial performance. These results suggest that, for C-corporations, the effect of family management on profitability remains questionable and needs further research.

6. Conclusions

The discussion about the influence of ownership dispersion on financial performance has already a long-lasting history. However, the inclusion of the role of family ownership in the discussion is of recent dates. In this paper, we extend the empirical debate (1) by concentrating principally on private family firms which allows us to include the underresearched zero agency-cost base case (100% owner-manager), (2) by examining the role of several management/governance and family characteristics as moderating variables on the ownership dispersion/performance relationship and (3) by examining the extent and nature of specific agency problems in family firms. Therefore, we estimated several chained interaction models by using the 1998 NSSBF survey.

Our results suggest that ownership dispersion has a positive influence on performance *when* the family firm is in the “cousin consortium” generational stage compared with the ”controlling owner” and “sibling partnership” stage. This supports the theoretical concepts of Schulze et al. (2003) concerning the agency costs and negative consequences of altruism over different generational ownership stages. Agency costs in private family firms seem to be

higher than previously has been proposed by traditional agency models (e.g. Jensen and Meckling, 1976). Our results concerning the relationship between family managers and performance also suggest that the zero agency-cost base case is in fact no zero agency cost case due to ignored agency costs such as free riding by children (aanpassen C-corp?).

As suggested by the theoretical framework by Lubatkin et al. (2005), our research represents an empirical attempt to pinpoint the role of ownership dispersion on the performance of family firms. We studied whether and how this dispersion of ownership interacts with other governance and management characteristics. Although this study advances our understanding of the effect of governance characteristics on the performance of private family firms, it does have its limitations. The NSSBF database did not allow us to make a more elaborated distinction between the different generations of family firms. Further research may scrutinize our findings about the differential effects of family firm generations. Moreover, taking into account the difference between active and non active family members may confirm some assumptions we made and thus may enrich our conclusions. Ultimately, the availability of data on more specific governance and management characteristics (e.g. board size, board composition, CEO remuneration) in private family firms, could refine our conclusions.

Appendix 1: Robustness checks: OLS results of using the industry adjusted ROA as the dependent variable

Table 6-1 – Chained interaction model 1: hypothesis test of whether ownership concentration affects the profitability of family firms

	∂y/∂CONCENTR[1]	*Std. dev.*[2]	*t-stat.*		*∂y/∂CONCENTR*[3]	*Std. dev.*	*t-stat.*
Entire sample of family firms				**Only C-corporations**			
MGR=0 & GEN=1				*MGR=0 & GEN=1*			
NOW=1	0.0055	0.009	0.572	NOW=1	0.0057	0.012	0.476
NOW=2	0.0058	0.010	0.601	NOW=2	0.0056	0.012	0.463
NOW= 5	0.0067	0.010	0.660	NOW= 5	0.0053	0.012	0.426
NOW=10	0.0080	0.012	0.665	NOW=10	0.0047	0.013	0.351
MGR=0 &GEN=0				*MGR=0 &GEN=0*			
NOW=1	-0.0191	0.013	**-1.448***	**NOW=1**	-0.0239	0.017	**-1.373***
NOW= 5	-0.0180	0.013	**-1.365***	**NOW=2**	-0.0240	0.017	**-1.380***
NOW= 7	-0.0174	0.014	**-1.284***	**NOW=5**	-0.0244	0.017	**-1.405***
NOW= 8	-0.0172	0.014	-1.245	**NOW=10**	-0.0249	0.018	**-1.406***
MGR=1 &GEN=1				*MGR=1 &GEN=1*			
NOW=1	-0.0053	0.004	-1.278	NOW=1	0.0027	0.005	0.498
NOW=2	-0.0050	0.004	-1.219	NOW=2	0.0025	0.005	0.478
NOW=5	-0.0042	0.005	-0.844	NOW=5	0.0022	0.006	0.386
NOW=10	-0.0028	0.008	-0.345	NOW=10	0.0016	0.007	0.214
MGR=1 &GEN=0				*MGR=1 &GEN=0*			
NOW=1	-0.0300	0.010	**-2.971*****	**NOW=1**	-0.0269	0.013	**-2.125****
NOW=2	-0.0297	0.010	**-2.970*****	**NOW=2**	-0.0271	0.013	**-2.136****
NOW= 5	-0.0289	0.010	**-2.861*****	**NOW= 5**	-0.0274	0.012	**-2.185****
NOW=10	-0.0275	0.012	**-2.370*****	**NOW=10**	-0.0280	0.013	**-2.159****

*, **, *** significant at the 10%, 5% and 1% level respectively (one tailed).

[1] $\partial y/\partial$CONCENTR= -0.0194+0.000276*NOW -0.0109*MGR+0.02469*GEN

[2] Std dev. is based on the variance-covariance matrix (not reported) and is calculated for each line in the above table based on the following formula:

=(CONCENTR*CONCENTR) + (GEN (1,0)*GEN_CONCENTR*GEN_CONCENTR) + (NOW (1,…)*CONCENTR_NOW*CONCENTR_NOW) + (2*GEN(1,0)*GEN_CONCENTR*CONCENTR) + (2*NOW(1,…)*CONCENTR_NOW*CONCENTR) + (2*GEN (1,0)*NOW(1,…)* GEN_CONCENTR * CONCENTR_NOW) + (MGR(1,0)²*MGR_CONCENTR*MGR_CONCENTR) + (2*MGR(1,0)* MGR_CONCENTR*CONCENTR) + (2*MGR(1,0)*NOW(1,…)*MGR_CONCENTR* CONCENTR_NOW) + (2*MGR(1,0)*GEN(1,0)*GEN_CONCENTR*MGR_CONCENTR)

For the other hypotheses, the calculation was done analogously.

[3] $\partial y/\partial$CONCENTR= -0.02378-0.00012*NOW +0.00309*MGR+0.02966*GEN

Table 6-2 – Chained interaction model 1: hypothesis test of whether family management affects the profitability of family firms

	$\partial y/\partial MGR^1$	*Std. dev.*	*t-stat.*		$\partial y/\partial MGR^2$	*Std. dev.*	*t-stat.*
Entire sample of family firms				**Only C-corporations**			
CONCENTR=10%	0.4121	0.782	0.526	CONCENTR=10%	0.5874	0.989	0.593
CONCENTR=50%	-0.0239	0.420	0.056	CONCENTR=50%	0.4638	0.531	0.872
CONCENTR=75%	-0.2964	0.256	-1.156	CONCENTR=75%	0.3865	0.330	1.171
CONCENTR=80%	-0.3509	0.242	**-1.452***	CONCENTR=100%	0.3093	0.369	0.837
CONCENTR=100%	-0.5689	0.280	**-2.031****				

*, **, *** significant at the 10%, 5% and 1% level respectively (one tailed).
[1] $\partial y/\partial MGR = 0.6173-0.0118*CONCENTR$
[2] $\partial y/\partial MGR = 0.6183-0.00309*CONCENTR$

Table 6-3 – Chained interaction model 1: hypothesis test of whether the generation affects the profitability of family firms

	$\partial y/\partial GEN^1$	*Std. dev.*	*t-stat.*		$\partial y/\partial GEN^2$	*Std. dev.*	*t-stat.*
Entire sample of family firms				**Only C-corporations**			
CONCENTR=10%	-2.2021	0.748	**-2.943*****	**CONCENTR=10%**	-2.458	0.866	**-2.838*****
CONCENTR=50%	-1.2145	0.408	**-2.973*****	**CONCENTR=50%**	-1.274	0.464	**-2.742*****
CONCENTR=75%	-0.5972	0.303	**-1.969****	**CONCENTR=75%**	-0.534	0.395	**-1.351***
CONCENTR=80%	-0.4738	0.305	**-1.555***	CONCENTR=80%	-0.386	0.411	-0.939
CONCENTR=85%	-0.3503	0.314	-1.114	CONCENTR=100%	0.2060	0.554	0.371
CONCENTR=100%	0.020	0.385	0.051				

*, **, *** significant at the 10%, 5% and 1% level respectively (one tailed).
[1] $\partial y/\partial GEN = -2.449+0.02469*CONCENTR$
[2] $\partial y/\partial GEN = -2.754 + 0.0296*CONCENTR$

Table 6-4 – Chained interaction model 1: hypothesis test of whether the number of owners affects the profitability of family firms

	$\partial y/\partial NOW^1$	*Std. dev.*	*t-stat.*		$\partial y/\partial NOW^2$	*Std. dev.*	*t-stat.*
Entire sample of family firms				**Only C-corporations**			
CONCENTR=10%	0.0132	0.037	0.360	CONCENTR=10%	0.0072	0.027	0.261
CONCENTR=50%	0.0240	0.020	1.186	CONCENTR=50%	0.0022	0.017	0.129
CONCENTR=75%	0.0308	0.032	0.963	CONCENTR=75%	-0.0008	0.026	-0.032
CONCENTR=100%	0.0375	0.050	0.742	CONCENTR=100%	-0.0039	0.039	-0.099

*, **, *** significant at the 10%, 5% and 1% level respectively (one tailed).
[1] $\partial y/\partial NOW = 0.01057+0.00027*CONCENTR$
[2] $\partial y/\partial NOW=0.00846-0.000124*CONCENTR$

Table 7-1 – Chained interaction model 2: hypothesis test of whether the number of owners affects the profitability of family firms

	∂y/∂NOW[1]	*Std. dev.*[2]	*t-stat.*		*∂y/∂NOW*[3]	*Std. dev.*	*t-stat.*
Entire sample of family firms				**Only C-corporations**			
MGR=0 &GEN=1				*MGR=0 &GEN=1*			
CONC[2]=10%	-0.0332	0.050	-0.666	CONC[2]=10%	-0.0049	0.037	-0.132
CONC=50%	-0.0181	0.034	-0.529	CONC=50%	-0.0105	0.023	-0.446
CONC=75%	-0.0086	0.039	-0.218	CONC=75%	-0.0145	0.027	-0.531
CONC=100%	0.0008	0.054	0.014	CONC=100%	-0.0175	0.038	-0.455
MGR=0 &GEN=0				*MGR=0 &GEN=0*			
CONC=10%	0.0686	0.067	1.026	**CONC=10%**	0.0889	0.054	**1.640***
CONC=35%	0.0781	0.059	**1.323***	**CONC=50%**	0.0833	0.048	**1.739****
CONC=50%	0.0837	0.057	**1.449***	**CONC=75%**	0.0798	0.051	**1.570***
CONC=100%	0.1026	0.073	**1.406***	**CONC=100%**	0.0763	0.058	**1.306***
MGR=1 & GEN=1				*MGR=1 & GEN=1*			
CONC=10%	0.0088	0.039	0.224	CONC=10%	0.0006	0.028	0.021
CONC=50%	0.0238	0.027	0.877	CONC=50%	-0.0050	0.020	-0.248
CONC=75%	0.0333	0.038	0.865	CONC=75%	-0.0085	0.029	-0.291
CONC=100%	0.0427	0.056	0.759	CONC=100%	-0.0120	0.043	-0.279
MGR=1 & GEN=0				*MGR=1 & GEN=0*			
CONC=10%	0.1106	0.053	**2.087****	**CONC=10%**	0.0944	0.045	**2.102****
CONC=50%	0.1257	0.047	**2.681*****	**CONC=50%**	0.0888	0.042	**2.104****
CONC=75%	0.1352	0.055	**2.449*****	**CONC=75%**	0.0853	0.048	**1.769****
CONC=100%	0.1446	0.069	**2.075****	**CONC=100%**	0.0818	0.058	**1.400***

*, **, *** significant at the 10%, 5% and 1% level respectively (one tailed).

[1] $\partial y/\partial NOW = 0.0728+0.00038*CONCENTR+0.0385*MGR-0.1031*GEN$

[2] CONC is the abbreviation for CONCENTR

[3] $\partial y/\partial NOW = 0.0903-0.00014*CONCENTR+0.0055*MGR-0.0938*GEN$

Table 7-2 – Chained interaction model 2: hypothesis test of whether family management affects the profitability of family firms

	$\partial y/\partial MGR^1$	*Std. dev.*	*t-statistic*		$\partial y/\partial MGR^2$	*Std. dev.*	*t-statistic*
Entire sample of family firms				**Only C-corporations**			
NOW=1	-0.4871	0.249	**-1.954****	NOW=1	0.3514	0.320	1.098
NOW=2	-0.4451	0.243	**-1.829****	NOW=2	0.3570	0.312	1.141
NOW=4	-0.3610	0.251	**-1.433***	NOW=5	0.3738	0.344	1.085
NOW=5	-0.3189	0.265	-1.199	NOW=10	0.4017	0.363	1.104
NOW=10	-0.1087	0.397	-0.273				

*, **, *** significant at the 10%, 5% and 1% level respectively (one tailed).
[1] $\partial y/\partial MGR = -0.5292+0.04205*NOW$
[2] $\partial y/\partial MGR = 0.34589+0.00559*NOW$

Table 7-3 – Chained interaction model 2: hypothesis test of whether the generation affects the profitability of family firms

	$\partial y/\partial GEN^1$	*Std. dev.*	*t-statistic*		$\partial y/\partial GEN^2$	*Std. dev.*	*t-statistic*
Entire sample of family firms				**Only C-corporations**			
NOW=1	-0.3038	0.327	-0.928	NOW=1	-0.3006	0.428	-0.701
NOW=2	-0.4057	0.313	**-1.295***	NOW=2	-0.3944	0.411	-0.958
NOW=5	-0.7114	0.317	**-2.239****	**NOW=4**	-0.5820	0.391	**-1.489***
NOW=10	-1.2200	0.454	**-2.687*****	**NOW=10**	-1.1448	0.442	**-2.589*****

*, **, *** significant at the 10%, 5% and 1% level respectively (one tailed).
[1] $\partial y/\partial GEN = -0.2019-0.1019*NOW$
[2] $\partial y/\partial GEN = -0.2068-0.0938*NOW$

Table 7-4 – Chained interaction model 2: hypothesis test of whether the ownership concentration affects the profitability of family firms

	$\partial y/\partial CONCENTR^1$	*Std. dev.*	*t-stat.*		$\partial y/\partial CONCENTR^2$	*Std. dev.*	*t-stat.*
Entire sample of family firms				**Only C-corporations**			
NOW=1	-0.0066	0.004	**-1.657****	NOW=1	0.0004	0.004	0.083
NOW=3	-0.0059	0.004	**-1.445***	NOW=2	0.0002	0.004	0.052
NOW=4	-0.0054	0.0043	-1.259	NOW=5	-0.0002	0.005	-0.041
NOW=10	-0.0032	0.008	-0.395	NOW=10	-0.0009	0.007	-0.136

*, **, *** significant at the 10%, 5% and 1% level respectively (one tailed).
[1] $\partial y/\partial CONCENTR = -0.00699+0.000378*NOW$
[2] $\partial y/\partial CONCENTR = 0.00052-0.000144*NOW$

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