

A work project presented as part of the requirements for the award of a Master's Degree in Management from the NOVA – School of Business and Economics.

The Relationship between the Education Level of Successors and the Firm Performance in German Publicly Listed Family Firms – an Empirical Analysis

Markus Kempers – 2279

A project carried out on the Strategy course under the supervision of:

Professor Sara Alves

Date:

08-01-2016

Abstract

The purpose of this thesis is to investigate how far the education level of the second or third generation of publicly traded German family firms affects the post-succession firm performance. By conducting a correlational and regression design, the aim is to examine how several variables influence the performance of family firms.

Performance measures, for example ROA and Tobin's q and variables, like Education level and succession periods, examine analytically that a positive succession trend will occur. However, with the used model, only a less rigid model shows empirical evidence.

Keywords: Inherited control, family firms, firm performance, succession

Table of Contents

Abstract	2
Table of Contents	3
List of Figures	4
List of Tables	4
List of Abbreviations	4
1 Introduction	5
1.1 Current Situation and Presentation of the Problem	5
1.2 Objective and Methodology	6
1.3 Structure of the Thesis	7
2 Definitions and Models	7
2.1 Family Firms	7
2.2 Succession	8
2.3 Performance.....	9
2.4 Education Level.....	10
3 Literature Review	10
3.1 Overview of Studies	10
3.2 Comparison of Relevant Study Results.....	11
3.3 Research Gaps	13
4 Methodology of the Empirical Analysis	14
4.1 Selection and Justification of the Research Methodology	14
4.2.1 Variables	15
4.2.2 Measures	15
4.3 Selection of the Target Group and Samples	16
4.2 Derivation of Hypotheses	17
5 Results of the Empirical Analysis	18
5.1 Overview of the Results	18
5.2 Summary of Significant Insights of the Analysis and their Interpretation	19
5.3 Classification of the Results in the Field of Research and further Needs and Limitations.....	21
6 Summary and Conclusion	23
List of References	24
Appendix	25

Other Appendices (separate file)

List of Figures

Figure 1: Current market cap-trend of the observed companies	18
--	----

List of Tables

Table 1: Overview of existing studies	10
---	----

Table 2: Overview of used variables	15
---	----

Table 3: Correlation matrix among variables	19
---	----

Table 4: Cross-table of results	20
---------------------------------------	----

List of Abbreviations

CEO	Chief executive officer
FF	Family firms
IfM	Institut für Mittelstandsforschung
KMK	Kultusminister Konferenz
M-B	Market to book
Mgt	Management
ROA	Return on assets
ROE	Return on equity
RBV	Resourced-based view
S&P 500	Standards & Poor's 500

1 Introduction

1.1 Current Situation and Presentation of the Problem

Family firms are the most successful companies in Germany (Wulf, Hofmann and Renner, 2013). FFs account for 95,3 % of all German firms, 41,1 % of total sales and 61,2 % of all employees subject to social insurance contributions (Haunschild and Wolter, 2010; for similar results see Achleitner et al., 2009). Estimations of the IfM Bonn show that between 2014 and 2018, about 135.000 transitions to the next generation took and will take place (Kay and Suprinovic, 2013). Respectively, in family-owned businesses, the transition to the next generation is a discerning event. Anderson and Reeb (2003a) underline in their panel study that family firms perform significantly better than non-family firms.

Andres (2008) examines “the relationship between founding-family ownership and firm performance”. He indicates as long as the family “is still active either on the executive or the supervisory board”, and no control-enhancing mechanisms are used, the company shows superior firm performance (Andres, 2008). In addition, Pérez-González (2006) addresses the relevance of the education level of successors in publicly listed family firms in the US, and concludes that a higher education level leads to a better performance. Goldberg (1996) and Morris et al. (1997) also found a positive correlation between the education level of the successor and the post-succession firm performance.

However, this kind of empirical analysis has not yet been carried out for German family firms. The question how the education level of the second or third generation in publicly traded German family businesses affects the post-succession firm performance has therefore not been answered up to now. Hence, this study will analyze - indicate analyt-

ically - whether German publicly traded family firms show similar results regarding education levels. The research questions therefore are:

First, what influence does the education level have on the firms' performance in German publicly listed family firms? Second, is there any correlation between those variables?

1.2 Objective and Methodology

The objective of this thesis is to gain insights into the relationship between the education level of successors in German family firms and the post succession firm performance.

The thesis starts with a literature review. The models, research questions, variables, methods and results of relevant papers will be examined and discussed. The results of this examination are the basis for the empirical analysis of the thesis.

For gathering data of all publicly traded FFs, the DAXplus Family Index is used. Only family businesses in the second or third generation will be taken into account. Data sources are online databases of comparable financial information for public and private companies, such as COMPUSTAT or Bloomberg and DAXplus Family Index. The gathered data comprise information on the education of successors and the firm performance. Education data will be gathered by using the companies' websites, and social and professional social networks, like Xing and LinkedIn.

Performance indicators used are ROA, Tobin's q, return and current market cap. The analysis will focus on changes in these performance indicators. The educational degree of all successors will be identified and matched with the firm performances.

The data then will be analyzed by using statistical methods, and the correlations between several specific variables will be interpreted in order to answer the research questions.

1.3 Structure of the Thesis

The first chapter describes the problem and the objective of the thesis and the methodology. The theoretical basis is presented in chapter 2. The third chapter will give an overview of the current state of research with regard to education levels of successors and firm performances in family firms. Chapter 4 explains the methods used in the empirical analysis, followed by the results of the analyses, their interpretation and discussion in Chapter 5. Chapter 6 concludes the thesis with a summary, answers the research question and gives an outlook on further studies.

2 Definitions and Models

2.1 Family Firms

Family firms are the foundation for economy and society (Mühlebach, 2004). The literature on family businesses intensively focused on how to define family firms, but with the result that there does not exist a consistent terminology.

In 2010, the Deutsche Börse Group and the Technische Universität München “introduced two family firm stock indices”. The DAXplus Family 30 shows “the 30 largest and most liquid Prime Standard family firms”, whereas the DAXplus Family “is an all-share index” (Achleitner et al., 2010). “In order to be applicable (...) a firm has to fulfil a founding family definition: the founder(s) and/or related family members have to control at least 25 % of voting rights or at least 5 % voting rights if the founder or the fami-

ly is not only shareholder but also active management or supervisory board member” (Achleitner et al., 2010).

Summarizing, at least a certain percentage of ownership needs to be in family hands. The family can be extended to more than one family. The ownership percentage varies from 5 % of voting rights up to more than 25% of voting rights. This thesis relies on the definition of a family firm by Achleitner et al. (2010).

2.2 Succession

In regard to the word succession, the literature provides no consistent definition (Schmeisser et al., 2007). Olbrich (2005) defines succession as the subsumption of all processes, where the property of a firm, and, therefore, the executive power, is transferred to the next generation. Spielmann (1994) defines it as the process of transition of the executive, and in terms of capital responsibility of the subsequent generation.

Family successions, as well as non-family successions, are two possible types of transition within a family firm. Families prefer a succession inside the family before a non-family successor will be considered. The professional, as well as the personal abilities of a successor are crucial to the success of a transition (Becker & Stephan, 2001). An internal successor is the ideal case for the founders. According to the agent theory, founders want to minimize agency costs. “Agency costs arise by the separation of ownership and control” (Siebels and Knyphausen-Aufseß, 2012); (Jensen and Meckling, 1976); (Fama and Jensen, 1983a); (Bocatto et al., 2010); (Denis, 2001). Therefore, “family ownership should be effective in coping with agency conflicts, as the shares are in the hands of agents” (Songini and Gnan, 2015). This may enhance the firm performance (Hoffmann et al., 2014).

Another perspective is the stewardship-based theory, which says that family managers are motivated by acting as “stewards”, and that the motives align with those of the organization (Davis, et al., 2010). This theory, however, will not further be discussed within this thesis.

2.3 Performance

The focus of this thesis lies on the financial performance of firms. Therefore, financial indicators will be used in order to gain insights into pre and post succession performances. Family firm performance measures will be current market cap, ROA and Tobin’s q. These financial indicators will be defined in subchapter 4.2.2

2.4 Education Level

The main German higher education degrees are Bachelor of Science, Master of Science and a doctoral degree. The legal basis is, besides the Bologna Accord, the so-called “Framework Act for Higher Education” (in German: Hochschulrahmengesetz) and several “federal state legislations (in German: Ländergesetze) in Germany. The older degrees, Diploma and Magister, are nowadays equal to a Master. The doctoral degree is awarded on the basis of a doctoral thesis (KMK, 2015). In order to achieve a doctoral degree, a Master Degree, or a state examination (e.g. for law), is required.

3 Literature Review

3.1 Overview of Studies

Several scholars have extensively stressed founder-led firm performances, as well as the performance of internal versus external successors of FFs. The results are divergent (see Table 1).

Author(s)	Type	Sample	Definition of Family firms	Measures	Key findings
Anderson and Reeb (2003a)	Empirical analysis (quantitative)	403 (141 FF; 262 Non-FF) (FF. vs. Non-FFs)	Founding family equity ownership and/ or active board representation of family members	Tobin's q ROA ROE	Non-FFs perform worse than FFs. "Relation between family holdings and firm performance is nonlinear"; Performance is better "when family members serve as CEO".
Andres (2008)	Empirical analysis (quantitative)	275 German exchange-listed companies (1998-2004)	Considering "one of the following two criteria: a) founder and/or family members hold more than 25% of the voting shares, or b) if the founding-family owns less than 25% of the voting rights they have to be represented on either the executive or the supervisory board"	Tobin's q ROA	Non-FFs are less profitable than FFs. FFs outperform firms with other types of blockholders However, FFs only outperform non-family firms, as long as the founding family is actively represented.
Bloom and van Reenen (2007)	Empirical analysis (qualitative and quantitative)	Cross-country-study: 732 medium sized family firms in France, Germany, UK and the USA(FFs)	Second generation and beyond	Tobin's q	Passing management control to the eldest son, will lead to poor management practices. Combining family ownership with professional management, will end up in positive management practices.
Sciascia et al. (2014)	Empirical analysis (quantitative)	233 Italian incorporated firms (FF vs. Non-FFs)	Percentage of family members controlling and managing the family business	ROE	Positive correlation of performance and family management in later generational stages
Sraer and Thesmar (2007)	Empirical analysis (quantitative)	On average 700 French stock market listed firms (1994- 2000) (FF vs. Non-FFs)	A blockholder is a member of founder's family or the founder itself. Block implies at least 20% of voting rights Further, four categories: Widely held firms, heir-managed firms, founder-managed firms and professionally managed firms.	Tobin's q (M-B ratio) ROA ROE	FFs outperform widely held firms. Respectively, all types of FFs, including descendants running ones. Descendants are smooth out to industry shocks
Pérez-González (2006)	Empirical analysis (quantitative)	335 firms: 122 FFs successions and 213 unrelated successions	„At least one of the following: (a) an individual with at least 5 percent of ownership; (b) two or more individuals related by blood or marriage as directors, officers, or shareholders; (c) a founder as an executive or director“	Operating ROA Tobin's q (M-B ratio) Stock return	"promotions of unrelated CEOs are associated with positive abnormal returns". If the successor is related to the founder, the firm underperforms "in terms of operating profitability and" MB ratios.; "nepotism hurts performance"; Lower performance by successors, "who did not attend a selective college"; Graduate school indicator: "CEOs – both family and non-family - who pursued graduate studies were correlated with higher performance relative to (...) cases where no graduate program was reported "
Villalonga and Amit (2006)	Empirical analysis (quantitative)	Fortune 500 (1994-2000)	According to Anderson and Reeb (2003a)	Tobin's q ROA	"When the founder serves as CEO of the family firm or as chairman with a hired CEO", family ownership creates value; "When descendants serve as CEOs, firm value is destroyed."

Table 1: Overview of existing studies

Sources: Anderson and Reeb (2003); Andres (2008); Bloom and van Reenen (2007); Sciascia et al. (2014); Sraer and Thesmar (2007); Pérez-González (2006); and Villalonga and Amit (2006)

3.2 Comparison of Relevant Study Results

Anderson and Reeb (2003a) focused on the "relation between founding-family ownership and performance in large public firms". Based on profitability measures (ROA) of FFs, where the founder descendants serve as CEOs, family firms outperform. This

might be caused by family involvement, meaning the founder-family act as stewards in the firm. Referring to the market performance, FFs seem to perform “better only in the presence of founder CEOs and outside (hired-hand) CEOs” (Anderson and Reeb, 2003a). Their panel study further implies “that family ownership mitigates managerial opportunism” by holding a management position, meaning influencing and monitoring the firm (Anderson and Reeb, 2003a). In consonance with these authors, Sraer and Thesmar’s (2007) study shows that French FFs outperform widely held corporations, as well. It is obvious that “this result holds for founder-controlled firms, professionally managed family firms, but more surprisingly also for firms run by descendants of the founder” (Sraer and Thomas, 2007). Due to their limited frame of time and sample, this interpretation is difficult because only the firms that run best will be transmitted (Sraer and Thesmar, 2007). They justify these results by “implicit insurance contracts with the labor force in heir-managed firms: employment is less sensitive to industry shocks and as a consequence heirs pay lower wages” (Andres, 2008).

Contrary to Anderson and Reeb (2003a), Villalonga and Amit’s (2006) Fortune 500 study found out “when the founder serves as CEO of the family firm or as chairman with a hired CEO”, family management creates value. Similar results were shown by Bloom and van Reenen’s (2007) cross-European country study. Their observation displays that passing management control to descendants, respectively the eldest son, leads to a worse performance (Bloom and van Reenen, 2007). Combining professional management with family ownership might end up in better management practices and performance (Bloom and van Reenen, 2007). They imply that these results, by limiting the pool to family members only, will not be efficient in terms of resources (Bloom and van Reenen, 2007). In terms of value: “Founder-CEO firms with control-enhancing mecha-

nisms are about 25 % more valuable than nonfamily firms” (Villalonga and Amit, 2006). However, the impact of being more valuable depends on how family ownership, control (multiple share classes, pyramids, cross-holdings) and management are mixed (Villalonga and Amit, 2006). Regarding descendants, firm value will be destroyed if they serve as CEO. This could indicate one conflict between non-family shareholders and family because descendant CEOs might be more costly in terms of the owner/manger conflict (Villalonga and Amit, 2006).

Pérez-González’ (2006) event study investigates the impact of inherited control on the firm performance in family firms. Generally, only unrelated CEOs are correlated with abnormal positive returns (Pérez-González, 2006). When successors are related to the founder CEO or to larger shareholders, firms will “underperform in terms of operating profitability and market to book ratios” (Pérez-González, 2006). Further, by testing for nepotism, a lower performance in FFs is ascertained. The differences between appointed descendants CEO, who attend either a selective or non-selective college, are striking. Further investigations indicate that if descendants “did not attend a selective college”, the M-B ratio (“as a proxy for Tobin’s Q”), as well as the ROA decline (e.g., M-B ratio is about 25 % lower in three years “relative to firms that promote unrelated CEOs”) (Pérez-González, 2006). In line with this, Pérez-González’ graduate school indicator claims that “incoming CEOs – both family and non-family – who pursued graduate studies were correlated with higher performance relative to (...) where no graduate program was reported” (Pérez-González, 2006). Overall, Pérez-González (2006) shows evidence “that nepotism hurts performance by limiting the scope of labor market competition.” Goldberg (1996) finds evidence that effective family firm successors were better prepared, in terms of college degrees, in comparison to less effective. When focusing on

the Italian environment, Sciascia et al.'s (2014) limited confirmation showed a positive effect of later generational stages, and on performance in regard to profit.

3.3 Research Gaps

There is no coherent definition on FFs. In addition, most of the studies deal with the US market. Research on the educational attainment in combination with the FF performance in Germany does not exist. German studies are more general. Andres (2008), for example, addresses the importance of active family representation within the board, or as one executive. Erhardt et al.'s (2006) investigation shows that FFs seem to outperform in terms of operating power, but that performance decreases across generations.

In particular, endogeneity problems for comparing and identifying FFs emerged. Definitions of family firms vary too much, and data gatherings of non-listed FFs are scarce. Taking small different control variables for regression models distorted the comparison of the results. In addition, most scholars merely focused on performance in terms of profitability. Thereby, the question of targets and their rankings arises.

In sum, the diversity of framework upon agency theory or RBV, as well as the heterogeneity of family firms made it difficult to achieve comparable results. The methodological approach with regard to relevant indicators is not coherent. Taking the above listed research gaps into account an examination on whether or not education attainment, respectively qualification, will lead to a better performance will be addressed in the following.

4 Methodology of the Empirical Analysis

4.1 Selection and Justification of the Research Methodology

As stated, the purpose of the thesis is to investigate the relationship between the education level and the firm performance of family member transitions. To examine whether or not inherited control and the educational level of the successors has an impact on the firm performance, a quantitative study was performed. By conducting a correlational and regression design, the aim is to examine how several variables influence the performance of the firm. Strong model violations are assumed (autocorrelation and heteroscedasticity). Therefore, the bootstrapping method is used. In order to gain insight into the relationship between inherited control and firm performance, the following (analog) regression model is employed:

$$y = \beta_0 + \beta_1 * variable1 + \beta_2 * varibale2 + \beta_3 * varibale3 + \beta_4 * variable4$$

4.1.1 Variables

In order to define predictor variables, which draw implications about pre versus post performances, several subdivisions were undertaken. The subdivisions include the time of succession and educational attainment. Below, detailed information is explained and figured. The predictor succession (variable 1) is scaled as a dummy. “1” is defined as the occurrence of succession and “0” as the immediately preceding time reference category. In order to check blurring with other influences, if available, three 1-periods and three 0-periods are used. Since effects on an intervention may also occur delayed, the variable will be considered as variant with *time_lag1* (variable 2) and *time_lag2* (variable 3). The predictor “Educ_Lev” (variable 4) is ordinal scaled. Caused by an ascending structure and differentiation in four levels, the variable is used as a quasi-metric to be used as one predictor in the regression equation.

<u>EDUCATIONAL ATTAINMENT</u>			
<u>Educ_Lev</u>	:	1	No level/ other
		2	Bachelor
		3	Master
		4	Doctor/ Professor
<u>TIME of SUCCESSION</u>			
<u>Succession</u>	:	0	3 years before = pre-performance
<u>Succession time-lag1</u>			
<u>Succession time-lag2</u>		1	Time of succession + 3 years after = post-performance

Table 2: Overview of used variables

Source: Own definition

4.1.2 Measures

The following profitability measures, respectively dependent variables, are used to assess information in regard to inherited firm performances.

- I. Current Market Cap: The current market capitalization measures the corporate size. The current market value of all the companies' outstanding shares are stated in the pricing currency. It is computed by multiplying the outstanding share times its last price.
- II. ROA: The ROA is calculated by using: $\frac{\text{Net income (consolidated)}}{\text{Total assets}}$.
- III. Tobin's q: As a proxy for M-B ratio, Tobin's q is used. Tobin's q is "the market value of total assets divided by the replacement cost of assets" (Anderson and Reeb, 2003a).

4.2 Selection of the Target Group and Samples

In order to gather relevant data of inherited and controlled family firms, several steps were taken into consideration:

- I. Identifying publicly traded family firms: Therefore, the constructed family firm stock index of Deutsche Börse Group (Achleitner et al., 2010), called DAXplus Family Index, was chosen. The advantage of choosing the DAXplus Family index is that the definition of family firms is comparable (see subchapter 2.1)

- II. Limiting the sample to the second and third generation: All DAXplus Family listed companies, as well as board members, supervisory board members and management were analyzed with regard to family members. Often, the identification of family members was complicated due to changed family names (e.g. marriage). Striking was that many companies were in the first or even in the fourth generation. However, these companies were not taken into account because the aim is to examine the education level effect of the second and the third generation. This limitation leads to a sample of 19 successors in 14 companies (see appendix 1).
- III. Gathering personal information: This step was to gather relevant personal information. Therefore, the companies' homepage, LinkedIn, Xing and Google with social and professional links, were used. Appendix 2 displays the personal information.
- IV. Gathering financial data: Financial data were used for analyzing firm performances. The data were taken from COMPUSTAT and Bloomberg. The limited time frame of successors reduced the sample. The data were taken unexamined and uncorrected. Hence, the data might contain outliers (see the following chapter; figure 2). These special effects and influences were not examined and not straightened within the thesis and therefore might cause systematic errors.
- V. Time lagged performance changes: By adding the variables `time_lag1` and `time_lag2` to the regression model, the sample of succession is reduced. Out of 14 companies (Chapter 4.2, II), only four companies could be accepted for the chosen model (see yellow-marked lines in appendix 1 and appendix 3).

4.3 Derivation of Hypotheses

The following analysis is based on the assumption that there is a correlation between the key performance indicators (Current market cap, ROA and Tobin's q) and their explanatory variables: succession and education level.

To formulate the hypotheses, the following variables (dependent and independent) are used. The three dependent variables: current market cap, ROA and Tobin's q depend on the four predictors: succession, succession_lag1, succession_lag2 and Educ_Lev. The thesis addresses the following hypotheses:

H₁: The (current) market cap correlates positively with the four predictors.

H₂: ROA correlates positively with all four predictors.

H₃: A positive correlation between Tobin's q and its predictors exists.

The fourth and fifth hypotheses – with the same model –address only two variables.

H₄: ROA grows with a time-lagged succession (succession_lag1) of one period, and a higher education level.

H₅: Tobin's q increases with a later stage of time-lagged succession (succession_lag2), and a higher education level (Educ_Lev).

5 Results of the Empirical Analysis

5.1 Overview of the Results

The collected data refer to companies in the period from 1989 to 2014. Thus, a panel structure with variable NAME as panel-ID and the years 1989 to 2014 as WAVES were given. As the variable Educ_Lev has time-constant values, one random evaluation is needed. The graphical analysis of potential dependent variables indicated a rising trend

of the data series. Representative, the current market cap is shown below (y-axis: in million €) (see figure 1).

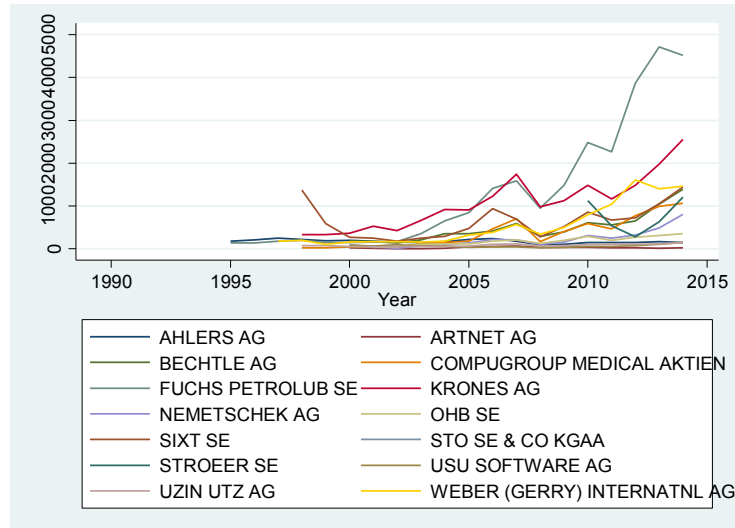


Figure 1: Current market cap-trend of the observed companies (own illustration)

Source: Data from COMPUSTAT and Bloomberg, illustrated in STATA

The changes of the time series nourishes the assumption that phenomena, such as auto-correlation (“leads to inefficient estimation of the coefficients”) and/or heteroscedasticity could lead to a reduced accuracy of significance statements (Kohler and Kreuter, 2012). Therefore, STATA provides a bootstrapping based on robust estimation (vce(bootstrap)) (see Appendices 4, 5 and 6).

Below, table 3 shows the correlation matrix among dependent and independent variables. Depending on the chosen variables, one can see if a positive or a negative relationship of the variable exists or not.

	Curent-p	ROA	TOBINS_Q	Succes-n	Educ_Lev	Succes-1	Succes-2
CurentMark-p	1.0000						
ROA	0.0918	1.0000					
TOBINS_Q	0.4927	0.1075	1.0000				
Succesion	0.2789	0.0500	0.1245	1.0000			
Educ_Lev	-0.3247	0.3212	0.3840	0.0000	1.0000		
Succesion-1	0.4418	0.2396	0.2128	0.6124	-0.0000	1.0000	
Succesion-2	0.5536	-0.1026	0.3364	0.4082	0.0000	0.6667	1.0000

Table 3: Correlation matrix among variables

Source: Own work on STATA

5.2 Summary of Significant Insights of the Analysis and their Interpretation

The variables succession, succession_lag1, succession_lag2 and Educ_Lev exert a positive significant effect on the target measures. For answering the hypothesis, the algebraic sign, as well as details of the significance statements are important. The model-significance statement is described by the following size: Prob > chi2. As long as the number is < 0.05, the model works out (C1: significance of the model).

In a second step (C2: significance of the predictors), if the model is significant, it will be examined, whether or not the individual predictors have a significant effect on the target variable. This statement is checked by the size of: $P > |z|$ (p-value has to be smaller than 0.05; if yes, the variable has a significant influence on the dependent variable).

If the predictor is significant, the algebraic sign is evaluated in the last step (C3: positive algebraic sign). Since all the hypotheses assume a positive relationship, the regression coefficient should be positive. These results are shown in the following cross-table (table 4):

Hypothesis			Succession	Succession_lag1	Succession_lag2	Educ_Lev	
		Prob > chi2	P> z ; algebraic sign	P> z ; algebraic sign	P> z ; algebraic sign	P> z ; algebraic sign	
1	Current Market Cap	0.0000	0.895 ; +	0.000 ; +	0.034 ; +	0.000 ; -	
2	ROA	0.0000	0.031 ; -	0.052 ; +	0.327 ; -	0.000 ; +	
3	TOBINS_Q	0.0000	0.950 ; -	0.887 ; -	0.064 ; +	0.065 ; +	

Table 4: Cross-table of results

Source: Own table

The individual regressions are:

$$I. \quad \text{Current Market Cap} = 522.0935 + 4.55785 * \text{Succession} + 34.17548 * \text{Succession_lag1} + 129.7493 * \text{Succession_Lag2} - 102.2398 * \text{Educ_Lev}$$

$$\text{II. ROA} = -.1440109 - .0299376 * \text{Succession} + .1024897 * \text{Succession_lag1} - .0745387 * \text{Succession_Lag2} + .0573749 * \text{Educ_Lev}$$

$$\text{III. TOBINS_Q} = -.134575 -.01125 * \text{Succession} -.0145 * \text{Succession_lag1} + .3435375 * \text{Succession_Lag2} + .4263333 * \text{Educ_Lev}$$

Hypothesis 1: The model is significant, Succession is not significant; Succession_lag1, Successin_lag2 and Educ_Lev are significant; Educ_Lev has the wrong algebraic sign.

The current market cap does not show the empirical evidence on how the educational level of the successor influences the post performance of the FF. Nevertheless, a positive trend of a current market cap occurred.

Hypothesis 2: The model is significant; Succession, Succession_lag1 and Educ_Lev are significant, but Succession_lag2 not; moreover, the algebraic signs in Succession and Succession_lag2 are wrong.

ROA's model is significant. However, the model will be rejected.

Hypothesis 3: The model is significant; all predictors are non-significant.

Tobin's Q model is significant, but the predictors are not.

Assuming that all conditions must be true for an acceptance of a hypothesis, all four hypotheses are rejected. Thus, one needs to consider whether or not a less rigid hypothesis formulation is useful. It is conceivable, for example, to consider whether it is not enough if one of the three succession variables achieves the intended condition.

Referring to this particular model, the thesis illustrates four highly significant models. Nevertheless, the explanatory value might be conflicting.

By restricting, in this particular model, to only two predictors, it can be seen that Educ_Lev and succession_lag1 have a positive impact on ROA. Therefore, the hypothesis 4 cannot be rejected. This means that positive changes will occur, but time lagged

only (1 year). Hypothesis 5: A positive correlation between Tobin's Q and Educ_Lev and a succession_lag 2 exists in this model. Thus, the hypothesis cannot be rejected.

5.3 Classification of the Results in the Field of Research and Further Needs and Limitations

Several approaches were taken into consideration in order to gain insights on family firm successions on German publicly listed family firms. However, the thesis fails to support evidence that in this particular regression model all measures correlate positively. Nonetheless, H₄ and H₅ cannot be rejected. Referring to Pérez-González (2006), who said that there is a positive correlation between a higher education level and post performance, the thesis supports this view, even in different time-lagged periods.

According to Sciascia et al.'s (2014) and Sraer and Thesmar's (2007) inherited control and performances, the thesis suggests, in this particular model, a positive relationship, as well.

The overall question on how convincing the observed results are is still unanswered. As mentioned before, different models were used, as well as different definitions for family firms. The delimitations of the thesis limited its generalizability. The small number of observed companies, as well as the observed time periods led to a smaller sample, and, respectively, to time-lagged succession periods. This implies that the determination of the intervention is difficult to describe. Further, the family/member ownership and influence were a) not considered b) questionable (in regard to how statistically quantifiable they are). Using different dummies will lead to different model variations and other results (e.g. instead of three pre and post periods only two ones). In order to expand the thesis and pose possible needs for future studies, the current thesis suggests assembling control variables to make it more stable. In addition, the sample should be greater than

the one used. For future research, questions of the component FFs versus non-FF and active versus passive control (family embeddedness) should be explored more deeply. Future research should focus more comprehensively how much family influence is necessary. Finally, a quantitative analysis on privately held companies will still be a large problem, due to the lack of gathering financial data.

6 Summary and Conclusion

The main findings of this thesis present various results on firm performance of successors. First, scholars differ in defining family firms. Second, scholars choose different approaches to test the family influence, examining whether or not pre versus post performance lead by descendants. Thereby, the comparability is not stringently proved. According to the written research questions: “What influence does the education level have on the firms’ performance in German publicly listed family firms? Is there any correlation between those variables?” the thesis answers both ones.

Family involvement “can have both positive and negative performance consequences” (Hofmann et al., 2014). As the aim of this panel data analysis was to examine the effect of different education levels and succession on post performances, in this particular model, only less rigid hypotheses could be accepted. Results show that ROA and Tobin’s q illustrate a time-lagged (later stage) positive correlation on FF performance. In this regard, the thesis shows evidence, according to Pérez-González (2006), that the same performance measures have a positive impact on post-performances. Moreover, the thesis highlights that family influence and performance, respectively research of inherited control in Germany, was not often examined.

Nevertheless, the limitations, mentioned in chapter 5.3, are opportunities for further research in Germany.

List of References

- Achleitner, Ann-Krisitn, Reiner Braun, Stephanie Schraml, and Juliane Welter.** 2009. "Goal structures in family firms: Empirical evidence on the relationship between firm and family goals". CEFS Working Paper: Technische Universität München
- Achleitner, Ann-Kristin, Christoph Kaserer, Tobias Kauf, and Sarah Volk.** 2010. "DAXplus Family – Primer on a Family Firm Stock Index in Germany (DAX-plus)". *Center for Entrepreneurial and Financial Studies Working Paper No. 2010-05*.
- Anderson, Ronald C., and David M. Reeb.** 2003a. "Founding-Family Ownership and Firm Performance: Evidence from the S&P 500." *The Journal of Finance*, 58 (3): 1301-1328.
- Andres, Christian.** 2008. "Large shareholders and firm performance: An empirical examination of founding-family ownership". *Journal of Corporate Finance*, (14) 4, 431-445.
- Becker, Wolfgang, and Petra Stephan.** 2001. *Unternehmensnachfolge in mittelständischen Familienunternehmen*. Bamberg: Otto-Friedrich-Universität.
- Bloom, Nicholas and John van Reenen.** 2007. "Measuring and explaining management practices across forms and countries". *The Quarterly Journal of Economics*, 122 (4): 1351-1408.
- Bocatto, Eduardo, Carles Gispert, and Josep Rialp.** 2010. Family-Owned Business Succession: The Influence of Pre-performance in the Nomination of Family and Nonfamily Members: Evidence from Spanish Firms. *Journal of Small Business Management*, 48 (4): 497-523.
- Davis, James H., Mathew R. Allen, and H. David Hayes.** 2010. "Is blood thicker than water? A study of stewardship perceptions in family business." *Entrepreneurship Theory and Practice*, 34 (6): 1093-1116.
- Denis, Diane K.** 2001. "Twenty-five years of corporate governance research... and counting". *Review of Financial Economics*, 10(3): 191-212.
- Fama, Eugene F., and Michael C. Jensen.** 1983a. "Separation of Ownership and Control". *Journal of Law and Economics*, 26 (2): 301-325.
- Goldberg, Steven D.** 1996. "Effective Successors in family-owned business". *Family Business Review*, 9 (2): 185-194.
- Haunschild, Ljuba, and Hans-Jürgen Wolter.** 2010. *Volkswirtschaftliche Bedeutung von Familien-und Frauenunternehmen*. Bonn: Institut für Mittelstandsforschung Bonn: IfM-Materialien Nr. 199.

- Hoffmann, Christian, Torsten Wulf, and Stephan Stubner.** 2014. "Understanding the performance consequences of family involvement in the top management team: The role of long-term orientation". *International Small Business Journal* doi:10.1177/0266242614550500
- Jensen, Michael C., and William H. Meckling.** 1976. "Theory of the firm: Managerial behavior, agency costs and ownership structure". *Journal of Financial Economics*, 3(4): 305-360.
- Kay, Rosemarie, and Olga Suprinovic.** 2013. *Unternehmensnachfolgen in Deutschland 2014 bis 2018*. Bonn: Institut für Mittelstandsforschung Bonn.
- Kultusminister Konferenz.** "Basic Structure of the Education System in the Federal Republic of Germany – Diagram". Accessed December 2nd, 2015 http://www.kmk.org/fileadmin/doc/Dokumentation/Bildungswesen_en_pdfs/en-2014.pdf
- Kohler, Ulrich, and Frauke Kreuter.** 2012. *Data analysis using stata*. Texas: College Station, Stata Press
- Morris, Michael H., Roy O. Williams, Jeffery A. Allen, and Ramon Avila.** 1997. "Correlates of success in family business transitions". *Journal of Business Venturing*, 12 (5): 513-531.
- Mühlebach, Corinne.** 2004. *Familiness als Wettbewerbsvorteil: Ein integrierter Strategieansatz für Familienunternehmen*. Bern: Paul Haupt Verlag.
- Olbrich, Michael.** 2005. *Unternehmensnachfolge durch Unternehmensverkauf*. Wiesbaden: Deutscher Universitäts-Verlag.
- Pérez-González, Francisco.** 2006. "Inherited Control and Firm Performance". *The American Economic Review*, (96) 5: 1559-1588.
- Schmeisser, Wilhelm, Luise Lesener, and Christian Tschardtke.** 2007. *Unternehmensnachfolge durch Unternehmensverkauf: Eine Analyse der Erfolgsfaktoren von nachfolgeinduzierten Buy-out Transaktionen unter besonderer Berücksichtigung der Banken*. Mering: Rainer Hampp Verlag.
- Siebels, Jan-Folke, and Dodo zu Knyphausen-Aufseß .** 2012. "A Review of Theory in Family Business Research: The Implications for Corporate Governance". *International Journal of Management Reviews*, 14 (3): 280-304.
- Songini, Lucrezia, and Luca Gnan.** 2015. "Family Involvement and Agency Cost Control Mechanisms in Family Small and Medium-Sized Enterprises". *Journal of Small Business Management*, 53 (3): 748-779.

Spielmann, Urs. 1994. *Generationswechsel in mittelständischen Unternehmen: Ablösung von Firmen- und Nichtgründern*. Wiesbaden: Deutscher Universitäts-Verlag.

Sraer, David, and David Thesmar. 2007. "Performance and Behavior of Family Firms: Evidence from the French Stock Market". *Journal of the European Economic Association*, (5) 4: 709-751.

Statistisches Bundesamt. "Educational attainment". Accessed November 26th, 2015
<https://www.destatis.de/EN/FactsFigures/SocietyState/EducationResearchCulture/EducationalLevel/Tables/EducationalAttainmentPopulationGermany.html>

Villalonga, Belen and Raphael Amit. 2006. "How Do Family Ownership, Control and Management Affect Firm Value?" *Journal of Financial Economics*, 80 (2): 385-417.

Wulf, Torsten, Christian Hoffmann, and Desirée Renner. 2013. *Zukunftsfähigkeit deutscher Familienunternehmen - Ergebnisbericht*. Marburg: Philipps-Universität Marburg and HHL Leipzig Graduate School of Management.

Appendix

List of Appendices

Appendix 1: Overview of the Sample	26
Appendix 2: Education Level of Successors	27
Appendix 3: Financial Data of the relevant four Companies	27
Appendix 4: Current Market Cap Analysis and its syntax	27
Appendix 6: ROA Analysis and its syntax	27
Appendix 7: Tobin's q Analysis and its syntax	27

Appendix 1: Overview of the Sample

Company Name	Quantity	Generation	Names:	MGT position / board = yes	IPO	Succession
Bechtle	1	2nd	Karin Schick	Yes	March 2000	Not found
Fuchs	2	3rd	Dr. Manfred Fuchs (2nd)	Yes	30.01.85	1985-2015
			Stefan Fuchs (3rd)	Yes		2001
Gerry Weber	1	2nd	Ralf Weber (2nd)	Yes	19.10.89	2013 -td
Krones	2	2nd	Volker Kronsender (2nd)	Yes	29.19.84	1988- td
			Norman Kronsender (2nd)	Yes		Not found
Nemetschek	1	2nd	Dr. Alexander Nemetschek (2nd)	Yes	10.03.99	2008 - td
Sixt	2	2nd	Alexander Sixt (3rd)	Yes	01.07.86	2015 - td
			Konstantin Sixt (3rd)	Yes		2015 - td
Ströer	1	2nd	Dirk Stöer (2nd)	Yes	2010	2004- td
Ahlers	2	2nd/ 3rd	Jan A. (2nd)	Yes	1987	1968-2012
			Dr. Stella A. Ahlers (3rd)	Yes		2005 - td
Artnet	1	2nd	Jacob Pabst (2nd)	Yes	17.05.99	2012 - td
CompuGroup Medical	1	2nd	Prof. Dr. med. Daniel Gotthardt (2nd)	Yes	04.05.07	2003 - td
OHB	1	2nd	Marco R. Fuchs (2nd)	Yes	13.03.01	2000- td
Sto	2	3rd	Jochen Friedrich Stotmeister (2nd)	Yes	Nowadays different structure	1988- td
			Gerd Stotmeister (2nd)	Yes		Not found
USU Software	1	2nd	Dr. Benjamin Strehl (2nd)	Yes	21.03.00	2014 td
Uzin Utz	1	2nd/ 3rd	Dr. H. Werner Utz (3rd)	Yes	14.10.97	1980- td

Source: DAXplus Family

Appendix 2: Education Level of Successors

Company name	amount	generation	Name	Information	1	2	3	4	5	6	7	8	9	10	11	12	
				Education level (highest level)	no level / other	Bachelor	Master / Diploma	Doctor / Prof.	MBA	Location	Germany	International	iv league	background	business	tech	other
Bechtle	1	2nd	Karin Schick	Accounting employee	1												
Fuchs	2	3rd	Manfred Fuchs (2nd)	Business administration			3	4				7				10	
			Stefan Fuchs (3rd)	Business administration			3					7				10	
Gerry Weber	1	2nd	Ralf Weber (2nd)	Business administration			3					7				10	
Krones	2	2nd	Volker Kronsender (2nd)	(FH) Master of Business and Engineering			3					7				10	11
			Norman Kronsender (2nd)	Forest manager	1							7					12
Nemetschek	1	2nd	Dr. Alexander Nemetschek (2nd)					4				7					11
Sixt	2	2nd	Alexander Sixt (3rd)	Business administration			3					8				10	
			Konstantin Sixt (3rd)	Business administration			3					8				10	
Ströer	1	2nd	Dirk Stöer (2nd)	Business administration			3					7				10	
Ahlers	2	2nd/ 3rd	Jan A. Ahlers (2nd)	(FH)			3					7				10	
			Dr. Stella A. Ahlers (3rd)	Theology				4				7					12
Artnet	1	2nd	Jacob Pabst (2nd)	Business administration			3					7				10	
Compu Group Medical	1	2nd	Prof. Dr. med. Daniel Gotthardt (2nd)					4				7	8				12
OHB	1	2nd	Marco R. Fuchs (2nd)		1							7	8				12
Sto Se	2	2nd	Jochen Friedrich Stotmeister (2nd)	Business administration			3					7				10	
			Gerd Stotmeister (2nd)				3					7					11
USU Software	1	2nd	Dr. Benjamin Strehl (2nd)	Business administration			3	4				7	8			10	
Uzin Utz	2	3rd	Dr. H. Werner Utz (3rd)	Business administration			3	4				7					10

Source: Companies' website, as well as LinkedIn, Xing and Google

Appendix 3: Financial Data of the relevant four Companies (for all: see separate file)

NAME	Year	CurrentMarketCap	Revenue	ROA	TOBINS_Q	Succession	Educ_Lev	Succession_lag1	Interaction	Succession_lag2
AHLERS AG	2001	177,76	379,731	0,048540056		1,283		4		
AHLERS AG	2002	157,15	350,488	0,048438706		1,2216		4		
AHLERS AG	2003	144,6845	327,828	0,061196608		1,3812		4	0	0
AHLERS AG	2004	164	319,901	0,0807341		1,4593		4	0	0
AHLERS AG	2005	210,672	325,291	0,077860891		1,5981		4	0	0
AHLERS AG	2006	239,2558	245,936	0,38013932		1,3137		4	1	1
AHLERS AG	2007	170,384	259,892	0,039406665		1,1665		4	1	1
AHLERS AG	2008	93,936	268,097	6,19561E-05		0,8945		4	1	1
AHLERS AG	2009	102,96	249,44	0,024514211		1,08		4	1	1
AHLERS AG	2010	142,496	250,8	0,044487295		1,2574		4	1	1
AHLERS AG	2011	141,0717	256,213	0,051558696		1,2459		4	1	1
COMPUGROUP MEDICAL AKTIEN	1999	16,6132	110,366	0,01435032		1,2356		4		
COMPUGROUP MEDICAL AKTIEN	2000	36,792	96,999	0,021141851		1,4358		4		
COMPUGROUP MEDICAL AKTIEN	2001	42,5407	108,736	0,001263067		1,6535		4	0	0
COMPUGROUP MEDICAL AKTIEN	2002	43,8438	51,803	0,100838202		1,5705		4	0	0
COMPUGROUP MEDICAL AKTIEN	2003	110,109	68,809	0,013454493		1,9641		4	0	0
COMPUGROUP MEDICAL AKTIEN	2004	146,6285	87,417	0,08380083		1,8621		4	1	1
COMPUGROUP MEDICAL AKTIEN	2005	174,344	119,923	0,109068436		1,9281		4	1	1
COMPUGROUP MEDICAL AKTIEN	2006	466,8622	144,823	0,053294626		2,9367		4	1	1
COMPUGROUP MEDICAL AKTIEN	2007	697,705	185,323	0,078873018		2,7981		4	1	1
COMPUGROUP MEDICAL AKTIEN	2008	160,7223	234,916	0,00411429		0,9427		4		1
COMPUGROUP MEDICAL AKTIEN	2009	396,4838	300,288	0,026576977		1,4227		4		
FUCHS PETROLUB SE	1997	172,8163	1540,078	0,013159922		1,1544		3		
FUCHS PETROLUB SE	1998	190,8307	1543,672	0,00392426		1,096		3		
FUCHS PETROLUB SE	1999	142,1791	834,048	0,024554979		1,053		3	0	0
FUCHS PETROLUB SE	2000	139,5142	901,976	0,02477661		1,0436		3	0	0
FUCHS PETROLUB SE	2001	152,3196	940,006	0,011582362		1,0509		3	0	0
FUCHS PETROLUB SE	2002	168,4782	1064,724	0,034103673		1,0933		3	1	0
FUCHS PETROLUB SE	2003	351,7445	1040,9	0,046705457		1,3547		3	1	0
FUCHS PETROLUB SE	2004	645,0702	1096,3	0,062042634		1,7782		3	1	0
FUCHS PETROLUB SE	2005	839,0943	1192,2	0,105887458		1,8581		3	1	0
FUCHS PETROLUB SE	2006	1411,1569	1323,3	0,141912737		2,5182		3		1
FUCHS PETROLUB SE	2007	1585,7196	1365,3	0,167296125		2,7471		3		
NEMETSCHEK AG	2004	96,25	96,636	0,062152123		1,4247		4		
NEMETSCHEK AG	2005	135,7125	98,776	0,144116993		2,1029		4		
NEMETSCHEK AG	2006	212,7125	107,623	0,066584367		1,774		4	0	0
NEMETSCHEK AG	2007	207,4187	146,514	0,078231256		1,7833		4	0	0
NEMETSCHEK AG	2008	99,9075	150,603	0,061932154		1,1986		4	0	0
NEMETSCHEK AG	2009	155,3475	136,099	0,076744959		1,4846		4	1	0
NEMETSCHEK AG	2010	306,7488	150,987	0,114597322		2,2984		4	1	0
NEMETSCHEK AG	2011	248,325	165,12	0,128090676		1,8986		4	1	0
NEMETSCHEK AG	2012	319,55	176,982	0,118264516		2,3395		4	1	0
NEMETSCHEK AG	2013	484,33	187,613	0,134513145		3,0603		4		1
NEMETSCHEK AG	2014	804,7463	218,46	0,107944475		3,2962		4		

Source: COMPUSTAT and Bloomberg

<pre> 9. xtreg CurrentMarketCap Succession Succession_lag1 Succession_lag2 Educ_Lev, re vce(boot) >) (running xtreg on estimation sample) Bootstrapping replications (50) ----- 1 ----- 2 ----- 3 ----- 4 ----- 5 X.....X.XX.....XX..X.X.X.....XX..X.X.....XX..X.X..... Random-effects GLS regression Number of obs = 20 Group variable: ID Number of groups = 4 R-sq: within = 0.356 Obs per group: min = 5 between = 0.622 avg = 5.0 overall = 0.425 max = 5 corr(u_i, X) = 0 (assumed) Wald chi2(4) = 5049.20 Prob > chi2 = 0.0000 (Replications based on 4 clusters in ID) -----+----- Observed Bootstrapped z P> z [95% Conf. Interval] -----+----- CurrentMarketCap Coef. Std. Err. z P> z [95% Conf. Interval] -----+----- Succession 4.95785 34.42213 0.13 0.895 -62.30829 52.02399 Succession_lag1 130.7493 81.28825 1.61 0.110 5.428567 249.8721 Succession_lag2 -102.2358 6.928164 -14.62 0.000 -116.1212 -88.35048 Educ_Lev 522.0935 34.78129 15.02 0.000 453.6922 590.5048 -----+----- sigma_u 128.0381 sigma_e 0 (fraction of variance due to u_i) -----+----- </pre>	<p>Appendix 4: Current Market Cap analysis and its syntax</p> <p>Source: Own calculations</p>
<pre> 11. xtreg ROA Succession Succession_lag1 Succession_lag2 Educ_Lev, re vce(bootstrapp) >) (running xtreg on estimation sample) Bootstrapping replications (50) ----- 1 ----- 2 ----- 3 ----- 4 ----- 5 X.....X.XX.....XX..X.X.X.....XX..X.X.....XX..X.X..... Random-effects GLS regression Number of obs = 20 Group variable: ID Number of groups = 4 R-sq: within = 0.289 Obs per group: min = 5 between = 0.294 avg = 5.0 overall = 0.294 max = 5 corr(u_i, X) = 0 (assumed) Wald chi2(4) = 3089.20 Prob > chi2 = 0.0000 (Replications based on 4 clusters in ID) -----+----- Observed Bootstrapped z P> z [95% Conf. Interval] -----+----- ROA Coef. Std. Err. z P> z [95% Conf. Interval] -----+----- Succession -0.029316 0.138662 -2.16 0.031 -0.071149 -0.007460 Succession_lag1 -0.048897 0.071961 -0.68 0.492 -0.090827 -0.006972 Succession_lag2 -0.078287 0.0761056 -1.02 0.310 -0.2145668 0.1855668 Educ_Lev -0.077149 0.1432718 -0.54 0.589 -0.2008004 0.0701554 _cons -1.846109 0.044755 -41.25 0.000 -1.2317291 -0.9982928 -----+----- sigma_u 0.7799331 sigma_e 0 (fraction of variance due to u_i) -----+----- </pre>	<p>Appendix 5: ROA analysis and its syntax</p> <p>Source: Own calculations</p>
<pre> 12. xtreg TOBINS_Q Succession Succession_lag1 Succession_lag2 Educ_Lev, re vce(bootstrapp) >) (running xtreg on estimation sample) Bootstrapping replications (50) ----- 1 ----- 2 ----- 3 ----- 4 ----- 5 X.....X.XX.....XX..X.X.X.....XX..X.X.....XX..X.X..... Random-effects GLS regression Number of obs = 20 Group variable: ID Number of groups = 4 R-sq: within = 0.2130 Obs per group: min = 5 between = 0.2134 avg = 5.0 overall = 0.2608 max = 5 corr(u_i, X) = 0 (assumed) Wald chi2(4) = 1322.24 Prob > chi2 = 0.0000 (Replications based on 4 clusters in ID) -----+----- Observed Bootstrapped z P> z [95% Conf. Interval] -----+----- TOBINS_Q Coef. Std. Err. z P> z [95% Conf. Interval] -----+----- Succession -0.1125 0.1787575 -0.66 0.509 -0.3616083 0.3391083 Succession_lag1 -0.145 0.1020768 -1.42 0.154 -0.2145668 0.1855668 Succession_lag2 0.3439375 0.1852227 1.85 0.064 -0.0200004 0.7071554 Educ_Lev 0.4263333 0.2306371 1.85 0.065 -0.025707 0.8783737 _cons -1.134575 0.8061605 -1.41 0.156 -1.71462 1.44547 -----+----- sigma_u 0.34375876 sigma_e 0.38607174 rho 0.44221777 (fraction of variance due to u_i) -----+----- </pre>	<p>Appendix 6: Tobin's q analysis and its syntax</p> <p>Source: Own calculations</p>