

Master Thesis

Family Firms' Performance during the COVID-19 Crisis

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Date 2 July 2021



Abstract

This empirical study provides new insights on private family firms' performance during the COVID-19 crisis, with an extra focus on family firms in industries who are hit by the COVID-19 pandemic. The sample consists of 185.338 firm year observations from 21 West-European countries, collected over the period from 2012 to 2020. The results show that, on average, family firms outperform non-family firms in return on assets (ROA) by 0.41 percentage points during the COVID-19 crisis. Using two alternative firm performance measures, return on equity (ROE) and operating return on assets (OROA), family firms also outperform non-family firms during the COVID-19 crisis, by respectively 1.95 and 0.34 percentage points. Large family firms are mainly responsible for the outperformance. Robustness tests on excluding countries and early year data also confirm the research results. Further, family firms in this study show a capital structure based on less external finance, such as lower debt levels and a lower debt-to-asset ratio, which supports the pecking order theory. However, family firms do not outperform non-family firms in sectors who are hit by the COVID-19 pandemic. The results in this study expand existing literature by providing new evidence of private family firms' performance during the COVID-19 crisis.

Key words: family firms, firm performance, COVID-19 crisis

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1 Introduction

In December 2019, an outbreak of the coronavirus (COVID-19) epi-centered in Wuhan, China, has turned the world upside down. The World Health Organization (WHO) declared a pandemic on 11th March 2020, since the novel coronavirus has spread rapidly over the world and affected a large number of people (Maital & Barzani, 2020; World Health Organization, 2020). This worldwide outbreak can be stated as an alarming global health crisis affecting the global economy (Kraus et al., 2020; Pak et al., 2020). A lot of companies are in uncertain times and may not survive the effects of the COVID-19 crisis, especially when government support is phased out. However, family firms show strong financial flexibility, with better cash positions and lower debt in times of crisis, due to their conservative financial structure (Fahlenbrach, Ragheth, & Stulz, 2020; Ward, 1988). Their trusting relationships, fast decision making and long-term orientation to guarantee continuity of a healthy company in the future for next generations, make them better resilient in an economic downturn (Matser, Agterhuis, van den Akker, Hoogeboom, & van Helvert, 2020; Miller & Le Breton-Miller, 2005; Nyenrode Business Universiteit, 2020; van Essen, Strike, Carney, & Sapp, 2015). These unique features of family businesses may play a significant role on their firm performance during the COVID-19 crisis (Deloitte, 2020).

1.1 Introducing COVID-19 and its economic impact

The COVID-19 virus is an infectious disease which is transmitted from human to human and can cause breathing problems and fever (RIVM, 2021). As of July 1st 2021, almost 4 million people worldwide have died from the virus and over 182 million COVID-19 infected cases are confirmed (World Health Organization, 2021). To prevent infection and to slow transmission of the coronavirus, public health organizations recommend washing hands regularly and maintain at least one meter distance between people (World Health Organization, 2021). In order to protect society, healthcare and the economy, most governments have anticipated with actions, crisis- and policy responses (Pak et al., 2020). At the same time, their finance ministries announced several financial support and stimulus packages for all businesses to protect jobs and incomes and to repair the immediate economic damage from the COVID-19 pandemic (Ashraf, 2020; Europa Nu, n.d; Rijksoverheid, 2020).

The outbreak of the COVID-19 pandemic is not only a global health crisis impacting people's social and daily life, but it also became a worldwide economic crisis (Kraus, et al., 2020). Shen, Fu, Pan, Yu and Chen (2020) state that the COVID-19 crisis is the worst global

recession since 1930. Most countries reported a fall in the real gross domestic product (GDP) growth rate in 2020. Some economies have been hit more than others, since some southern countries experience GDP losses of around 12%, while some northern and western countries report GDP losses of ‘only’ 7% in 2020 (Sapir, 2020).

1.2 Family firms during the COVID-19 crisis

Whereas epidemiological studies have concentrated on understanding the role of macro-level factors to pandemics, the economic impact of the pandemic is also large at firm-level (Sharma, Borah, & Moses, 2021). The pandemic may affect firm performance (Shen, Fu, Pan, Yu, & Chen, 2020), firm financing and firm costs of capital (Goodell, 2020). Firms’ debt levels have increased because the COVID-19 lockdown measures reduced sales and therefore cash flows have been extremely affected (Ellul, Erel, & Rajan, 2020; The World Bank, 2021). Firms with less financial flexibility, who cannot easily provide money for their cash flow shortfall, will experience financial distress. These cash flow shortfalls might cause problems in the longer term (Ellul et al., 2020; Fahlenbrach, Rageth, & Stulz, 2020).

For some firms the economic effect of COVID-19 is temporary. The COVID-19 pandemic may not affect all companies and sectors (Mazur et al., 2021). Firms with large amounts of cash and less debt show lower impact of COVID-19, since their financial flexibility help them to cope with unexpected events (Fahlenbrach, Rageth, & Stulz, 2020). Firms that show stronger financial flexibility in times of crisis, are family firms due to their conservative financial structure (Ward, 1988) and long-term view (van Essen et al., 2015; Miller & Le Breton-Miller, 2005). These companies enjoy better cash positions, have lower debt to equity ratios and continue to have stable earnings (Miller & Le Breton-Miller, 2005). During the COVID-19 crisis, family-owned firms with stronger pre-2020 finances, such as more cash, less debt and larger profits, have lower stock price reactions to the pandemic than other firms (Ding, Levine, Lin, & Xie, 2021).

There seems to be a difference in performance between family firms and non-family firms during crisis. Looking at the financial crisis of 2008–2010, family firms were better performers compared to non-family firms (Bauweraerts, 2013; Bloch, Kachaner, & Mignon, 2012; van Essen et al, 2015; Minichilli, Brogi, & Calabrò, 2015; Zhou, He, & Wang, 2017). Although there are also studies that find opposite evidence for family firms’ performance during the financial crisis, family firms are still interesting to investigate (Cesaroni, Chamocho, & Sentuti, 2017; Lins, Volpin, & Wagner, 2013). First, family firms are largely and widely spread

all over the world, public and private, small and large and throughout all sectors. Second, the unique characteristics of family firms, such as their long-term orientation, flexibility, fast decision making and financial independence may play a significant role on their firm performance during the pandemic (Deloitte, 2020; Nyenrode Business Universiteit, 2020). According to research from RSM-Nyenrode (2020), many family businesses have a more optimistic view about the chances of survival of their firm. Family firms (61%) state that the COVID-19 has led to permanent innovations within their company.

The choice of family-owned business to pursue conservative financial policies, such as a high degree of self-financing and less external capital, enables them to endure in difficult economic times (Ward, in Matser et al., 2020). Therefore, family businesses have a lot of economic resilience (Keijzer, 2020; Kools, 2020; Matser et al., 2020). Roberto Flören, RSM professor, states “as a result, family businesses often come out of crises better than non-family businesses” (Nyenrode Business Universiteit, 2020).

The aim of this study is to gain insight whether there is a relationship between family-owned firms and firm performance during the COVID-19 crisis. Using a sample of West European private family and non-family firms, the study investigates if family firms are better performers than non-family firms during the COVID-19 crisis. The novel health care crisis has a different cause, scope and severity (Ding et al., 2021), that makes this COVID-19 crisis different from other crises. Therefore, little research is done about private family firms in Western Europe during the COVID-19 crisis. For that reason, this research contributes to the literature by bringing new evidence from the current COVID-19 crisis on the debate whether private family firms are better performers during crisis than non-family firms (Zhou et al., 2017).

1.3 Structure

This study is divided into six chapters. The study starts with an introduction of COVID-19 and its economic consequences. The second chapter includes the literature review, relevance and problem statement. That chapter reviews academic relevance of family-owned businesses and firm performance in normal market conditions and in crises. Next, the third chapter discusses the methodological approach, variables and data sources of this study. Empirical findings, results and robustness tests are described in chapter four. In chapter five, conclusions are presented. Finally, the bibliography and the appendices close this study with a sixth and seventh chapter.

2 Theoretical background

The academic relevance of family firms and their firm performance in normal market conditions and in crises is discussed in the next five paragraphs of this chapter.

2.1 Defining a family firm

Family firms constitute all over the world (Zhou et al., 2017). In most of the countries, family-owned businesses account for a large part of the economy (Amann & Jaussaud, 2011). Across Europe, between 70% and 80% of all companies are family-owned businesses and 44.29% of the companies in Western Europe is a family firm (Faccio & Lang, 2002; Mandl, 2008). The family business sector is mostly dominated by small and medium-sized enterprises (SMEs), as families are important in small firms (Faccio & Lang, 2002; Siakas, Naaranoja, Vlachakis, & Siakas, 2014). However, some family firms are relatively large and giants in their sector (Tagiuri & Davis, 1996).

Family firms have unique features that make them different as type of organization. Family-owned businesses cope with a dilemma since they are characterized by two overlapping, dynamic and sometimes conflicting systems, namely the family (the emotional) and the business (the professional) (Siakas et al., 2014; Tagiuri & Davis, 1996). The ‘family’ part is a unique feature in the family business compared to other or non-family businesses. Figure 1 shows non-family firms are involved with the business and family firms are involved with the business and the family. Every member of the family is somehow involved with the business, whether this is ownership, management or employment. The interaction between the family and the business is mutual. Therefore, the personal and private interests of the family may blend with the firm and vice versa (Siakas et al., 2014). For instance, difficult times puts pressure on the family relationship and the business (Kox & Kramer, 2021).

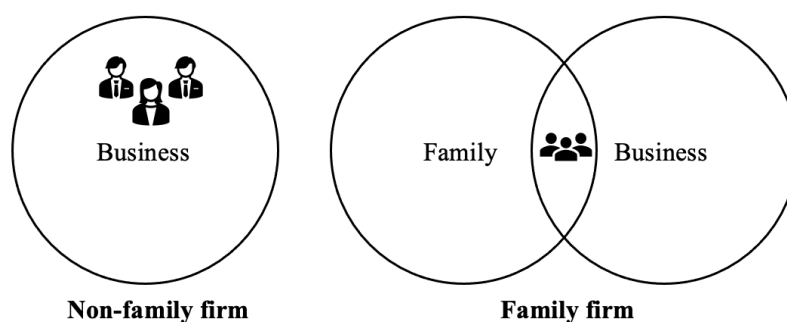


Figure 1 Overlapping elements of the family firm (Kox and Kramer, 2021; Tagiuri and Davis, 1996)

The family firm has been characterized as a firm with the combination of family control and the business. However, the definition of family firms in academic literature is widely ranged, based on both single and multiple criteria. Therefore, it is difficult to find an exact and universal definition for a family firm (Amann & Jaussaud, 2011; Miller, Le Breton-Miller, Lester, & Cannella Jr., 2007). In prior research a family firm is defined as family-owned when the founder's family owns a fraction of the firm or family members serve on the board of directors (Anderson & Reeb, 2003; Faccio & Lang, 2002; La Porta, Lopez-de-Silanes, & Shleifer, 1999). Villalonga and Amit (2006) use a variety of definitions. The definitions vary from the least restrictive, a family member owns any amount of shares, to very restrictive definitions, under which the family is largest shareholder, has at least 20% of the voting stock, is second or later generation and has family directors. The percentage of voting shares held by the family differs in several studies. For example, at least 5%, 10%, 20% or 33% of the company's voting rights are owned by one person or one family (Barth, Gulbrandsen, & Schøne, 2005; Claessens, Djankov, & Lang, 2000; Maury, 2006; La Porta et al., 1999). Mostly large companies own less than a majority of the stock and elect a board of directors that will support the family's interests (Tagiuri & Davis, 1996).

For most smaller firms, owning at least 50% of the firm's stock is having ownership control (Tagiuri & Davis, 1996). For this study, a family firm is defined as one in which one or more individuals or families own at least 50.01% of the firm's stock (Amann & Jaussaud, 2011; Ang, Cole, & Lin, 2000).

2.2 Family firm performance

The impact of family ownership on firm performance is widely investigated in the literature, to understand how and if family ownership affects firm performance (Sciascia & Mazzola, 2008). Although research on the performance of family-owned firms is growing, the results are very mixed (Bertrand & Schoar, 2006). Therefore, it is one of the most debated topics in recent years (Cesaroni et al., 2017). Several studies have examined firm performance between family firms and non-family firms (Anderson & Reeb, 2003; Maury, 2006; Villalonga & Amit, 2006). The distinction between private family firms (Che & Langli, 2015; Sciascia & Mazzola, 2008; Westhead & Howorth, 2006) and public family firms (Anderson & Reeb, 2003; Maury, 2006) on firm performance is also researched. Earlier research has focused on listed family firms, probably because of easier data accessibility (Che & Langli, 2015). Looking at financial performance, listed family firms seems to outperform non-family (Heino, Tuominen, & Jussila, 2020). Especially, research among large public traded United States (U.S.) firms indicate that

family-owned firms outperform non-family firms on a variety of performance measures; they have higher return on assets (ROA) and higher Tobin's q ¹ than non-family firms (Anderson & Reeb, 2003; Dyer, 2018; Maury, 2006). Family-owned firms have greater performance because the founder serves as CEO within their sample (Anderson & Reeb, 2003; Fahlenbrach, 2009; McConaughy, Walker, Henderson, Jr, & Mishra, 1998; Villalonga & Amit, 2006). Lee (2006) states that "families indeed generate positive influence on businesses; family firms are likely to grow faster, experience higher employment growth and be more profitable" (p.112). However, some studies find opposite evidence whether family firms are better performers than non-family firms. In contrast to Anderson and Reeb (2003), Holderness and Sheehan (1988) find evidence that majority-shareholder of U.S public firms have lower Tobin's q than non-family firms (in Villalonga & Amit, 2006). In addition, the outperformance of family firms in the U.S. varies greatly depending on how these family firms were defined and sampled (Miller et al., 2007).

In non-U.S. economies, the evidence about the relationship between family firms and firm performance is scarce and also mixed, especially for private family firms (Villalonga & Amit, 2006; Sciascia & Mazzola, 2008). Since studies for public family firms often show positive results on firm performance, there is no guarantee the evidence is valid for private family firms (Che & Langli, 2015). Various studies examine the involvement of family ownership on firm performance of private owned firms. The relationship is negative (Sciascia & Mazzola, 2008; Westhead & Howorth, 2006) and positive (Che & Langli, 2015) for private family firms, in respectively Italy, United Kingdom and Norway. Family firms with stronger family power and higher percentage of family ownership are associated with higher firm performance (Che & Langli, 2015). It should be mentioned that all of above studies are carried out in different countries, with different samples, type of firms and governance regimes (Miller et al., 2007).

2.3 Family firms' performance during crisis

Family firms can experience stressful changes and events during their existence, internally (for example: death, divorce, birth and marriage) and externally (for example: trends in social cultural, political, technological and demographic environments and crisis) which can influence their structure, dynamics and financial performance (Kox & Kramer, 2021). When it comes to crisis, they are less common, but when they occur, the impact is great. Family firms are

¹ Performance measure using market valuation and replacement costs of assets (Hayes, 2021).

therefore dealing with ‘double vulnerability’ during financial shocks. A crisis hits the owners of the family firm twice, first on personal level and second business related. Both systems can be affected simultaneously by a crisis. Taking the COVID-19 crisis as an example, the business is facing strict governmental restrictions and the family can face emotional times due to illness (Kox & Kramer, 2021; Kraus et al., 2020).

Since crises do not occur that often, almost all of existing and prior research is based on family ownership and firm performance in stable economic times (Anderson & Reeb, 2003; Che & Langli, 2015; Lee, 2006; Maury, 2006; Sciascia & Mazzola, 2008; Villalonga & Amit, 2006; Westhead & Howorth, 2006; in Zhou et al., 2017). In other words, the ‘special’ COVID-19 event creates the opportunity to analyze family firms and their resilience in economic downturn (Chrisman, Chua, & Steier, 2011). For recession periods, the evidence is rather scarce (Zhou et al., 2017). It may be interesting to re-examine financial performance of family firms and non-family firms during recession times since evidence in stable and good economic times may not be suitable (Zhou, 2012). Therefore, the question of this study is whether family businesses perform better than non-family businesses during the COVID-19 pandemic.

Similarly to previous studies concerning family firm performance in normal economic times, research shows mixed results according to firm performance and family ownership in crisis times. Listed non-U.S. family firms from 35 countries around the world underperform relative to non-family firms during the 2008–2009 global financial crisis (Lins et al., 2013). The underperformance is for those family firms with high expected agency costs and with reduction of investments. Other studies find contradictory conclusions. They find that family businesses performed better than non-family businesses during the 1997/1998 Asian crisis (Amann & Jaussaud, 2011), the internet bubble explosion (Bloch et al., 2012) and the global financial crisis of 2008–2010 (Bloch et al., 2012; van Essen, Strike, Carney, & Sapp, 2015; Minichilli et al., 2015; Zhou et al., 2017). Family firms where the founder was still present invested less and had better access to the credit market (Zhou et al., 2017). They have easier access and less restrictions to debt and credit than non-family firms during the financial crises (Crespí-Cladera & Martín-Oliver, 2015; D'Aurizio, Oliviero, & Romano, 2015). Moreover, firms with family CEOs and relatively lower family ownership concentration perform better in times of a crisis (Minichilli et al., 2015). Family firms resist better during the crisis, they are able to recover faster, make decisive decisions and enjoy better performance than non-family firms (Amann & Jaussaud, 2011). There are also indications that family firms can deal better with unexpected events (Bauweraerts, 2013).

Prior studies have examined the effect of crisis on large, listed family firms' performance. The relationship between firm performance and private family firms is under-investigated in existing literature (Bauweraerts, 2013). The involvement of families in private firms seems to be negative (Cesaroni et al., 2017) and positive (Bauweraerts, 2013) related to financial performance during the global financial crisis compared to their non-family peers. This shows that studies find mixed evidence whether private family firms outperform non-family firms during crisis.

2.4 Theoretical approaches of family firms' performance

In order to examine the relationship between firm performance and family ownership in private firms during the COVID-19 crisis, the agency theory (Fama & Jensen, 1983), the socioemotional wealth theory (Gomez-Mejía, Takács Haynes, Núñez-Nickel, Jacobson, & Moyano-Fuentes, 2007) and the pecking order theory (Myers & Majluf, in Bauweraerts & Colot, 2012) are possible explanations for positive financial performance of family firms.

Agency theory

First, the agency theory suggests that the firm's ownership is separated from the firm's management and both parties have diverging and different goals (Che & Langli, 2015; Fama & Jensen, 1983). Anderson and Reeb (2003) explain that better goal alignment between shareholders and managers in family firms can lower agency costs and give family firms competitive advantage over non-family firms during crisis (Bauweraerts, 2013; Zhou et al., 2017). The family involvement in family firms means less separation of ownership and management and thus having similar goals reduces opportunistic behaviour risks of managers, improves efficiency and will lead to higher performance (Amann & Jaussaud, 2011; Cesaroni et al., 2017; O'Boyle Jr et al., 2012).

However, the family involvement in firms can also increase ownership and management complexity. The emotional of the family and the professional of the business can be conflicting sometimes. At all times, the business is not free from family influences (Lee, 2006); marital dissolution, for example, impacts short-term financial performance (Galbraith, 2003). This explains the different arguments about the usefulness of agency theory within private family firms. The 'performance-based system' of agency theory does not fit well with the 'relationship-based system' of family firms (Westhead & Howorth, 2006). Therefore, the stewardship theory is a popular alternative to agency theory to analyze private family firms in which there is better alignment of interests between ownership and management. The stewardship theory assumes

that closely held family firms (the stewards) are more motivated to align their interests with the business (shareholders), since they will focus on protecting “family agendas” to maximize the firms financial performance (Che & Langli, 2015; Chrisman, 2019).

Families have strong incentive to achieve their goals since “the family’s welfare is closely tied to firm performance” (Lee, 2006, p.104). Since ownership and management are usually the same entities in family firms, no conflicts will occur between the short term goals of the agent (manager) and the long-term orientation of the principal (owner) compared to their non-family counterparts (Bauweraerts, 2013; O’Boyle Jr, Pollack, & Rutherford, 2012). This may be beneficial when unexpected events, such as crises, occurs (Bauweraerts, 2013). The agency theory is also applicable for privately held firms (Chrisman, Chua, Kellermanns, & Chang, 2007).

Socioemotional wealth theory

Second, the socioemotional wealth theory suggests that the outperformance of family firms during the crisis can be explained by the fact that family firms want to guarantee continuity of a healthy company in the future for next generations (Bauweraerts, 2013; Gómez-Mejía et al., 2007; Matser et al., 2020). They maintain good and long-term relationships with employees, customers, suppliers, internal and external shareholders (Cennamo, Berrone, Cruz, & Gomez-Mejia, 2012; Matser et al., 2020; Miller & Le Breton-Miller, 2005). Family-owned businesses protect the family image, reputation and social ties with stakeholders to pass a sustainable company onto next generations (Bauweraerts, 2013; Cennamo, Berrone, Cruz, & Gomez-Mejia, 2012). Thus, they build up a strong social network and will not move their business quickly, eventhough the circumstances are better somewhere else (Matser et al., 2020). Their various unique social featur, such as trusting relationships and intellectual capacity will improve and speed up the decision making process during crises (Arregle, Hitt, Sirmon, & Very, 2007; Bauweraerts, 2013).

Pecking order theory

Third, the pecking order theory suggests that firms have hierarchy for financing decisions; they prefer self-financing (internal) to debt (external) financing (Gama & Galvão, 2012). Family firms would develop specific financing preferences and limit their choice of financial resources, since the family managers’ want to keep control of the business (Bauweraerts & Colot, 2012; Levie & Lerner, 2009). Due to their long-term orientation and emotional closeness with the business, they choose a more conservative financial structure. The

capital structure is based on less external finance, includes a high degree of self-financing and more equity than debt in contrast to non-family firms (Crespí-Cladera & Martín-Oliver, 2015; Gama & Galvão, 2012; Hamid, Abdullah, & Kamaruzzaman, 2015). Since family firms enjoy more equity-ownership structure in contrast to non-family firms, their long-term view also appears to have less agency conflicts between equity and debt holders (Anderson, Mans, & Reeb, 2003). Moreover, the financial structure of family firms show better solvency ratios and lower leverage ratios (Amann & Jaussaud, in Cesaroni et al., 2017). Also, family firms who are more concerned preserving their non-economic factors, such as their socioemotional wealth, have lower debt levels (Baixauli-Soler, Belda-Ruiz, & Sánchez-Marín, 2021). During economic downturn, when most firms face economically hard times, the conservative financial structure of family firms might prevent them from drastic financial problems as they are more economic resilient than others (Matser et al., 2020; Zhou et al., 2017). As a consequence, this enables family firms to cope better with crisis (Ward, in Matser et al., 2020). They outperform non-family firms and can better mobilize their resources to maintain their business activities to continue in acute situations (Kraus et al., 2020).

Firms with family involvement are associated with higher profitability, plausibly due to better goal alignment between ownership and management, their trusting relationships with employees, customers, suppliers, shareholders and their conservative financial structure. There seems to be a positive relationship between family-owned firms and their financial performance in times of crisis. For this reason, the following hypothesis is presented:

***Hypothesis:** Family firms perform better than non-family firms during the COVID-19 crisis.*

2.5 Research problem and relevance

There is an ambiguous link between family-owned firms and financial performance in normal economic times and in crisis. The results of these prior studies are very mixed. Therefore, this study contributes to existing literature whether the involvement of family ownership effects their financial performance during the COVID-19 crisis (Sharma et al., 2021).

First, the investigation of private family firms is limited compared to the large proportion of studies on listed family firms worldwide (Chrisman et al., 2007). A journal pre-proof study from Amore et al. (2021) investigates whether family involvement in Italian listed firms has influence on their stock-market and accounting performance during the COVID-19 pandemic. Firms in which a family is shareholder and serves as CEO, outperform non-family

firms during the pandemic. That research is concerning listed family firms, but private family firms are not investigated yet in relation to the COVID-19 crisis. Whereas the research of Bauweraerts (2013) shows outperformance of private family firms during the global financial crisis of 2008, private family firms and the relationship between firm performance during the COVID-19 crisis remains uninvestigated. The interests of private family firms during crisis have been increased and this study will give new insights of private family firms' performance during the COVID-19 crisis (Chrisman et al., 2007).

Second, the few studies focused on private family firms, used small samples (Sciascia & Mazzola, 2008; Westhead & Howorth, 2006), which could lead to sample selection bias (Che & Langli, 2015). However, the sample selection bias will be minimal since this study includes a large sample of firms within several West European countries.

Third, the recent global health and economic crisis caused by the COVID-19 virus, has affected a large number of countries, industries and firms disproportionately (Mazzucato & Kattel, 2020). The COVID-19 crisis has a different cause, scope and severity that makes this crisis different from other crises (Reinhart, in Ding et al., 2021). For that reason, this study gives an extra focus on family firms' performance in sectors who are hit by the COVID-19 pandemic.

3 Methodological approach

This chapter describes the methodological approach of this study and is divided in three paragraphs: 3.1 fixed effects estimation, 3.2 variables and 3.3 sample and data source.

3.1 Fixed effects estimation

This study is based on panel data collected from private firms in Western Europe, divided over family firms and non-family firms. Since the panel data contains a lot of available information, it gives more efficient estimates (Fingleton, n.d.).

The empirical model to test family firms' performance during the COVID-19 crisis is the fixed effects estimation, which includes country-specific fixed effects, sector-specific fixed effects and time fixed effects. The country fixed effects model will absorb unobservable country level time-invariant characteristics, such as culture, (national) political system and (tax rate) regulations, for each country j to help explaining the firm performance variable over the whole sample period from 2012 to 2020 (Zhou et al., 2017). For example, the tax policy in a particular country could have effect on the return on assets (ROA) since the performance measure include changes in capital structure, such as interest and tax. These unobserved predictors of each country j are assumed to be constant over year t (fixed) and will no longer be omitted variables. The sector-specific fixed effects model will capture all specific sector differences across sectors, such as systemic risk differences across industry types, to deal with omitted variable bias (Moreira, n.d.). Systematic risk can be defined as risk related to how sensitive a firm's sales and cash flows are to general economic conditions within an industry (de Goeij, 2017). Lastly, the time fixed effects will control for year-specific shocks and events, such as economic fluctuations, that are common to all firms in all countries in a particular year and are important to explain return on assets (ROA), return on equity (ROE) and operating return on assets (OROA) (Buck, 2015; Moreira,n.d.). Including country, sector and time fixed effects, the fixed effects model is a suitable method to use in this study.

The fixed effects estimation is used for the regression analysis to test whether private family firms outperform non-family firms during the COVID-19 crisis in Western Europe. The following empirical model is designed:

Firm performance_{isjt}

$$\begin{aligned}
&= \alpha_i + \beta_1 Family_{isjt} + \beta_2 COVIDcrisis_t + \beta_3 Family_{isjt} * COVIDcrisis_t \\
&+ \beta_4 Size_{isjt} + \beta_5 Age_{isjt} + \beta_6 SalesGrowth_{isjt} + \beta_7 Debts_{isjt} + u_j + z_s + \tau_t \\
&+ e_{isjt}
\end{aligned}$$

where *firm performance_{isjt}* is measured with three different dependent variables: ROA, ROE and OROA. *ROA_{isjt}* is the main measure for firm performance. *ROA_{isjt}* is defined as net income of each firm *i* in sector *s* and in country *j* at year *t* divided by the book value of total assets. Alternative firm performance measures are *ROE_{isjt}* and *OROA_{isjt}*. *ROE_{isjt}* is defined as net income of each firm *i* in sector *s* and in country *j* at year *t* divided by shareholders' equity; *OROA_{isjt}* is defined as earnings before interest and taxes (EBIT) of each firm *i* in sector *s* and in country *j* at year *t* divided by the book value of total assets; α_i is the constant term; *Family_{isjt}* is a dummy variable that equals one if the firm is a family-owned firm, zero otherwise; *COVIDcrisis_t* is a dummy variable that equals one for the year is 2020, zero otherwise; *Family_{isjt} * COVIDcrisis_t* is an interaction variable, which represent the combined effect of *Family_{isjt}* and *COVIDcrisis_t* on firm performance (Stevens, 2000). β_3 is the coefficient of interest. The following variables refer to firm-specific control variables that potentially affect firm performance (Lins et al., 2013; Lee, 2006): *Size_{isjt}* is the natural logarithm of the book value of total assets of each firm *i* in sector *s* and in country *j* at year *t*; *Age_{isjt}* is the number of years between date of establishment and end of year 2020; *SalesGrowth_{isjt}* is the percentage change in sales for period 2012–2020; *Debts_{isjt}* represent the effect of capital structure on performance and is the ratio of long-term debt divided by the book value of total assets of each firm *i* in sector *s* and in country *j* at year *t* (Bauweraerts, 2013). u_j is the country fixed effects; z_s is the sector fixed effects; τ_t is the time fixed effects and the last term *e_{isjt}* refers to the error term, where *i* ($=1 \dots N$) represents an individual firm, *s* ($=1 \dots N$) represents the sector, *j* ($=1 \dots N$) denotes a country and *t* the number of years ($=1 \dots T$).

Software program STATA is used for the data analysis.

3.2 Variables

3.2.1 Dependent variables

This study uses return on assets (ROA) as main firm performance measure. Profitability measures to check if the results are not sensitive to the definition of return on assets (Zhou et al., 2017), are return on equity (ROE) and operating return on assets (OROA) using earnings before interest and taxes (EBIT) divided by the book value of total assets (Anderson & Reeb, 2003; Bauweraerts, 2013; Maury, 2006; Zhou et al., 2017). The alternative firm performance measures ROE and OROA will be tested in the robustness paragraph (see 4.3 Robustness tests).

Return on assets

Return on assets (ROA) is used as main measure for firm performance. Following earlier studies, the ROA is defined as net income of each firm divided by the book value of total assets (Anderson & Reeb, 2003; Che & Langli, 2015; Maury, 2006). Total assets include liabilities (like debt) plus shareholder's equity. This ratio indicates the profitability of a firm relative to its total assets and is displayed as a percentage. Return on assets is an indicator how efficient a firm is using its assets to generate income (Hargrave, 2021).

ROA is calculated by the formula:

$$\text{Return on assets} = \frac{\text{Net income}}{\text{Total assets}}$$

Return on equity

The first variable to check if the results are not sensitive to the definition of ROA, is return on equity (ROE). ROE is defined as net income of each firm divided by shareholders' equity of each firm. ROE measures the profitability of a firm in relation to its shareholders' equity. Shareholders' equity is equal to a firm's assets minus debts (Fernando, Return on Equity – ROE, 2021). However, this measure does not provide a complete view of firm's performance, since it does not factor in leverage. This may cause problems when a firm generates income from (an unhealthy amount of) debt whereby their ROE will increase even though they may have a riskier capital structure (Deloitte Center for the Edge, 2013).

ROE is calculated by the formula:

$$\text{Return on equity} = \frac{\text{Net income}}{\text{Shareholders' equity}}$$

Operating return on assets

The second profitability measure to check for sensitivity of the results using ROA is operating return on assets (OROA). OROA provides a more balanced view of firm's performance than ROE. OROA is measured as earnings before interest and taxes (EBIT) of each firm divided by the book value of total assets (Bennedsen, Nielsen, Pérez-González, & Wolfenzon, 2007; Zhou et al., 2017). This measure uses operating income in the numerator instead of net income which is used by ROA (Corporate Finance Institute, n.d.). OROA is unaffected by the changes in capital structure (before interest and taxes) and captures total assets rather than a part of them, unlike ROA and ROE respectively (Simoes Viera, 2014; Zhou et al., 2017).

OROA is calculated by the formula:

$$\text{Operating return on assets} = \frac{EBIT}{\text{Total assets}}$$

3.2.2 Independent variables

This research includes two independent dummy variables: *Family* and *COVIDcrisis*.

Family

The independent variable *Family* is a binary variable; indicates one if the firm is family-owned for at least 50% of the voting rights and zero for a non-family firm.

In this study, a family firm is classified as family-owned when the ultimate owner (one or more individuals or families) of a firm owns a minimum percentage of 50.01% or more of the stock, following family firm definition of Ang, Cole and Lin (2000).

COVIDcrisis

The second independent variable *COVIDcrisis* is a binary variable and crisis indicator; the value equals one for the crisis year 2020 and zero for the years 2012-2019.

3.2.3 Control variables

In order to control for firm-specific characteristics for which the fixed effects model cannot control, several control variables are collected (Maury, 2006; Zhou et al., 2017). The database Orbis is used to obtain the firm-specific control variables for all firms (van Essen et al., 2015).

Firm size

The first firm-specific variable is *firm size*. *Firm size* is measured as the natural logarithm of the book value of total assets of each firm *i* in sector *s* and in country *j* at year *t*. The natural logarithm is used to minimize the effect of extreme values bias the findings.

Firm age

Firm age is calculated in years as the difference between date of establishment and the end of year 2020; the number of years the firm has been in business (Cesaroni et al., 2017).

Sales growth

The control variable *sales growth* represents the value of growth opportunities; the percentage change in sales for the period 2012-2020 and is calculated as (net sales this year– net sales last year) / net sales last year (Miller et al., 2007). For example, the sales growth rate for the year 2020 is calculated as (net sales year 2020 – net sales year 2019) / net sales year 2019.

Sales growth is calculated by the formula:

$$\text{Sales growth} = \frac{\text{Net sales this year} - \text{net sales last year}}{\text{Net sales last year}} * 100\%$$

Debts

The control variable *debts* is included to control for the effect of capital structure on firm performance (Bauweraerts, 2013). It is defined as long-term debts divided by the book value of total assets. The debt-to-assets or solvency ratio provides a measure of the long-term financial position of a company by the percentage of a firm's assets financed with long-term debt (Kenton, 2020). The lower the debt levels, the higher the firm performance ROA, since the denominator of ROA (total assets) includes liabilities like debt (McClure, 2020).

Debts is calculated by the formula:

$$\text{Debts} = \frac{\text{Long - term debts}}{\text{Total assets}}$$

This study expects a positive relationship between *firm size* and firm performance (Simoes Viera, 2014). Possible reasons for larger firms to have higher profitability is due to greater market power, economies of scale advantages, better market experience and favorable financing conditions (Pervan & Višić, 2012). It is expected that control variable *firm age* has also a positive relationship with firm performance. Older firms learn about their abilities and become dominant and experts over their business environment (Rossi, 2016). According to the

socioemotional wealth theory, family firms want to guarantee the continuity of a healthy company in the future. Therefore, it is expected that family firms are older than non-family firms due to their long-term view and the desire to pass the family business onto next generations. On the other hand, family members in the next generation could renounce to run the family business whereas non-family firms could hire managers from outside. This study expects a positive relationship between the control variable *sales growth* and firm performance. Higher level of sales increases firms' net income. A negative relationship between debts and firm performance is expected. Firms with higher profitability have lower debts levels because they are able to use internal financing, according to the pecking order theory (Simoes Viera, 2014). Family firms choose a more conservative financial structure with a high degree of self-financing, due to their long-term orientation and emotional closeness with the business. In this case, it is expected that family firms have lower debt levels than non-family firms. An overview of the dependent variables, independent variables, control variables and their definitions is presented in Table 1.

Table 1 Variables, definitions and measurements in this study.

Variable	Definition	Measurement
Dependent variables		
<i>ROA</i>	Return on assets	Net income of each firm divided by the book value of total assets.
<i>ROE</i>	Return on equity	Net income of each firm divided by its shareholders' equity.
<i>OROA</i>	Operating return on assets	Earnings before interest and taxes (EBIT) of each firm divided by the book value of total assets.
Independent variables		
<i>Family</i>	A family business	Dummy variable, which equals one when the firm is family-owned for at least 50% of the voting stock and zero otherwise.
<i>COVIDcrisis</i>	Crisis year 2020	Dummy variable, which equals one for crisis year 2020 and zero for the years 2012–2019.
Control variables		
<i>Size</i>	Firm size	The natural logarithm of the book value of total assets.
<i>Age</i>	Firm age	The number of years between date of establishment and end of year 2020.
<i>Sales growth</i>	Growth opportunities	The percentage change in sales for period 2012–2020 and is calculated as (net sales year this year – net sales last year) / net sales last year.
<i>Debts</i>	Capital structure	Long-term debts divided by the book value of total assets.

3.3 Sample and data source

The sample of this study consists of 185.338 firm year observations of 20.927² private firms (11.904 family firms and 9.023 non-family firms) in 21 West European countries during the period 2012-2020. The West European region obtains enough valid data about private family firms and their firm performance during the COVID-19 crisis, to avoid sample selection bias. The firms have at least nine years of available data with a known value of return of assets (ROA) during that period. Firms in the banking, insurance and financial services sector (SIC³s 6000-6900) are excluded from this research (Maury, 2006), since financial indicators can be sensitive to economic activities (Ooghe and Van Wymeersch, in Bauweraerts, 2013) and potentially affect firm performance (Anderson & Reeb, 2003). Also, families are more important for non-financial firms (Faccio & Lang, 2002). The sample excludes listed firms, as private firms are most likely closely held by a family and therefore considered as family-owned (Faccio & Lang, 2002). After eliminating financial firms, listed firms and missing data, the sample consists of 185.338 firm year observations, separated into 105.237 family firm year observations and 80.101 firm year observations.

In this study, a family firm is classified as family-owned when the ultimate owner (one or more individuals or families) of a firm owns at least 50% or more of the firm's shares. To obtain private family firm data and their ownership structure, database Orbis is used. Orbis is full of information concerning ownership structure of private companies worldwide and it provides also the corresponding variables essential in this study (Bauweraerts, 2013). Orbis identifies an ultimate owner of a firm by calculating the voting rights at a threshold of 25.01% or 50.01% (Lins et al., 2013). This study uses the 50.01% threshold, where firms are identified as ultimate owner when a single family owns more than 50% of the firm's shares. Non-family firms are identified when the ultimate owner exceeds the 50.01% threshold and if the firm is not affiliated with one or more individuals or families. This includes firms that are owned by public authorities, employees and/or directors, corporate companies, foundations, banks and financial companies, insurance firms, mutual and pension funds, hedge funds, venture capital and private equity firms. Those non-family firms have multiple block holders that exceed the 50.01% threshold and are not identified as widely held.

² Based on first model year 2012

³ Standard Industrial Classification

4 Empirical findings and results

This chapter gives an overview of the empirical findings and results of this study. It is divided in three paragraphs: 4.1 descriptive statistics, 4.2 fixed effects estimation and 4.3 robustness tests.

4.1 Descriptive statistics

This paragraph provides the descriptive statistics of 185.338 private family and non-family firm year observations during the period 2012-2020 in Western Europe. It will provide a first insight of the main variables, such as return on assets (ROA), return on equity (ROE), operating return on assets (OROA), firm age, firm size, number of employees, sales and debts.

The sample includes 105.237 family firm year observations, which is 56.78% of the total sample. The group of non-family firms include 80.101 firm year observations. Even though not reported in Table 2, the sub-group of non-family firms contains the following percentages of shareholders: 36% corporate, 4.04% financial companies, 1.3% mutual and pension funds and the remaining is owned by banks, employees and/or directors, public authorities, foundations, insurance companies, hedge funds, venture capital and private equity firms. The sample includes many small (76.176 firm year observations) and medium-sized (76.192) businesses, but also very large (6.972) and large (25.998) companies⁴. An overview of the number of firm year observations from family and non-family firms in Western Europe and the industry statistics of family and non-family firms are provided in Appendix A and B (Table 6 and 7).

Table 2 presents the summary statistics for the variables in this study. Observations, means and standard deviation describing the main variables in the sample. Family firms are with about 20 years on average 5 years younger than non-family firms. Family firms are also

⁴ Companies match at least one of the following conditions:

- Very large companies: operating revenue of more than 100 million EUR, total assets more than 200 million EUR, more than 1000 employees and they are listed.
- Large companies: operating revenue of more than 10 million EUR, total assets more than 20 million EUR and more than 150 employees
- Medium sized companies: operating revenue of more than 1 million EUR, total assets more than 2 million EUR and more than 15 employees
- Small companies: when they are not included in another category (Orbis, n.d.).

smaller than non-family firms. The average number for employees is slightly higher for family businesses. The average ROA is 7.11% for all firms in the sample during the period 2012-2020. Family firms present on average higher values in ROA than non-family firms over the sample period, 7.50% versus 6.60% respectively. Also, the alternative performance measures ROE and OROA show a higher average for family firms than for non-family firms. Family firms have on average a ROE of 19.13% and an OROA of 10.05% compared to non-family firms, which show an average ROE of 15.19% and an average OROA of 9.05%. Non-family firms display on average higher levels of assets and sales than family firms. The sales growth of family firms is also very negative, on average about -339% during the sample period. It was not expected that non-family firms report more average sales than family firms. Following the socioemotional wealth theory⁵, the levels of sales were expected to be higher for family firms because their trusting relationships with stakeholders and customers help them to efficiently operate even the demand decreases in times of crisis (Bauweraerts, 2013; Bloch et al., 2012). Further, family firms have less long-term debt, a lower debts-to-asset ratio (variable *debts*) and a higher current ratio; the mean differences are statistically significant. It was expected that family firms have less long-term debt than non-family firms. This indicates they indeed prefer self-financing to debt as suggested by the pecking order theory. The average debts ratio for family firms is 8.70 and 10.09 for non-family firms, indicating 8.70% of a family firms' assets is financed with long-term debt (Kenton, 2020). The ratio is higher for non-family firms, meaning that they use a higher degree of debts to finance its assets (Hayes, 2021). Family firms have a higher current ratio than non-family firms; a current ratio of 2.99 compared to 2.60 for non-family firms. A higher current ratio means a better short time liquidity and the company is in better capable of paying its current liabilities (Fernando, 2021).

⁵ The socioemotional wealth theory state that the firm performance of family firms can be explained by the trusting relationships and social ties with stakeholders to pass a sustainable company onto next generations (Bauweraerts, 2013; Gómez-Mejía et al., 2007; Matser et al., 2020).

Table 2 Descriptive statistics of family firms, non-family firms and total firms in the period 2012-2020. It provides observations, means and standard deviation describing the main variables. The table is divided in five sub-columns: family firms (1), non-family firms (2), total firms (3) and difference in means (4).

	(1) Family firms			(2) Non-family firms			(3) Total firms			(4) Difference in means (2) – (1)
	Observations ^a	Mean	Standard Deviation	Observations ^a	Mean	Standard Deviation	Observations ^a	Mean	Standard Deviation	Mean
ROA	105.237	7.50	13.21	80.101	6.60	11.97	185.338	7.11	12.69	-0.90***
ROE	105.233	19.13	67.97	80.101	15.19	68.59	185.334	17.42	68.27	-3.94***
OROA	105.237	10.05	16.05	80.101	9.05	13.90	185.338	9.62	15.17	-0.99***
Employees	57.205	207	3048.10	63.570	201	1882.33	120.775	204	2503.11	-5.76
Age	105.237	19.56	15.47	80.101	24.79	17.73	185.338	21.82	16.69	5.23***
Size	105.237	6.17	1.92	80.101	7.31	1.97	185.338	7.03	1.96	1.26***
Assets	105.237	24310.52	483287.3	80.101	76538.11	953797.9	185.338	46882.7	725577.8	52227.59***
Long-term debt	105.237	4502.52	105626.23	80.101	13518.53	211764.94	185.338	8399.14	160424.6	9016.00***
Debts	105.237	8.70	14.73	80.101	10.09	16.98	185.338	9.30	15.76	1.39***
Sales	105.237	22560.17	338060.66	80.101	57367.88	586289.11	185.338	37603.67	462327.47	23807.71***
Sales growth	105.237	-338.94	123547.75	80.101	162.38	18243.77	185.338	-122.27	93866.77	501.32
Current ratio	104.082	2.99	5.73	79.520	2.60	4.84	183.602	2.82	5.37	-0.38***

Note: The following variables are in thousand EUR: assets, long-term debt, debts and sales. *** indicate statistical significance at 0.01 level.

^a Number of observations based on available year data points in the fixed effects model.

Figure 2 shows the average ROA of family and non-family firms in the model for the period from 2012 to 2020. Overall, family firms have higher average ROA percentages than non-family firms during the period 2012-2020. Moreover, the sensitivity performance measures ROE and OROA are also higher for family firms than non-family firms during the sample period in the model. Even though not presented in Figure 2, the average ROE for both family and non-family firms is 17.42% during 2012-2020. The average ROE for family firms and non-family firms is respectively 19.13% and 15.19%. For alternative performance measure OROA, the average OROA for both family and non-family firms is 9.62% in the model. The average percentage is 10.05% for family firms and 9.05% for non-family firms, based on firm year observations in the regression model during 2012-2020.

Looking at 2020, during the COVID-19 pandemic, family firms have an average a ROA of 7.42% which is 1.2 percentage points higher than non-family firms who have an average ROA of 6.22%. The ROA of family firms slightly increased in 2020 compared to 2019. Non-family firms, on the other hand, show a strong decline in ROA in 2020 compared to 2019. Family firms' ROA increased with about 0.68% compared to 2019, whereas non-family firms' ROA fell with approximately 8% in 2020 compared to 2019.

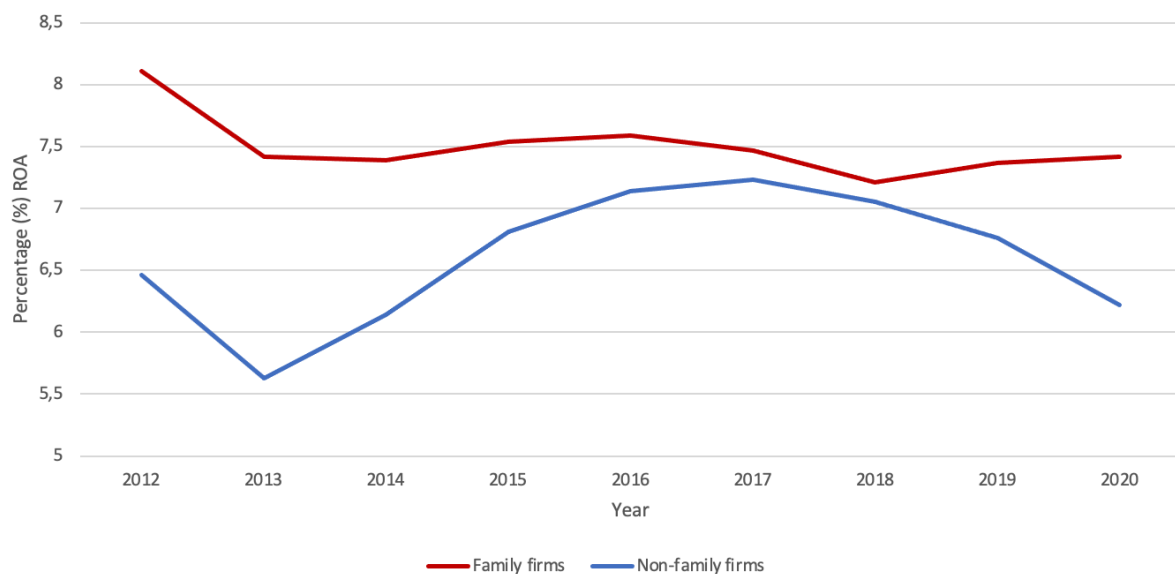


Figure 2 Average ROA (%) of family and non-family firms in the sample during 2012-2020.

4.1.1 Multicollinearity

To check if multicollinearity is not a problem in the estimated model, the variance inflation factor (vif) command is used to detect for multicollinearity. Multicollinearity occurs when independent variables are highly correlated with other independent variables in the regression. The standard errors of the estimated coefficients increase, and this causes problems when interpreting results. The estimate becomes less precise (Radboud Universiteit, 2019). The results of the vif test for all variables are lower than 5, indicating that multicollinearity is no problem in this study (All Marriott Library Guides, n.d.; Bauweraerts, 2013; Simoes Viera, 2014).

However, the vif analysis is mainly focused on OLS regressions. Since this study uses a fixed effects model, the Pearson correlation matrix is presented in Table 3 to check whether high correlation is present between the independent and control variables. Some correlation coefficients in Table 3 are high (>0.5), but these correlations are between dependent variables. The strong positive correlation between ROA and OROA is expected. The correlation coefficients between the independent and control variables are low. Therefore, there is no concern about multicollinearity problems in this study (Simoes Viera, 2014).

Table 3 Pearson correlation matrix between main variables of family and non-family firms in the period 2012-2020.

Variable	ROA	ROE	OROA	Family	COVID-crisis	Age	Debts	Size	Sales-growth
ROA	1.0000								
ROE	0.6211***	1.0000							
OROA	0.8407***	0.5388***	1.0000						
Family	-0.0095***	-0.0098***	-0.0160***	1.0000					
COVID-crisis	-0.0114***	-0.0120***	-0.0168***	-0.0000	1.0000				
Age	-0.0742***	-0.0476***	-0.0756***	-0.1547***	0.0936***	1.0000			
Debts	-0.1399***	-0.0713***	-0.0998***	-0.0438***	-0.0110***	-0.0255***	1.0000		
Size	-0.0126***	0.0172***	-0.0197***	-0.2806***	0.0176***	0.3618***	0.0520***	1.0000	
Sales growth	0.0028	0.0116***	0.0027	-0.0024	0.0008	0.0023	0.0012	0.0014	1.0000

*** indicate statistical significance at respectively 0.01 levels.

4.2 Fixed effects estimation

This paragraph provides the results of the fixed effects estimation. First, the Hausman-test is conducted to check whether the fixed effects model or the random effects model is appropriate to test whether family firms outperform non-family firms during the COVID-19 crisis. The random effects model is defined as appropriate model, when the null hypothesis (H_0) is not rejected and there is no correlation between the error term and independent variables of the random effects model. However, when there is correlation between the error term and the independent variables in the panel data model, the appropriate model to use is fixed effects model. The p-value for the Hausman test is 0.0000 with dependent variables ROA, ROE and OROA, meaning there are statistically significant results to use the fixed effects model for this study and to reject H_0 (Sheytanova, 2014).

4.2.1 Autocorrelation and heteroskedasticity

The total panel dataset consists of a large N (185.338 firm year observations) and a somewhat small T (9 years). Therefore, serial autocorrelation and heteroskedasticity can be present in the dataset. Autocorrelation occurs if residuals correlate over time. This causes an ‘overestimation’ and less independent units of observations to estimate the reliability of the coefficients. Therefore, the Wooldridge-test is conducted to test for autocorrelation.

The Wald-test is conducted to check for heteroskedasticity in the fixed effect regression model. With heteroskedasticity, the variance of the residuals systematic changes over time. Heteroskedasticity is predicted, because in times of crisis the model cannot explain everything that is going on. As in good and/or normal economic times, the model can predict well. Since there is significant presence of serial correlation and heteroskedasticity in the dataset, the robust standard errors are used in the fixed effects regression (Radboud Universiteit, 2019).

4.2.2 Benchmark results

This section shows the benchmark results of the relationship between family ownership and firm performance. The results of the fixed effects estimation are presented in Table 4. The country fixed effects, sector fixed effect and time fixed effects are included for the period 2012-2020.

The estimation of the fixed effect model predicts well in this study. Looking at the control variables in Table 4, the variable *size* is positively related to firm performance meaning if a firm grows in size (total assets), the financial performance of the firm will increase. Whereas, *size* is positively related to firm performance, this study finds a negative and significant relationship between *age* and firm performance. The variable *debts* is negatively related to firm performance at 0.01 significance levels. The negative sign of *debts* indicates if the ratio between long-term debt and total assets of a firm increases, firm performance will decrease. The pecking order theory predicts this negative relationship between *debts* and firm performance, since profitable firms have lower debt levels because they can use internal financing (Gama & Galvão, 2012; Simoes Viera, 2014). The coefficient of the variable *sales growth* is zero, meaning that there is a very weak relationship between sales growth and firm performance. This result was expected to be stronger and positive according to the socioemotional wealth theory, since good and long-term relationships with customers will be beneficial for the level of sales and therefore the firms' net income.

Turning to the main variable of interest, Table 4 shows the relationship between the independent variables and the firm performance measure ROA. On average, family firms outperform non-family firms in ROA by 0.41 percentage points during the COVID-19 crisis. The positive coefficient of the variable of interest *Family * COVID-crisis* is significant at 0.05 levels. During the sample period from 2012 to 2020, on average, family firms have higher firm performance than non-family firms, since their ROA is 0.94 percentage points higher than the ROA of non-family firms. The average ROA of family firms during the sample period is 8.05% (average ROA of all firms during 2012-2020 plus family coefficient). However, the firm performance of all firms is on average 0.63 percentage points lower during the COVID-19 crisis. For family firms, the average ROA is 7.83% during the crisis (average ROA of all firms during 2012-2020 plus family coefficient plus COVIDcrisis coefficient plus the extra value for being a family firm during the COVID-19 crisis) compared to the ROA of non-family firms of 6.48% during the crisis (average ROA of all firms during 2012-2020 plus COVIDcrisis coefficient). These results are consistent with previous research from Amann & Jaussaud

(2011), Bauweraerts (2013), Bloch et al. (2012), van Essen, Strike, Carney, & Sapp (2015), Minichilli et al. (2015) and Zhou et al. (2017) who also find the outperformance of family firms during various crises (i.e., the 1997/1998 Asian crisis, the internet bubble explosion and the global financial crisis of 2008–2010). The findings in this study provides new insights of the outperformance of private family firms during the recession times of the COVID-19 pandemic.

Two more tests are conducted to check if the results hold under different definitions of firm performance. Using ROE (column 2) and OROA (column 3) as dependent variables, the results are unchanged. When ROE is the firm performance measure, on average, family firms outperform non-family firms by 1.95 percentage points during the COVID-19 crisis. The positive coefficient of the variable of interest *Family * COVID-crisis* is significant at 0.05 levels. During the sample period from 2012 to 2020, the performance of family firms is on average 1.71 percentage points higher than the performance of non-family firms in ROE, resulting in a ROE of 19.13% for family firms (average ROE of all firms plus family coefficient). Moreover, during the COVID-19 crisis, the performance of family firms is slightly higher on average compared to non-family firms by 1.95 percentage points. The ROE of family firms is 17.05% during the COVID-19 crisis (average ROE of all firms plus family coefficient plus COVIDcrisis coefficient plus the extra value for being a family firm during the COVID-19 crisis), whereas non-family firms have a ROE of 13.40% during the crisis (average ROE of all firms plus COVIDcrisis coefficient).

Using OROA as performance measure, family firms outperform non-family firms on average by 0.34 percentage points during the COVID-19 crisis and the results are significant at 0.10 levels. The OROA of family firms during the crisis is 9.05% (average OROA of all firms plus family coefficient plus COVIDcrisis coefficient plus the extra value for being a family firm during the COVID-19 crisis). The OROA of non-family firms is 8.12% during the COVID-19 crisis (average OROA of all firms plus COVIDcrisis coefficient). During the sample period from 2012 to 2020, the performance of family firms is 0.59 percentage points higher than the performance of non-family firms. These tests are part of the robustness check in paragraph 4.3 (see 4.3.2 specification changes).

The corresponding R-squared is rather low. The R-squared represent the amount of variance of firm performance (dependent variable) explained by independent and control variables. Since this study does not include firm fixed effects, a set of observable control variables are missing that also could potentially influence firm performance. A lot of the variation across countries, sectors and time fluctuations are captured by the fixed effect model,

but other firm-specific proxies that potentially affect firm performance are not included due to data unavailability from database Orbis.

Table 4 Fixed effects estimation of firm performance: return on assets (ROA), return on equity (ROE) and operating return on assets (OROA) and family firms during the COVID-19 crisis.

	Firm performance	Sensitivity check for firm performance definition	
	(1) ROA	(2) ROE	(3) OROA
Family	0.936*** (0.143)	1.714** (0.781)	0.585*** (0.190)
COVID-crisis	-0.627*** (0.150)	-4.032*** (0.865)	-1.498*** (0.171)
Family * COVID-crisis	0.407** (0.172)	1.952** (0.980)	0.341* (0.191)
Size	0.516*** (0.038)	2.608*** (0.167)	0.444*** (0.048)
Age	-0.049*** (0.005)	-0.142*** (0.019)	-0.058*** (0.006)
Debts	-0.126*** (0.007)	-0.325*** (0.024)	-0.126*** (0.007)
Sales growth	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Constant	7.603*** (0.888)	5.879* (3.059)	11.207*** (1.085)
R^2	0.072	0.046	0.061
Country fixed effects	Included	Included	Included
Sector fixed effects	Included	Included	Included
Time fixed effects	Included	Included	Included
Observations ^b	185.338	185.334	185.338

This table shows the results of country, sector and time fixed effect regressions of West European family and non-family firms and firm performance during the COVID-19 crisis. The dependent variable of column 1 is ROA defined as net income divided by the book value of total assets. To check for the sensitivity of firm performance two alternative dependent variables are added to the regression. The alternative dependent variable of column 2 is ROE defined as net income divided by shareholders' equity and column 3 shows the dependent variable OROA defined as earnings before interest and taxes (EBIT) divided by the book value of total assets. Standard errors adjusted for heteroskedasticity and serial correlation are showed within brackets. *, ** and *** indicate statistical significance at respectively 0.10, 0.05 and 0.01 levels.

^b Number of observations based on available firm year data points in the fixed effects model.

4.3 Robustness tests

4.3.1 Sample changes

The robustness check in this study involves smaller samples to test whether the results hold. The results for sample changes are presented in Table 5. The first row shows the results with less countries in the sample. Countries with less than 1000 firm year observations (row 1) are dropped out of the regression (Lins et al., 2013). The number of firm year observations in these countries are too little compared to the number of firm year observations in other countries to include them in the regression. The findings in row 1 leave the results largely unchanged, based on less countries in the smaller sample. It means that the outperformance of family firms is attributable to the inclusion of countries with more than 1000 firm year observations.

Further, family firms are mostly small and medium-sized enterprises (SMEs) (Siakas, Naaranoja, Vlachakis, & Siakas, 2014). Besides, family firms seem to be smaller than non-family firms (Hulshoff, 2001). This study includes a large number of small and medium-sized businesses, but some family firms are relatively large in their sector (Tagiuri & Davis, 1996). Hence, the sample also consist of very large and large companies. Row 2 of Table 5 presents the results of dropping very large companies out of the regression. The findings are robust for two profitability measures (ROA and ROE) to the exclusion of very large firms (family and non-family) in the sample. The findings of excluding both very large and large firms out of the regression in row 3 do not show robust results. The outperformance of family firms is accountable to the contribution of large family firms in the sample.

Eventually, the sample period is changed to check for sensitivity in the years 2012 and 2013. A few years before, the global financial crisis from 2008, dried up liquidity and vulnerable European countries suffered greatly (Åslund A., 2010; Åslund A., 2011). When the Greek government got problems financing its debt in 2010, more European member states were facing a largely downturn (Wijffelaars & Loman, 2015). The financial crisis seriously leads to a severe sovereign debt crisis in the years 2010 to 2013. In 2014, the situation in these European countries improved (Kenton, 2020). Even though the basic benchmark model includes time fixed effects which control for year-specific shocks and economic fluctuations, the robustness check will drop observations from the years 2012 and 2013. The results in row 4 of Table 5 presents that the robustness check does not undermine the findings. The coefficient of dropping early data out of the regression is slightly higher than the benchmark model, which includes now ‘booming’ economic years from 2014.

Table 5 Robustness check including sample changes and specification changes.

	Firm performance		Sensitivity check for firm performance definition			
	(1)		(2)		(3)	
	ROA		ROE		OROA	
	Est.	Obs. ^c	Est.	Obs. ^c	Est.	Obs. ^c
Benchmark model	0.407** (0.172)	185.338	1.952** (0.980)	185.334	0.341* (0.191)	185.338
Sample changes: drop...						
1. Countries < 1000 firm year observations	0.422** (0.175)	180.556	2.025* (1.006)	180.552	0.359* (0.194)	180.556
2. Very large companies	0.381** (0.178)	178.366	1.973* (1.012)	178.362	0.306 (0.198)	178.366
3. Very large and large companies	0.259 (0.207)	152.368	1.530 (1.195)	152.364	0.230 (0.230)	152.368
4. Early data (year < 2014)	0.690*** (0.1721)	143.481	2.878*** (0.981)	143.478	0.674*** (0.190)	143.481
Specification changes: add...						
5. ROE and OROA	(See column 2 and 3 benchmark model)					
6. Sector hit by COVID-19		185.338		185.334		185.338
a. Family * COVIDcrisis	1.049*** (0.201)		4.301*** (1.130)		1.162*** (0.225)	
b. Family * COVIDcrisis * Sectorhit	-1.307*** (0.241)		-4.783*** (1.279)		-1.672*** (0.275)	
c. Combined coefficient	-0.258		-0.482		-0.510**	
d. Joint F-test	1.39		0.16		4.31**	

This table shows the robustness results of the fixed effect estimation including country, sector and time fixed effects. The dependent variable of column 1 is ROA defined as net income divided by the book value of total assets. To check for the sensitivity of firm performance two alternative dependent variables are added to the regression. The dependent variable of column 2 is ROE defined as net income divided by shareholders' equity and column 3 shows the dependent variable OROA defined as earnings before interest and taxes (EBIT) divided by the book value of total assets. Standard errors adjusted for heteroskedasticity and serial correlation are showed within brackets. *, ** and *** indicate statistical significance at respectively 0.10, 0.05 and 0.01 levels.

^c Number of observations based on available firm year data points in the fixed effects model.

4.3.2 Specification changes

Next, this section focusses on the robustness check to model changes. The results for specification changes are present in Table 5. To check whether the results are sensitive to the definition of firm performance (main variable is return on assets (ROA)), two other alternative profitability measures are used (Maury, 2006). Column 2 and 3 in Table 5 shows the results of the fixed effects estimation with return on equity (ROE) and operating return on assets (OROA) as firm performance measures. The results are also displayed in the benchmark model in Table 4 column 2 and 3. The main variable of interest *Family * COVID-crisis* is for both alternative profitability measures positive and significant at 0.05 and 0.10 levels. The findings strengthen the hypothesis that under three different firm performance measures, the results are unchanged. On average, family firms outperform non-family firms in ROA, ROE and OROA during the COVID-19 crisis.

Finally, this study examines whether the main results hold for different sectors during the COVID-19 crisis. In particular, the COVID-19 pandemic has impacted various sectors. Some sectors report large increase in revenue and others are very affected by the lockdown measures. The COVID-19 crisis is different from other (financial) crises in the past, since not all sectors are proportionally affected (Mazzucato & Kattel, 2020). Therefore, it is interesting to investigate whether family firms outperform non-family firms in sectors that are hit by COVID-19. This study added the variable '*Sectorhit*' to the fixed effects model. *Sectorhit* is a dummy variable that equals one if the firms in a particular sector show a decrease (%) in ROA 2020 compared to the average ROA of the period 2017-2019, defined as hit by the COVID-19 pandemic. *Sectorhit* is zero if the firms in a particular sector show an increase (%) in ROA 2020 compared to the average ROA of the period 2017-2019. The variable of interest *Family * COVIDcrisis * Sectorhit* is tested in order to determine the joint effect of a family firm (*Family*) in a sector that shows a decrease (%) in ROA 2020 (*Sectorhit*) during the COVID-19 pandemic (*COVIDcrisis*) on firm performance.

The coefficients of the interaction terms (*Family * COVIDcrisis* and *Family * COVIDcrisis * Sectorhit*) under row 6a and 6b in column 1 are taken together, to determine the total effect of *Sectorhit*. The coefficient is -0.258 (1.049 *Family * COVIDcrisis* -1.307 *Family * COVIDcrisis * Sectorhit*). Even though the findings in row 6a and 6b show significant results, a joint test between *Family * COVIDcrisis* and *Family * COVIDcrisis * Sectorhit* is needed to interpret the results of the interaction term. The combined coefficient and the combined test of the two interaction variables are presented in row 6c and 6d, respectively. In contrast to family

firms' performance is on average higher compared to non-family firms during the COVID-19 crisis, the findings in Table 5 provide no statistical evidence that family firms show on average a higher ROA than non-family firms in a sector which is hit by COVID-19 during the crisis. To check for the sensitivity to the definition of ROA, row 6d in columns 2 and 3 show the results of the joint F-test for ROE and OROA. For ROE, the results show no significant effect that family firms outperform non-family firms in a sector which is hit by COVID-19 during the crisis. However, with OROA as dependent variable, the joint F-test is significant, indicating that the slope coefficient differs across levels of the *Sectorhit* variable and is significantly different from zero. On average, the OROA of family firms is 0.51 percentage points lower than the OROA of non-family firms in a sector which is hit by COVID-19 during the crisis period.

This study calculated the average ROA, ROE and OROA of all firms in every sector in the population over the years 2012-2020 to conclude which sector is hit by COVID-19. If the average of all firms in a particular sector shows a decrease (%) in ROA 2020 compared to the average ROA of the period 2017-2019, the sector is considered to be hit by the COVID-19 pandemic. This also applies for the increase (%) in ROA 2020, the sector is considered to be not hit by the COVID-19 pandemic. When the average ROA is known for every sector for each year, the ROA for the period 2017-2019 is calculated by the total average ROA 2017, ROA 2018 and ROA 2019 for each sector. The average of ROA 2017, 2018 and 2019 is more precisely than only using ROA 2019 as comparison for ROA 2020. The percentage change for ROA 2020 compared to ROA 2017-2019 for each sector is calculated as:

$$\text{Percentage change} = \frac{ROA\ 2020 - (ROA\ 2017 - 2019)}{ROA\ 2017 - 2019}$$

Decrease (%) of average ROA per sector during 2012-2020 in Western Europe

From the 27 sectors in this study, 17 sectors are hit by the COVID-19 pandemic. Figure 3 illustrates all sectors that show a decrease (%) ROA in 2020 compared to ROA 2017-2019 in Western Europe. The 17 sectors that show a decrease (%) in ROA 2020 compared to ROA 2017-2019, are the following: Business Services, Computer Hardware, Food & Tobacco Manufacturing, Industrial, Electric & Electronic Machinery, Information Services, Media & Broadcasting, Metals & Metal Products, Mining & Extraction, Miscellaneous Manufacturing, Printing & Publishing, Public Administration, Education & Health Social Services, Textiles & Clothing Manufacturing, Transport Manufacturing, Transport, Freight & Storage, Travel, Personal & Leisure, Utilities and Waste Management & Treatment.

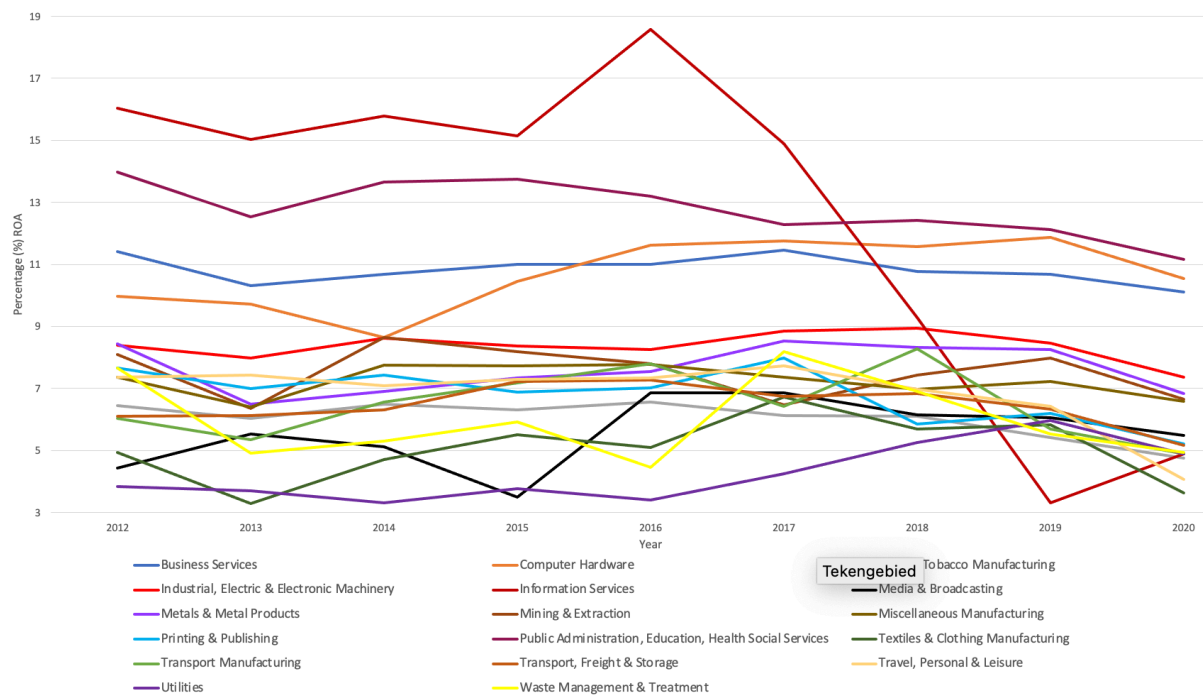


Figure 3 Decrease (%) of average ROA per sector during the period 2012-2020 in Western Europe. This figure shows the average ROA of all firms within the sectors that are affected by COVID-19; the sectors showing a decrease (%) in ROA 2020 compared to ROA 2017-2020.

These findings show plausible results. For instance, the sector Travel, Personal & Leisure shows a decrease (%) in ROA 2020, since international travel was limited and restaurants, terraces, sport and recreational facilities were closed for a long period due to tightening of lockdown measures (Kalkhoven & de Vries, 2020). The sector Public Administration, Education & Health Social Services is hit because due to the COVID-19 pandemic half the world's students are affected by partial or full school closures and the closure of other public facilities. Not only students, but also teachers are affected by the disruption of schools' closures, learning losses and adapted education systems (Unesco, n.d.). The COVID-19 pandemic has disrupted the Textiles & Clothing Manufacturing sector as well. Textile and clothing production has been decreased or even stopped. The logistic sectors, such as Transport Manufacturing and Transport, Freight & Storage are also directly impacted by the COVID-19 pandemic. Firms who are involved in storage, flow of goods and movement are hit both within and across (inter)national borders by the COVID-19 measures, such as transportation limitations (International Finance Corporation, 2020).

Increase (%) of average ROA per sector during 2012-2020 in Western Europe

Figure 2 illustrates all sectors that show an increase (%) ROA in 2020 compared to ROA 2017-2019 in Western Europe. The following 10 sectors show an increase (%) in ROA 2020:

Agriculture, Horticulture & Livestock, Biotechnology and Life Sciences, Chemicals, Petroleum, Rubber & Plastic, Communications, Computer Software, Construction, Leather, Stone, Clay & Glass products, Retail, Wholesale, Wood, Furniture & Paper Manufacturing.

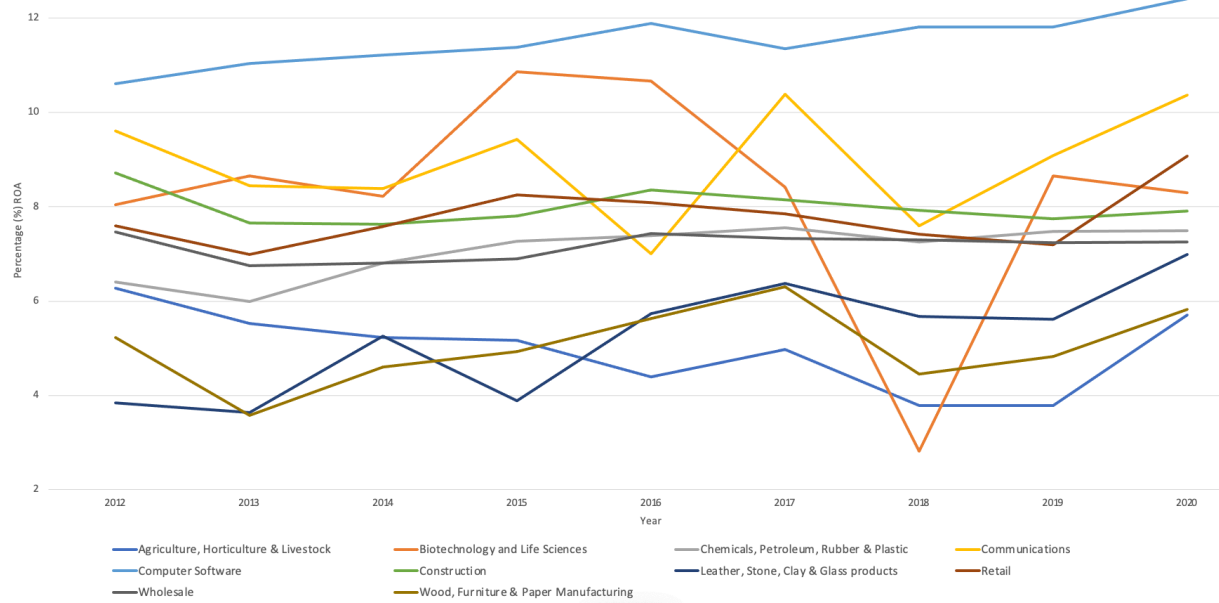


Figure 4 Increase (%) of average ROA per sector during the period 2012-2020 in Western Europe. This figure shows the average ROA of all firms within the sectors that are not affected by COVID-19; the sectors showing an increase (%) in ROA 2020 compared to ROA 2017-2020.

The findings show plausible results. For example, the sectors Construction and Wood, Furniture & Paper Manufacturing show an increase (%) in ROA in 2020 because people started to pay more attention to their house and garden during COVID-19 (van Dijk, 2021). The sectors Communications and Computer Software benefit from the COVID-19 pandemic, since people are making more use of communication devices and computer software to communicate all over the world, since travelling was restricted for a certain period. With people working from home and schools teaching online, the Communications and Computer Software sector show resilience due to the help of digital technologies (ITU, 2020). Also, industries like Biotechnology and Life Sciences and Chemicals, Petroleum, Rubber & Plastic are defined as not affected by COVID-19. Even though the sector Biotechnology and Life Sciences shows a slightly decrease (%) in ROA 2020, compared to the sector ROA of the period 2017-2019 the industry shows a positive ROA on average. The life sciences sector is very affected by the corona crisis with high pressure and responsibilities in the operating business (Lockey, 2020). On the other hand, the sector Chemicals, Petroleum, Rubber & Plastic -which covers manufacturing of basic chemicals and pharmaceutical products- turn out to be economically

strong with vaccine development (Eurostat, n.d.). These industries have a unique responsibility to help the world during the COVID-19 pandemic (Lockey, 2020).

4.3.3 Endogeneity

This section focusses on the endogeneity problem of family ownership and firm performance. Demsetz and Villalonga (2001) state that firm performance may affect the ownership structure of firms. The market will succeed in bringing forth firms who maximize their value and create suitable ownership structures (Demsetz & Villalonga, 2001). Firm size and risk have effect on a firm's ownership, just as ownership may vary across countries because of differences in their legal systems (Anderson & Reeb, 2003; Demsetz & Lehn, 1985). The current model includes country fixed effects, so differences in legal systems across countries are absorbed.

The main question in this study is whether family ownership improves firm performance or whether favorable economic prospects foster families to maintain their business (Anderson & Reeb, 2003). The family may only hold firms with good (economic) prospects (Maury, 2006). Therefore, there might be incentive for families to “abandon the ship” in bad economically expected periods if they foresee low profitability in future performance (Villalonga & Amit, 2006; Zhou et al., 2017). In addition, in the presence of information asymmetries, family board members with larger equity stakes and higher managerial positions have information advantages over other shareholders in the firm (Anderson & Reeb, 2003; Villalonga & Amit, 2006). Family firms will retain ties to profitable businesses and can more easily determine the firm's future prospects (Anderson & Reeb, 2003). Hence, reverse causality may bias the estimates in the analysis and reduce the usefulness of the results.

However, endogeneity is a bigger problem for ownership concentration in general than it is for family ownership. A single family is more constrained to the concentration of ownership than independent owners of non-family firms (Demsetz & Villalonga, 2001; Villalonga & Amit, 2006). The personal values and ethics of family firms are deeply embedded in their business and they build social capital via strong relationships for later generations (Miller & Le Breton-Miller, 2005). Therefore, they want to keep the business in the family even though they are expecting low profitability in future performance. Independent owners of non-family firms are less emotionally embedded with the firm and will leave earlier if future prospects are bad.

The endogeneity problem could be economically addressed by adding an instrumental variable to the estimation. A good instrumental variable should have a strong and direct

influence on the independent variable (in this study *Family*) but uncorrelated with the dependent variables for firm performance. Possible instrumental variables could be existence of a succession plan or board size, as described in research of Basco and Voordeckers (2015). For instance, the existence of a succession plan consists of biological characteristics and awareness facts. It is not likely that the existence and age of the children who are probably interested in the family business have a relationship with firm performance. Awareness facts, such as the importance of a succession plan is also not related to firm performance. Further, the CEO and top management team are in important positions with regard to the succession process and the existence of a succession plan (Basco & Voordeckers, 2015). Unfortunately, due to data unavailability of the existence of a succession plan of family firms in database Orbis, the model is not tested with possible instrumental variables to solve the endogeneity problem.

5 Conclusion

The infectious COVID-19 virus has spread rapidly over the world and can be stated as an alarming global health and economic crisis. Firms are in uncertain times and may not survive the negative effects of the COVID-19 pandemic, especially when government financial support is shortening. Family firms have shown economic resilient in prior (financial) crises. This study, based on private family firms and non-family firms in Western Europe for the period from 2012 to 2020, finds evidence for the hypothesis that family firms outperform non-family firms on average in return on assets (ROA) by 0.41 percentage points during the COVID-19 pandemic. The findings also provide support that family firms perform better than non-family firms using alternative profitability-based measures during the COVID-19 crisis. When return on equity (ROE) and operating return on assets (OROA) are the alternative performance measures, family firms also outperform non-family firms during the COVID-19 crisis, by 1.95 and 0.34 percentage points respectively. Large family firms contribute mainly to the outperformance of family businesses. Robustness tests on excluding countries and early year data also confirm the research results. Unfortunately, the endogeneity problem whether family ownership improves firm performance or whether favorable economic prospects foster families to maintain their business (Anderson & Reeb, 2003), cannot be economically addressed in this study due to data unavailability in the used database.

The positive relationship between family firms and firm performance indicates that the characteristics of family firms benefit their profitability. The similar goals between managers and owners of family firms gives family firms competitive advantage over non-family firms during crisis (Anderson & Reeb, 2003; Bauweraerts, 2013; Zhou et al., 2017). Family-owned firms have lower agency problems and their efficiency improves which will lead to higher performance during crisis (Maury, 2006). Also, this study finds support for the pecking order theory, since family firms show a (conservative) capital structure based on less external finance, lower debt levels and a lower debt-to-asset ratio. Family firms prefer self-financing (internal) to debt (external) financing, which prevents them from drastic financial problems during the COVID-19 crisis in comparison to non-family firms (Zhou et al., 2017). These findings contribute to existing literature, since the findings provide new evidence that private family firms have higher firm performance during the COVID-19 crisis. Moreover, the results complement recent literature that family firms outperform non-family firms during the 1997/1998 Asian crisis, the internet bubble explosion and the global financial crisis of 2008-

2010 (Amann & Jaussaud, 2011; Bloch et al., 2012; Bauweraerts, 2013; van Essen, Strike, Carney, & Sapp, 2015; Minichilli et al., 2015; Zhou et al., 2017).

However, the COVID-19 crisis is a different crisis than other crises due to its cause, scope and severity (Ding et al., 2021). The imposed measures from governments to delay a rapid spread of the coronavirus and to protect society and healthcare systems, have impacted social lives and the economy greatly. But not all sectors are proportionally affected by those measures (Mazzucato & Kattel, 2020). Whereas some sectors have been very affected by the negative effects of the COVID-19 pandemic, other sectors benefit from the imposed measures (Carletti, Oliviero, Pagano, Pelizzon, & Subrahmanyam, 2020). For that reason, this study investigates whether family firms outperform non-family firms in sectors who are hit by COVID-19 pandemic. The results provide no statistical evidence that family firms perform better in a sector which is hit by the COVID-19 pandemic. However, using operating return on assets (OROA) as dependent variable for firm performance in the robustness paragraph, family firms significantly do not outperform non-family firms in sectors who are hit by COVID-19 during the crisis period. On average, family firms have a lower ROA than non-family firms by 0.51 percentage points during the COVID-19 crisis.

5.1 Limitations and suggestions for future research

This study has several limitations which can be addressed in future research. First, governments of West European countries support member states with financial stimulus packages for businesses to protect jobs and incomes (Ashraf, 2020; Rijksoverheid, 2020). The EU created several funds to support and help the EU member states with recovery packages which include financial, social and investment arrangements. Since family firms prefer self-financing (internal) to debt (external) financing (Gama & Galvão, 2012), future research could investigate if family firms request more or less government financial support measurements, such as loans and debt, than non-family firms during the COVID-19 crisis. This thesis is limited to obtain data from database Orbis. Whereas Orbis is full of information about ownership structure of private firms worldwide, it does not contain information about which companies have received government (financial) support during the COVID-19 crisis. To add this information to the dataset, will probably be time consuming. The database limitations and time limitations can be regarded as important challenges for future research (Basco & Voordeckers, 2015).

Second, several studies show that family firms outperform non-family firms because the founder serves as CEO within their sample (Anderson & Reeb, 2003; Fahlenbrach, 2009; McConaughy et al., 1998; Villalonga & Amit, 2006). The definition of a family firm varies in

the literature. This study does not focus on the founder CEO of the family firm, the concentration of family members that serve on the board of directors or on whether the firms are run by first, second and third generations. Future research could include more definitions and variables to the model to investigate if family firms (with founder CEO, family board members or multiple generations) have greater performance during the COVID-19 crisis than non-family firms. For example, the variables director ownership variable, outside directors, founder CEO, board size or generations could be added to the model (Basco & Voordeckers, 2015). Due to data unavailability in database Orbis, this research was limited to the definition of an ultimate owner of a family firm with a threshold of 50.01% of the firm's shares. With more precise information about the family business and restrictive family business definitions, further research can be an addition to existing literature about family firms and their firm performance during the COVID-19 crisis.

Third, the model does not incorporate several firm-specific control variables that could influence firm performance. Variables that could be included to the model are research and development (R&D) investments and advertising expenses (Anderson & Reeb, 2003; Demsetz & Lehn, 1985). However, the database Orbis, which is used to obtain all private family firm data and ownership structure information, does not report information of R&D investments or advertising expenses for private family nor non-family firms in Western Europe. Private firms have fewer obligations to disclosure all their financial documents and they provide only the minimum content necessary (Glaum, 2020).

Finally, this study could not economically solve the endogeneity problem due to data unavailability in the database. Further research can add instrumental variables to the empirical model to check whether family ownership improves firm performance or whether favorable economic prospects foster families to maintain their business (Anderson & Reeb, 2003). Possible instrumental variables could be the existence of a succession plan or board size (Basco & Voordeckers, 2015). Solving the endogeneity problem will strengthen this study to state that the outperformance of family firms during the COVID-19 crisis is due to family characteristics and not because bad economic prospects of COVID-19 affect the ownership structure of family firms.

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7 Appendices

Appendix A

Table 6 Number of family and non-family firms by International Organization for Standardization (ISO) code and country.

ISO code	Country	Family firm year observations	Non-family firm year observations	Total firm year observations ^d
AT	Austria	197	422	619
BE	Belgium	930	5.486	6.416
CH	Switzerland	117	287	404
CY	Cyprus	45	0	45
DE	Germany	285	426	711
DK	Denmark	27	125	152
ES	Spain	98	166	264
FI	Finland	26.207	3.129	29.336
FR	France	30.008	16.554	46.562
GB	Great Britain	47	68	115
GR	Greece	207	117	324
IS	Iceland	562	240	802
IT	Italy	14.105	10.318	24.423
LI	Liechtenstein	0	27	27
LU	Luxembourg	81	39	120
MT	Malta	9	36	45
NL	Netherlands	61	327	388
NO	Norway	31.496	7.601	39.097
PT	Portugal	56	325	381
SE	Sweden	575	34.147	34.722
TR	Turkey	124	261	385
	Total	105.237	80.101	185.338

^d Number of observations based on available firm year data points in the sample.

Appendix B

Table 7 Number of family and non-family firms by four digits Standard Industry Classification (SIC) code and sector name.

SIC code	Sector description	Family firm year observations	Non-family firm year observations	Total firm year observations ^e
0119-0912	Agriculture, Horticulture and Livestock	1.958	1.794	3.752
8731	Biotechnology and Life Sciences	95	255	350
3499-8811	Business Services	21.140	12.406	33.546
2671-3089	Chemicals, Petroleum, Rubber and Plastic	1.114	1.725	2.839
3651-5999	Communications	257	379	636
3571 & 3577	Computer Hardware	45	65	110
7370-7379	Computer Software	2.516	2.496	5.012
1500-1799	Construction	19.634	10.608	30.242
2010-2111	Food and Tobacco Manufacturing	1.757	2.246	4.003
3500-3844	Industrial, Electric and Electronic Machinery	2.984	3.183	6.167
7383	Information Services	0	9	9
3211-3299	Leather, Stone, Clay and Glass products	453	509	962
4832-8999	Media and Broadcasting	592	299	891
3300-3562	Metals and Metal Products	4.026	4.084	8.110
1021-1499	Mining and Extraction	366	346	712
3911-3999	Miscellaneous Manufacturing	235	208	443
2700-2796	Printing and Publishing	994	724	1.718
8000-9721	Public Administration, Education, Health Social Services	3.863	2.546	6.409
5013-5999	Retail	11.485	6.000	17.485
2211-3199	Textiles and Clothing Manufacturing	1.010	663	1.673
3694-7699	Transport Manufacturing	545	692	1.237

4000-4789	Transport, Freight and Storage	6.715	5.114	11.829
4720-8661	Travel, Personal and Leisure	6.611	4.625	11.236
4910-4961	Utilities	516	1.644	2.160
4950 & 4953	Waste Management and Treatment	469	511	980
5010-5961	Wholesale	14.518	15.219	29.737
2421-2679	Wood, Furniture and Paper Manufacturing	1.339	1.751	3.090
	Total	105.237	80.101	185.338

^e Number of observations based on available firm year data points in the sample.