Saint Petersburg State University

Graduate School of Management

Master in Corporate Finance

FAMILY OWNERSHIP AND FINANCIAL PERFORMANCE: EVIDENCE FROM AUTOMOTIVE INDUSTRY

Master's Thesis by the 2nd year student

Concentration – Corporate Finance

Amaliia Dzhafarova

Research Advisor:

Associate Professor, Yulia B. Ilina

Saint Petersburg

2021

ЗАЯВЛЕНИЕ О САМОСТОЯТЕЛЬНОМ ХАРАКТЕРЕ ВЫПОЛНЕНИЯ ВЫПУСКНОЙ КВАЛИФИКАЦИОННОЙ РАБОТЫ

Я, Джафарова Амалия Сафалановна, студент второго курса магистратуры направления «Менеджмент», заявляю, что в моей магистерской диссертации на тему «Семейная собственность и финансовая результативность: пример автомобильной промышленности», представленной в службу обеспечения программ магистратуры для последующей передачи в государственную аттестационную комиссию для публичной защиты, не содержится элементов плагиата.

Все прямые заимствования из печатных и электронных источников, а также из защищенных ранее выпускных квалификационных работ, кандидатских и докторских диссертаций имеют соответствующие ссылки.

Мне известно содержание п. 9.7.1 Правил обучения по основным образовательным программам высшего и среднего профессионального образования в СПбГУ о том, что «ВКР выполняется индивидуально каждым студентом под руководством назначенного ему научного руководителя», и п. 51 Устава федерального государственного бюджетного образовательного учреждения высшего образования «Санкт-Петербургский государственный университет» о том, что «студент подлежит отчислению из Санкт-Петербургского университета за представление курсовой или выпускной квалификационной работы, выполненной другим лицом (лицами)».

(Подпись студента)

31.05.2021   (Дата)

STATEMENT ABOUT THE INDEPENDENT CHARACTER OF THE MASTER THESIS

I, Dzhafarova Amaliia, second year master student, program «Management», state that my master thesis on the topic «Family Ownership and Financial Performance: Evidence from Automotive Industry», which is presented to the Master Office to be submitted to the Official Defense Committee for the public defense, does not contain any elements of plagiarism.

All direct borrowings from printed and electronic sources, as well as from master theses, PhD and doctorate theses which were defended earlier, have appropriate references.

I am aware that according to paragraph 9.7.1. of Guidelines for instruction in major curriculum programs of higher and secondary professional education at St.Petersburg University «A master thesis must be completed by each of the degree candidates individually under the supervision of his or her advisor», and according to paragraph 51 of Charter of the Federal State Institution of Higher Education Saint-Petersburg State University «a student can be expelled from St.Petersburg University for submitting of the course or graduation qualification work developed by other person (persons)».

(Student's signature)

31.05.2021   (Date)

АННОТАЦИЯ

Автор	Джафарова Амалия Сафалановна
Название магистерской диссертации	Семейная собственность и финансовая результативность: пример автомобильной промышленности
Факультет	Высшая Школа Менеджмента
Направление подготовки	38.04.02 "Менеджмент" (Профиль: Корпоративные финансы)
Год	2021
Научный руководитель	Ильина Юлия Борисовна
Описание цели, задач и основных результатов	Семейная собственность – это одна из малоизученных тем, несмотря на то что 30% мировых компаний являются семейными. Целью данной магистерской диссертации является определение взаимосвязи между семейной собственностью и финансовой результативностью публичных компаний автомобильной промышленности. Обзор литературы проводился по структуре собственности, семейной собственности, агентским проблемам, семейным проблемам. Были изучены теоретические основы взаимосвязи между семейной собственностью и финансовой результативностью. Концептуальная модель влияния семейной собственности на финансовую результативность была разработана и протестирована на собранных данных. Были разработаны управленческие рекомендации и практическое применение. Главный вывод этого исследования – наличие взаимосвязи между семейными переменными, такими как собственность, поколение, председатель правления, генеральный директор и финансовыми показателями (ROA и Tobin's Q).
Ключевые слова	Семейная собственность, семейный бизнес, автомобильные компании, финансовая результативность

ABSTRACT

Master Student's Name	Dzhafarova Amaliia S.
Master Thesis Title	Family Ownership and Financial Performance: Evidence from Automotive Industry
Faculty	Graduate School of Management
Main field of study	38.04.02 "Management" (Concentration: Corporate Finance)
Year	2021
Academic Advisor's Name	Ilina Yulia B.
Description of the goal, tasks and main results	Family ownership is one of the underexamined topics despite the fact that 30% of world companies are family-owned. The goal of this master thesis is to identify the relationship between family ownership and financial performance of the listed companies from automotive industry. The literature review was conducted on ownership structure, family ownership, agency problem, family challenges and family-adjusted corporate governance mechanisms. The theoretical background of the relationship between family ownership and corporate performance was studied. The conceptual model of impact of family ownership on financial performance was developed and tested on the collected data. And managerial implications and recommendations were developed. The main finding of this research is relationship between family variables such as ownership, generation, board, chairman, CEO and financial performance measured by ROA and Tobin's Q.
Keywords	Family ownership, family business, automotive companies, financial performance

CONTENT

INTRODUCTION

It is believed that public companies with family ownership perform worse than companies with other ownership structures. However, numerous studies tend to support opposite point of view. Moreover, family ownership is common phenomenon for the developed markets. Such companies as Bosch, Toyota, Volkswagen, Suzuki, Maersk, Carrefour, Michelin, Bridgestone, LVMH, Hermes are family-owned for numerous generations. I have no doubts that the majority of these giants is familiar to general public. But do these well-known companies really perform worse than other non-family-owned companies in the world? Let's pay attention to some eye-catching facts: 30% of S&P500 index comprises for the companies with presence of family ownership (Anderson, 2003). 37,5% of German companies are family-owned (Andres, 2008). Japan has 43% family-owned companies (Allouche, 2008). 70% of Indian and Brazilian companies are family owned (Dow, 2016). 58,7% of Chinese companies are family-owned one (Tang, 2017). At the current moment there are 920 large family-owned companies in the world with capitalization of 1 billion USD and with family-stake of minimum 20% (Anderson, 2003). Concerning some examples from luxury market, Forbes put Louis Vuitton (LVMH), Gucci (Kering) and Hermes in the top-100 world most valuable brands, in these companies the largest stake is hold by the family (Forbes, 2020). Some scholars evaluate family in the ownership structure as an advantage as family ownership could bring some benefits to the companies, enhance financial performance via family goals, relationships, and resources (Mazzi, 2011). Others are convinced that family just follows its own interest which contradicts with main goal of business to maximize profit. One argues that family-management follows preservation, strengthening, provision standards that allows to create better product without chasing short-term goals. Other believe that great results could be achieved only by pressure and short-term goals reinforced by the professional management.

I should highlight that the topic is very challenging as the family ownership is not a case of frequent occurrence in Russia at the moment. But most probably it is due to the fact that the Russian market economy is still very young. Someday Russia will also become an experienced economy leading to creation of prerequisite for appearance of huge number of listed companies with family ownership. That means that the knowledge from western market would become applicable.

The goal of this master thesis is to identify the relationship between family ownership and financial performance of the listed companies from automotive industry. For the execution of the research following objectives were resolved:

- To study the theoretical background of the relationship between family ownership and corporate performance;
- To develop conceptual model of impact of family ownership on financial performance and to test methodology;
- To collect the data;
- To investigate empirically the relationship between family ownership and financial performance;
- To develop practical implications and recommendations.

As part of this work, a study of family ownership and other family variables was carried out. The result of this work is creation of two regression model which consisted of 5 family variables and 3 control variables. Over all two regression models were created: the first one with dependent variable return-on-assets, the second one with dependent variable Tobin's Q. Both of which showed significance and good explanatory power.

The thesis consists of two chapters. The first chapter presents extensive literature review on influence of family ownership structure on accounting and market performance. Moreover, the first ever family business index FBI500 which was developed by the EY and St.Gallen University is presented in details. Furthermore, main family challenges which are usually discussed by public are explained in details. The second chapter describes the process of building a conceptual model, the rationale for the choice of its components and industry. Furthermore, the pilot test model, detailing of the sample and the statistical methods used are presented. Besides, the practical implication is discussed. In addition, the work contains a bibliography consisting of 94 sources and 8 appendices.

This master thesis is valuable because it provides industry specific research whereas the majority of the scholars conduct research on country-based samples. Industry specific research seems to be more valuable to end-users of the information since the results from different industries could not be applicable to specific industry. Moreover, this research will contribute to the development of family ownership studies which at the moment are limited in number.

For the execution of this work, academic, professional, foreign literature was used on the ownership structure, family enterprises and its performance. For the research, the primary data is obtained from Orbis database and open sources such as annual reports of the companies.

CHAPTER 1: THEORETICAL BACKGROUND

This chapter will provide an overview on theoretical frameworks and evidences from all over the world. The first part of the chapter is dedicated to overview of various types of owners and highlights the concept of agency problem from which many companies suffer. The second part presents studies which elaborate on the influence of various ownership structures on financial performance. The third part provides contemporary definition of family business, new stock index dedicated to family companies, key issues in family business and possible ways to solve them by adjusting corporate governance to family problems. Finally, the fourth part is dedicated to extensive literature review on influence of family ownership on corporate performance.

1.1 Ownership structure and agency problem

Company is "a legal fiction which serves as a nexus for contracting relationships and which is also characterized by the existence of divisible residual claims on the assets and cash flows of the organization which can generally be sold without permission of the other contracting residuals" (Jensen, 1976). By 2019 there were circa 41 000 listed companies globally. Their combined market value comprised for 80 trillion dollars. This number is comparable to the global GDP. Significant amount of the listed companies has institutional investor in its ownership structure. As the world's listed companies are powerful the question about their owners and their performance is of the economy-wide significance.

OECD analysts identified five key categories which are presented in the ownership structure of the company:

- Private corporations and holding companies consist of listed and unlisted private companies, their subsidiaries, joint ventures and operating divisions;
- Public sector consists of direct ownership by government, public pension funds, state-owned enterprises and sovereign wealth funds;
- Strategic individuals and families consist of two groups physical persons and families that presented by controlling owners, members of controlling family, block holders and family offices;
- Institutional investors consist of pension funds, insurance companies, mutual funds and hedge funds;
- Other free-float including retail investors consist of two groups direct holdings of retail investors and institutional investors (OECD, 2019).

The main problem which is associated with ownership structure is agency problem. Berle and Means pioneered in the field of agency theory. At that time, they have already stated that for the agents there is a tendency to follow discrepancy from principal goals when making decisions.

They believed that this separation originated management willingness to use companies resources for own consumption. But concerning separation of ownership and control they predicted that even common shareholder could lose influencing power because of diluted ownership and enormous amounts of shareholders. But they believed that ownership concentration positively affects firm's value and helps to overcome agency problem. They developed a concept of stockholders, stockholders could influence the company by 5 ways: common stock, majority control, legal issues, minority control, management control (Berle, 1932).

Jensen and Meckling defined agency relationship as " a contract under which one or more persons (the principal: either outside equity nor debt holder) engage another person (the agent) to perform some services on their behalf which involves delegating some decisions making authority to the agent". The agency problem originated from separation of ownership and management. It is believed that the agency problem is general and common so mechanisms to cope with it by keeping the agency cost to a minimum are the great part of corporate governance (Jensen, 1976). Shleifer and Vishny came with a following definition for corporate governance: "methods for finance suppliers by which they can ensure the return on money they invested" (Shleifer, 1997).

Agency problem resides in managers desire to grab companies' assets from the company in order use by his/her own. However, the unfavorable behavior could lie in reduced strain to carry out professional duties if the ownership claim drops which will result in low market value. Moreover, Jensen and Meckling highlighted that agency problem could probably occur during IPO process as it is the actual moment when the ownership is diluted. In order to cope with agent problem principal should try to develop incentive scheme in the way to support agent to undertake the actions in the best interest of company's goal value maximization (Jensen, 1976).

Chrisman et al. (2004) divided agency problem into two types: adverse selection and moral hazard. The adverse selection type happens when the agent's goals, interest and qualities does not match with principal expectations. Moral hazard lies in agent's inactivity or damaging decision, for example shirking or consumption of perks. The first type of agency problem could be tackled with better search and verification cost, whereas second one could be tackled with incentives, punishment, bonding and alignment of interests (Chrisman, 2004).

Agency cost is an internal cost incurred from separation of ownership and management. The agency cost consists of three variables: supervising cost incurred by principal, bonding cost incurred by agent, residual loss. Supervising cost reply for tracking of the agent-behavior in order to identify non-favorable actions which will not maximize the profit. Bonding cost is just a payment for agent in order not to initiate the certain movements which could be hazardous for principal or just to ensure that if certain movement happened the principal be paid for it. Residual loss replies for discrepancy of agent's actions from principal desire, so it is decease in welfare

(Jensen, 1976). Fama and Jensen claim that the structure of agency cost is a little bit different, it includes: structuring, monitoring, bonding cost and loss (Fama, 1983).

1.2 Research on ownership structure and corporate performance

Companies tend to have different ownership structures and the influence of this diversity was widely studied by researchers all over the world.

In 1988 Morck et al. presented the classical model which is used by many scholars nowadays. The authors studied 500 firms on the American market in 1980 in order to examine the relationship between management ownership and market valuation. As the proxy for market valuation the Tobin's Q was chosen. Authors described several effects in their work. The convergence of interest effect means that the insider of the company is directly interested in increasing its value, i.e. the share of shares held by insiders has a positive effect on the strategic efficiency of the company. The entrenchment effect (voting power, control of the board) implies opportunistic behavior of the company's top management toward shareholders. The authors found out a non-monotonic S-shaped form of relationship between the management ownership and the strategic efficiency of companies. The positive correlation between Tobin's Q and managerial ownership was found on the 0-5% and over 25% board ownership. Whereas the negative correlation was found on the 5-25% board ownership. Moreover, the presence of founding family negatively influenced the Tobin's Q (Morck, 1988). Jensen and Meckling in 1976 came with quite the same results positive association between insider ownership and firm performance (Jensen, 1976).

Dehkalani et al. (2015) studied the impact of institutional ownership on financial performance, measured by ROE and EPS, of 38 Indian companies listed on the Bombay Stock Exchange from 2009 to 2013. The institutional ownership was measured by percentage of institutional ownership and number of institutional owners. However, the small constraint should be mentioned: authors used the data from the companies excluding investment companies, banks and financial intermediates. After testing the hypothesis authors concluded that no relationship between institutional ownership and financial performance was detected for Indian listed companies (Dehkalani, 2015).

Loya et al. (2018) examined the influence of the ownership structure on the financial performance, measured by ROA and ROE, of the 13 Jordan banks from 2015 to 2014. The main findings are that the reduction of the profitability is highly dependent on the high ownership concentration, larger banks' size, and higher debt to equity ratio. Bank's performance is positively influenced by the foreign ownership and government ownership. And finally, institutional ownership and the age do not influence the bank's performance (Loya, 2018).

Al-Gamrh et al. (2020) studied relation of local and foreign ownership on the financial (ROA and ROI) and social performance (social index) in UAE. The authors conducted a research on example of 128 local public companies listed on DFM and ADX in the time period from 2008 to 2012. The authors found out that local ownership negatively impacts the financial performance whereas foreign impacts its positively (Al-Gamrh, 2020).

Alabdullah (2018) studied also the ownership structure influence on market performance, measured by market share, of the 109 non-financial firms listed in the Amman Stock Exchange for the fiscal year 2012. He found out that firm under managerial control has better financial performance, there is positive correlation. But there is just no correlation between foreigner ownership, size of the company and industry separately and financial performance (Alabdullah, 2018).

Turkish scholars also dig into the topic. Kevser et al. (2019) studied the example of Turkish banks on the same topic: ownership structure and financial performance. The research was conducted on the sample of 13 Turkish banks listed on BIST from 2005-2017. Investigated ownership structure consisted of family, corporate, managerial, foreign, largest shareholder, whereas ROA, ROE, Tobin's Q, EPS, P/E were taken as ratios of financial performance. The authors found out strong evidence for positive relationship between family ownership, negative ownership between managerial ownership, negative relationship between corporate ownership, positive relationship between foreign ownership, negative relationship between foreign, positive relationships between largest shareholder ownership and, ROA and Tobin's Q, ROA and ROE, ROA and EPS, EPS, P/E ratio, Tobin's Q and EPS and P/E ratio respectively. Due to the results of the research authors concluded that ownership structure of Turkish banks impacts its financial results (Kevser, 2019).

Nigerian scholars also contributed to the topic. Kurawa et al. (2019) studied the sample of six Nigerian Deposit Money Banks, from 2003 to 2014. They found out that ownership concentration below 54.94% impacts the financial performance of the Nigerian DMBs negatively and if ownership concentration is above 54.94% it affects positively the financial performance (Kurawa, 2019).

Each ownership structure seems to have impact on corporate performance. However, the family ownership is under the scope in this thesis so the next paragraphs would be dedicated to family ownership.

1.3 Family business challenges and contemporary market situation

There are countless definitions for family ownership in the articles. Kets de Vries defines "family owned" if an individual may receive enough shares to guarantee at least 20% of voting rights and the highest percentage of voting rights compared to other shareholders (Kets de Vries,

1993). Chu and Anderson assign companies to "family-owned" if the family shareholdings occur regardless of percentage (if family just holds shares or is involved in management) (Anderson, 2003; Chu, 2011). However, it is difficult to identify whether the shareholder, CEO or member of the board of director belongs the founder's family if the company is old. Daily and Dollinger just pay attention only to the last name of the individual to solve this problem (Daily ,1993). Øyvind Bøhren et al. ranks a company as "family-owned" only if family possess more than 50% of voting rights. Moreover, individuals are assigned to the family by several criteria: blood, marriage (Bøhren ,2019). Sacristan-Navaro et al. rank the company as a family-owned if the family obtains more than 10% of voting rights (Sacristan-Navaro, 2011). Andres used following criteria: if the founder of family representative obtains over 25% of voting shares or if the stake is lower founder/family representative should be on the board of directors no matter executive or supervisory (Andres, 2008). Beehr et al. believe that family firm is just a firm where the owner and one more employee is from the same family (Beehr, 1997). Villalonga and Amit share the previous point of view and add some details: this employee could be family either by blood or by marriage but he/she has to be officer/director/stockholder (Villalonga, 2004). King and Santor just focus on voting rights if the family owns over 20% of voting rights the company is assumed to be family owned (King, 2008). Rutherford et al. even makes it simpler: if two officers obtain the same surname the company is assumed to be family owned (Rutherford, 2008).

Family enterprises were the first enterprise which existed in the world millennia ago. These primitive enterprises were widespread in agriculture, pottery, weaving, and metalwork. As obtaining resource was scarce option millennia ago land, tools, other assets were hereditary. Family enterprises were building and strengthening fledgling local economies. The word economics originated from ancient Greek word oikonomia could be understood in the sense of "management of household operations" which in more exact terms means family management. Family enterprises helped to establish Chinese, Egyptian, Greek, Persian, and Roman civilizations. In the Middle Ages primitive family enterprises transformed into guilds involved in specific trade. These companies also were economic-generators as millennia ago and facilitated build a prosperous world (BCG, 2020a). Still family enterprises play significant role in all countries and contribute from 25% to 49% of countries GDP (BCG, 2020b). Due to 2016 Edelman Trust Barometer people tend to give credit to family enterprises more than to the companies either with public or governmental ownership (The Economist, 2020).

So initially, all the companies are set up as family business (Lee, 2006), however, when the company starts to grow the founder's lack of the knowledge comes to the fore, so the hiring of professional top-management and CEO becomes a burning issue (it is often constraint of venture capital). After that the dilution of the ownership happens as the company needs more money.

Usually, company gets money in exchange for equity stake and moreover, in order to attract talent company creates employee option pool which frequently takes 10-15% and is taken from founders' stake. So, the founder no more controls the whole company. Then comes the stage of M&A when the company could be bought by another company. Often by this stage founders burn out so they just decide to leave the company. That's the end for family business. However, there are still some companies which decide to develop by themselves and skip M&A stage. This companies have all opportunities to become a family business. But then another split comes succession problem. Not all successors decide to seize the opportunity and run family business. For example, in the USA the survival rate for succession from generation to another is just 30% (Astrachan, 2002). However, if they decide to rule the company not all succeed and company could go bankrupt even in the second generation.

Hermes is good example for family business run by the same family for 184 years. Hermes is listed company. Hermes is one of the top-100 world most valuable brands and run by already 6th generation of the same family (Forbes, 2020). Family management, artesian traditions, superb material, excellent quality, scarcity and exclusivity are key points of difference of the company which allow it to outperform competitors. The underlying reason of successful family management for several generations is respect to human, nature and innovations which is an endorsed value for the whole family (MartinRoll, 2020). Company successfully beats off hostile acquisitions of competitors (LVMH case) as in luxury business conglomerates are prevailing.

Nevertheless, family business is the most frequent form of business globally. Approximately 80% of firms located in the USA are either family-owned or family-controlled, besides 12% of family firms comprises GDP (Astrachan, 2002). Moreover, one third of companies in Standard&Poor 500 are family companies (Anderson, 2002). But family-ownership is a more frequent case for Western Europe and Asia excluding Japan and comprises for 60% there, whereas for the USA, the UK and Japan family ownership is also the case but the widespread-ownership is prevailing there (Andres, 2008).

Many scholars emphasize that family companies obtain unique characteristic such as altruism, commitment, reputation and trust which can lead to better performance (Davis, 1983). If the family serves in the management the employees could develop loyalty to them like an extended family and work more efficient and consequently make the company more profitable (Lee, 2006).

However, stellar reputation, which considers to be the unique advantage, is not always the case. In 2014 the daughter of chairman of Korean Air, which is owned by chaebol Hanjin Kal, caused the huge scandal which is known in the media as "nut-rage". Heather Cho lost her self-control because of inappropriate serving of sneaks from her point of view on the board of Korean Air in New York. Due to this hilarious reason she commanded to return the aircraft back to the

gate (The Straits Times, 2018). The former chairman, father of Heather Cho, was accused of fraud and tax dodging and consequently ousted from the board of directors (AP, 2019). At the current moment the parent company Hanjin Kal is faced with the fight between brother, current CEO, Won-tae Cho and sister, Hyuan-an Cho, who wants to replace the brother in leading position (Pulse, 2020). All these events lead to the fluctuations in share price, loss of reputation and explosion of family business reputation.

In 2019 the big-4 representative Ernst&Young and University of St.Gallen established the 3rd edition of Family Business index (FBI500). This index consists of 500 global largest enterprises with family ownership, graded by revenue. The key results identified by the researchers comparing 2019 to 2018 are (EY, 2019):

- Technology companies took larger stake. Entrants 2019 were more likely to be small by size, young by years since establishment and public by being listed on stock exchange;
- The significant part of directors in the board consisted of professional managers who are not family members;
- The vast number of directors in the board are men following the patters of Fortune 500 but still less diversity;
- The revenue increase in FBI500 companies comprised for 9,9% while in Fortune500 the growth accounted for only 8,6%;
- 44% of the family enterprises are run by 4th or older generation, this finding cast doubt on many researches which describe succession problem even to the second generation (Bain, 2015);
- Switzerland has 17 family firms per capita which is the largest number worldwide (Bain, 2015);
- The compound revenue of 10 biggest family enterprises accounts for 1,74 trillion USD which is bigger than Australian GDP (12th largest economy) (Bain, 2015);

Researchers use certain criteria to identify enterprises with family ownership. First of all, the companies with 2nd generation and more were selected. Moreover, companies had to have active participation of family in business operations (either board of directors' member of CEO). Finally, the ownership threshold for public companies was minimum 50% of ownership and voting rights and for private companies minimum 32% of ownership and voting rights.

The majority of the family-owned companies are situated in the Europe (fig. 1.) having 1% increase in Europe contributed by German entrants in 2018. The second place takes North America having 1% decrease in North America contributed by the USA drop in 2018. All other continents are not densely occupied by family companies.
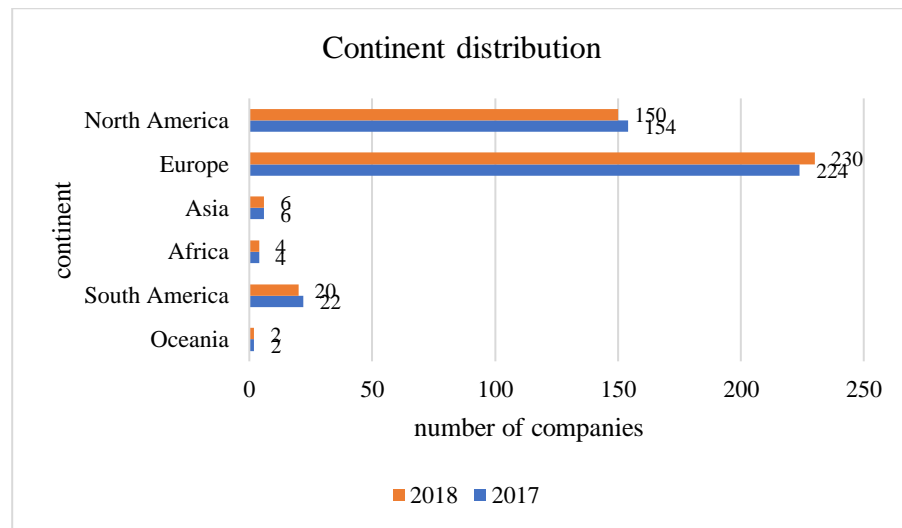
Fig. 1. Continent distribution

Source: (EY, 2019)

From figure 2 could be seen that in 2019 technology enterprises joined more the FBI500 whereas representatives of traditional industries such as consumer and retail faced significant drop.
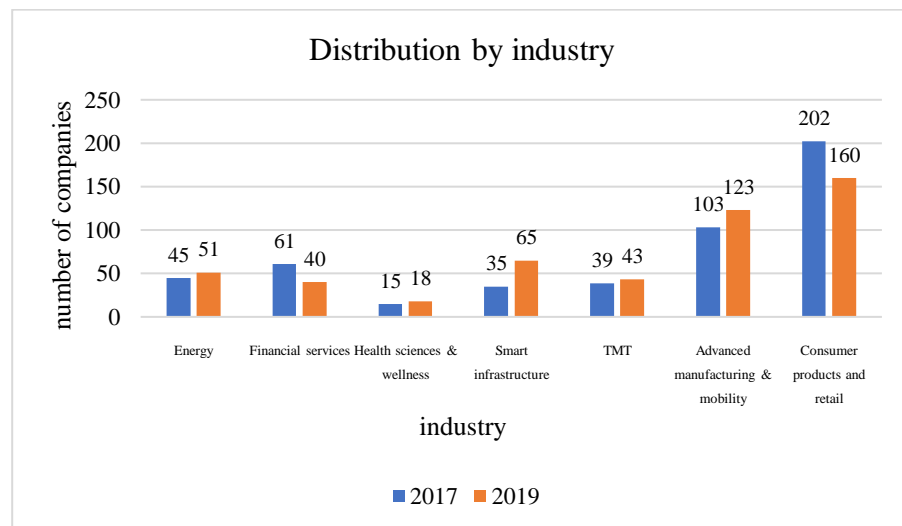

Fig. 2. Distribution by industry

Source: (EY, 2019)

According to the data collected by the researchers in 2019 the vast majority of the companies earned less than 25 billion USD (fig. 3.). Approximately 7% had distribution of revenue between 25 billion USD and 50 billion USD. 3% of companies earned more than 50 billion USD but less than 100 billion USD. Finally, the minority of 2% got more than 100 billion USD as a revenue in 2019.

Fig. 3. Revenue

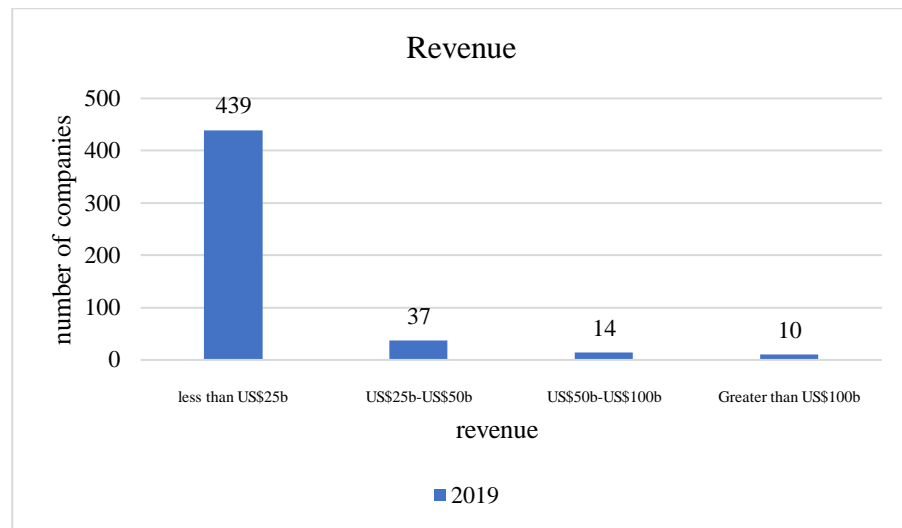Source: (EY, 2019)

According to the picture the significant part of family enterprises has less than 5000 employees (fig. 4.). The rest of companies took the equal stake of 10% for each category.
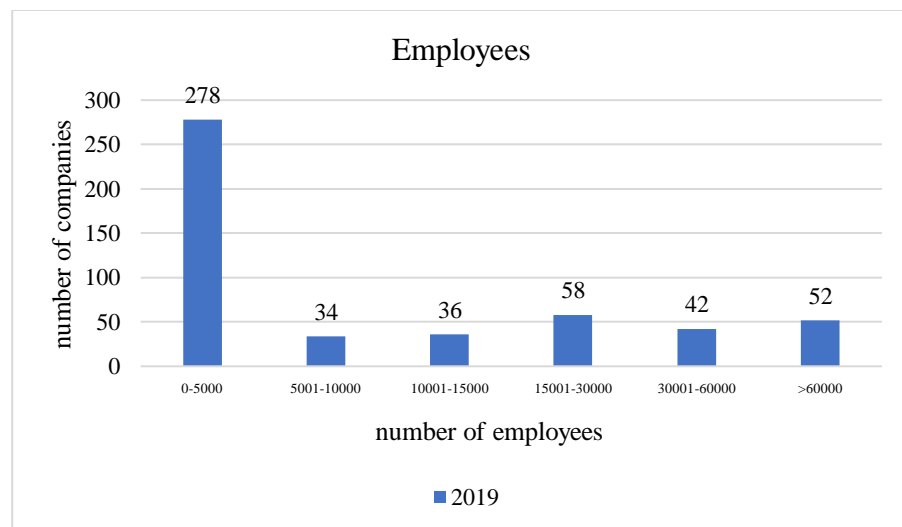

Fig. 4. Employees

Source: (EY, 2019)

Approximately a half of the investigated companies from the FBI500 were established after the Second World War but before the Fall of Berlin Wall (fig. 5.).
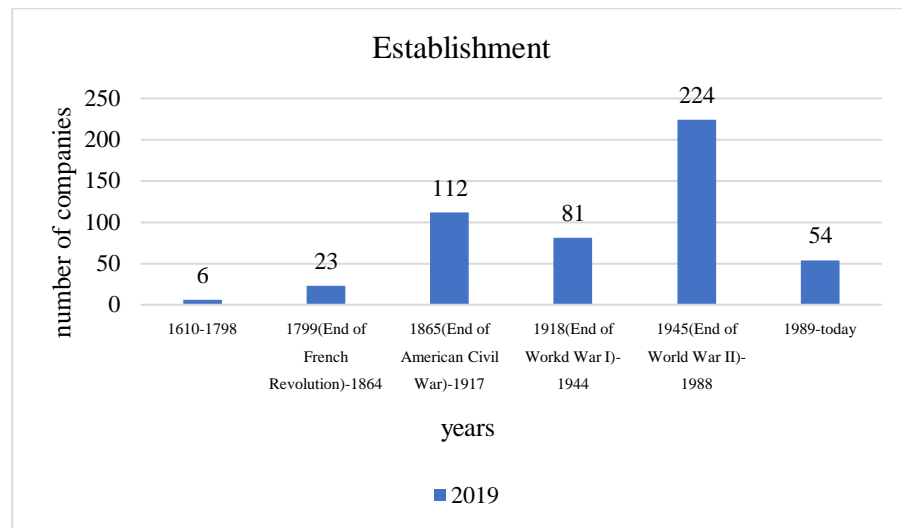
Fig. 5. Establishment

Source: (EY, 2019)

In the majority of companies family representative comprise 20%, nevertheless, the stake of companies with 20-40% is also quite impressive (fig. 6.). 10% of the companies have 40-60% of family in the board of directors. 3% and 5% of the companies are occupied by the family representative by 60-80% and 80-100% respectively.

Fig. 6. Family involvement in board of directors

Source: (EY, 2019)

The graph shows that the distribution of companies with family CEO and non-family CEO is quite equal, however, with prevailing part of non-family CEO's (fig. 7.).

Fig. 7. Family CEO

Source: (EY, 2019)

Researchers expect that FBI500 will become the benchmark in the future as a Fortune500 for example. At the current moment there is absence o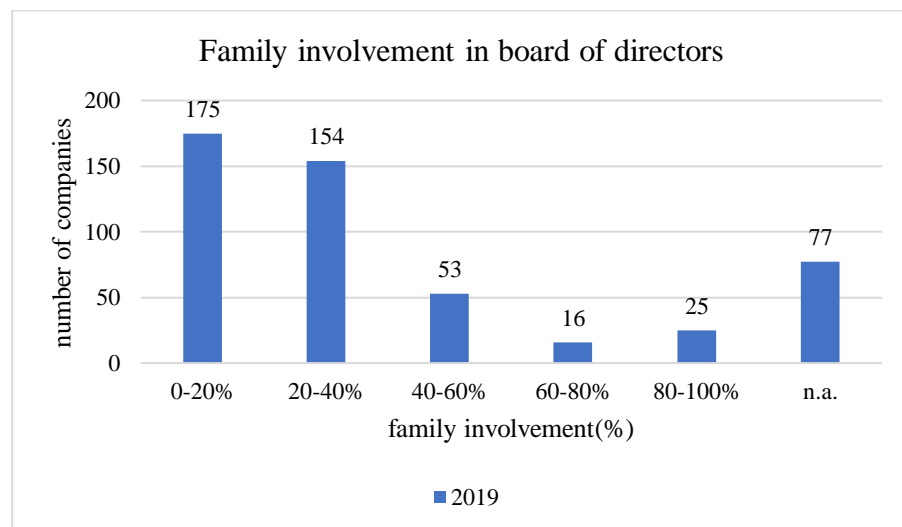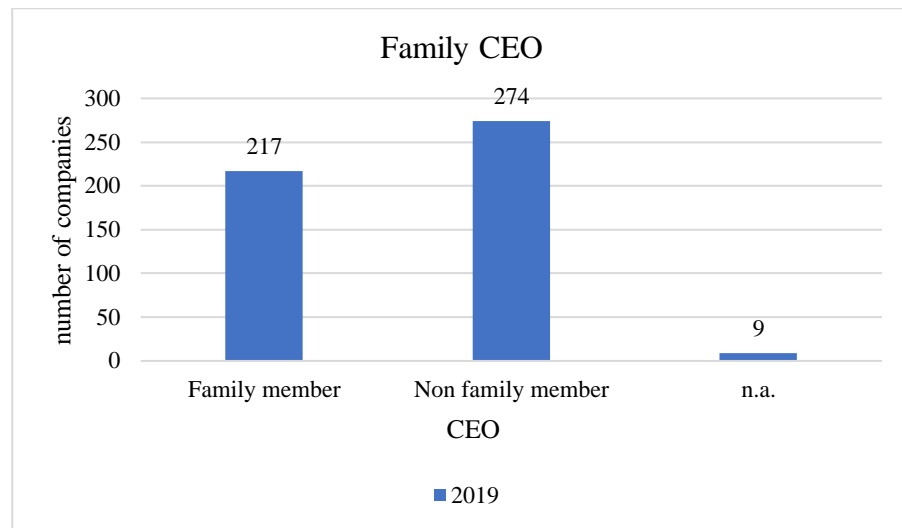f insights about the importance of contribution of family enterprises to global economy. Since this companies are united by involvement family of course they will experience same problems at certain time: succession, family management in the context of corporate governance, mismatch of the value's professional management and family, borrowing of money (Bain, 2015).

Nicolas Kachaner et al. singled out 7 principles of family business which makes it successful and thriving. These principles were found out on the sample of 149 listed companies with the revenue over 1 billion USD in the North America (the USA, Canada, Mexico) and Western Europe (Portugal, Spain, France, Italy). The family criteria were significant stake of the family in ownership and high involvement in operations. The main outcome was that family companies care more about resilience rather than performance. These are the principles that help to achieve resilience.

1. *Parsimony in ups and downs*: As the welfare of family depends on companies' money, family tries to eliminate overspending on different things for example exuberant headquarters. The cost-efficient strategy of family enterprises pays off during crisis as family enterprises suffer less than other companies;

2. *High hurdle for CAPEX*: Family firms follow simple rule not to spend more than they earn. That's why the CAPEX in family firms could not exceed FCF. Consequently, family firms tend to favor strong projects and sometimes do not seize each opportunity from which comes sometimes companies' inefficiency in the eyes of non-family rivals;

3. *Chose minor debt*: In all corporate finance books it is stated that debt is cheaper than equity and has certain advantages as tax-deductibility for example. However, family firms

18

give precedence to small amount of debt. Debt connotes dullness, risk and less power. Debt limits the company in the downs as the company face the problem how to repay non-family investor or is struggling under covenants;

4. *Acquisition strategy is focused on small firms and is limited in the number*: Family corporations tend to be risk-averse that's why they acquire small companies which either operate in companies core business or contribute to geographical expansion. The exception is industry disruption for which family companies are also looking for. Family companies prefer joint venture and partnerships rather than acquisition. As acquisition connote risk of mismatching corporate culture and impossibility to disperse family values.

5. *Diversification:* Despite the common believe that corporations with family ownership stay in the core business many representatives of family corporations diversify a lot as only by this mean corporations stay the course during crisis and consequently could keep family's welfare.

6. *Generate large part of revenue abroad by patience and smaller investments*: Family firms usually go oversees by small investments in order to try the market. But once the investments are made family firm does not expect fast return on investment and adopt wait-and-see attitude which pays off in long-term;

7. *Retain employees by culture of credence and dedication*: On average the retention rate in family firms is higher than on non-family firms. Employees are attracted by shared culture of credence and dedication rather than financial perks. In order to build long-term teams of professionals' family firms invest more in people via trainings and promoting inside the organization.

Authors claim that all these principles are interrelated and make family firm thriving. Parsimony and low debt contribute to retention rate allowing to have more loyal people on board. Risk-averse strategy of small investments overseas makes diversification organic. Low number of acquisitions and preference of partnerships and joint ventures bring about low debt. Parsimony contributes to high bar of CAPEX. Tradeoff between high hurdle for CAPEX and investing in risky ventures results in longevity but not in inefficiency as it is believed (HBR, 2012).

Consultants from McKinsey also singled out 4 characteristic which make family companies sustainable and excellent in performance over non-family ones even in IT:

1. *Long-term orientation*: Usually the key goal for family companies is to pass on thriving company to the next generation that's why they do not follow the principal of "I came, I saw, I conquered" in order to gain immediate returns. The main components are low debt in order not to dilute ownership and low spending, it was found out that their R&D

investments are lower, however, generate higher returns as only worthwhile projects are chosen;

2. *Institutional memory*: As family firms live long live their owners gain dipper knowledge of industry and coming innovations so family firms suffer less during economic downs;

3. *Smart diversification*: As family companies care a lot about family wealth, they diversify more in order to reduce risk. But their diversification is usually connected one either horizontal or vertical;

4. *A balance between tradition and change*: Family companies do not digitalize first in the industry but still could bring disruptive technology as younger generation of the family always keeps eye on innovations (Exonomist, n.d.).

Family ownership is not an easy task as family has to align personal welfare and company goals and clearly separate personal relationships and business life. Such companies are mistrusted sometimes by public because of the believed value destruction behavior. Family corporate governance is like a scale where on one side is value creation and on other side value breakdown. Balancing of these two sides is a proxy for prosperous performance and longevity. In the following section the variables of value creation and breakdown will be highlighted. Value creation is comprised of following things:

1. *Incentives:* The family members receive two types of incentives from the company. The first one is moral incentive. Family members feel personal commitment towards the company as it was founded and developed by the ancestors (Davis, 1983). The family DNA is intertwined with companies' corporate culture, values and strategy. This makes family feel obliged to keep contributing and developing the company in order not to betray blood heritage. The commitment could be stronger for the family if the company bears the surname of founding family (Belenzon, 2017). The current Toyota CEO Akio Toyoda said that "all the Toyota vehicles bear my name. For me, when the cars are damaged, it is as though I am as well" (Automotive News Europe, 2019). The second type of incentive is financial as the family welfare is bounded to companies' performance (Villalonga, 2006).

2. *Family assets*: Family companies possess unique intangible assets. First of all, it is trust. They are trusted because of long history, emotional attachment and strong reputation. Family is perceived as a part of the company and their personal values are incorporated into corporate strategy. Thus, Hermes corporate strategy is based on respect to human, nature and innovations which is an endorsed value for the whole family (MartinRoll, 2019). Secondly, as family-owned companies exist for the generations family accumulates profound knowledge and deep understanding of industry, builds strong network. Thirdly,

as all families founding families have secret recipe but not for dumplings in the kitchen but for management and production in the company (Benedson, 2015).

3. *Long term horizon*: As families are building companies for upcoming generation, they do not seek for harvesting short term revenue. Family enterprises are more likely to take long-term projects and choose investment projects other companies will not consider. The main components of their strategy are low debt in order not to dilute ownership and low spending, it was found out that their R&D investments are lower, however, generate higher returns as only worthwhile projects are chosen. Moreover, family companies are resilient because of anti-takeover protection which is created in order not to dilute family ownership (Anderson, 2003; The Economist, 2020).

Value breakdown is comprised of following things:

1. *Succession*: Succession is important milestone for each family-controlled company. At this stage founder should detect unique family assets and its transferability, identify if his/her heirs obtain business acumen for running business, make clear succession plan showing solutions for current problems, anti-dilution solution for family stake and plan for transferring the key assets. If some of these points cannot be covered it is wiser to get rid of the company.

2. *Entrenchment and tunneling*: In terms of family business entrenchment effect could be understood as opportunistic behavior of the family management toward minority shareholders. Tunneling is associated with unethical behavior of the family in appropriation of company assets, excessive renumeration packages for family members which damages non-family workers, minority shareholder rights and overall performance of the company (Morck, 1988). As family in the family enterprises is usually largest shareholder so family possess blocking stock share. So, family could take decision in favor their own subjective opinion but not rational thoughts, choose projects they like and ignore unfavorable one.

All family challenges which on one side create value but on other side demolish it could be solved by implementation of family-focused corporate governance mechanisms. Some companies such as Ahlstrom with long history and many generations onboarding have already ready schemes:

1. *Family Assembly*: This is an informal meeting of family members where they talk and debate about companies' current strategy, fresh decisions. Moreover, this meeting also serves as explanatory vehicle for family members who are not in harmony with some opinions of other family members. Furthermore, conduction of the meeting in informal mode allows to keep track of family's opinion towards company's future.

2. *Family Council*: This is formal entity which representatives are chosen by family assembly. Family council prepares summaries of family meetings mainly focusing of family vison of strategy, core values and family point of view towards recent activities. So, this entity is a mediator between family and CEO in order to reach consent and not to lose influence on decision-making from family side.

3. *Family Values and Policies*: This is formalized set of rules on family values, shared strategy vision, composition of the board of the directors, succession planning and required qualifications of family members who desire to be employed by family company. To sum up, this set of rules is just like a constitution but not for country but for family where all rights and obligations are discussed in details in order to ensure successful existence of the business and transfer to upcoming generation.

4. *Board of Directors*: In the traditional board of directors family being usually a largest shareholder holds a half of the seats. The board of directors serves for ensuring that company keeps track of chosen strategy in operations, investments and so on.

5. *Obligatory trainings for the family*: These trainings initially are aimed at young family members. As usually all family members are companies shareholders they should have understanding of companies activities regardless of their wish to be employed by family company. On the trainings family members get to know about current strategy, recent deals, market situation, family history and ownership, existing policies. Moreover, such trainings help current family directors to monitor future vision of the company by upcoming generation in order to prepare company for upcoming transformation (HBR, 1998).

1.4 Research on family ownership and corporate performance

All the researches in this field could be divided into 2 groups: family business behavior and performance. Family involvement in management seems to be important because employees by their loyalty to the family could work more efficient and consequently make the company more profitable (Lee, 2006). The performance excellence of family business over non-family business is very ambiguous topic. But the scholars who speak for it highlight that the underlaying reason of better performance is that wealth of family is inseparable from financial performance of the company that's why family does its best to track agent's behavior (Lee, 2006). But there is a lot of downsides of family-ownership: employees not always share "family goals", limited career opportunities as family could bring it representative in top-management, difficult to reach the tradeoff between efficiency and equity, conflicts inside the family and succession issues.

Anderson and Reeb pioneered the research in the field of family business, their work is cited by many scholars. Anderson et al. (2003) studied the correlation between family ownership and companies' financial performance measured by Tobin's Q and ROA on the sample of the companies with family ownership in the S&P500. The data was collected between the time period of 1992 to 1999 on 403 companies excluding banks and utility. The main findings were that the family-owned companies perform better than a non-family one and family active involvement could enlarge market value of the company. Nevertheless, family ownership starts to influence significantly the performance only if ownership of family is around 30%. Moreover, the presence of the family member as a CEO provides better performance than with the outside CEO. Agency cost could be lower in family companies if legal institutions are developed and efficient and markets are transparent (Anderson, 2003).

Lee (2006) followed the same patterns of the Anderson et al. research but focused more on competitiveness and stability of family business. The research was conducted on the sample of 403 American companies in the time period from 1992-2002, so they extended the time period used in Anderson et al. research (1992-1999) and even covered the recession period. The scope of the work was also extended Lee also focused on operational and economic performance (profit margin, revenue growth, employment stability) rather than financial (ROA and Tobin's Q). Lee pointed out that family ownership is of frequent occurrence in manufacturing industry in the USA. Lee came up with the following research results: overall family ownership positively affects business organization; family business tends to extend quicker and be more successful in terms of profit in particularly if the family is really involved in management. Finally, author found out that family-owned companies tend to keep the employment rate stable even during downturn in economy (Lee, 2006).

Allouche et al. (2008) draws attention to the Japanese examples as in the Asia the family ownership is more widely spread. The example of Japan was of great interest for the authors as in Japan the presence of founding-family ownership was a long tradition which began almost in 19th century even before opening of the borders. In 2003 almost 43% of the listed companies in Japan were with family ownership. The analysis was built around financial performance, financial structure and level of family control. The data was taken from 1998 to 2003. Authors found out strong evidence that performance and financial structure of Japanese firm is influenced by level of family control. The main finding of the research is the overall better performance of Japanese companies under family control (Allouche, 2008).

Filatotchev et al. (2005) also conducted the research in the same APAC region, they investigated Taiwanese family-owned pubic companies. Authors examined impact of ownership structure and board characteristic on financial performance using the sample of 228 companies

listed on TSE. Authors assume that due to recent scandals the doubt could be cast on professional managers and bring family values back on stage. As the wealth of the family is tied to the performance of the company family could motivate better the management for work and reduce the problem of free-riders. All this is achieved due to long-term goals of the family. Moreover, family control could appear as the source of advantage and enhance the company value. Authors highlight that for the APAC region the presence of the family on board could be advantage as the leadership style in these countries is relationship-based. Coming the results, authors pointed out the no evidence was found for relationship between family control and financial ratios such as sales per issued capita, EPS, M/B value. But, institutional and foreign involvement in ownership structure is positively associated with better financial results. Finally, separation of board of directors and family is positively associated with firm performance (Filatotchev, 2005).

Gill et al. (2015) conducted a similar research as Allouche (2008) in India. Family ownership is an ordinary occasion for Indian listed companies. Normally, family holds large shareholdings and is presented in the top-management and on board. The analyzed companies were form the S&P BSE 500 index, time period from 2006 to 2010. The main findings were that family ownership and involvement of the family in management is a common case for India. Moreover, the financial performance of those companies is superior. However, the better performance is reached by family businesses with outside board directors. Finally, firm size and unaffiliated block holdings tend to possess a considerably negative impact on financial performance (Gill, 2015).

Jiang et al. (2011) examined association between family ownership and firm performance. The research was conducted on the sample from 744 large family-owned Asian companies (Indonesia, Malaysia, Philippines, Thailand, Taiwan, Singapore and South Korea). Authors investigated the relationship between family CEO, pyramid structure and financial performance. But no relationship was found, so generally, the irrelevant position is supported. However, it should be mentioned that some interesting results were discovered: in Indonesia and Taiwan the presence of Family CEO has a positve influence on performance whereas in Hong Kong it is negative. In Malaysia, Philippines, Singapore, South Korea and Thailand the association is irrelevant. Concerning the second part of the research, authors found out that the consequence of family ownership and control are subject to differences in legal and regulatory institutions that protect (minority) shareholders in various countries (Jiang, 2011).

Wenyi Chu (2011) studied the correlation between family ownership, particularly family management, control and firm size, and financial performance. The sample consisted of 786 listed family companies in Taiwan from 2002 to 2007. Out of 786 observations 418 companies are family business whereas 368 are non-family. Generally, the analysis showed that family business is a

prevalent organization form in Taiwan and average family shareholding of 16.4%. Authors pointed out the positive correlation between family ownership and financial performance. Moreover, he found a strong evidence for stronger influence of family ownership on financial performance with family either CEO or top-management. Besides, the relationship between family ownership and firm performance is more significant if family representative is either chairperson nor director. However, no evidence was found for stronger association of family ownership and financial performance in small over large companies. Firm age, debt in capital structure negatively influence the firm performance whereas firm asset, market share positively influence the firm performance. Founding family ownership positively influences ROA a proxy which was chosen for firm performance measure. If CEO, top manager, chairman of board director is a family member there is strong positive association. Small and medium sized family companies has stronger positive association with ROA than large one (Chu, 2011).

Andres (2008) examined the performance of family business in Germany. Germany is an excellent location for family business because of environment. Approximately 85% companies have one stockholder with voting rights over 25%. For the research the sample of 275 listed firms was collected in the time period from 1998 to 2004. The family-owned companies accounted for 37,5%. The key findings are that family business is more successful in terms of profitability and even can excel non-family business but only if family is either present on the board or in top-management. The significant influence of family on performance is reached only if founder serves as a CEO (Andres, 2008).

Spanish scholars examined first-second combinations of the shareholders in the large family-owned companies in Spain. Sacristan-Navarro et al. (2011) studied the sample of 80 listed non- financial Spanish family companies over the certain time period from 2003 to 2008. Authors studied the dependence of financial performance from the combination of shareholders. Sacristan-Navarro found out that there are certain combinations in the family business in Spain: family and individual (most likely to be first largest shareholder); family and individual (most likely to be second largest shareholder); family and individual and banks; family and individual and non-financial firm; non-financial firm and non-financial firm. However, the association between shareholders combination in family-owned company and firm performance was not found (Sacristan-Navarro, 2011).

Arrondo-García et al. (2016) studied the influence of global financial crisis on the growth, risk-taking and performance of first-generation and multi-generation Spanish companies. In the research 6315 unlisted companies in Spain were used. The found out that first-generation companies underperform the multi-generation companies during the crisis as the first-generation company's debt grew considerably (Arrondo-García, 2016).

Subrata Chakrabarty (2009) focused on the role of culture and institutional maturity as a driver of frequency of occurrence of family businesses. The data derived from 27 countries all over the world. She found out that national culture is strongly associated with if country institutionally underdeveloped. But the impact of national culture reduces if the institutional infrastructure and legal norms are quite efficient. The evidence was found that collectivism culture impacts the degree to which companies have family in their ownership structure. Moreover, the author pointed out that market supremacy of family-owned companies is impacted by countries power distance culture (Chakrabarty, 2009).

Martinez et al. (2007) examined the same issue on the sample from Chile. The sample consisted of 175 public companies listed on Bolsa de Comercio de Santiago stock exchange for almost 10-year period from 1995 to 2004. The majority of these companies in particularly 100 were family-controlled whereas 75 non-family-controlled. Authors tested only one hypothesis and found out strong evidence for excellent financial performance measured by ROA, ROE, Tobin's Q of family firms over non-family (Martinez, 2007).

King et al. (2008) compared not only the financial performance of family-controlled firms but also capital structure. The research was conducted on the sample of 613 firms originated in Canada for 7-year period from 1998 to 2005. Authors ascertained that family-controlled firms with single share class exhibit: same-level performance measured by Tobin's Q as non-family-controlled, excellent financial performance measured by ROA over non-family-controlled and obtain higher financial leverage measured by debt-to-total asset ratio than non-family-controlled. However, the picture changes if family-controlled firm employ dual-class shares: the single difference is lower market valuation measured by Tobin's Q with two other variables stable (King, 2008).

Chu (2009) examined the correlation of family ownership and market performance measured by Tobin's Q and ROA on the sample of 341 listed small-to-medium (small less than 100 personnel, medium 100 to 499 personnel) size firms originated from Taiwan for the 4-year time period from 2002-2006. The Taiwanese region was chosen because of prevailing nature (more than a half) of family business there. Author certified that family-control vitally impacts performance of SMEs in positive way (Chu, 2009).

Arosa et al. (2010) conducted the research on the sample of 586 private companies in Spain in order to shed light on relationship between ownership concentration and performance measured by ROA. Spanish scholars found no evidence for positive association between ownership concentration and firm performance of private companies. However, the association varies depending on generation in charge of family firm (Arosa, 2010).

Villalonga et al. (2006) examined the topic that excites me from 3 different dimensions: family ownership, family control (multiple share classes, pyramids, cross-holdings, and voting agreements) and family management on the sample of Fortune500 for 6-year period from 1994 to 2000. Authors from the Ivy League ascertained that firms have higher value in terms of profitability (measured by Tobin's Q and ROA) only if founder is actively involved into the business operations either as a CEO or as a chairman. If the heirs are in charge of the firm than firm exhibit lower value. Moreover, absence of controlling mechanism facilitates higher value when founder run the company. If it is running by heirs, they will ruin the value no matter of presence or absence of controlling mechanism. However, this is applicable only to 2nd generation as the non-monotonic effect generations on value was found (Villalonga, 2006).

Barontini et al. (2006) studied still the same topic as previous scholars: relationship between family control and performance measured by Tobin's Q and ROA. The research was conducted on the sample of 675 listed Western-European companies from mainland for 2-year period from 1999 to 2001. Authors pointed out strong evidence for higher Tobin's and ROA for family business (both founder-run and heirs-run) comparing to non-family business. If the heir becomes CEO family business performs at least as well as non-family. All in all, presence of family and active involvement does not harm performance (Barontini, 2006).

Maury (2006) dig into the vital question of relationship between family ownership and the market value, profitability. Market value was measured by Tobin's Q, whereas profitability was measured by ROA and ROE. The research was conducted on the sample of 1672 non-financial companies in 13 Western European countries for 3-year period from 1996-1998. The author found out that family ownership brings 7% higher Tobin's Q and 16% higher ROA, however for ROA the required component is active participation of the family in the company via minimum 2 positions in top management. If the family takes passive control position profitability is not different from family-controlled companies (Maury, 2006).

Jara-Bertin et al. (2008) studied how combinations of large shareholders where family is the largest influence the market value. The authors conducted the research on the sample of the 1208 European firms for 4-year period from 1996 to 2000. They draw two conclusions: if the second largest shareholder is an institution the value of the family-controlled company grows. Otherwise, if the second largest shareholders are other family the value of the family-controlled company reduces (Jara-Bertin, 2008).

Gorriz et al. (1996) studied the relationship between family ownership and performance in particularly productivity and profitability on the sample of 81 Spanish listed firms for 42-year period from 1990 to 1991. Authors found strong evidence for higher productivity of family enterprises, but no difference in profitability between family and non-family enterprises. The

underlying reason could be that on average family enterprises have smaller size than non-family in order to reach level on which they can maximize profitability (Gorriz, 1996).

McConaughy et al. (1998) analyzed association between family ownership and performance in particularly efficiency and value on the sample of 219 American companies for 2-year period from 1986-1988. Authors ascertained that family companies wither run by founder or heir are more efficient and has higher valuation than non-family. Comparing two types of family companies, founder-run and heir-run, authors found that the latter one is more efficient. Moreover, in the group of founder-run family companies it was concluded that companies ruled by younger in age people has higher efficiency than companies ruled by older person (McConaughy, 1998).

Pedersen et al. (2003) examined the influence of various largest shareholders on firm performance measured by market-to-book ratio. The research was done on the sample of 214 European firms for 1-year period. Authors concluded that: if the largest shareholder is either a financial institution or other corporation the market value grows. If family or just an individual in the largest shareholder there is no significant impact on performance. Finally, if government is largest shareholder there is negative association between ownership concentration and firm value. Overall, this research proved that owner identity matters in case of firm performance (Pedersen, 2003).

Lauterbach et al. (1999) analyzed association between ownership structure and companies efficiency measured by net income divided by the optimal net income calculated om efficient frontier framework on the sample of 280 listed Israeli companies for 2-year period from 1992 to 1994. Authors pointed out family companies with owner as a CEO are 30% less efficient than family companies managed by professional outsider. All in all, the family company managed by family is the worst case in efficiency comparing to other types of studied companies: family company with professional manager, family company managed by partnerships. From point of view of the authors, the best ownership structure in within the framework of the performance is company with diffuse ownership and managed by professional manager (Lauterbach, 1999).

Of course, family ownership is always associated with longevity, Perez-Gonzalez (2006) examined relationship of succession issues particularly heirs as a CEO and firm performance measured by operating profitability and market-to-book ratios. He examined this topic on the sample of 335 American companies. He found strong evidence for worse financial performance of the family companies with heir by blood or marriage as CEO comparing to family companies with professional CEO. The underlying reason be nepotism which limits the choice of well-qualified candidates. (Perez-Gonzalez, 2006).

Barth et al. (2005) examined the association between family ownership and firm productivity measured by total factor productivity ratio calculated via Cobb-Douglas production

function. TFP was chosen by the authors instead of familiar operating profit because of the manipulation issues. The research was conducted on the sample of 438 Norwegian firms in 1996. Authors drew a conclusion that family-controlled companies have lower TFP than non-family-controlled, the difference comprised for 10%. The underlying reason could be peculiarities of family governance. However, if the family company is governed by outsider decreased productivity is no more a problem, such family companies perform on the same production level as non-family. The underlying reason could be on average better experience of outsider as he/she was hired because of this. Talking about family companies with family involved in active governance (CEO or chairman), these companies much worse measured by TFP than non-family rivels, the difference comprises for 14%. It could be explained by the limited choice opportunities in the family, so it is a hard task to find appropriate CEO, chairman in the family (Barth, 2005).

Pacheco (2019) studied the association between family ownership and firm performance measured by ROA, REBITDA and REBIT. The research was conducted on the sample of 117 Portuguese wine companies in the time period from 2011 to 2016 year. Author came to the conclusion that there is U-shaped association between family power in particularly percentage ownership and participation of the family in board of directors and performance. Moreover, better performance of the company could be reached if the entire top-management is comprised of family representatives. The profitability of the company is decreasing if presence of the family in the board of directors is increasing from 0% to 47%. However, if family comprised more than 47% of the board the profitability recovers and starts to increase. Moreover, the negative correlation between debt and profitability was found which acknowledges one of the peculiarities of the family ownership the desire to minimize debt in order not to take a lot of risk in order to keep the company for next generation and unwillingness to lose control (Pacheco, 2019).

Savitri (2018) examined influence of family ownership, agency cost, business strategy on performance measured by ROA and ROE. The study was carried out on the sample of 143 public Indonesian companies from 2007 to 2014 years. Indonesia is striking example of family ownership as one third of manufacturing companies are family companies usually with pyramid and cross family ownership. The author found out that business strategy acts as a middle between percentage of family ownership and financial ratio. All in all, family ownership influences performance and family-controlled companies are eager to reach better results in performance by enhancing five competitive advantages such as family control, absence of information inconsistency, feasible minority shareholders, entrepreneurial behavior and strong investment plans (Savitri, 2018).

Schank et al. (2017) studied the impact of family ownership of performance measured by ROA and ROE. The main concern was examination of superior performance of family-controlled companies over non-family-controlled companies. The research was carried out on the sample of

1161 Romanian companies and 1342 German companies in the time period from 2008 to 2015. The authors found that family ownership is irrelevant for performance in Romania, but has positive association in Germany. The outlying reason for this are drastic differences in infrastructure development of two European in terms of stability of the economy and maturity of the family firms. Concerning other traditional control variables such as size, age, capital structure, leverage negative association was discovered which is applicable for both countries (Schank, 2017).

Tang et al. (2017) focused in estimating differences in financial performance of family-controlled and non-family-controlled companies measured by ROA and ROE. The study was carried out on the sample of 2528 public Chinese companies in the time period from 2003 to 2014 in China. The main question which was studied was superior performance of family over non-family companies, as number of companies with family in its ownership structure is rapidly rising in China. Authors determined that family-owned public chinese companies perform better than non-family, their ROA is 13,23% higher compared to non-family companies. Moreover, concerning the types of owners of family companies' clan-controlled companies perform better than family-controlled and individual-controlled companies. Finally, in the family companies if CEO and chairman are different people performance is far better than if it it the same person. However, authors pointed out that Chinese family companies are still not mature and seldom have 2nd generation in top-management so do not face succession problems which can really hamper financial performance (Tang, 2017).

Nikolov (2017) studied the role of agency cost as a mediator in family companies to better financial performance measured by ROA and BHAR. The research was conducted on the sample of 2000 companies from COMPUSTAT in the time period from 2001 to 2010. The author ascertained that family companies which inject capital into research and development and advertising exhibit better performance in terms of accounting and market ratios due to consistent long-term strategic planning and accurate management which is associated with sunk agency cost. Moreover, Nikolov highlights that the findings are consistent even after the family decreased its share due to initial public offering process (Nikolov, 2017).

Minichilli et al. (2016) contributed to the research of financial performance, estimated by ROA and ROE, of the family-controlled companies during economic crisis and right after in the recovery time. The research was carried out on the sample of 2696 italian listed companies from 2002 to 2012, 288 out of 2696 are family-controlled companies. Due to authors findings family-controlled companies experience better performance during economic downturn comparing to non-family ones. Moreover, family companies with CEO from family and low level of family ownership have better performance during crisis. However, it should be mentioned that during the years without crisis there is no distinguishment between family and non-family-controlled

companies in Italy. So, the superior performance during crisis outlines better company malmanagement in resilience terms (Minichilli, 2016).

Adhikari et al. (2016) investigated post-M&A performance, measured by BHAR, of the family companies. The research was conducted on the sample from Standard&Poor 500 from 1992 to 2006, only considering finalized M&A deals. Adhikari et al. ascertained that post-acquisition family-controlled companies better perform better than non-family ones. The average BHAR for family players is 17% higher comparing to non-family ones. Moreover, due to derived results the author assumed that the agency problem, going on between shareholders and professional managers, is graver for non-family-owned companies than for family-owned companies. Finally, despite the well-established belief that family companies are chasing only for the increase of family wealth ignoring company goals authors claimed that on average family companies do not follow value-destroying strategy when making M&A deals (Adhikari, 2016).

Recently the topic of environment issues became more and more popular among scholars and scope of scholars in the field of family business shifted from financial performance towards environmental performance. Cordeiro et al. (2021) examined the attitude of the investors to environmental performance disclosure. The research was conducted on the dataset derived from 1st outlet of Newsweek "Green Rankings", 500 largest companies in the USA, in 2009. The authors found out the positive relationship between extent of investor reaction and environmental ratings, depicting environmental performance, especially in family-controlled companies. Such strong reaction of investors is explained by the authors in the following way for the investors family is associated with trust so that's investor strongly believe that family is involved in environmental investments not because of family value creation but because of companies' goals, moreover it should be remembered that family-controlled companies are well-known because of its long-time horizon projects and resilience. Moreover, the correlation between environmental ratings and investor reactions is much stronger in heavy polluting industries for family-controlled companies. Furthermore, authors assume that the agency problem between family and minority stockholders is not severe in environmental activities investments (Cordeiro, 2021).

Miller et al. (2007) in contrast to other recent studies which found out positive association between family ownership and company's performance came to the conclusion that such researches are always influenced by the family firm definition and sample's origin. Authors investigated two samples: Fortune 1000 and 100 random listed companies. Authors pointed out that family- controlled companies on no occasion excel non-family-controlled in performance in the Fortune1000 sample. Only entrepreneurial companies run by founder excel non-family, however, authors cast huge doubts whether such kind of business could be named family-controlled as actually it is controlled by founder-entrepreneur. On the random sample no evidence

was found for the excellence of family business either family (classic definition) nor founder ran (Miller 2007).

Gupta et al. (2017) investigated relationship between family ownership and accounting and market performance measured by ROA, ROE, Tobin's Q and market capitalization. The research was conducted on the sample of 1100 Indian companies from 2007 to 2014. Out of 1100 companies 965 are family-controlled and 135 are non-family-controlled. The author based on the regression analysis draw a conclusion that family-owned companies act worse in terms of financial performance than non-family-owned companies. Moreover, authors found out the strong negative association between level of ownership and accounting and market performance. Such results are explained by the author by nepotism, entrenchment, family feuds phenomenon which are wide spread in India (Gupta, 2017).

Dow et al. (2016) examined performance, estimated by Tobin's Q, of family-controlled companies worldwide using national environment, expressed as capital market environment, investor protection and culture, as mediator. The research was conducted on the sample of 24083 companies worldwide from 2005 to 2010 year. The authors discovered that the market performance of the family-owned companies is worse compared to non-family-owned. The underlying reason presented by authors was vast differences in legal infrastructure, especially corporate law and investor protections and local culture in the sample which was comprised of companies from 33 countries. So, the inevitable influence of the national environment on market performance of family companies was detected (Dow, 2016).

Beuren et al. (2016) studied relationship between family ownership and financial performance, measured by ROA and Tobin's Q. The research was conducted on the sample of 187 Brazilian companies from the economic sector "Financial and Others" from May to September 2012. The authors found out that family companies in Brasilia perform worse than non-family ones. The reason highlighted by the authors for this result was nepotism, misalignment of family and company goals, limited talent pool in the family and high wages for the family representatives. Moreover, they detected the influence of level of family ownership on the performance. The family company tends to produce the best performance when level of family ownership comprises 60% and 70% (Beuren, 2016).

Chapter 1 conclusion

The family business is not simple as it seems from the first glance. Combination of family relations and business puts a lot pressure on the family as they should always prioritize either business or family. That's way corporate governance of such companies should be adjusted towards family pain points such as feuds, multiple family branches, succession planning, increased

number of family members and generations. Extensive literature showed that family ownership matters, family companies could outperform non-family companies, family ownership influences accounting and market performance. The topic is becoming now more and more popular in the academic and business field. Thus, EY in collaboration with HSG developed FBI500, the index of 500 family enterprises ranked by revenue globally. However, this topic is still ambiguous, but in chapter 2 I will test dataset in order to discover if family ownership still impacts financial performance of automotive companies.

CHAPTER 2: EMPIRICAL STUDY

In the previous sections the theoretical background was described in order to compose my own model for this research. The goal of this master thesis is to identify the relationship between family ownership and financial performance of the listed companies from automotive industry. This chapter will provide an overview on research and empirical study. The first part of the chapter is dedicated to overview automotive industry and current trends with challenges occurred during COVID-19. The second part presents mini cases from automotive industry. The third part provides research model overview. In the following part the sample is discussed in details. After that the empirical results and further discussion is presented. Finally, practical and theoretical implications are elucidated.

2.1 Industry overview: Contemporary trends and challenges

For the research the automotive industry was chosen. The reason for choice was because of the presence of developed family businesses there and that automotive industry lies in the field of my interest. As I will show in the section 2.2 automotive industry already obtains a lot of interesting players with long family history. As it is production industry, presence of a lot of tangible and intangible assets is required and barriers of entry are quite high. That's why I made the assumption that because one of the benefits of family ownership which is family asset (deep understanding of industry, networks, trust and reputation, financial sources) the industry could be intensified with family companies. In order to understand better the market where family-controlled companies work, the industry overview is presented below. In 5-year, time period from 2015 to 2019 the global market value of automotive industry experienced fluctuations (fig. 8.). Rocketing from 1539 to 1655 billion USD from 2015 to 2016 respectively, started to decrease steadily afterwards and reached 1604 billion USD in 2019. The CAGR accounted for 1%.
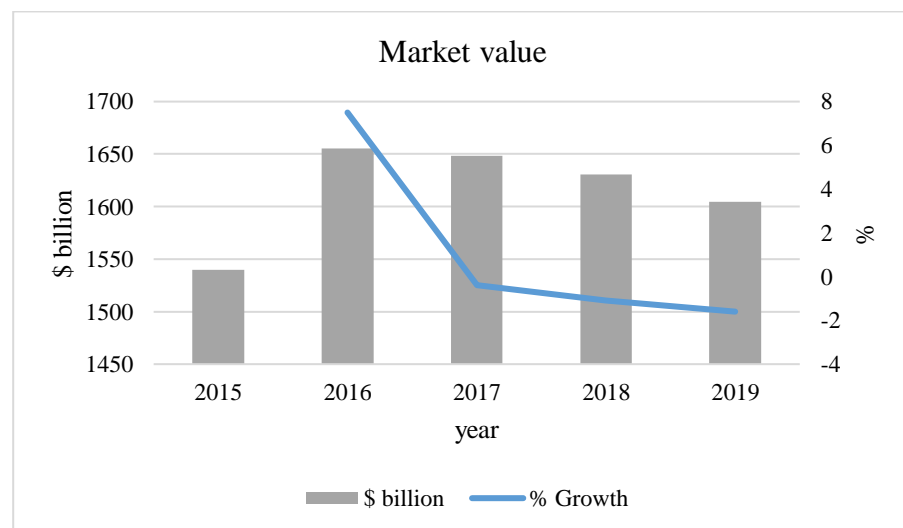

Fig. 8. Market value (global)

Source: (MarketLine, 2020)

Starting from 143,5 million units in 2015 the market volume peaked in 2017 comprising for 154,5 million units (fig. 9.). Afterwards the annual market volume decreased reaching bottom of 146,4 million units in 2019. The CAGR accounted for 0,5%.
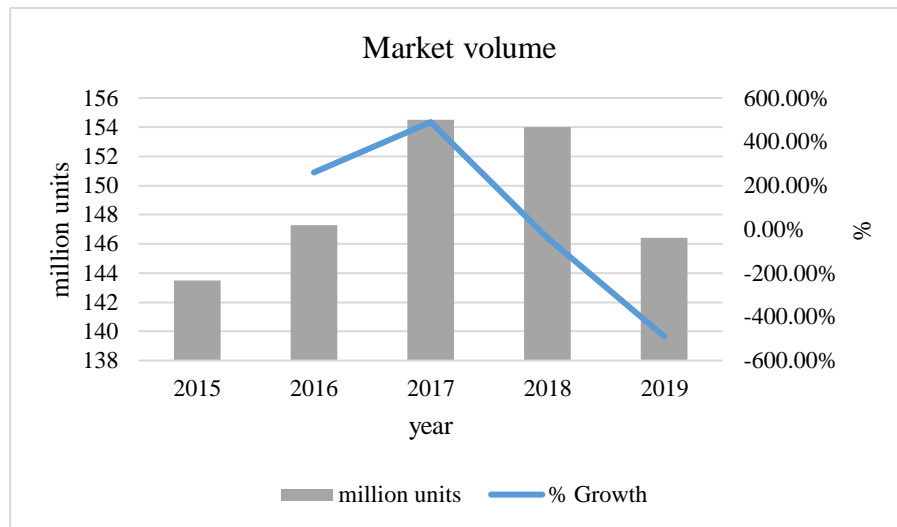

Fig. 9. Market volume (global)

Source: (MarketLine, 2020)

As it could be seen from the pie chart below that car manufacturing is the largest category in the industry accounting for 63,6 million units in 2019 (fig. 10.). Motorcycle manufacturing takes also significant part of market volume comprising 57,6 million units in 2019. Finally, truck manufacturing takes the rest accounting for 25,2 million units in 2019.

Fig. 10. Category segmentation
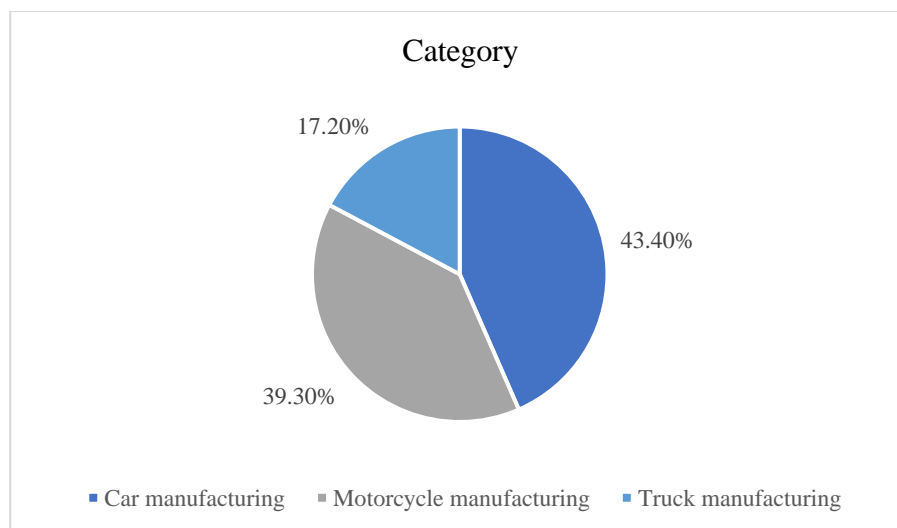
Source: (MarketLine, 2020)

Asia-Pacific region takes almost a half of the market volume of automotive industry accounting for 892.7 billion USD in 2019 (fig. 11.). One fifth of the market volume takes Europe comprising for 339.9 billion USD in 2019. The automotive market volume in the USA in 2019 was 210 billion USD. Middle East has the smallest market share of the market volume having 3.5

billion USD in 2019. The rest of the world market value accounted for the 158.4 billion USD in 2019.
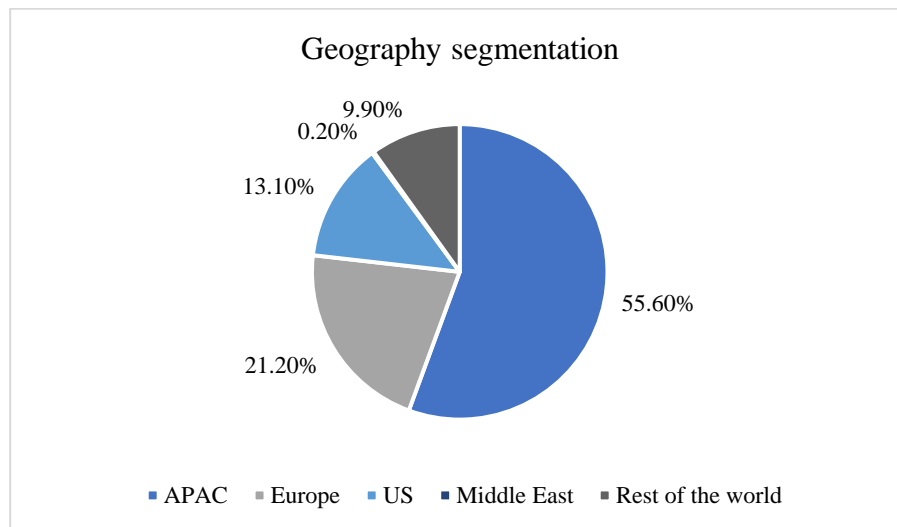

Fig. 11. Geography segmentation

Source: (MarketLine, 2020)

The key players of the industry are well-known by the public due to long history of operations. Toyota Group, Volkswagen, Hyundai Motor Co and General Motors are shaping the industry being leading players having produced 14.2%, 14.1%, 5.4%, 4.5% of all cars manufactured in 2019 respectively. Vehicle manufacturers invest heavily into R&D in order to survive in the industry. Strategic alliances are widespread strategy for leading players which allows to have access to technologies, intellectual property of the partner and share own. So, the main outcome of alliances is derived economies of scale for partners. For example, Toyota is collaborating with Suzuki in research and development of autonomous vehicles and with Mazda and Denso in research and development of electric vehicles. Ford and Volkswagen established a partnership for manufacturing of vans and pick-ups and research and development of autonomous and electric cars. The alliances are even more important because tech giants such as Google and Apple are also trying to disrupt industry with fully autonomous car. Moreover, due to increased effort into developing autonomous cars software suppliers became first tier suppliers to vehicle manufacturers. Focusing on the electric vehicle market it should be mentioned that already the majority of vehicle manufacturers have electric vehicles in its portfolio because of increased demand triggered by governmental initiatives in order to decrease emission and prevent climate change. The electric vehicle market is growing with CAGR of 23,5% from 2015 to 2019 (MarketLine, 2020).

The COVID-19 pandemic had severe impact on the automotive industry. The new car sales in March 2020 decreased by 46%, 46%, 39% comparing to 2019 in China, European Union and the USA respectively (BCG, 2020c). On average, each week of factory shutdown in Europe cost

vehicle manufacturer 8 billion euro. The week closure of factory cost 7,5 billion USD for American player (Kommersant, 2020). The long shutdowns influenced the decisions of vehicle manufacturer to decrease research and development expenses and leave unprofitable markets. The analyst from Passport divided the effects from COVID-19 into two groups: supply and demand side. The main issue for supply side was disruption of supply chains worldwide because of shut-down of manufactures. The main outcomes for automotive industry because of long-term shut-down of manufactures were decrease of investments in innovations, development of better supply chain management in order to provide more flexibility, decreased capacity preventing supply chain disruption. The driver for demand side was characterized by downturn in economy and shifting consumer behavior. The main influences for demand side, which were highlighted by the analysts were long recovery period for demand, preference of personal transport instead of public, EV popularity in upcoming future (Passport, 2020).

PWC conducted an extensive research on future trends of automotive industry and outlined that future car will look like as follows:

1. *Electrified:* the environmental issues become burning forcing the market to produce emission-free cars. Moreover, focus of many countries towards renewable energy results in establishment of carbon dioxide-neutral mobility policies. So, the electric vehicles will be a worldwide initiative.

2. *Autonomous:* development of machine learning, artificial intelligence, Industry 4.0. accelerated the development autonomous vehicles. Leading car manufacturers and tech giants are making attempts in this field already. Autonomous vehicles require no human actions at all.

3. *Shared:* car sharing services is already introduced in the major big cities. Car sharing is one of the striking examples of sharing economy which will become more and more popular in the upcoming future. Launch of the autonomous vehicles for the public will accelerate car sharing service growth.

4. *Connected:* enhancement of the car systems and connection will allow the cars to communicate with each other in the traffic jam in order to eliminate traffic jams or report severe accidents. Moreover, connection will allow the passenger to stay tuned and receive up-to-date information and chat with friends, work or relax.

5. *Yearly updated:* the model cycle will decrease in the future due to permanent innovations. The car will be more associated worth hard and software than as with engine. On average modern cars are updated 5 to 7 years, this number will decrease to 1 year in order to incorporate the newest updates into hard and software.

All in all, according to PWC analyst opinion the experience with the car will become simpler, less dangerous, inexpensive and more convenient (PWC, 2018).

2.2 Mini cases: family ownership and performance of companies from automotive industry

Mini case 1: Volkswagen AG

Volkswagen AG is one of the striking examples of the family ownership in automotive industry. The largest shareholder (52,2%) of Volkswagen is family holding company Porsche S.E. which is wholly owned by Porsche and Piech family. Ferdinand Porsche as an engineer stood at the origins of Volkswagen which was initiated as state-owned company aiming to produce affordable cars in 1937. However, after second world war Ferdinand Porsche lost control over Volkswagen and founded his own car brand Porsche. By the time of his death in 1951 his children, Ferry Porsche and Louise Piech, also worked in the company inheriting equal stakes in Porsche. Both siblings had strong personalities creating competitive landscape and contributing a lot to the company. Afterwards the son of Louise Ferdinand Piech became a shining star in the Porsche being ambitious to become a CEO one day. Despite his contribution to the development of Porsche 917 and win of Le-Mans race in 70th he was treated as outsider in the family being Piech not Porsche. From this point the disputes between two family branches started and became more severe. So, usually in the second generation the separation of the ownership and management happens and Porsche was not an exception because of the permanent family feuds about leading positions. In 1972 Ferry Porsche prohibited the family to work in top-management leaving the opportunity to have a seat in the supervisory board. Because of that Ferdinad Piech left Porsche and build his incredible career in Audi and VW reaching the positions of CEO and chairman afterwards. Under his control Audi became a premium brand and Volkswagen increased quality, model range and production volume. Ferdinand Piech is recognized as one of the most influential persons in the automotive industry shaping it throughout his career (Porsche AG, 2020; Wimmebruecker 2017).

In 2008 Porsche Piech family finally attempted takeover of Volkswagen as the company was built on the idea of their ancestor and the family felt personal commitment. The Porsche branch of family pioneered the buyout of the Volkswagen shares in 2005. However, when the crisis happened, they could not continue due to liquidity problems. Afterwards two branches of family joined forces and two companies, Porsche and Volkswagen, merged instead of take over. Porsche Piech family established holding Porsche S.E. which was initiated by Porsche AG in 2007. The holding is wholly owned by the family. Around 60 family members are united in the holding having one voice through its holding company. The holding structure allows not to dilute family

stake and align family goals with firm strategy by providing one opinion from the whole family (Grah, 2019). Due to German corporate law family has 5 seats in the supervisory board being the largest shareholders (52,2%), Lower Saxony (20.0%) has 2 seats, Qatar Holding (17.0%) has also 2 seats and three seats are hold by labor workers (VW, 2017).

However, being the family-owned company, Volkswagen AG and parent company Porsche S.E. experience several cases which are possibly hampering their performance. First of all, it is disputes between two family branches, Porsche and Piech, which has led to the separation of ownership and management in 1972, but the holding structure of parent company was attempting to solve this issue by uniting family members voices to one voice through the holding company. Just after the acquisition huge disputes about leading positions between Ferdinand Piech and Wolfgang Porsche arise. Being chairman and having brutal leadership style Piech defended his leading position. However, now the things are changing and Porsche and Piech branches are coming to partner leadership style. Thus, Hans-Peter Porsche, one of the directors, provided power to Porsche family member, Peter Daniell Porsche, as well as Piech family member, Stefan Piech. (Wimmelbuecker, 2017; Reuters, 2018).

Secondly, Porsche Piech family is already presented in the company by 4th generation, 8 people are taking leading roles in the supervisory boards. The increase of number of generations and family members leads to creation of more and more family branches leading to increased number of family feuds. Moreover, increase of the number of family members harms personal commitment and attachment towards the company by preferring personal interest and focusing on personal welfare, thus abandoning the long-term strategic tasks of the company (Reuters, 2018).

Thirdly, the nomination of incompetent family members is still an issue for Volkswagen supervisory board and all other car brands, which are owned by Volkswagen, supervisory boards. So, Ursula Piech, former kindergartner teacher, Stefan Piech, head of entertainment company, Christian Porsche, doctor, Stephanie Porsche-Schröder, designer, are the examples of directors whose personal background do not match with companies' activities. All this is a big question mark about the value they could provide to the company with having poor understanding of vehicle manufacturing and inappropriate background in different fields (N-TV, 2019; Schneider, 2013).

So, all this shows importance of family-oriented corporate governance in such as companies as Volkswagen as family feuds, lack of emotional attachment, allowance of incompetent family members in management or board can have severe consequences for the company. The tradeoff between family welfare and firm value should be found. If one of this becomes more important either the company of the family will be destroyed.

Mini case 2: Ford Motor Company

Ford is another well-known example of family ownership in the automotive industry. The company was initiated by Henry Ford. He pioneered the production of affordable cars changing the perception of the car from luxurious attribute to affordable mean of transport. His moto is well-known by each management student: "Any customer can have a car painted any color he wants so long as it is black" (Ford, 1922).

The company is already run by 5th generation of Ford dynasty. The majority of family members are just beneficiaries of the trust enjoying dividends; however, some members built their careers inside the company. Edsel B.Ford II is one of the directors in the board since 1988. William Clay Ford Jr is executive chairman since 1999 and one of the directors since 1988. Elena Ford does not hold board seat but is a Vice President in the company since 2013 (Ford, 2019).

In the 1987 in order not to dilute family stake all family shares were put into the trust. The family members are not allowed to sell their shares to outsiders and if they want to leave, the sale of the shares to other family members is only possible solution. The beneficiaries of Ford trust are 101 family members. The Trust holds 70,78 million class B shares which have 100% of voting rights for any M&A, sale, or liquidation deals. If the class B shares are sold to individual who does not belong to the family the class B shares are converted into common stock. If the family member wants to leave the trust makes the buyout procedure. All in all, unless trust holds 60,7 million Class B shares the family has 40% of voting rights. If the number of owned shares by trust decreases to 33,7 million the voting power account for only 30%. Finally, if the amount is less than 33,7 million shares special voting privileges exist no more for the family. All these rules were created when the company went public in 1956 (The New-York Times, 2000). Trust ownership structure for the families is quite widespread as it executes the most important role to prevent dilution of ownership and keeps firm in the family. The key benefits of the trust are legal defense of the assets from the bankers, governmental authorities and family feuds; preservation of interest of youngest family members as trust resolves timing and distribution issues (Fan, 2020).

2.3 Research model

The empirical research model is based on the following regression models (1) and (2):

$$ROA_{it} = \beta_0 + \beta_1 * family\ variables_{it} + \beta_2 * control\ variables_{it} + \varepsilon_{it} \qquad (1)$$

$$Tobin's\ Q_{it} = \alpha + \beta_1 * family\ variables_{it} + \beta_2 * control\ variables_{it} + \varepsilon_{it} \qquad (2)$$

There are two dependent variables (table. 1.) which indicate financial performance measured by ROA and Tobin's Q. There are two vectors i and t, where i presents company and t time period. The vector i varies from 1 to 31. The vector t varies from 1 to 5. So, vectors of

dependent variable ROA and Tobin's Q show observation for each i firm in t period. The vectors of independent variable *family* show family variables for i company in t period. The vectors of independent variable *control* show company characteristics for i company and t period. β_0 is unknown scalar quantity. β_1 and β_2 represent estimated coefficients for previously described independent variables. ε_{it} is random error term.

<div align="right">

Table. 1. Dependent variable

</div>

Dependent variable	Description	Source
Return on assets$_{it}$	Net income divided by total assets in i company in t period	(Anderson, 2003) etc.
Tobin's Q$_{it}$	Market capitalization divided by total assets in i company in t period	(Andres, 2008) etc.

ROA and Tobin's Q both represent financial performance of the company (table. 1.). However, ROA belongs to accounting ratios and Tobin's Q to market ratios. Both these ratios are key dependent ratios in the majorities of studies for family enterprises performance discussed in chapter 1.

<div align="right">

Table. 2. Independent variables

</div>

Independent variable	Description	Source
Family variables		
Family_ownership$_{it}$	Percentage of ownership by founding family in i company in t period	(Gill, 2015) etc.
Family_generation$_{it}$	Number of generations who are already onboarded into family business in i company in t period	(Miller, 2007) etc.
Family_board$_{it}$	Percentage of directors that are members of the family in i company in t period	(Gill, 2015) etc.
Family_chairman$_{it}$	Dummy variable which is equals to if: =1 if family member is chairman =0 if another individual is chairman in i company in t period	(Anderson, 2003) etc.
Family_ceo$_{it}$	Dummy variable which is equals to if: =1 if family member is CEO =0 if another individual is CEO in i company in t period	(Chu, 2011) etc.

Control variables		
Control_size$_{it}$	Natural logarithm of total assets in i company in t period	(Andres, 2008) etc.
Control_age$_{it}$	Number of years since establishment in i company in t period	(Villalonga, 2006) etc.
Control_growth$_{it}$	Net sales of t year divided by net sales $t-1$ year (subtracted by 1 and multiplied by 100 in order to have percentage) in i company in t period	(Barontini, 2006) etc.

The most interesting and up-to-date variables were chosen in order to enhance the regression model (table. 2.). ROA, Tobin's Q, family ownership, generation, family board, chairman, CEO, firm size, firm age, growth of sales were derived from Orbis database, annual reports and articles in the internet for each year from 2015 to 2019.

2.4 Sample and data description

I obtained my data from Orbis database. The data by the NACE code 2910 was downloaded from Orbis database. 2910 is manufacturing of motor vehicles which include manufacture of passenger cars, manufacture of commercial vehicles, manufacture of buses, trolley-buses and coaches, manufacture of motor vehicle engines, manufacture of chassis for motor vehicles, manufacture of other motor vehicles, ATVs, go-carts and similar including race cars (Eurostat, 2008). Overall, the sample comprised for 187 public companies. After that each company in the sample was carefully checked for presence of family ownership. 119 companies had individual or family in its ownership structure, however, only 31 company appeared to be family owned due to used criteria (Appendix 1). The criteria I used was is based on the study of different researches in the previous chapter. In this paper the company would be considered as family owned if: is owned by 2nd and more generations and family holds at least 10% stake (EY, 2019; Sacristan-Navaro, 2011). The observation period for this sample was decided to be 5 years (2015 to 2019), so overall there are 155 observations in the sample.

The descriptive statistics was retrieved from Stata software.

Table. 3. Descriptive statistics of dependent variables

	Mean	**Std. Dev.**	**Min**	**Max**
ROA	5.334149	11.4366	-61.387	87.883
Tobin's Q	1.068517	1.571848	0.068	10.526

The average return-on-assets comprised for 5.34% with minimum and maximum varying from -61.39% to 87.88% respectively (table. 3.). The average of ratio Tobin's Q accounted for 1.07 with minimum and maximum varying from 0.07 to 10.53 respectively.

Table. 4. Description statistics of independent family variables

	Mean	Std. Dev.	Min	Max
Family_ownership	43.62884	16.32566	10.34	73.2
Family_generation	2.729032	1.008469	2	6
Family_board	17.27292	11.77221	0	50
Family_chairman	0.5677419	0.4969956	0	1
Family_ceo	0.316129	0.4664711	0	1

In my automotive sample the ownership stake of family in the company varied from 10.34% to 73.2% (table. 4.). The average was 43.63% which is quite high possible being a peculiarity of family ownership in the automotive industry. The onboarding generation of family was minimum 2 and maximum 6. The average accounted for 2.73. The presence of the family in the board directors varied from 0% to 50% with average comprising 17.28%. The variable family chairman and family CEO were binary variables accepting the value of 1 if this person was from family and 0 if not. The average for family_chaiman was 0.57 and 0.32 for family_ceo.

Table. 5. Description statistics of independent control variables

	Mean	Std. Dev.	Min	Max
Control_age	66.80645	34.23128	17	153
Control_size	14.42313	2.799406	8.156597	20.12233
Control_growth	4.150542	22.15979	-51.59877	107.3565

The first control variable firm age varies from 17 years to 153 years (table. 5.). The average age of the listed company from my automotive sample accounted for 66.8 years. The size of the company which was measured by natural logarithm of total assets differed from 8.16 to 20.12 with the average of 14.42. Finally, last control variable growth which presents by itself the growth of net sales year over year differed from -51.6% to 107.36% with the average of 4.15.

In the majority of the company's family owns 40-60% which was quite surprising but could explain Volkswagen success as the goals of family are aligned with company goals which results in high influence on decision making which could not be reached without high stake (fig. 12.). Moreover, there is little fluctuations in ownership over years as families tend not to dilute their stake in order to keep control.
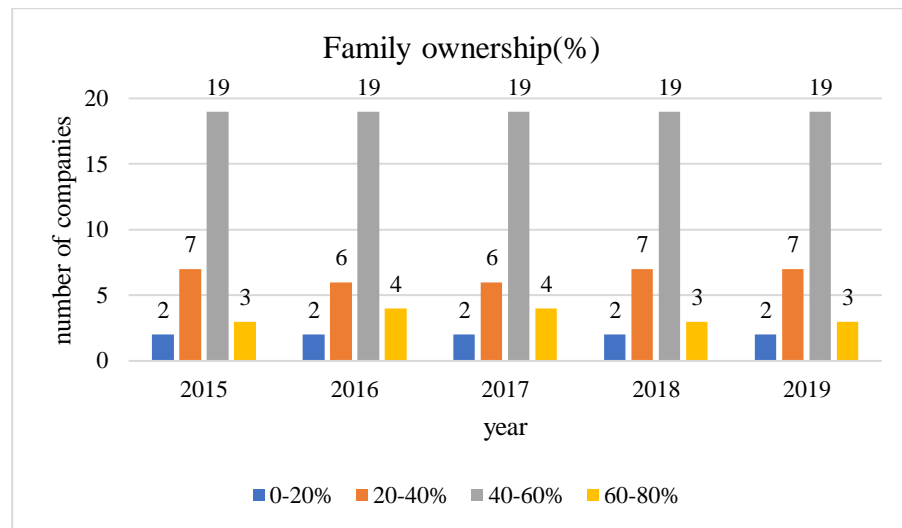
Fig. 12. Family ownership

As I looked on the companies with at least 2nd generation. The overall result is not surprising that the majority of the companies were established from 1945 and 1988 (fig. 13).
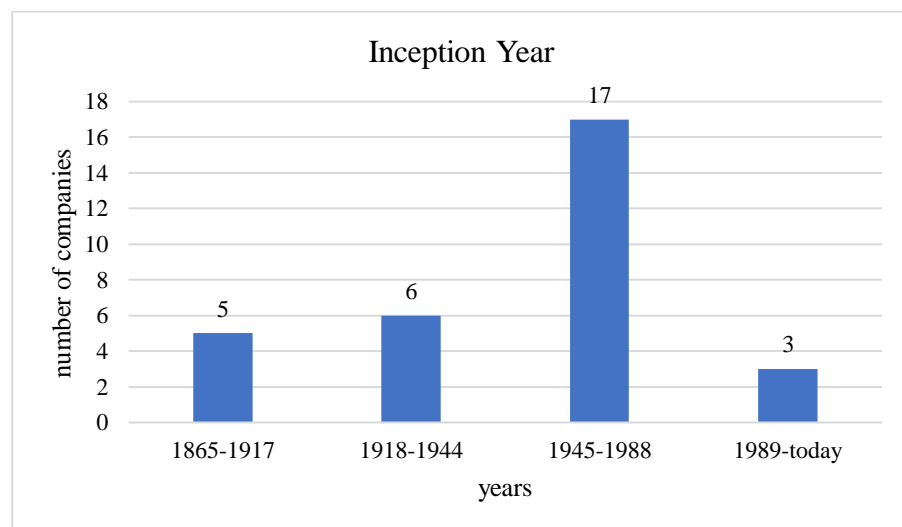
Fig. 13. Inception year

The significant amount of the companies is run at the moment by the 2nd generation as it still easy to remember roots (fig, 14.). Usually at the stage of 2nd generation the professionalization of management takes place. Moreover, the crucial step is 3rd generation when company either survives or goes bankrupt.
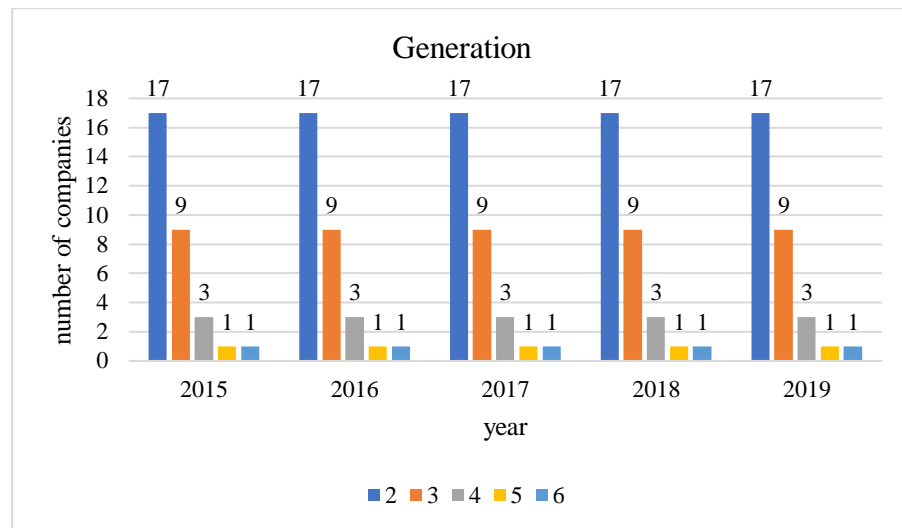
Fig. 14. Generation

In the majority of companies family possess less than 20% of seats in the board of directors. This could be explained by introduction of family boards and constraints for supervisory board due to professionalization of the management (fig. 15).
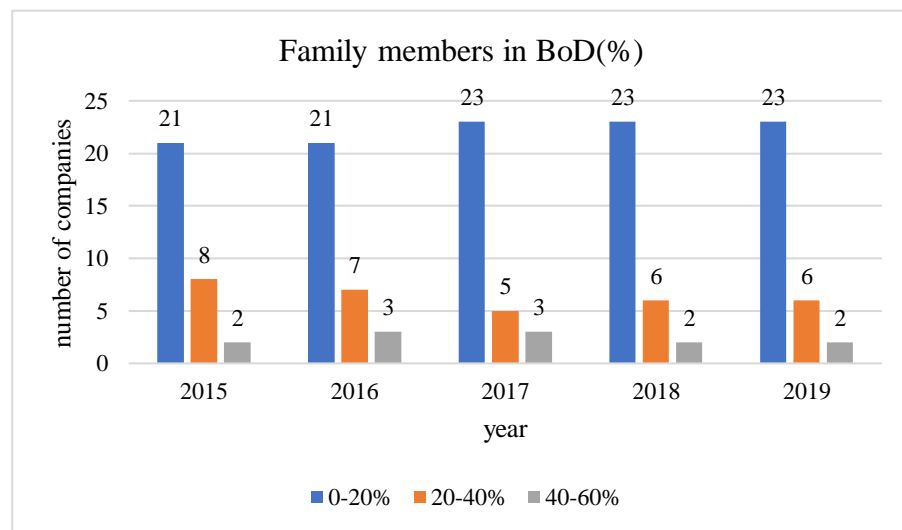
Fig. 15. Family involvement

However, family is still likely to have a family member as a chairman. Almost in a half of the cases chairman in my dataset was from the family (fig. 16).
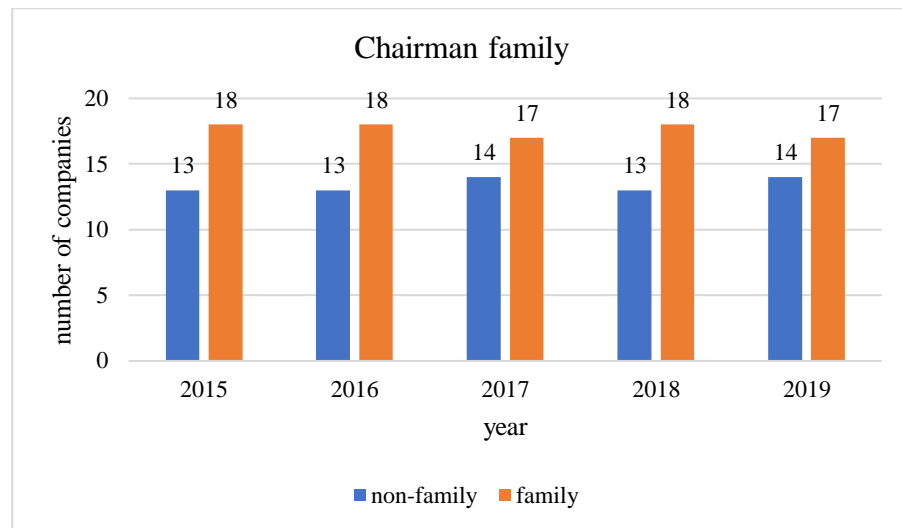
Fig. 16. Chairman

Nevertheless, keeping place for family representative as a CEO is less likely due to talents limits in the family and need to bring the most capable person on board (fig. 17).
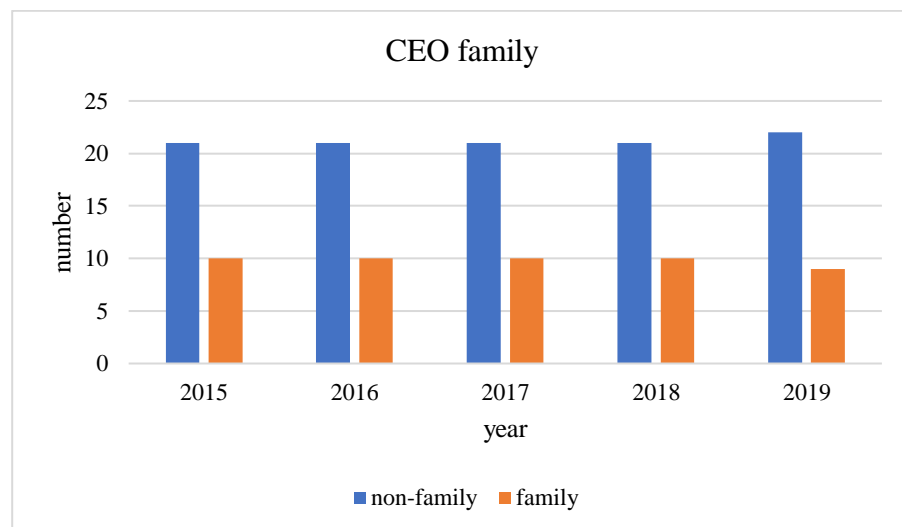
Fig. 17. CEO

2.5 Empirical results and discussion

I proceed with empirical analysis of obtained data with the help of Stata software. In order to control the robustness of the model the Pearson correlation matrix (Appendix 2) was built and multicollinearity test (Appendix 3) was conducted. The Pearson correlation matrix showed that none of the correlation coefficients between variables regardless the sign exceed 0.7. This indicates that only weak and moderate correlation between variables is presented in the sample allowing to take the next step regression analysis. Moreover, in order to exclude the multicollinearity which

could severely hamper the sample the test was conducted. All the regressors are compliant with the rule of thumb that VIF for regressor could be maximum 10 of lower.

The sample has both different parameters and different time periods so this is panel data which has its peculiarities when testing. The panel data methodology is assessed using three different regression models: pooled model, fixed effect model and random effect model. In the pooled model the main idea is that slope and intercept are constant across objects and time periods. In the fixed effect model all the parameters, excluding intercept are constant across objects and time but intercept varies across objects. Finally, random effect model differs from the previous models by the fact that intercept varies across objects and time periods.

In order to find correct regression technique, the Breusch-Pagan test, F test and Hausman test were conducted. The Breusch-Pagan test showed the rejection of null hypothesis about pooled model, illustrating that random effect model would be more correct than pooled for both models (Appendix 7). The Hausman test led to the rejection of alternative hypothesis and to the conclusion that random effect model would be more correct than fixed effect model for model 1 (Appendix 6). The Hausman test led to the rejection of null hypothesis and to the conclusion that fixed effect model would be more correct than random effect model for model 2 (Appendix 6). Furthermore, F-test showed that null hypothesis should be rejected leading to the assumption that fixed effect model is more preferable for both models (Appendix4). Finally, the Akaike information criteria was calculated for both models and in both models, it detected that pooled model is better (Appendix 8). So, all in all, due to the test conducted fixed effect model was more appropriate technique, however, pooled model (table 6) appeared to be more significant regarding R-squared (explanatory power of the model) and p-value of estimated coefficients than fixed effect model (Appendix 4) and random effect model (Appendix 5). This could be explained by lack of influence of time period.

The table below represents an estimated coefficients for the pooled regression model (table.6 .).

Table. 6. Results of the regression analysis

	Model 1 - ROA	**Model 2 - Tobin's Q**
family_ownership	0.129096***	-0.0082265
family_generation	2.924389***	-0.2793079
family_board	0.1917303**	-0.0167675
family_chairman	-0.4081528	-0.6538321*
family_ceo	2.322405	0.839927*
control_age	-0.1103772***	-0.0023863**

control_size	0.9185383***	-0.04199
control_growth	0.0882536***	0.0015358
constant	-19.06486***	3.345078***
Prob>F	0.0000	0.0014
R-Squared	0.2422	0.1680
Number of observations	151	143

Notes: *, **, *** - significant at 10, 5 and 1 percent respectively

In both models it could be seen that the model is significant due to significance of p-value of F under 90, 95 and 99 percent significance level comprising for 0.0000 and 0.0014 in model 1 (ROA) and model 2 (Tobin's Q) respectively. The coefficient of determination R-squared shows that explanatory power of model 1 accounted for 24% and of model 2 accounted for 17%. The model 1 has the highest coefficient of determination and greater number of significant variables. All in all, in model 1 such variables as family_ownership, family_generation, family_board, control_age, control_size, control_growth and constant are significant at 95% level of significance. In model 2 such variables as family_chairman, family_ceo and age are significant at 90% level of significance.

The estimated coefficient of independent variable *Family_ownership* is significant in model 1 indicating that family ownership is positively related to financial performance of the company measured by ROA in my sample from automotive industry. This finding appears to be very important as indicates that family brings some value added to the company. It could be strong reputation, industry knowledge, political connections, network, absence of chase for harvesting short-term revenues, careful choice of projects regardless of time horizon, frequent monitoring of companies performance, and finally, desire to build the company which will exist longer than founders with family bringing value for generations. Concerning theoretical background, obtained result that family ownership is positively related to financial performance is consistent with findings of Villalonga et al., Pacheco, Jiang, Chu et al., Tang et al. Villalonga et al. found out positive association between family ownership and financial performance for the sample of Fortune500 companies (Villalonga, 2006). Pacheco found out that on the sample of Portuguese companies the positive relationship is also the case (Pacheco, 2019). Jiang partially supported this for the studied sample of APAC countries, the positive relationship was found out to be the case only for Philippines (Jiang, 2011). Chu et al. also pointed out that family ownership is positively related to financial performance for Taiwanese companies (Chu, 2011). Tang et al. found evidence for the same on the Chinese sample (Tang, 2017).

The next estimated coefficient of family variable *Family_generation* seemed to be significant in model 1 showing strong evidence for positive relationship between generation and ROA. In order to remind the reader, I would like to highlight that in this sample only the family companies with minimum 2nd generation were chosen. The 2nd generation is the stage when the separation of ownership and management happens and personal attachment of family members weakens. Moreover, the succession issues arise as the family already seems to be separated on several branches. There is saying which characterizes main problem of family companies: "From shirtsleeves to shirtsleeves in three generations" (Knowles, 2006). That is possibly the main concern why people do not believe in the family business and try to avoid. However, my finding shows that generation is positively related to ROA leading to the possible conclusion that listed family companies in the automotive industry are likely to overcome generation problems and keep the company in family. Concerning theoretical background, obtained result that generation is positively related to financial performance seems to be inconsistent with study of Miller et al. and Arrondo-Garcia et al. Miller et al. found no evidence for presence either negative or positive relationship between generation and financial performance on the sample of Fortune1000 companies (Miller, 2007). Arrondo-Garcia et al. came to the conclusion that generation is negatively related to the financial performance on the example from Spain (Arrondo-Garcia, 2016).

Moving to independent variable *Family_board* the estimated coefficient appeared to be significant in model 1. It was found out that percentage of family members in the board of directors is positively associated with ROA in my sample from automotive industry. This could be explained by the fact that usually family appears to be largest shareholder which is likely to obtain the half of the seats in the board of the directors. Hence, leading to the strong power on strategic decision making in the company allowing to choose projects preferred by family. As it was discussed previously family is likely to choose worthy projects as they do not have to make profit immediately building heritage for generations. Concerning theoretical background, the obtained result that family board is positively related to financial performance is consistent with research of Gill et al. and inconsistent with Li. Gill et al. found out positive relationship between presence of family in the board of directors and financial performance for Indian companies (Gill, 2015). However, my result is inconsistent with the study of Li. Li found no evidence of presence relationship between family board and financial performance on the sample of Taiwanese companies (Li, 2018).

Family_chairman was a binary independent variable. The results of the pooled regression model showed that the estimated coefficient was significant in model 2. The presence of the chairman from the family seemed to be negatively related to Tobin's Q. This result appeared to be

inconsistent with the study conducted by Wenyi Chu. Chu found out that family chairman is positively related to financial performance of the family companies in the sample of Taiwanese companies (Chu, 2011).

The estimated coefficients of other binary variable *Family_ceo* was significant in the model 2. The outcome is that the presence of the CEO from the family was positive related to Tobin's Q. This variable is quietly frequently used by the scholars. My finding appeared to be consistent with the research of Jiang et al., Andres, Chu. Jiang et al. found out that family member as a CEO seemed to be positively related to financial performance in Indonesia and Taiwan on the sample of APAC region companies (Jiang, 2011). Andres found out that family CEO was positively associated with financial performance on the sample of companies from Germany (Andres, 2008). In the research conducted on the sample Taiwanese companies by Chu, the positive association between family CEO and financial performance was found (Chu, 2011).

Previously the family variables were discussed now it is time to move to control variables. The estimated coefficient of the variable *control_age* seemed to be significant in model 1 and 2. The strong evidence was provided for the negative relationship between age and financial performance measured by ROA and Tobin's Q. These results are consistent with research of Pacheco, Gupta et al., Anderson et al., Martinez et al., Miller et al. Pacheco found out evidence for negative relationship between company age financial performance (Pacheco, 2019). Gupta et al. found support for positive relationship between company age and financial performance on the sample of Indian companies (Gupta, 2017). In the research of Anderson et al. on the sample of American companies the negative relationship between age and financial performance appeared to be (Anderson, 2003). Martinez et al. found the same for the Chilean example (Martinez, 2007). Miller et al. confirmed the same on American example (Miller, 2007).

The estimated coefficient of independent variable *control_size* is significant in model 1. The size of the company is positively associated with financial performance measured by ROA. This result is consistent with research of Pacheco, Andres, Martinez et al. and inconsistent with Gupta et al., Anderson et al., Gill et al. Pacheco found out evidence for positive relationship between company size financial performance on the sample of Portuguese wine-producers (Pacheco, 2019). Andres found the same result on German sample (Andres, 2008). Martinez et al. confirmed the same on example from Chile (Martinez, 2007). Gupta et al. found support for negative relationship between company size and financial performance for Indian companies (Gupta, 2017). Gill et al. detected negative relationship between size and financial performance on the sample of Indian companies (Gill, 2015). In the research of Anderson et al. on the sample of American companies the negative relationship between size and financial performance appeared to be (Anderson, 2003).

Finally, the estimated coefficient of variable *control_growth* is significant in pooled regression model 1. The growth of the sales year over year is positively related to ROA in my sample from automotive industry. This variable is not frequently used in the researches. Thus, being interesting and not highly studied catching my eye on it. These results are consistent with research of McConaughy et al., Barontini et al. and Maury et al. McConaughy et al. pointed out that sales growth is positively related to financial performance on the sample of American companies (McConaughy, 1998). Barontini et al. also found out that sales growth is positively related to financial performance on the sample of European companies (Barontini, 2006). Maury found the same as previous authors on the sample of companies from Western Europe (Maury, 2006).

2.6 Practical implication

The findings of this master thesis provide both theoretical and practical implication. The understanding of family-owned companies is quite important nowadays as family-owned companies comprise significant part of companies in different countries but are still underexamined. There is lack of studies on influence of family ownership on corporate performance, both financial and environmental, which nowadays is burning issue. The majority of the researches in the topic of ownership structure are focused on institutional ownership, governmental ownership, foreign ownership but not family ownership which could become one of the key ownership structures in the future. The lack of studies also results in weakened performance of the family companies as they have no assess to the information how proper family corporate governance should look like.

Concerning theoretical implication, my research provides industry specific findings for family companies operating in automotive industry. Usually, the majority of scholars just study family companies in the region or particular country without paying attention to peculiarities of each industry. However, industry specific research seems to be more valuable to end-users of the information since the results from different industries could not be applicable to specific industry. For such countries as South Korea where the significant part of GDP is comprised by automotive industry such research could be valuable. So, this research pioneered in the field of industry specific family ownership studies. Finally, this research makes contribution to the limited number of researches about family ownership which only appeared in the end of 1990s. The main goal of all family ownership researches is to comprise objective picture of the family ownership and provide the end-user with adequate and proper information in order to eliminate the problem of mistrust to family companies.

Concerning practical implication, this research would be valuable for various stakeholders. First of all, the main stakeholder is family companies from automotive industry. As I already mentioned the lack of research on family business results in limited available information for family companies which strive to improve their performance. For example, proper corporate governance adjusted for the needs of family companies could make possible to eliminate succession problem, agency problem, family employment problem, separation of ownership and management problem, family feud problem. Regarding the empirical results of my research, the following recommendations could be established. Initially, the increasing number of generations positively influences the performance, so family companies should improve succession planning in order to ensure that company keeps in family for numerous generations. Moreover, family companies should avoid appointing family member as a chairman but trying to have family in the board as family chairman relates negatively to financial performance and family board is positively related to financial performance. Furthermore, on average appointing family CEO is good choice in automotive industry as family CEO is positively related to financial performance. Besides, the extended literature review in my thesis will be valuable for family companies as it will shed light on family performance in different countries and highlight some peculiarities.

The second type of stakeholders which could be interested in my research are traders, institutional investors, pension funds. All of them would get to know that various generations, presence of family in the board, non-family chairman and family CEO are on average good signs for family-owned automotive companies. Traders will make more precise market analysis, buy shares in family-owned companies and gain profit as these companies are undervalued because of believe that non-family-owned companies perform better. Institutional investors will not underestimate family companies when family companies go to IPO and dilute family ownership, institutional investors could make more precise analysis and become shareholder in family company. Pension funds which obtain huge amount of money that should be saved in order to be re-paid to the individual when he or she is a senior so any other time money is free to use. Pension funds could also make their strategy precise and up-to-date and do not underestimate family companies as potential investment goals.

The third type of stakeholders are companies which are looking for expansion. When looking for partner or potential investment, companies should consider whether the company is family owned as family-owned companies tend to stick to long-term goals and to be more reliable and perform at least as well as non-family one.

The fourth type of stakeholder for whom I consider the research would be valuable are policy makers. Research will help policy to enhance the implementation and enforcement of

existing regulations concerning corporate social responsibility (CSR) and board independence. Moreover, some regulation could be put on independent director's quota.

To sum up, the findings of this master thesis are valuable from both sides theoretical and practical. The main stakeholders for whom I consider the research would be valuable are family companies in the automotive industry; traders, institutional investors and pension funds looking for investment in automotive industry; companies looking for expansion and policy makers. When I was checking the companies, which operate in motor vehicle manufacturing I saw various interesting electric vehicle producers which are young but could become family company in the future. Family ownership is really important as it could become one of the key ownership structures in the future.

Chapter 2 conclusion

Automotive industry obtains an interesting example of large listed leading players which are controlled by families. In this chapter two case studies: Volkswagen and Ford were presented. Moreover, extended industry overview and research model were discussed. The results of my research proved that relationship between family variables such as ownership, generation, board, chairman, CEO and financial performance measured by ROA and Tobin's Q exist.

CONCLUSION

Family ownership as an ownership structure and performance of the family companies is one of the topics which are not sufficiently elucidated in the academic background. Despite the fact that 30% of S&P500 index comprises for the companies with presence of family ownership, 70% of Indian and Brazilian companies are family owned, 58,7% of Chinese companies are family-owned one (Anderson, 2003; Dow, 2016; Tang, 2017). Overall, 30% companies worldwide are family-owned companies (La Porta, 1999). Even recently the first ever family companies-based index FBI500 was developed by EY and HSG (EY, 2019). So, the family ownership is becoming a significant ownership structure which can create potential benefits. The family ownership researches started to appear in the academic journals in the end of 20th century but are still not sufficiently studied. Some of the scholars found evidence for supremacy of family ownership structure over non-family owned in terms of performance (Gorriz, 1996; McConaughy, 1998; Barontini, 2006; Maury, 2006; Martinez, 2007; Allouche, 2008; Tang, 2017). However, the active family involvement was crucial in many studies (Anderson, 2003; Lee, 2006; Andres, 2008; Chu, 2011; Pacheco, 2019). Family business is not simple one as family experiences dual behavior trying to align family welfare with company welfare. The family members from one side are relatives from other side business partners. The main danger of family companies could be depicted in one saying "From shirtsleeves to shirtsleeves in three generations" (Knowles, 2006). Frequently such problems as succession, entrenchment and tunneling are highlighted as value breakdowns. On other hand they are balanced by family incentives, family assets and long-term horizon planning as value creators. All this points out the need of proper mechanisms of corporate governance adjusted specifically for family-owned companies such as family assembly, family council, family constitution, presence of family in board of directors and obligatory trainings for the family members (HBR, 1998).

The goal of this thesis was to identify the relationship between family ownership and financial performance of the listed companies from automotive industry. The main result is created regression model of the relationship between family variables such as ownership, generation, presence in the board, family chairman, CEO and financial performance measured by ROA and Tobin's Q.

Concerning the findings, I have to mention that the sample of 31 family-owned automotive companies from 2015 to 2019 was studied. The created regression model consisted of 5 family variables and 3 control variables. Over all two regression models were created: the first one with dependent variable return-on-assets, the second one with dependent variable Tobin's Q. The main findings are:

- Family ownership is positively related to ROA;

- Generation is positively related to ROA;
- Family board is positively related to ROA;
- Family member serving as a chairman is negatively related to Tobin's Q;
- Family member serving as a CEO is positively related to Tobin's Q;
- Age of the company is negatively related to ROA and Tobin's Q;
- Size of the company is positively related to ROA;
- Growth of the company is positively related to ROA.

However, I have to highlight that this research had several limitations. First of all, the sample comprised of only 31 company resulting in 155 observations because only the companies under NACE 2910 "motor vehicle manufacturing" were considered. So, the findings of this research are mainly applicable to automotive industry. Secondly, used criteria for defining family companies made the sample quite limited. Finally, research was limited by availability of information on some companies thus all of them were listed.

Regarding practical implication, the findings of this master thesis are valuable from both sides theoretical and practical. The main users for whom the research could be useful are family companies in the automotive industry; traders, institutional investors and pension funds looking for investment in automotive industry; companies looking for expansion and policy makers. Family-owned companies should properly plan corporate governance mechanisms. Moreover, family-owned companies should make attempts to exist for several generations, have family present in the board of directors, avoid appointing family chairman and hire family CEO. Traders, institutional investors, pension funds, companies looking for expansion will gain in accuracy of investment analysis. Policy makers could enhance the implementation and enforcement of existing regulations concerning corporate social responsibility and board independence.

Concerning direction of further research, there are several possibilities. First of all, to enlarge the sample from automotive industry to several manufacturing industries as they still have similarities such as heavy investments in research and development, tangible and intangible assets. Secondly, the several new variables such as performance of the company after succession, distance between two largest shareholders, research and development spending, total number of family members working in the company, EPS and ROE as dependent variables could be added to the research.

To sum up, this master thesis elucidated contemporary works on family ownership, family challenges, family adjusted corporate governance mechanisms as family ownership is becoming a significant ownership structure which can create potential benefits. However, family business is one of the most challenging businesses because of the necessity of the dual behavior of family: relatives and business partners. But for me the main characteristic which distinguishes family-

owned companies among other ownership structures is personal attachment. The CEO of Toyota being also a descendant of founder Toyoda said "All the Toyota vehicles bear my name. For me, when the cars are damaged, it is as though I am as well" (Automotive News Europe, 2019). That's why family-owned companies are unique. The goal of the research was fulfilled. The relationship between family ownership and financial performance exists. The thesis has both theoretical and practical implications.

SOURCES

1. Adhikari, H. P., & Sutton, N. K. (2016). All in the family: The effect of family ownership on acquisition performance. *Journal of Economics and Business*, *88*, 65-78.

2. Al-Gamrh, B., Al-Dhamari, R., Jalan, A., & Jahanshahi, A. A. (2020). The impact of board independence and foreign ownership on financial and social performance of firms: evidence from the UAE. *Journal of Applied Accounting Research*.

3. Alabdullah, T. T. Y. (2018). The relationship between ownership structure and firm financial performance. *Benchmarking: An International Journal*.

4. Allouche, J., Amann, B., Jaussaud, J., & Kurashina, T. (2008). The impact of family control on the performance and financial characteristics of family versus nonfamily businesses in Japan: A matched-pair investigation. *Family business review*, *21*(4), 315-330.

5. Anderson, R. C., & Reeb, D. M. (2003). Founding-family ownership and firm performance: evidence from the S&P 500. *The Journal of Finance*, *58*(3), 1301-1328.

6. Andres, C. (2008). Large shareholders and firm performance—An empirical examination of founding-family ownership. *Journal of corporate finance*, 14(4), 431-445.

7. AP. (2019). *Korean Air boss dies weeks after board removal over scandals*. Retrieved from: https://apnews.com/article/1dcb2d394d7f457e9cdf9076d5902845

8. Arosa, B., Iturralde, T., & Maseda, A. (2010). Ownership structure and firm performance in non-listed firms: Evidence from Spain. *Journal of Family Business Strategy*, *1*(2), 88-96.

9. Arrondo-García, R., Fernández-Méndez, C., & Menéndez-Requejo, S. (2016). The growth and performance of family businesses during the global financial crisis: The role of the generation in control. *Journal of Family Business Strategy*, 7(4), 227-237.

10. Astrachan, J. H., Allen, I. E., & Spinelli, S. (2002). Mass mutual/Raymond Institute American family business survey. *Springfield, MA: Mass Mutual Financial Group*.

11. Automotive News Europe. (2019). *At Toyota, 'it's not that easy' being a Toyoda*. Retrieved from: https://europe.autonews.com/automakers/toyota-its-not-easy-being-toyoda

12. Barontini, R., & Caprio, L. (2006). The effect of family control on firm value and performance: Evidence from continental Europe. *European financial management*, *12*(5), 689-723.

13. Barth, E., Gulbrandsen, T., & Schønea, P. (2005). Family ownership and productivity: The role of owner-management. *Journal of Corporate Finance*, 11(1-2), 107-127.

14. BCG. (2020a). *Great Family Businesses Need Good Governance*. Retrieved from: https://www.bcg.com/publications/2020/great-family-businesses-need-good-governance

15. BCG. (2020b). *The Soft Rules of Family Businesses*. Retrieved from: https://www.bcg.com/publications/2020/managing-soft-rules-in-family-business

16. BCG. (2020c). *COVID-19 automotive demand post COVID-19*. Retrieved from: https://image-src.bcg.com/Images/Auto%20post%20COVID-19_052920_tcm9-249607.pdf

17. Beehr, T. A., Drexler Jr, J. A., & Faulkner, S. (1997). Working in small family businesses: empirical comparisons to non-family businesses. Journal of Organizational Behavior: The International *Journal of Industrial, Occupational and Organizational Psychology and Behavior*, 18(3), 297-312.

18. Belenzon, S., Chatterji, A. K., & Daley, B. (2017). Eponymous entrepreneurs. *American Economic Review*, *107*(6), 1638-55.

19. Bennedsen, M., Fan, J. P. H., Jian, M., and Yeh, Y. H., 2015. The Family Business Map: Framework, Selective Survey, and Evidence from Chinese Family Firm Succession. *Journal of Corporate Finance,* 33. 212-226.

20. Berle, A., Means, G., 1932. The Modern Corporation & Private Property. Harcourt, Brace & World, Inc. Reprinted 1991 by Transaction Publishers, New Brunswick, New Jersey, USA.

21. Beuren, I. M., Politelo, L., & Martins, J. A. S. (2016). Influence of family ownership on company performance. *International Journal of Managerial Finance*.

22. Bhaumik, S. K. & Gregoriou, A. 2010. Family ownership, tunnelling, and earnings management: A review of the literature. *Journal of Economic Surveys*, 24: 705–730.

23. Bøhren, Ø., Stacescu, B., Almli, L. F., & Søndergaard, K. L. (2019). When Does the Family Govern the Family Firm?. *Journal of Financial and Quantitative Analysis*, 54(5), 2085-2117.

24. Chakrabarty, S. (2009). The influence of national culture and institutional voids on family ownership of large firms: A country level empirical study. *Journal of International Management*, 15(1), 32-45.

25. Chrisman, J. J., Chua, J. H., & Litz, R. A. (2004). Comparing the agency costs of family and non–family firms: Conceptual issues and exploratory evidence. *Entrepreneurship Theory and practice*, 28(4), 335-354.

26. Chu, W. (2009). The influence of family ownership on SME performance: evidence from public firms in Taiwan. *Small Business Economics*, *33*(3), 353-373.

27. Chu, W. (2011). Family ownership and firm performance: Influence of family management, family control, and firm size. Asia Pacific Journal of Management, 28(4),

28. Cordeiro, J. J., Profumo, G., & Tutore, I. (2021). Family ownership and stockholder reactions to environmental performance disclosure: A test of secondary agency relationships. *Business Strategy and the Environment*, *30*(4), 2091-2107.

29. Bain, D. (2015). *The top 500 family businesses in the world*. Retrieved from: https://familybusiness.ey-vx.com/pdfs/182-187.pdf

30. Daily, C. M., & Dollinger, M. J. (1993). Alternative methodologies for identifying family-versus nonfamily-managed businesses. *Journal of small business management*, 31(2), 79.

31. Davis, P. (1983). Realizing the potential of the family business. *Organizational dynamics*, *12*(1), 47-56.

32. Dehkalani, N. M., Asadi, A., & Hamid, R. K. (2015). The Relationship between Institutional Ownership with the Current Financial Performance of the Firms Listed in Bombay Stock Exchange. *International Journal of Management, Accounting and Economics*, ISSN, 2383-2156.

33. Dow, S., & McGuire, J. (2016). Family matters?: A cross-national analysis of the performance implications of family ownership. *Corporate Governance: An International Review*, *24*(6), 584-598.

34. Eurostat. (2008). *NACE Rev. 2.* Retrieved from: https://ec.europa.eu/eurostat/documents/3859598/5902521/KS-RA-07-015-EN.PDF

35. EY. (2019). *How the world's largest family businesses are responding to the Transformative*. Retrieved from: https://www.ey.com/en_gl/growth/how-the-world-s-largest-family-businesses-are-responding-to-the-transformative-age

36. Fama, E. F., & Jensen, M. C. (1983). Separation of ownership and control. *The journal of law and Economics*, 26(2), 301-325.

37. Filatotchev, I., Lien, Y. C., & Piesse, J. (2005). Corporate governance and performance in publicly listed, family-controlled firms: Evidence from Taiwan. *Asia Pacific Journal of Management*, 22(3), 257-283.

38. Forbes. (2020). *The world's most valuable brands*. Retrieved from: https://www.forbes.com/the-worlds-most-valuable-brands/#6349a042119c

39. Ford. (2019). *Annual report Ford* Retrieved from: https://annualreport.ford.com/Y2019/default.aspx

40. Ford, H., & Crowther, S. (1922). My life and work. Doubleday, Page.

41. Gill, S., & Kaur, P. (2015). Family involvement in business and financial performance: a panel data analysis. *Vikalpa*, *40*(4), 395-420.

42. Górriz, C. G., & Fumás, V. S. (1996). Ownership structure and firm performance: Some empirical evidence from Spain. *Managerial and Decision Economics*, *17*(6), 575-586.

43. Grah, A. (2019). *Als Porsche einst Volkswagen übernehmen wollte*. Retrieved from: https://www.dw.com/de/als-porsche-einst-volkswagen-%C3%BCbernehmen-wollte/a-49618351

44. Gupta, A., & Nashier, T. (2017). Family ownership and firm performance: evidence from India. *Quarterly Journal of Finance and Accounting*, *55*(3-4), 37-68.

45. HBR. (1998). *Governing the Family-Owned Enterprise: An Interview with Finland's Krister Ahlström*. Retrieved from: https://hbr.org/1998/01/governing-the-family-owned-enterprise-an-interview-with-finlands-krister-ahlstrom

46. HBR. (2012). *What You Can Learn from Family Business*. Retrieved from: https://hbr.org/2012/11/what-you-can-learn-from-family-business

47. Martin Roll. (2020). *Hermes - The Strategy Insights Behind The Iconic Luxury Brand*. Retrieved from: https://martinroll.com/resources/articles/strategy/hermes-the-strategy-behind-the-global-luxury-success/

48. Jara-Bertin, M., López-Iturriaga, F. J., & López-de-Foronda, Ó. (2008). The contest to the control in European family firms: How other shareholders affect firm value. *Corporate governance: an international review*, *16*(3), 146-159.

49. Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of financial economics*, 3(4), 305-360.

50. Jiang, Y., & Peng, M. W. (2011). Are family ownership and control in large firms good, bad, or irrelevant?. *Asia Pacific Journal of Management*, 28(1), 15-39.

51. Kets de Vries, M.F.R., 1993. The dynamics of family-controlled firms: the good and the bad news. *Organizational Dynamics* 21 (3), 59–71

52. Kevser, M., & Leyli, E. B. (2019). The relationship between the ownership structure of banks and their financial performance: empirical research for Turkey. *Ekonomski horizon*ti, 21(2), 111-129.

53. King, M. R., & Santor, E. (2008). Family values: Ownership structure, performance and capital structure of Canadian firms. *Journal of Banking & Finance*, 32(11), 2423-2432.

54. Knowles, E. (2006). The Oxford dictionary of phrase and fable. OUP Oxford.

55. Kommersant. (2020). *Auto quarantine gets stronger and longer*. https://www.kommersant.ru/doc/4315685

56. Kurawa, J. M., & Umar, U. H. (2019). Relationship between ownership concentration and financial performance of deposit money banks in Nigeria: Does a turning point exist?. *Journal of Emerging Economies and Islamic Research*, 7(2), 32-43.

57. La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (1999). Corporate ownership around the world. *The journal of finance*, *54*(2), 471-517.

58. Lauterbach, B., & Vaninsky, A. (1999). Ownership structure and firm performance: Evidence from Israel. *Journal of Management and Governance*, *3*(2), 189-201.

59. Lee, J. (2006). Family firm performance: Further evidence. *Family business review*, 19(2), 103-114.

60. Li, S. (2018). Increased non-family ownership in family-owned firms: How does it affect CEO turnover-performance sensitivity?. *Strategic Management Journal*, 39(13), 3434-3457.

61. Loay, S. J., Jamal, A. S., & latif Mah'd, O. A. (2018). Ownership Structure Impact on Jordanian Banks' Financial Performance. *Asian Journal of Accounting and Governance*, 9, 1-10.

62. Marketline. (2020). *Global Automotive Manufacturing*. Retrieved from: https://www.marketresearch.com/MarketLine-v3883/Global-Automotive-Manufacturing-13900740/

63. Martínez, J. I., Stöhr, B. S., & Quiroga, B. F. (2007). Family ownership and firm performance: Evidence from public companies in Chile. *Family Business Review*, *20*(2), 83-94.

64. Maury, B. (2006). Family ownership and firm performance: Empirical evidence from Western European corporations. *Journal of corporate finance*, 12(2), 321-341.

65. Mazzi, C. (2011). Family business and financial performance: Current state of knowledge and future research challenges. *Journal of Family Business Strategy*, 2(3), 166-181.

66. McConaughy, D. L., Walker, M. C., Henderson Jr, G. V., & Mishra, C. S. (1998). Founding family controlled firms: Efficiency and value. *Review of Financial economics*, *7*(1), 1-19.

67. Miller, D., Le Breton-Miller, I., Lester, R. H., & Cannella Jr, A. A. (2007). Are family firms really superior performers?. *Journal of corporate finance*, *13*(5), 829-858.

68. Minichilli, A., Brogi, M., & Calabrò, A. (2016). Weathering the storm: Family ownership, governance, and performance through the financial and economic crisis. *Corporate Governance: An International Review*, 24(6), 552-568.

69. Morck, R., Shleifer, A., & Vishny, R. W. (1988). Management ownership and market valuation: An empirical analysis. *Journal of financial economics*, 20, 293-315.

70. N-TV. (2019). *Das ist der Porsche-Piëch-Clan*. Retrieved from: https://www.n-tv.de/wirtschaft/Das-ist-der-Porsche-Piech-Clan-article21233728.html

71. Nikolov, A. N. (2017). Family influence, advertising, and R&D: Implications for firm performance. *Journal of Global Business Insights*, *2*(2), 65-80.

72. OECD. (2019). *Owners of the World Listed Companies*. Retrieved from: http://www.oecd.org/corporate/Owners-of-the-Worlds-Listed-Companies.pdf

73. Pacheco, L. (2019). Performance vs. family ownership and management: The case of the Portuguese Wine Firms. Entrepreneurial Business and Economics Review, 7 (3), 7-24. http. *doi. org/10.15678/EBER*.

74. Passport. (2020). *Automotive Industry update: coronavirus impact*. Retrieved from: https://www.euromonitor.com/automotive-industry-update-coronavirus-impact/report

75. Pedersen, T., & Thomsen, S. (2003). Ownership structure and value of the largest European firms: The importance of owner identity. *Journal of Management and Governance*, *7*(1), 27-55.

76. Pérez-González, F. (2006). Inherited control and firm performance. *American Economic Review*, *96*(5), 1559-1588.

77. Porsche AG. (2020). *The History*. Retrieved from: https://www.porsche.com/international/aboutporsche/christophorusmagazine/archive/379/article overview/articl e14/

78. Pulse (2020). *Korean Air heiress returns to management after 2018 "water cup tantrum"*. Retrieved from: https://pulsenews.co.kr/view.php?sc=30800028&year=2020&no=911239

79. PWC. (2018). *Five trends transforming the Automotive Industry*. Retrieved from: https://www.pwc.at/de/publikationen/branchen-und-wirtschaftsstudien/eascy-five-trends-transforming-the-automotive-industry_2018.pdf

80. Reuters. (2018). *Porsche hands the wheel to 4th generation members of family clan*. Retrieved from: https://www.reuters.com/article/porsche-volkswagen-supervisory-board/corrected-porsche-hands-the- wheel-to-4th-generation-members-of-family-clan-idUKL5N1QR50G

81. Rutherford, M. W., Kuratko, D. F., & Holt, D. T. (2008). Examining the link between ''familiness'' and firm performance: Can the F-PEC untangle the family business theory jungle? *Entrepreneurship Theory and Practice*, 32(6), 1089–1109.

82. Sacristán-Navarro, M., Gómez-Ansón, S., & Cabeza-García, L. (2011). Large shareholders' combinations in family firms: Prevalence and performance effects. *Journal of Family Business Strategy*, 2(2), 101-112.

83. Savitri, E. (2018). Relationship between family ownership, agency costs towards financial performance and business strategy as mediation. *Verslas: teorija ir praktika*, *19*(1), 49-58.

84. Schank, M. J., Murgea, A., & Enache, C. (2017). Family ownership and firm performance: Romania versus Germany. *Timisoara Journal of Economics and Business*, *10*(2), 169-186.

85. Schneider, M. (2013). *Porsche schwört Nachfahren für ein Weltreich ein*. Retrieved from: https://www.handelsblatt.com/unternehmen/industrie/europas-maechtigste-familie-porsche-schwoert- nachfahren-fuer-ein-weltreich-ein/8275824.html?ticket=ST-729320-NKHR21xUSA7tio9AZuDR-ap2

86. Shanker, M. C., & Astrachan, J. H. (1996). Myths and realities: Family businesses' contribution to the US economy—A framework for assessing family business statistics. *Family business review*, 9(2), 107-123.

87. Shleifer, A., & Vishny, R. W. (1997). A survey of corporate governance. *The journal of finance*, 52(2), 737-783.

88. Tang, L., Lu, K., & Wu, W. (2017). Comparison of family ownership and non-family ownership private firm performance. *Transformations in Business & Economics*, 16.

89. The Economist (2020). *Why Family Businesses Outperform Others*. Retrieved from: https://execed.economist.com/blog/industry-trends/why-family-businesses-outperform-others

90. The New York Times. (2000). *Ford motor to pay 10 billion dividend and ensure family control*. Retrieved from: https://www.nytimes.com/2000/04/15/business/ford-motor-to-pay-10-billion-dividend-and-ensure-family-control.html]

91. The Straits Times (2018). *South Korean customs looking into Korean Air 'nut rage' family for not paying duties on luxury goods*. Retrieved from: https://www.straitstimes.com/asia/east-asia/south-korean-customs-looking-into-korean-air-nut-rage-family

92. Villalonga, B., & Amit, R. (2006). How do family ownership, control and management affect firm value?. *Journal of financial Economics*, *80*(2), 385-417.

93. VW. (2017). *Members of the Supervisory Board and their appointments*. Retrieved from: https://annualreport2017.volkswagenag.com/group-management-report/executive-bodies/supervisory- board.html

94. Wimmelbuecker, S. (2017). *Battle between Piech, Porsche families highlighted in German documentary*. Retrieved from: https://europe.autonews.com/article/20171020/ANE/171019650/battle- between-piech-porsche-families-highlighted-in-german-documentary

APPENDIX

Appendix 1: Sample

Table. 7. Companies from the sample

Company name	Family
ATLAS BATTERY COMPANY LIMITED	Shirazi
BAYERISCHE MOTOREN WERKE AG	Quandt
CHINA MOTOR CORPORATION	Yen
EICHER MOTORS LIMITED	Siddhartha
FERRARI N.V.	Agnelli
FORCE MOTORS LIMITED	Firodia
FORD MOTOR CO	Ford
FORD OTOMOTIV SANAYI A.S.	Koc
GESTAMP AUTOMOCION S.A.	Riberas
GHANDHARA NISSAN LIMITED	Khan Khattak
GREAT WALL MOTOR COMPANY LIMITED	Wei
HINDUSTAN MOTORS LIMITED	Birla
HONDA ATLAS CARS (PAKISTAN) LIMITED	Shirazi
HWA AG	Aufrecht
JAY USHIN LTD	Minda
KABE GROUP AB	Blomqvist
MAHINDRA & MAHINDRA LIMITED	Mahindra
ORIENTAL HOLDINGS BERHAD	Loh
PACCAR INC	Pigott
PETROS PETROPOULOS S.A	Petropoulos
PT ASTRA INTERNATIONAL TBK	Keswick
PT INDOMOBIL SUKSES INTERNASIONAL TBK	Salim
RANE MADRAS LIMITED	Lakshminarayan and Yier
ROSENBAUER INTERNATIONAL AG	Rosenbauer
SUZUKI MOTOR CO	Suzuki
TAN CHONG MOTOR HOLDINGS BERHAD	Tan
TATA MOTORS LIMITED	Tata
TRIGANO	Feulliet
VOLKSWAGEN AG	Porsche and Piech

WILLIAMS GRAND PRIX HOLDINGS PLC	Williams
YULON MOTOR COMPANY LIMITED	Yen

Appendix 2: correlation matrix

Table. 8. Pearson correlation matrix

	ROA	Tobin's Q	Family_ownership	Family_generation	Family_board	Family_chairman	Family_ceo	Control_age	Control_size	Control_growth
ROA	1									
Tobin's Q	0.2256	1								
Family_ownership	0.0675	-0.1098	1							
Family_generation	0.0441	-0.2587	0.0773	1						
Family_board	0.1172	-0.0512	0.1240	-0.4061	1					
Family_chairman	0.1144	-0.1938	-0.0435	-0.1186	0.6046	1				
Family_ceo	0.1183	0.1941	0.2357	-0.2998	0.5249	0.2571	1			
Control_age	-0.0788	-0.1733	0.2723 -	0.6212	0.3421	-0.3141	-0.2430	1		
Control_size	0.0084	-0.2465	0.1623	0.3481	-0.1868	-0.0099	-0.2824	0.3417	1	
Control_growth	0.2422	-0.0036	0.0866	-0.0183	0.0585	0.0769	0.0017	-0.0336	-0.0239	1

Appendix 3: multicollinearity test

Table. 9. Multicollinearity test

Variable	VIF
Family_ownership	1.29
Family_generation	2.83
Family_board	2.42
Family_chairman	1.90
Family_ceo	1.54
Control_age	2.99
Control_size	1.31
Control_growth	1.02
Mean VIF	1.91

Appendix 4: Fixed effect model

```
Fixed-effects (within) regression          Number of obs     =       151
Group variable: id                         Number of groups  =        31

R-sq:  within  = 0.1450                     Obs per group: min =        2
       between = 0.0089                                    avg =      4.9
       overall = 0.0114                                    max =        5

                                           F(8,112)          =      2.37
corr(u_i, Xb)  = -0.8738                    Prob > F          =    0.0212


            roa |     Coef.   Std. Err.      t     P>|t|    [95% Conf. Interval]

family_ownership|  -.2335193   .2985798    -0.78   0.436   -.8251168    .3580782
family_generation|  2.93128    3.736345     0.78   0.434   -4.471808   10.33437
   family_board |   .0806689   .1045653     0.77   0.442   -.1265138    .2878516
 family_chairman|   .9312934   2.297026     0.41   0.686   -3.619969    5.482556
      family_ceo|  -2.448598   2.757726    -0.89   0.376   -7.912678    3.015482
     control_age|  -.4972974   .3147134    -1.58   0.117   -1.120862    .1262669
    control_size|   .6727362   2.421319     0.28   0.782   -4.124798     5.47027
  control_growth|     .04645   .0168945     2.75   0.007    .0129757    .0799243
           _cons|  29.28966   31.71895      0.92   0.358   -33.55738     92.1367

        sigma_u |  19.469336
        sigma_e |  4.0096109
            rho |   .95931239   (fraction of variance due to u_i)

F test that all u_i=0:     F(30, 112) =    18.33          Prob > F = 0.0000
```

Fig. 18. Fixed effect model – model 1

```
Fixed-effects (within) regression          Number of obs      =        143
Group variable: id                         Number of groups   =         30

R-sq:  within  = 0.1485                     Obs per group: min =          2
       between = 0.0531                                     avg =        4.8
       overall = 0.0428                                     max =          5

                                            F(8,105)           =       2.29
corr(u_i, Xb)  = -0.9624                    Prob > F           =     0.0266

        tobinsq │     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
────────────────┼──────────────────────────────────────────────────────────────
family_ownership│   -.005341   .0522689    -0.10   0.919    -.1089805    .0982985
family_generation│  -.3990141   .6549937    -0.61   0.544    -1.697746    .8997174
    family_board│   .0199823   .0189392     1.06   0.294    -.0175706    .0575353
 family_chairman│  -.2726178   .4429264    -0.62   0.540    -1.150859    .6056234
     family_ceo │   .2398011   .5742478     0.42   0.677    -.8988262    1.378428
    control_age │   .1224624   .0564678     2.17   0.032     .0104971    .2344277
   control_size │   .5518319   .4254812     1.30   0.197    -.2918188    1.395483
 control_growth │   .0035075   .0029719     1.18   0.241    -.0023852    .0094002
          _cons │  -14.34999   5.614885    -2.56   0.012     -25.48327   -3.216708
────────────────┼──────────────────────────────────────────────────────────────
        sigma_u │  5.1620473
        sigma_e │  .70165851
            rho │  .98185918   (fraction of variance due to u_i)

F test that all u_i=0:     F(29, 105) =    16.32          Prob > F = 0.0000
```

Fig. 19. Fixed effect model – model 2

Appendix 5: Random effect model

```
Random-effects GLS regression              Number of obs      =        151
Group variable: id                         Number of groups   =         31

R-sq:  within  = 0.1027                     Obs per group: min =          2
       between = 0.4037                                     avg =        4.9
       overall = 0.1992                                     max =          5

                                            Wald chi2(8)       =      30.22
corr(u_i, X)   = 0 (assumed)               Prob > chi2        =     0.0002

        ──────── theta ────────
  min      5%     median     95%      max
0.6994   0.7824   0.8045   0.8045   0.8045

            roa │     Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
────────────────┼──────────────────────────────────────────────────────────────
family_ownership│   .2228258   .1054313     2.11   0.035     .0161843    .4294674
family_generation│  3.758433   2.123021     1.77   0.077    -.4026128    7.919478
    family_board│   .1337963   .0953651     1.40   0.161    -.0531158    .3207085
 family_chairman│   1.01728    2.069001     0.49   0.623    -3.037887    5.072447
     family_ceo │  -.6321275   2.408474    -0.26   0.793    -5.352649    4.088394
    control_age │  -.1739769   .0706316    -2.46   0.014    -.3124124   -.0355415
   control_size │   1.153589   .6362863     1.81   0.070    -.0935088    2.400688
 control_growth │   .0537599   .0159297     3.37   0.001     .0225384    .0849815
          _cons │  -24.12498   9.803034    -2.46   0.014    -43.33857   -4.911389
────────────────┼──────────────────────────────────────────────────────────────
        sigma_u │  8.9945952
```

Fig. 20. Random effect model – model 1

```
Random-effects GLS regression              Number of obs     =       143
Group variable: id                         Number of groups  =        30

R-sq:   within  = 0.0268                    Obs per group: min =        2
        between = 0.1446                                   avg =      4.8
        overall = 0.0922                                   max =        5

                                           Wald chi2(8)      =      6.75
corr(u_i, X)   = 0 (assumed)               Prob > chi2       =    0.5637

                    ─── theta ───
   min     5%      median    95%      max
 0.6761  0.6761    0.7884   0.7884   0.7884


        tobinsq │    Coef.    Std. Err.     z     P>|z|    [95% Conf. Interval]

family_ownership │ -.0194888   .0178808   -1.09   0.276   -.0545345    .0155569
family_generation │ -.4527537   .3605301   -1.26   0.209    -1.15938    .2538723
   family_board │  .0125716   .0172175    0.73   0.465   -.0211742    .0463173
 family_chairman │ -.5848682   .3929098   -1.49   0.137   -1.354957     .185221
     family_ceo │  .4975889   .4659124    1.07   0.286   -.4155826     1.41076
    control_age │  .0097709    .011965    0.82   0.414   -.0136799    .0332218
   control_size │  .0120698   .1063139    0.11   0.910   -.1963016    .2204411
 control_growth │  .0020328   .0028488    0.71   0.476   -.0035509    .0076164
          _cons │  2.288982   1.657084    1.38   0.167   -.9588432    5.536807

        sigma_u │ 1.4491151
        sigma_e │ .70165851
            rho │ .81007893   (fraction of variance due to u_i)
```

Fig. 21. Random effect model – model 2

Appendix 6: Hausman test

```
                    ── Coefficients ──
                    (b)         (B)          (b-B)      sqrt(diag(V_b-V_B))
                   fixed       random      Difference         S.E.

family_own~p    -.2335193    .2228258     -.4563451        .2793459
family_gen~n     2.93128     3.758433     -.8271526        3.074582
family_board    .0806689     .1337963     -.0531274        .0428882
family_cha~n    .9312934     1.01728      -.085987         .9977795
 family_ceo    -2.448598    -.6321275     -1.81647         1.343244
control_age    -.4972974    -.1739769     -.3233205        .306685
control_size    .6727362     1.153589     -.4808533        2.336221
control_gr~h    .04645       .0537599     -.0073099        .0056276
```

```
             b = consistent under Ho and Ha; obtained from xtreg
             B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

          chi2(8) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                  =        9.53
          Prob>chi2 =      0.2998
          (V_b-V_B is not positive definite)
```

Fig. 22. Hausman test – model 1

```
              ──── Coefficients ────
                 (b)         (B)         (b-B)      sqrt(diag(V_b-V_B))
                fixed       random     Difference          S.E.

family_own~p   -.005341    -.0194888    .0141478          .0491153
family_gen~n   -.3990141   -.4527537    .0537397          .5468407
family_board    .0199823    .0125716    .0074108          .0078899
family_cha~n   -.2726178   -.5848682    .3122504          .2044643
  family_ceo    .2398011    .4975889   -.2577878          .3356876
 control_age    .1224624    .0097709    .1126915          .0551857
control_size    .5518319    .0120698    .5397621           .411985
control_gr~h    .0035075    .0020328    .0014747          .0008463

                       b = consistent under Ho and Ha; obtained from xtreg
           B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

              chi2(8) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                      =      18.87
           Prob>chi2 =      0.0156
           (V_b-V_B is not positive definite)
```

Fig. 23. Hausman test – model 2

Appendix 7: Breusch-Pagan test

```
Breusch and Pagan Lagrangian multiplier test for random effects

        roa[id,t] = Xb + u[id] + e[id,t]

        Estimated results:
                              Var        sd = sqrt(Var)

                   roa |   87.23575        9.340008
                     e |   16.07698        4.009611
                     u |   80.90274        8.994595

        Test:   Var(u) = 0
                          chibar2(01) =     68.54
                        Prob > chibar2 =    0.0000
```

Fig. 24. Breusch-Pagan test – model 1

```
Breusch and Pagan Lagrangian multiplier test for random effects

        tobinsq[id,t] = Xb + u[id] + e[id,t]

        Estimated results:
                              Var        sd = sqrt(Var)

               tobinsq |   2.406823        1.551394
                     e |   .4923247        .7016585
                     u |   2.099935        1.449115

        Test:   Var(u) = 0
                          chibar2(01) =    137.52
                        Prob > chibar2 =    0.0000
```

Fig. 25. Breusch-Pagan test – model 2

Appendix 8: Akaike

Model	Obs	ll(null)	ll(model)	df	AIC	BIC
pooled	151	−551.1384	−530.2031	9	1078.406	1105.562
fixed	151	−413.2234	−401.3946	9	820.7892	847.9447
random	151	.	.	9	.	.

Fig. 26. Akaike information criteria– model 1

Model	Obs	ll(null)	ll(model)	df	AIC	BIC
pooled	143	−265.2054	−252.0586	9	522.1172	548.7828
fixed	143	−141.6541	−130.1569	9	278.3138	304.9794
random	143	.	.	9	.	.

Note: N=Obs used in calculating BIC; see [R] BIC note

Fig. 27. Akaike information criteria– model 2