Are Family Firms Better Performers During the Financial Crisis?

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Abstract

This paper examines whether family firms are better performers during the global financial crisis. Using a dataset covering firms from S&P 500 (US), FTSE100 (UK), DAX 30 (Germany), CAC 40 (France), and FTSE MIB 40 (Italy) during the period of 2006-2010, we find that broadly defined family firms do not outperform non-family firms during the crisis. However, family firms with founder presence (as CEO, a board member or a significant blockholder) outperform non-family firms by 18 percent in Operating Return on Assets (OROA). Tobin's Q and risk-adjusted Alpha of founder firms, by contrast, do not exhibit any difference. We interpret the attenuation of the market value premium of founder firms as the result of high volatility of stock prices and investors' overreaction during the crisis (Veronesi, 1999; Glode *et al.*, 2010). Further research shows that during the global financial crisis, founder firms invest less and enjoy better access to the credit market than non-family firms. Our analysis suggests that the superior performance of founder firms is largely caused by less incentive to invest in risky projects with a high likelihood of failure in order to boost earnings during the crisis. Furthermore, our results reveal that founder firms bear the least agency costs, and that Tobin's Q and Alpha may not be the most appropriate measures of corporate performance during the financial crisis.

***JEL classifications*:** G01; G14; G32

***Key words*:** family firms, performance, founder, corporate governance, financial crisis

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Introduction

Family firms constitute a large proportion of national economies around the world. This is undeniable (for instance: La Porta, Lopez-de-Silanes and Shleifer for overall outlook, 1999; Anderson and Reeb in the US, 2003; Klein in Germany, 2000; Morck and Yeung in Sweden, 2003; Bennedsen *et al.* in Denmark, 2007; Claessens *et al.* in Eastern Asia, 2000). The prevalence of family firms gives rise to the question of whether or not the family firm is a more efficient organizational form. Earlier empirical studies offer contradictory conclusions. In the US, Holderness and Sheehan (1988) find that family firms have a lower Tobin's Q than non-family firms, while Anderson and Reeb (2003) report opposite findings. Empirical evidence in other countries is mixed and inconclusive (McConaughy et. *al.*, 1998; Morck *et al.*, 2000; Claessens *et al.*, 2002; Cronqvist and Nilsson, 2003).

More recent studies tend to render the conclusion that the outperformance of family firms is sensitive to the definition of family firms (for instance, Maury, 2006; Miller *et al.*, 2007), and that the founders of family firms play a central role in differentiating family firms from their counterparts in corporate performance. Active involvement of founders in top management (CEO) and monitoring as directors of the board is associated with superior corporate performance (Villalonga and Amit, 2006; Miller *et al.*, 2007).

Almost all of the existing literature, however, only focuses on corporate performance comparison between family firms and non-family firms in normal economic times or good market conditions. Studies are rather scant for periods of depression or recession. It is important to re-examine the performance of family firms and non-family firms during recession times because conventional economic rules may not be applicable during recession times. For instance,

Kuppuswamy and Villalonga (2012) report that corporate diversification is valuable to firms during a financial crisis (2007-2009), thus challenging the view of diversification discount since the late 1990s and the early 2000s. Ampenberger et al. (2008) show that family firms are less diversified in unrelated business segments. Therefore, widely-documented outperformance of family firms (especially founder-run firms) during normal times may have been diluted through the channel of less diversification by family firms in the context of a financial crisis. Secondly, in bad times, demand falls from customers and credit constraints increase from financial institutions, especially for those firms which largely rely on debt financing; this may amplify intrinsic organizational fragility which will be reflected in corporate performance. Lins, Volpin and Wagner (2011) argue that the relationship between blockholder control and firm value is more pronounced in the financial crisis because of the adjustment to firm value made by the changing benefits and costs of blockholding[1] during the crisis. Thirdly, Meyer (2011) reports that Private Equity (PE) fund-held firms have incurred less losses relative to non-PE-held firms during the current financial crisis. Similar to PE-held firms, family firms share the characteristics of ownership concentration and intensive board monitoring. It might be interesting to examine whether family firms, like PE-held firms, will experience less performance decline during the crisis.

The global financial crisis was heralded by the Lehman Brother's bankruptcy in 2008. This offers us an ideal setting for studying corporate performance of family firms versus non-family

[1] On one hand, Blockholders are argued to get better access to internal and external financing (e.g. Wruck (1989), Hertzel and Smith (1993), Berglöf and Perotti (1994), Winton (1993), Stein (1997)), help in product markets (Khanna and Palepu (2000)), and offer monitoring (e.g. Shleifer and Vishny (1986), Admati, Pfleiderer and Zechner (1994), Burkart, Gromb and Panunzi (1997), Maug (1998), and Kahn and Winton (1998). These benefits may become more significant during the financial crisis. On the other hand, controlling blockholders also face a tradeoff between using firm funds to extract private benefits and using firm funds to make productive investment. In the financial crisis, controlling blockholders' asset expropriation at the cost of minority shareholders may become more serious (e.g. Zingales (1994), and Shleifer and Vishny (1997)), given that they think private benefits are more attractive.

firms because, as Campello, Graham, and Harvey (2010) state, this crisis, differing from previous ones, originates from the subprime mortgage crisis (customer finance), which spilled over to the corporate domain, and can be viewed as an exogenous shock[2]. Besides this, the large magnitude and global scale of the crisis enable us to conduct an international study rather than a regionally based research, such as the studies conducted on the Asian financial crisis in 1997 (Mitton, 2002; Lemmon and Lins, 2003).

Using a detailed dataset from proxy filings of firms from S&P 500 (US), FTSE100 (UK), DAX 30 (Germany), CAC 40 (France), and FTSE MIB 40 (Italy) during the period of 2006-2010, we aim to contribute to the existing literature by bringing new evidence from the current global financial crisis to bear on the debate whether family firms are an effective organizational form[3].

The second contribution of this paper is to enrich our understanding of the real effects of the financial crisis on firms. A growing body of literature reports some significant decreases in investment during the crisis (for instance, Campello, Giambona, Graham, and Harvey, 2010; Duchin, Ozbas, and Sensoy, 2010; Ivashina and Scharfstein, 2010). However, all of these studies hardly investigate how the impacts of the crisis on corporate performance[4] and investment differ between family and non-family firms. The results of our paper complement these studies and may be of interest to fund managers in portfolio firm screening during recession times.

[2] Bezemer (2009) argues that the current financial crisis is predictable and that "accounting (or flow-of-fund) macroeconomic models" can help to anticipate the crisis. He lists 12 economists who warn of unsustainable housing debt and the coming of a credit crisis. However, all of these economists only sound the alarm on the mortgage market and housing bubbles. They hardly foresee the spillover of the mortgage crisis into the corporate domain. Therefore, it appears untrue to regard the current crisis as endogenous.

[3] Alchian (1950), Demsetz (1983) and Demsetz and Lehn (1985) launch the question of why family ownership is not dominating if it is indeed a better organizational form.

[4] Lins, Volpin, and Wagner (2011) make an international study (excluding US firms) into the relationship between bolckholder and firm value during the global financial crisis. Although they only focus on firms with family ownership concentration and bypass other family firms like founder-run firms or heir-run firms. My paper complements their research by offering a broader analysis on the different types of family firms. US S&P 500 firms constitute the major body of the sample and I find results that are different from their findings.

In this paper, we pose two research questions. The primary question is: Do family firms outperform non-family firms during the global financial crisis? We find that whether we use the market performance measure (Tobin's Q and Alpha) or the accounting performance measure (Operating Return on Assets (OROA)), broadly defined family firms, comprising 35 percent of the sample, have not significantly outperformed non-family firms during the crisis. However, family firms with active founder involvement (as the CEO, a board member or a significant blockholder) show significantly higher accounting performance by 18 percent relative to non-family firms during the crisis. The Tobin's Q and risk-adjusted return Alpha of founder firms, by contrast, do not exhibit the same significant difference.

Next, we explore the reasons for different findings of founder firms in accounting performance and market performance. On one hand, OROA computes yearly earnings over the book value of the total assets of a firm, which is less likely to be affected by spot stock prices. Our results show that during the crisis, compared with non-family firms, founder firms invest significantly less and have better access to the credit market. Croci, Doukas and Gonenc (2011) find that family firms invest less in risky projects and credit markets are more prone to supply family firms with long-term debt). Unlike non-family firms, whose managers are arguably myopic and have more incentive to over-invest in risky projects to boost current earnings (Andersen and Reeb, 2003) under the pressure of managerial dismissal in harsh economic conditions, founder firms are more long-term oriented and take a more conservative investment strategy during the crisis. Risky projects, especially those financed by short-term debt, are most likely to fail with financial constraints. As a result, over-investment with insufficient financing resources lead to project failure and further underperformance because of a dry-out of bank loans during the crisis.

On the other hand, market performance is measured as Tobin's Q and Alpha, which are mainly driven by the market price of stocks. High volatility of stock prices features as one characteristic of recession times (Veronesi, 1999). In addition, investors are apt to be irrational and to overreact to bad market conditions during recession times (Glode *et al.*, 2010). Consequently, high volatility and investors' overreaction may attenuate the value premium of founder firms.

Our empirical evidence suggest that founder firms bear the least agency costs compared with other firms during the financial crisis. Our results also suggest that during the crisis, when inventors tend to be irrational and stock price volatility is high, Tobin's Q and Alpha may not be the most appropriate measures of corporate performance.

The remainder of our paper is structured as follows: Section 2 presents a review of related literature. In Section 3, we describe data and variables. In Section 4, we show our empirical findings with discussions and explanations in Section 5. In Section 6, We discuss our findings. Finally, we conclude in Section 7.

2. Family firms, founder value and the financial crisis

Family firms have been receiving more attention from academia, policy makers and practitioners for at least two reasons: First, family firms prevail in national economies around the world. In the US, for example, family firms comprise one-third of the S&P 500 and account for 18 percent of the outstanding shares of the capital market (Anderson and Reeb, 2003). Second, family firms, with ownership concentration in most cases, are a good subject for testing finance theories like agency theory (Berle and Mean, 1932; Jensen and Meckling, 1976). The

key question of family firm research is whether family firms are an effective organizational structure to deliver superior performance relative to non-family firms, and which characteristics of family firms determine that performance. Earlier literature has mixed and inconclusive results regarding this question (Holderness and Sheehan, 1988; McConaughy *et al.*,1998; Morck *et al.*, 2000; Claessens *et al.*, 2002; Cronqvist and Nilsson, 2003; Anderson and Reeb, 2003).

Current literature in family business turns to more fine-grained classifications of family firms to reconcile the conflicting evidences, and it tends to agree that performance examination is sensitive to different definitions of family firms (Maury, 2006). Family firms with active founder involvement as the CEO or a board member predict outperformance. Villalonga and Amit (2006) show that family ownership can gain value only when the founder acts as the CEO of the family business or as the Chairman of the board. Similarly, Miller *et al.* (2007) make a distinction between lone founder businesses where family members of the founder do not involve themselves in management or ownership, and true family businesses where family members do. The results show that only businesses with a lone founder outperform. By the same token, Adams *et al.* (2009) identify a positive causal effect of founder–CEOs on firm performance, and report that founder–CEOs are more likely to step down from the CEO position after periods of either unusually low or unusually high operating performances. These research studies suggest a positive view of founder value and the necessity of a more fine-grained family firm classification when conducting family business research.

Although a host of literature centers on the performance examination of family firms vis-à-vis non-family firms in normal economic times or good market conditions, studies are almost missing on what their performance will be like during times of depression or recession. The global financial crisis since 2008 gives us an opportunity to address this problem. The extreme

market condition (both financial market and product market) during the crisis is more likely to amplify various factors that drive the performance of family business, making it unclear whether family firms can better handle an exogenous financial crisis on the balance of costs and benefits of family ownership, management and control.

On one hand, asset expropriation of minority shareholders by powerful controlling family shareholders might be more severe during the crisis, implying that family firms might under-perform. Unlike small diversified shareholders, who use market value rules to decide investments that maximize the value of the firms, large family shareholders, may derive greater private benefits from pursuing different investments, excessive compensations, and special dividends given their slumping capital incomes during the crisis (Fama and Jensen, 1985; Andersen and Reeb, 2003). Baek *et al.* (2003) document that chaebol firms with concentrated shareholding by controlling families had a larger drop in their equity values during the Korean financial crisis (1997). Firms with disproportionate ownership structure (voting rights exceed cash flow rights) also experience lower returns. Lins, Volpin and Wagner (2011) use a non-US dataset consisting of more than 8000 firms from 40 countries to find that family control is associated with lower firm valuation globally following a financial shock. In addition, family entrenchment and nepotism during the crisis may also hit firm values. Shleifer and Vishny (1997) suggest that one big cost of concentrated family ownership is from the remaining unqualified family members who may run the firm. Perez-Gonzalez (2006) and Bennedsen *et al.* (2007) evidence the performance drop of family succession, suggesting a high cost of nepotism and unqualified family CEOs. During the crisis, when market conditions are harsh, unqualified management may bring more costs to family firms. Using a sample of 800 firms in eight East Asian countries during the Eastern Asian financial crisis, Lemmon and Lins (2003) show a

significantly lower value of firms with entrenchment managers by 10-20 percent relative to other firms[5].

On the other hand, however, superior performance of family firms might arise from the better alignment of interests between shareholders and managers in family firms (Andersen and Reeb, 2003). Interest conflict between long-term oriented owners and short-term oriented managers is highly costly when a crisis comes. For example, it is well known that managers have the incentive to take excessively risky projects when a firm is close to bankruptcy, because they get the upside gain of the excess risk, but lose nothing from the downside failure. During the crisis, this situation is highly likely to happen. Moreover, myopic managers may over-invest in projects to boost current performance given falling sales during the crisis. Overinvestment is highly risky when financial instruments of the firms are not rich. A dry-out of short-term loans from banks with increasingly stringent lending policy might plague ongoing projects. Family firms with large shareholders as managers do not have such a problem. Villalonga and Amit (2006) document that founder-CEO firms, free from owner-manager conflict of interests, have the highest Tobin's Q among all of the different types of family firms they have categorized. Another source of outperformance during the crisis might relate to the reputational concerns of family owners with a long-term commitment to family firms. Chen *et al.* (2010) find that family firms are less tax aggressive than their non-family counterparts. They interpret the findings as the family owners' willingness to forgo tax benefits to avoid the potential penalty and reputational damage from an Internal Revenue Service audit. They also find that firms in need of external capital would exhibit even lower tax aggressiveness. Andersen and Reeb (2003) argue that banks

[5] Asian firms are known for a bad corporate governance with a weak legal protection of their investors. Although Baek et al. (2003) and Lemmon and Lins (2003) give evidences of family ownership underperformance in Asian countries during the regional financial crisis in 1997, it is doubtable whether these results can apply to firms in Western countries with a better corporate governance and institutional environment.

or other financial institutions are more likely to deal with the same governing entities and practices like those in family firms with reputational concerns than in non-family firms. Croci, Doukas and Gonenc (2011) evidence that credit markets are more prone to supply family firms with long-term debt. During the crisis, when most firms encounter credit constraints, the established relationship with financial institutions could enhance the operating performance of the firms that do not forgo good investments because of financing problem.

To sum up, whether family firms outperform non-family firms in the financial crisis remains an open empirical question. In the following sections, we will provide empirical evidences to investigate this question.

3. Data and variables

3.1 Sample and sources of data

The sample consists of a panel of 3,286 firm-year observations, representing 658 firms from S&P 500 (US), FTSE100 (UK), DAX 30 (Germany), CAC 40 (France) and FTSE MIB 40 (Italy) with accounting data from 2006 to 2010. These firms play a vital role in the Western industrialized economies. The primary industries of the sample firms span 61 different two-digit SIC codes. Noticing the turnover of the index firms each year during the period of 2006-2010, we only include those index firms in the 2011 lists, even though some of them may not stand in the index lists in a particular year[6].

[6] I will discuss the problem of survival bias in Section 4.6.

Our data collection process comprises three main phases. In the first phase, we compile a dataset to identify blockholders (big shareholders with at least 5 percent of the outstanding shares), board members and top management for each sample firm. We later use the dataset to define family firms. Bureau van Dijk Orbis was the source of the ownership and board data, which covers as many as 78.4 million private and public firms (in 2011) from all over the world. It provided a historical ownership structure alongside information on the board members and top managers of each of the sample firms.

In the second phase, we manually collect information on the founding history of each firm from the following sources: (1) company official website; (2) Hoover's; and (3) web searches on the firm's history and family running history. we use the collected information to identify the founders, founding families and family member relationships to further define the family firms.

The last phase is to merge the information from the first two phases with accounting data from COMPUSTAT and other firm characteristic data (firm age data was from Bureau van Dijk Orbis, and market value as well as stock return data were from Datastream and CRSP). Table 1 describes the definitions of all of the variables in our research.

[Inset Table 1 here]

3.2 Definitions of the different types of family firms

A key challenge for any analysis regarding family firms is the lack of a widely accepted definition[7] of what a family firm is (Bennedsen *et al.*, 2010). Previous work has shown that the results of empirical studies are highly sensitive to the choice of the family firm definition (Maury, 2006; Miller *et al.*, 2007). Taking this into account, we manage to incorporate a broad definition

[7] Miller *et al.* (2007) give a comprehensive review of various definitions of family firms.

of family firms into our research, and then scrutinize the possible difference across various types of family firms with our findings. Specifically, our approach of definition covers the following 4 types of family firms:

1. Founder firms, defined as firms in which the founder/founders of the firms holds/hold a position/positions as a board member, CEO, or a blockholder (has at least a 5 percent share holding).
2. Heir firms, defined as firms in which the heir/heirs (by blood or by marriage) of the founding family holds/hold a position/positions either as a board member, CEO, or a blockholder (has at least a 5 percent share holding).
3. Family-owned firms, defined as firms in which one individual or several members from the same family hold more than 10 percent of the outstanding shares, either directly or indirectly, through another family firm or fund which the individual or the family controls or owns.
4. Leader/owner firms, defined as firms in which the CEO or a board member is simultaneously a significant shareholder with an outstanding ownership stake of at least 5 percent.

When identifying founder(s) and heir(s) of a firm, following Villalonga and Amit (2006), we search from at least two sources of public information. The founder(s) may have founded either one sample firm or a predecessor firm of a sample firm. We regard founder(s) as the people responsible for the firm's early growth and development. Therefore, large owners taking control of a firm through a spin-off or a leveraged buyout are not founders in our definition.

When identifying large family firm investors in defining family-owned firms, following Villalonga and Amit (2006), we exclude investment management company investors, such as

Fidelity (founded and controlled by Edward Johnson and his daughter, Abigail), or Franklin Resources (founded and controlled by brothers Charles and Rupert Johnson), whose funds act as large institutional investors in the sample firms. We disregard these funds as large family firm investors because the ultimate owners of these funds are a widely dispersed base of diversified investors, not the investment management companies *per se*.

3.3 Measure of firm performance

Following earlier studies, we mean to investigate both market performance and accounting performance of family versus non-family firms during the financial crisis. We use Tobin's Q as the chief market performance measure[8] and interpret it as a measure of firm value. In our setting, Tobin's Q is calculated as the market value of the equity at the end of the fiscal year plus the book value of the total liability (the book value of the total assets – the book value of the equity) divided by the book value of the total assets at the end of the fiscal year. The market value of the equity is from Datastream, and the book values of the total assets and the equity are from COMPUSTAT. We use Operating Return on Assets (OROA) as an accounting performance measure. It is Earnings before Interests and Taxes (EBIT) divided by the book values of the total assets. Both EBIT and the book value of the total assets are from COMPUSTAT. OROA is a natural measure of firm performance because it acts as a comprehensive proxy for a firm's cash flow before interest and taxes relative to its book asset, the earning generator (Bennedsen *et al.*, 2007). Unlike a net income-based measure like Return on Assets (ROA), it is unaffected by the variation of capital structure, which determines a corporate tax base. Unlike return on equity (ROE), it captures the total assets rather than part of it.

[8] As an alternative measure of market performance, I also use Alpha from Fama and the French Three Factor Model to take into account market risks. I discuss this issue in Section 4.5.

3.4 Descriptive statistics

Table 2 shows the two-digit SIC industry distribution of the sample firms. As the main findings of this paper center on family firms and founder firms, We only list family firms (column 4), founder firms (column 5), and non-family firms (column 6) in this table. Although family firms are prevalent in national economy, they are not symmetrically distributed in every industry. Villalonga and Amit (2006) report that family firms are not present in 13 two-digit SIC industries, and that they are over-represented in some industries. In our sample, we find 11 two-digit SIC industries that are free of family firms. Our results of industry representation of family firms are comparable to the findings of Villalonga and Amit (2006) as well as Anderson and Reeb (2003). In addition, founder firms are concentrated in industries such as electronic and other electrical equipment (two-digit SIC code: 36), as well as business service (two-digit SIC code: 73). These results imply that controlling for industries matters to an econometric analysis.

[Insert Table 2 here]

Table 3 provides the descriptive statistics of the main variables of the sample firms during the crisis year 2008. All of the ratio variables are winsorized at 1 percentile and 99 percentile. We have concentrated our focus on family firms, founder firms, and non-family firms. Please refer to Appendix 3 for the details of the other subgroups of the family firms.

Family firms constitute 35 percent of the sample, which is highly consistent with the findings of Villalonga and Amit (2006, 37 percent) as well as Andersen and Reeb (2003, 35 percent). On average, family firms and founder firms are significantly smaller and less leveraged at 1 percent level relative to non-family firms. The results are consistent with those of Ampenberger *et al.* (2011) as well as Villalonga and Amit (2006). Less leverage may imply adverse risk characteristics of the family firms. However, family firms and founder firms invest more and

expend more significantly at 1 percent level. More importantly, founder firms exhibit more difference relative to non-family firms in their number of employees, firm age, research expense, as well as depreciation and amortization. These findings suggest that founder firms are younger firms with fewer employees, and that they are concentrated in high tech industries, which require intensive research and development investment. In terms of dependent variables OROA and Tobin's Q, we find that founder firms have significantly higher values compared with non-family firms in Tobin's Q, while they do not in accounting performance OROA. The data thus suggest that at the beginning of the crisis, family firms as a whole do not outperform non-family firms with respect to Tobin's Q and OROA. However, founder firms, a subgroup of family firms, are better performers in market value, but not in operating profitability. Earlier we argue that the financial crisis has had a significant impact on the real economy since 2009. The fiscal year choice (2008) may explain the different performance of the founder firms in OROA and Tobin's Q relative to the non-family firms. Appendix 3 evidences that all of the other non-founder family firms: heir firms, family-owned firms and leader/owner firms do not exhibit performance superiority relative to non-family firms in both OROA and Tobin's Q. These findings are consistent with those of Miller *et al.* (2007), suggesting a founder firms' value premium. In the next section, we will use multiple regressions to analyze the performance difference between family firms and non-family firms in a 5 year panel framework, which spans the period before and during the crisis, controlling for country, industry, and firm specific characteristics.

[Insert Table 3 here]

4. Do family firms outperform non-family firms in the financial crisis?

The principal objective of this paper is to examine whether family firms outperform non-family firms during the global financial crisis, and investigate the reasons for any possible outperformance. In this section, we will use several methods to show the main empirical results and to answer any related questions.

4.1 Univariate difference in difference analysis

We start our analysis with univariate difference in difference test of OROA, and Tobin's Q. Again, we list the 2 performance measures of non-family firms, family firms and founder firms before and during the crisis in Table 4.

[Insert Table 4 here]

Our first step focuses on a comparison between all of the family firms and the non-family firms. We find that both the accounting performance and the market performance are not significantly different except for the two-year-mean of Tobin's Q before the crisis (2006-2007). The performance change across the crisis for family firms and non-family firms are similar. These results imply that our broadly defined family firm group does not consist of superior performers during the financial crisis.

Next, we focus on the comparison between the founder firms and the non-family firms. With respect to their accounting performance OROA, the first striking result is that even during the crisis, founder firms' OROA does not drop significantly when compared with their performance before the crisis. To be specific, the three-year-mean of OROA before the crisis is 0.116 versus 0.111 for the two-year-mean during the crisis. By contrast, non-family firms during the crisis have a profitability shrink by 14 percent, while all family firms experience a 12 percent shrink.

Additionally, founder firms significantly outperform non-family firms during the crisis by 16 percent, and the change in performance before and during the crisis is also significantly different at 10 percent level. The findings provide the first evidence of the founder firms' outperformance during the crisis.

The picture of Tobin's Q is somehow different. Although founder firms significantly outperform non-family firms, both before and during the crisis, the magnitude of outperformance decreases when the crisis shocks the firms. Prior to the crisis, founder firms outperform non-family firms by 0.607 in Tobin's Q. During the crisis, however, founder firms only outperform by 0.380, which suggests that the financial crisis reduces the market value premium of the founder firms. We notice that in the case of the accounting performance OROA, the crisis tends to amplify the performance difference between founder firms and non-family firms from 0.005 (before the crisis) to 0.015 (during the crisis). The difference of OROA and Tobin's Q in magnitude change implies that the financial crisis may have a disparate effect on corporate cash flow based performance and market value based performance. We use multivariate regressions to scrutinize the difference in the next sub-section.

4.2 Firm fixed effect estimation

First, We use a firm fixed effect model to test whether family firms outperform non-family firms during the crisis. The econometric model is as follows[9]:

$$Y_{it} = \alpha_0 + \beta_0 Family_i * Crisis_t + \beta_1 Crisis_t + X'_{it-1}\beta_2 + u_i + e_{it} \qquad (1)$$

[9] Following earlier research studies, I define the variables $Family_i$, $Founder_i$ $Heir_i$, $Family\_owned_i$ and $Leader\_owner_i$ as a time invariant variable, indicating persistent family ownership, management and control. Because firm fixed effects absorb all firm level time-invariant effects, I drop the variable $Family_i$ from my fixed effect model. The firm fixed effect specification is also supported by the Hausman test.

Where Y_{it} is performance measure, referring to OROA or Tobin's Q. $Family_i$ is a dummy which equals one if one firm is a family firm. $Crisis_t$ is a dummy, denoting either *Crisis_acc,* which equals one if the fiscal year is 2009 or 2010, or *Crisis_mkt*, which equals one if the fiscal year is 2008, 2009 or 2010. *Crisis_acc* is used with OROA and *Crisis_mkt* is used with Tobin's Q[10]. $Family_i * Crisis_t$ is an interaction variable. β_0 is the coefficient of interest. u_i is the firm fixed effect, and e_{it} is an error term. X'_{it-1} is a vector of the lagged control variables[11]. Following Andersen and Reeb (2003), Villalonga and Amit (2006), as well as Miller *et al.* (2007), we incorporate several control variables into our model: Firm size is the natural logarithm of the book value of the total assets. Growth opportunities and advertising expense[12] are measured as research and development expenses over sales and advertising expense over sales respectively. Return volatility, the proxy for firm risk, is calculated as the standard deviation of the monthly stock returns for the last 36 months. Capital structure is the ratio of debt to total assets. Investment is the capital expenditure over the plant, property and equipment (PPE) at the end of the last fiscal year. We also include the firms' age, and natural logarithm of number of employees.

Table 5 illustrates that after controlling for firm fixed effects and time-variant firm specific characteristics, family firms, as broadly defined in the sample, do not significantly outperform non-family firms during the crisis. The insignificance is similar whether we use OROA or Tobin's Q as a performance measure and is consistent with early univariate analysis.

[10] The financial crisis hits the capital market and real economy at different time. Please refer to Table 1 for clarification.

[11] I use lagged control variables to control for contemporary feedback effects between the dependent variables and the control variables.

[12] Following Millers *et al.*, I code missing data as 0, because public corporations have to report significant expenditures by law.

[Insert Table 5 here]

Next, we split the family firms into 4 subgroups and introduce 4 dummies to the fixed effect model. We aim to examine whether different groups perform differently during the crisis. The model we use is as follows:

$$Y_{it} = \alpha_1 + \beta_0 Crisis_t + \beta_1 Founder_i * Crisis_t + \beta_2 Heir_i * Crisis_t + \beta_3 Family\_owned_i * Crisis_t + \beta_4 Leader\_owner_i * Crisis_t + X'_{it-1}\beta_5 + u_i + e_{it} \quad (2)$$

Where Y_{it} is a performance measure, referring to OROA or Tobin's Q. $Founder_i$ $Heir_i$ $Family\_owned_i$ and $Leader\_owner_i$ are dummies which equal one if one firm is a founder firm, heir firm, family-owned firm and leader/owner firm respectively. $Crisis_t$ is a dummy, denoting either *Crisis_acc*, which equals one if the fiscal year is 2009 or 2010, or *Crisis_mkt*, which equals one if the fiscal year is 2008, 2009 or 2010. $Founder_i * Crisis_t$, $Heir_i * Crisis_t$, $Family\_owned_i * Crisis_t$, and $Leader\_owner_i * Crisis_t$ are interaction variables. β_1 to β_4 are the coefficients of interest. X'_{it-1} is the same vector of the lagged control variables as in model (1). u_i is the firm fixed effect. e_{it} is an error term.

Table 6 exhibits disparate pictures for both the accounting performance OROA and the market performance Tobin's Q. Only founder firms show a significantly superior performance in OROA during the financial crisis, while they do not in Tobin's Q. In the case of OROA, the positive coefficient of *Founder* is significant at 5 percent level. It means on average, that founder firms outperform non-family firms by 2 percent OROA during the crisis. The magnitude of outperformance accounts for as high as 18 percent of the mean OROA of non-family firms in

2009 and 2010. In contrast, when controlling for the firm fixed effects and other time-varying factors, founder firms do not exhibit a significant value premium, measured in Tobin's Q during the crisis. These results complement the works of Andersen and Reeb (2003), Villalonga and Amit (2006), Maury (2006), as well as Miller *et al.* (2007) by providing new evidence suggesting that in recession times, the market value premium of founder firms disappears, whereas their accounting performance premium persists.

[Insert Table 6 here]

4.3 Endogeneity of founder status and other robustness tests

Although fixed effect estimation controls for unobservable time-invariant heterogeneity, time-variant heterogeneity may bias the estimates. Founder status is not randomly assigned to sample firms. We are unable to identify an unbiased and consistent estimator, given the underlying omitted determinants of selection into founder firms are correlated with outcome performances. We adopt Instrument Variable (IV) 2SLS estimation to tackle this issue.

The first step is to run an OLS regression of the founder status on an instrument variable with various controls used for the second stage regression:

$$Founder_i = \alpha_2 + \beta_0 Old\ \ firm_i + X_i^{'}\beta_1 + e_i \quad (3)$$

A valid instrument should be strongly correlated with the endogenous dummy Founder, while it is uncorrelated with the error term of the second stage regression. The instrument we use is Old firm, which is one if a firm is incorporated before 1960. Fahlenbrach (2009) first introduces this instrument[13] to analyze a founder-CEO effect on investment and stock market

[13] Fahlenbrach uses 1940 as a threshold of old firms. However, his sample period is from 1995 to 2002. In my case, I use 1960 since my sample period is from 2006 to 2010.

performance. A firm set up before 1960 is most unlikely to have its founder(s) present at the firm given the average age of founder firms is 29 in our sample. When the instrument is strongly correlated with founder firms, it has a slim chance of affecting the operating performance beyond the control variables in the second stage regression.

In the second stage, we use the predicted values of Founder from the first stage regression to replace the dummy Founder and then regress the firm performance on predicted Founder and control variables:

$$Y_{OROA} = \alpha_3 + \beta_2 Founder_i + X_i^{'}\beta_3 + e_i \quad (4)$$

Where Y_{OROA} is the difference between the average OROA from the period of 2009-2010 and the average OROA from the period of 2006-2008. $Founder_i$ is a dummy which equal one if one firm is a founder firm, heir firm, family-owned firm and leader/owner firm respectively. β_2 is the coefficient of interest. $X_i^{'}$ is a vector of control variables. The control variables are also the difference between the average of the period of 2009-2010 and the average of the period of 2006-2008. These control variables include firm size, growth opportunities, advertising expense, firm risk, capital structure, firm age, and number of employees. e_i is an error term.

In Table 7, the first-stage regression shows that Founder is strongly negatively related to Old firms (the coefficient is as high as -0141, significant at 1 percent level), implying the legitimacy of the instrument. In the second stage regression, the coefficient of Founder is 0.059, which is significant at a 10 percent level. The finding is consistent with that of the former fixed effect model. Taken together, the results of IV 2SLS estimation confirm the outperformance of founder firms in OROA during the crisis.

[Insert Table 7 here]

As an alternative robustness test[14], we exclude financial firms from the sample and re-run the firm fixed effect regressions. The results are consistent with those of the full sample. The magnitude of the coefficient of interest highly resembles that from the full sample estimation (Please refer to column 1 in Appendix 4 for details).

4. 4 Cross-country tests

In this sub-section, we consider whether country-level characteristics (for example, legal protection of shareholders, corporate governance systems and other institutional environments) add explanatory power to our findings.

We first divide the sample into Anglo-Saxon and Continental European groups by the legal origin (La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 1998) of the stock exchange country of a sample firm (in the sample, US S&P 500 and UK FTSE 100 firms are categorized into the Anglo-Saxon group and the rest of the sample is added to the Continental European group). The results (not reported for brevity) show that a founder premium in OROA is only significant in the Anglo-Saxon group, while Tobin's Q of the founder firms is not significantly different from non-family firms whether we use the Anglo-Saxon or the Continental European sample. The latter is consistent with the case in the full sample.

Next, we split the sample by US and non-US firms and find that the results are highly consistent with those in the first split of the sample above. Only US firms exhibit a founder premium in OROA (refer to column 2 in Appendix 4). Considering that 82 percent of the

[14] I also use pooled OLS to check the outperformance of the founder firms in OROA, using the full sample. The results are highly consistent with those of the fixed effect estimation (for brevity not reported).

founder firms are US firms and that the US firms constitute a large body of the sample, we conclude that the US founder firms mainly contribute to the explanatory power of our findings.

4.5 Alternative measure of market performance

We are aware of the inconsistent findings from the regression of Tobin's Q with those from the OROA. Founder firms do not outperform during the crisis in Tobin's Q, but in OROA. Numerous literature reports high volatility (for example, Veronesi, 1999) of stocks during recession times, thus indicating a high risk in financial markets. High market risk during the crisis is likely to affect the volatility and the return of individual stock prices. Therefore, using non-risk-adjusted Tobin's Q as a market performance measure may be problematic.

To exclude common market risks from the individual stock performance, we calculate annualized monthly risk-adjusted performance estimates (Alpha) and use Alphas as an alternative measure of market performance to replace Tobin's Q and re-run the fixed effect regressions. Following Carhart (1997) as well as Gil-Bazo and Ruiz-Verdu (2009)[15], we use a two-stage estimation procedure to obtain a panel of monthly Alphas. In the first stage, for each month, We regress the excess returns of individual stock on the Fama and French (1993) 3 risk factors[16] over the past 5 years to obtain betas. If less than 5 years of previous data is available for a specific stock-month, we required the stock to be present in the sample for at least 48 months in the past 5 years. In the second stage, we estimate a stock's monthly Alpha as the difference

[15] I focus on US firms because I want to ensure that my estimates of Alphas from the Fama and French three factor model are free from cross country heterogeneity.

[16] The regression equation is: $R_i - r_f = Alpha + \beta_1(R_m - r_f) + \beta_2 SMB + \beta_3 HLM$ where $R_i - r_f$ is the excess return of stock i, r_f is the risk-free return rate, and R_m is the return of the whole stock market. $R_m - r_f$ is the market excess return. *SMB* stands for "small (market capitalization) minus big" and *HML* for "high (book-to-market ratio) minus low"; they measure the historic excess returns of small caps over big caps and of value stocks over growth stocks. These three factors are historical data and available from Kenneth French's homepage: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

between the stock's excess return and the realized risk premium, defined as the vector of betas times the vector of the three factors. Finally, for each stock, we take an average of 12 monthly Alphas to get annualized monthly Alphas.

Table 9 shows the results of the fixed effect estimation using Model (2) with Alpha as a dependent variable. The findings are highly consistent with those found in the case of Tobin's Q as a market performance measure. Neither broadly-defined family firms nor founder firms outperform relative to non-family firms in Alpha. In Section 5, we will scrutinize the reasons for the attenuation of the market value premium of founder firms during the crisis.

[Insert Table 8 here]

4.6 Do surviving firms bias estimation?

The sample covers firms standing in the list of S&P 500, FTSE 100, DAX 30, CAC 40 and FTSE MIB 40 in 2011. This means that those firms all survived the crisis period of 2006 - 2010. They are presumably superior performers in the market. Turnover of index firms is common. Focusing only on those survivors may bias the estimation.

To address this concern, we restrict the sample to those firms which are consistently present in the S&P 500 index in each year (389 firms) through the period of 2006 - 2010[17] and re-run the regressions using model (2) with Tobin's Q, Alpha and OROA as dependent variables. The results in Appendix 5 are in consistence with those of the full sample.

We summarize this section by stating that when the financial crisis comes, broadly defined family firms are not superior performers. Only founder firms outperform other firms during the

[17] I only use US firms for this robustness test, because US firms mainly contribute to the explanatory power of the findings.

crisis in terms of OROA. However, the market value premium of founder firms, which is widely documented in normal or good economic times in earlier studies, disappears. We will explain these phenomena in the next section.

5. Why do founder firms outperform in operating profitability, but not in market valuation?

We start to explain the different performance of founder firms with respect to OROA and Tobin's Q/Alpha during the financial crisis by analyzing the different algorithms of these two measures. OROA is a period cash flow divided by the book value of the total assets at the end of a fiscal year. Therefore, it is a revenue based profitability measure driven by business strategy, operating efficiency, management skills, expense control and other firm level characteristics. On the contrary, Tobin's Q is computed as a market value over the book value of the total assets. Since the book value of a firm is persistent, Tobin's Q is mainly driven by the market price of stocks (we use the book value of the total liability of debt plus the market value of the stocks as a proxy for the market value of the total assets). By the same token, Alpha, though excluding the effect of market risks, is also determined by the individual stock price. A large body of financial literature documents a high volatility of stock returns in recession times (for example, Veronesi, 1999). Table 8 clearly evidences that during the crisis, volatility of monthly return is as high as 12 percent, while it is only 6 percent in normal times. Economists tend to attribute high volatility to investors' uncertainty about the future growth of an economy in bad times. In addition, investors are prone to be irrational and they overreact to bad market conditions during recessions (Glode *et al.*, 2010). In our context, we argue that in the recent financial crisis, high volatility tends to attenuate a value premium of founder firms because of investors' overreacting to bad market condition by underestimating valuable stocks. Univariate difference in the difference

analysis in Table 4 also supports our argument. Before the crisis the market value premium of founder firms is 0.607, and then during the crisis it declines to 0.380, revealing a reduction of 35 percent. Moreover, market value drops before and during the crisis to 0.449 for non-family firms versus 0.664 for founder firms. Return volatility for founder firms during the crisis year 2008 is 0.112, significantly higher than non-family firms (0.098) in Table 3. We therefore ascribe the vanishing of the founder firm market value premium to investors' irrational overreaction to bad market conditions and high volatility during the crisis time.

Next, we explore the reasons for the outperformance of founder firms in the accounting measure OROA during the crisis. We use a fixed effect model to investigate other financial and investment strategy differences between founder firms and non-family firms, which may also affect accounting performance. We test the difference in capital structure, , and investment (the ratio of capital expenditure to PPE) between the founder firms and the non-family firms, controlling for other variables[18]. Table 10 presents the results.

[Insert Table 10 here]

We find that founder firms invest significantly less (at a 5 percent level) relative to non-family firms during the crisis. At the same time, however, founder firms have gained more debt and their aggregate level of debt is higher than the non-family firms. The coefficient of *Founder*crisis_acc* in the second column means that on average, the capital structure of founder firms is more leveraged by 0.9 relative to non-family firms (significant at 10 percent level). Recalling Table 3's descriptive statistics, before the crisis[19] founder firms are less leveraged and invest significantly more relative to non-family firms. The coefficients indicate that founder

[18] For the regression of investment, I follow Elull *et al.* (2010) to choose the control variables. For the regression of the capital structure and the short-term debt change, I follow Antoniou *et al.* (2008) to choose the control variables.
[19] 2008 is viewed as before the crisis for accounting performance examinations.

firms substantially change their investment and financial strategy during the crisis. We also find that the cash flow and the working capital of the founder firms are similar to those of the non-family firms[20]. If we assume that a higher leverage means better access to the credit market, the fact that the founder firms raise their debt level during the crisis suggests that they have more debt financing resources than non-family firms in bad times, when financial institutions tighten their credit granting activities. Previous studies (Morck *et al.*, 1988, 2000; Fahlenbrach, 2009, etc.) argue that founders bring differentially valuable skills to firms. "Founders may be inspiring leaders, great visionaries, or exceptionally talented scientists." (Villalonga and Amit, 2006). Our findings suggest that in addition to the above mentioned skills, founders are able to obtain more financing resources, leading firms to survive times of recession. By contrast, it is widely documented that non-family firm managers are myopic and have more incentive to take on risky projects to boost current earnings (Andersen and Reeb, 2003). The incentive is even more intensified under the pressure of managerial dismissal in harsh economic conditions. In contrast, founder firms are more long-term oriented and take a conservative investment strategy during the crisis. Risky projects, especially those financed by short-term debt, are most likely to fail with financial constraints. As a result, desperate over-investment during the crisis may lead to project failure and further underperformance because of a dry-out of bank loans during the crisis.

In summary, the results show that during the financial crisis, founder firms make a more conservative investment strategy even though they may get better access to the credit market than their counterparts. Less incentive of founder firms to over-invest in risky projects to boost current earnings during the crisis explain their outperformance. On the other hand, because

[20] I also test the difference in working capital and cash between the founder firms and the non-family firms to examine their short-term financing instruments change, which may affect their operating performance. However, I do not find significant differences.

market performance is mainly driven by stock prices, high volatility of stock returns and investors' overreaction to bad market prevail during the crisis, the market value premium of founder firms may be diluted.

6. Discussion

The primary finding of this paper is that only founder firms are better performers in operating profitability (OROA). The other three types of family firms do not exhibit a significant difference relative to the non-family firms. What mechanism drives the discrepancy among founder firms and the other family firms? The founders of firms enjoy supreme and unchallenged authority and respect. They are long-visioned, highly talented, and inspiring entrepreneurs (Villalonga and Amit, 2006). In most cases, they are CEOs, decision makers, and large shareholders of the firms. To keep a sustainable growth for their young firms, founders are more likely to take a long-term-oriented strategy to helm their firms. Due to their unparalleled status in the firms, founders do not desperately take extra risky projects to boost current earnings to please board members, when the stock prices of the firms slump during the crisis. In contrast, professional CEOs in non-family firms would have more incentive to take more risks to inflate the revenue and maintain their positions. Heir firms are very similar to non-family firms. After several generations, the firms with strong family characteristics in their early stages gradually develop into professionally-managed firms. The previous characteristics of family firms fade away. Descriptive statistics in Appendix 4 demonstrate that heir firms closely resemble non-family firms in most of the dimensions. The chances are that the CEO in an heir firm is a non-founding family member. Therefore, heir firms are likely to suffer from the same myopic

investment strategy to boost current earnings. The case of family-owned firms and leader/owner firms is another picture. Unlike founder firms, which are new enterprises, family-owned and leader/owner firms are mature corporations. The controlling family or individual may not necessarily come from the founding family that focused on the growth opportunities during the early stages of the firm. When the crisis comes, however, large shareholding in the firm incurs huge capital income loss with the drop of stock prices. In this context, the controlling family or individual has more incentive than founders to boost short-term earnings to rapidly recover loss in the capital market at the cost of the small shareholders. Consequently, the family-owned firms and leader/owner firms underperform the founder firms.

Earning management is another concern when founder firms only outperform in OROA. Superiority of accounting performance is arguably attributable to the manipulation of earnings. This argument is implausible, because founder firms are less leveraged before the crisis (Table 3) and have less incentive to manipulate earnings to lobby banks to supply loans. It is financially distressful non-family firms that are more prone to conduct earning management. Even though non-family firms are more apt at manipulating earnings, founder firms are still better performers. In addition, US firms mainly contribute to the findings. La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) rank the US as one of the countries with the best investor protection and legal environment. This sample consists of the biggest public firms. Information transparency is demanding; internal and external audits are stringent. Earning management has a slim chance to be the main driving force of outperformance.

Last, Villalonga and Amit (2006) argue that founder-CEO firms bear less agency costs than classical owner-manager firms in normal economic conditions. Our paper provides new evidence in recession times to consolidate their argument, by evidencing that founder firms bear the least

agency costs among non-family firms and the different types of family firms. Our paper also suggests that during the crisis, because the capital market is more risky and investors are highly overreacting, stock prices are remarkably noisy and do not reflect the intrinsic value of a firm, and that stock-based performance measures like Tobin's Q and Alpha, may not be the most appropriate measures of a firm's market performance. Further research will center on the testing of volatility-adjusted measures like Sharp Ratio.

7. Concluding remarks

It is the prevalence of family firms all over the world that makes academics pay increasing attention to family business research. One central issue is to examine whether family firms are a superior organizational form. Although a growing body of literature has made rigorous performance analyses between family firms and non-family firms in normal or good economic times, rather scant papers try to investigate the topic in recession times. This paper attempts to fill this knowledge void.

Constructing a detailed dataset from proxy filings of firms from S&P 500 (US), FTSE100 (UK), DAX 30 (Germany), CAC 40 (France) and FTSE MIB 40 (Italy) from 2006 to 2010, we aim at contributing to the literature by providing new evidence to conduct a performance examination between family firms and non-family firms during the global financial crisis since the Lehman Brother's bankruptcy in 2008.

We find that family firms, broadly defined as the sum of founder firms, heir firms, family-owned firms and leader/owner firms, comprise 35 percent of the sample. They do not significantly outperform non-family firms during the crisis whether we use market value

measures (Tobin's Q/Alpha) or an accounting profitability measure (OROA). However, founder firms, as a subgroup of family firms significantly outperform non-family firms by 18 percent in OROA during the crisis. Tobin's Q/Alpha of founder firms, by contrast, does not exhibit a difference significantly. Our interpretation of this phenomenon is that Tobin's Q/Alpha is mainly driven by stock prices. High volatility and investors' overreaction during the crisis (Veronesi, 1999; Glode *et al.*, 2010) may attenuate the market value premium of founder firms.

Further testing shows that during the crisis, relative to non-family firms, founder firms invest significantly less and have better access to the credit market. We ascribe the outperformance of founder firms to less incentive to over-invest in risky projects with a high probability of failure under financial constraints to boost current earnings during the crisis.

Taken as a whole, our results support a widely-documented "founder premium" (for instance, Morck *et al.*, 1988, 2000; Fahlenbrach, 2009). Founders not only bring valuable skills in normal economic times, but also enable firms to weather the financial crisis with better expense control, more financial resource and a conservative investment strategy. Our results suggest that agency costs in founder firms are the least relative to other firms during recession times. The results also suggest that when inventors tend to be irrational and stock price volatility is high, Tobin's Q and Alpha may not be the most appropriate measures of corporate performance.

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Table 1 Variable definitions

Variables	Definition
Crisis_acc	The accounting crisis year, a dummy variable which is one if the fiscal year is 2009 or 2010. This variable indicates the years when the financial crisis significantly strikes the real economy[21].
Crisis_mkt	The market crisis year, a dummy variable which is one if the fiscal year is 2008, 2009 or 2010. This variable indicates the years when the financial crisis significantly strikes the financial market.
Family	A dummy variable, which is one if the sample firm is a family firm. Family firms are the sum of all of the four subgroups of firms: (1) founder firms; (2) heir firms; (3) family-owned firms; and (4) Leader/owner firms. Please refer to the definitions of the four subgroups of family firms below.
Founder	Founder firms, a dummy variable which is one if the founder/founders of the firm holds/hold a position as a board member, or CEO, or a blockholder (has at least a 5 percent share holding).
Heir	Heir firms, a dummy variable which is one if the heir/heirs (by blood or by marriage) of the founder/founders of the firm holds/hold a position either as a board member, or CEO, or a blockholder (has at least a 5 percent share holding).
Family_owned	Family-owned firms, a dummy variable which is one if one individual or several members from the same family together hold more than 10 percent of the outstanding shares either directly or indirectly through another family firm or fund which the individual or the family controls or owns.
Leader_owner	Leader/owner firms, a dummy variable which is one if the CEO or a board member is simultaneously a significant shareholder with an outstanding ownership stake of at least 5 percent.
OROA	Operating Retunes on Assets, defined as earnings before interests and taxes (EBIT) divided by the book values of the total assets.
Tobin's Q	Market value of equity plus the book value of the total liability (book value of total asset - book value of equity) divided by the book value of the total assets.
Difference in OROA	The difference between average OROA from the period of 2009-2010 and average OROA from the period of 2006-2008.
Size	Firm size, defined as the natural logarithm of the book value of the

[21] The bankruptcy of Lehman Brother in September 22, 2008 signals the coming of the global financial crisis. The financial market reacts immediately to the event of bankruptcy and stock prices slump. Appendix 1 evidences this picture. I therefore define the market crisis years as 2008, 2009 and 2010. However, the reaction of the real economy lags behind the financial market. The crisis has had a significant effect on the real economy since 2009, which is supported by the national GDP growth rate in Appendix 2. So I define the accounting crisis years as 2009 and 2010.

	total assets of a firm.

Table 1, continued

Capital Structure	Debt to equity ratio, defined as the book value of the total liability (book value of the total asset - book value of the equity) divided by the book value of the total equity.
Investment	Ratio of capital expenditure to the Plant, Property and Equipment (PPE), defined as capital expenditure divided by the PPE of the last fiscal year.
Ln employee	Natural logarithm of the number of employees of the firm.
ROA	Returns on Assets, defined as net income divided by the book value of the total assets.
Working capital growth	Yearly working capital growth rate, defined as an increment of the yearly working capital divided by the working capital of the last fiscal year.
Short debt change	Yearly short-term debt increment, defined as the difference between short-term debt this fiscal year and the last fiscal year, measured in 1 billion US dollars.
Advertising	Adverting expense, defined as yearly advertising expense divided by sales.
Research	Research and development expense, defined as yearly research and development expense divided by sales.
Firm age	The difference between the incorporation year and a fiscal year.
Return volatility	Firm idiosyncratic risk, defined as the standard deviation of stock returns for the previous 36 months.
Ln cash	Natural logarithm of cash.
Sales growth rate	Yearly sales growth rate, defined as an increment of the yearly total sales divided by the total sales of the last fiscal year.
Tangibility	Tangible assets, defined as the tangible assets divided by the book values of the total assets.
Profitability	Lagged OROA, Operating Return on Assets of the last fiscal year.
Dividend payout	Dividend divided by sales.
Non-debt tax shield	Depreciation and amortization divided by the book value of the total assets.
Alpha	Annualized average monthly risk-adjusted return of stock. Monthly risk-adjusted return is the difference between the monthly before-expense return and the risk premium, defined as the vector of betas times the vector of Fama and French three factors (1993) realized in month t. we estimate the betas by a rolling regression following Gil-Bazo and Ruiz-Verdu (2009).
Old firm	A dummy variable, which is one if the sample firm is incorporated before 1960.
Sales/asset	Ratio of sales to the book value of the total assets.
Expense/asset	Ratio of selling, general administrative expense to the book value of the total assets.
Cost/asset	Ratio of costs of goods to the book value of the total assets.

Depreciation/asset	Ratio of depreciation and amortization to the book value of the total assets.

Table 2 Industry distribution of family firms, founder firms, and non-family firms

SIC code	Industry description	All firms	Family firms	Founder firms	Non-family firms	% family firms in the industry	% founder firms in the industry
10	Metal mining	11	6	1	5	55%	9%
12	Coal mining	5	0	0	5	0%	0%
13	Oil and gas extraction	29	10	6	19	34%	21%
14	Mining and quarrying of nonmetallic minerals, except fuels	1	0	0	1	0%	0%
15	General building contractors	6	5	2	1	83%	33%
16	Heavy construction, except buildings	3	2	0	1	67%	0%
17	Special trade contractors	1	0	0	1	0%	0%
20	Food and kindred products	27	14	0	13	52%	0%
21	Tobacco products	6	2	0	4	33%	0%
23	Apparel and other textile products	3	1	0	2	33%	0%
24	Lumber and wood products	2	1	0	1	50%	0%
25	Furniture and fixtures	2	1	0	1	50%	0%
26	Paper and allied products	6	0	0	6	0%	0%
27	Printing and publishing	5	2	0	3	40%	0%
28	Chemical and allied products	49	16	1	33	33%	2%
29	Petroleum and coal products	8	2	0	6	25%	0%
30	Rubber and miscellaneous plastic products	6	2	1	4	33%	17%
31	Leather and leather products	1	1	0	0	100%	0%
32	Stone, clay, and glass products	7	4	0	3	57%	0%
33	Primary metal industries	11	6	2	5	55%	18%
34	Fabricated metal products	5	0	0	5	0%	0%
35	Industrial machinery and equipment	24	8	4	16	33%	17%
36	Electronic and other electrical equipment	37	15	9	22	41%	24%
37	Transportation equipment	21	6	0	15	29%	0%
38	Instruments and related products	35	10	2	25	29%	6%
39	Miscellaneous manufacturing products	4	1	0	3	25%	0%
40	Railroad transportation	3	0	0	3	0%	0%
42	Trucking and warehousing	1	1	0	0	100%	0%
44	Water transportation	2	2	0	0	100%	0%
45	Transportation by air	4	1	1	3	25%	25%
46	Pipelines, except natural gas	1	0	0	1	0%	0%
47	Transportation services	5	3	0	2	60%	0%
48	Communications	29	14	6	15	48%	21%
49	Electric, gas, and sanitary services	55	2	0	53	4%	0%
50	Wholesale trade of durable goods	7	3	1	4	43%	14%
51	Wholesale trade of nondurable goods	8	2	2	6	25%	25%
52	Building materials and gardening	3	1	0	2	33%	0%
53	General merchandise stores	13	7	2	6	54%	15%
54	Food stores	6	3	0	3	50%	0%
55	Auto dealers and service stations	3	2	0	1	67%	0%
56	Apparel and accessory stores	8	4	3	4	50%	38%

57	Furniture and home furnishings	4	2	2	2	50%	50%
58	Eating and drinking places	6	1	0	5	17%	0%
59	Miscellaneous retail	7	3	2	4	43%	29%

Table 2, continued

60	Depository institutions	4	0	0	4	0%	0%
61	Nondepository institutions	7	1	1	6	14%	14%
62	Security and commodity brokers	11	3	3	8	27%	27%
63	Insurance carriers	32	12	6	20	38%	19%
64	Insurance agents, brokers, services	1	0	0	1	0%	0%
65	Real estate	1	1	0	0	100%	0%
67	Holding And Other Investment Offices	48	16	8	32	33%	17%
70	Hotels and other lodging places	7	4	1	3	57%	14%
72	Personal services	2	2	2	0	100%	100%
73	Business services	44	18	13	26	41%	30%
75	Auto repair, services, and parking	1	0	0	1	0%	0%
78	Motion pictures	1	1	1	0	100%	100%
79	Amusement and recreation services	1	1	0	0	100%	0%
80	Health services	5	0	0	5	0%	0%
82	Educational services	2	2	2	0	100%	100%
87	Engineering and management services	10	3	1	7	30%	10%
95	Admin-Environ Quality, Housing	1	0	0	1	0%	0%
	Total	658	232	85	426	35%	13%

Number and percent of firms by primary two-digit SIC code. Family firms are defined as the sum of all of the four subgroups of firms: (1) founder firms; (2) heir firms; (3) family-owned firms; and (4) Leader/owner firms. Founder firms are firms where the founder/founders of the firm holds/hold a position as a board member, CEO, or a blockholder (has at least a 5 percent share holding). Heir firms are firms where the heir/heirs (by blood or by marriage) of the founder/founders of the firm holds/hold a position either as a board member, CEO, or a blockholder (has at least a 5 percent share holding). Family-owned firms are firms where one individual or several members from the same family together hold more than 10 percent of the outstanding shares either directly or indirectly through another family firm or fund which the individual or the family controls or owns. Leader/owner firms are firms where the CEO or a board member is simultaneously a significant shareholder with an outstanding ownership stake of at least 5 percent. The sample comprises 658 firms from S&P 500 (US), FTSE100 (UK), DAX 30 (Germany), CAC 40 (France) and FTSE MIB 40 (Italy) in the 2011 index company lists.

Table 3 Descriptive statistics of family firms, founder firms, and non-family firms in 2008

	Non-family firms (I)			All family firms (II)			Founder firms (III)			Difference in Mean			
	Obs	Mean	Std.Dev.	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	(I)-(II)		(I)-(III)	
Size	428	9.602	1.535	230	9.206	1.321	85	8.931	1.356	0.396	***	0.671	***
Capital Structure	428	3.837	6.051	230	2.469	3.888	85	1.729	2.415	1.368	***	2.108	***
Investment	391	0.125	0.079	213	0.155	0.109	79	0.181	0.121	-0.030	***	-0.056	***
Ln employee	420	3.064	1.421	223	2.945	1.579	84	2.434	1.515	0.119		0.630	***
ROA	351	0.054	0.080	154	0.045	0.102	74	0.052	0.107	0.009		0.001	
OROA	425	0.110	0.080	229	0.110	0.082	85	0.110	0.094	0.000		-0.001	
Tobin's Q	419	1.632	1.000	222	1.713	1.088	83	1.886	1.238	-0.081		-0.254	**
Working capital growth	371	-0.291	2.530	205	-0.029	1.697	73	-0.072	1.026	-0.263		-0.219	
Short debt change	426	-0.070	1.993	229	0.015	1.181	85	-0.058	1.121	-0.085		-0.012	
Advertising	427	0.008	0.019	230	0.014	0.029	85	0.017	0.031	-0.006	***	-0.010	***
Research	427	0.028	0.056	230	0.030	0.061	85	0.045	0.076	-0.002		-0.017	**
Firm age	428	53.439	46.681	230	48.717	44.366	85	28.988	19.894	4.722		24.451	***
Return volatility	418	0.098	0.065	221	0.103	0.037	82	0.112	0.032	-0.005		-0.014	*
Alpha	320	0.004	0.023	136	0.008	0.022	66	0.010	0.023	-0.004	*	-0.006	**
Ln cash	418	6.498	1.601	226	6.393	1.511	83	6.440	1.466	0.105		0.058	
Sales/asset	428	0.862	0.702	230	0.895	0.634	85	0.880	0.704	-0.033		-0.018	
Expense/asset	346	0.170	0.154	204	0.194	0.172	72	0.232	0.174	-0.025	*	-0.062	***
Cost/asset	428	0.570	0.600	230	0.563	0.536	85	0.527	0.580	0.007		0.043	
Depreciation/asset	414	0.035	0.022	221	0.037	0.022	80	0.042	0.028	-0.002		-0.007	**

This table reports means, standard deviations, and tests between means of non-family firms, family firms, and founder firms in 2008. Family firms are defined as the sum of all of the four subgroups of firms: (1) founder firms; (2) heir firms; (3) family-owned firms; and (4) Leader/owner firms. Founder firms are firms where the founder/founders of the firm holds/hold a position as a board member, CEO, or a blockholder (has at least a 5 percent share holding). Heir firms are firms where the heir/heirs (by blood or by marriage) of the founder/founders of the firm holds/hold a position either as a board member, CEO, or a blockholder (has at least a 5 percent share holding). Family-owned firms are firms where one individual or several members from the same family together hold more than 10 percent of outstanding shares either directly or indirectly through another family firm or fund which the individual or the family controls or owns. Leader/owner firms are firms where the CEO or a board member is simultaneously a significant shareholder with an outstanding ownership stake of at least 5 percent. Non-family firms are all remaining sample firms that do not fulfill our criteria of family firms. Size is the natural logarithm of the book value of the total assets of a firm. Capital structure is the book value of the total liability (the book value of the total asset – the book value of the equity) divided by the book value of the total equity. Investment is capital expenditure divided by the PPE of the last fiscal year. Ln employee is a natural logarithm of the number of employees in the firm. ROA is net income divided by the book value of the total assets. OROA is earnings before interests and taxes (EBIT) divided by the book values of the total assets. Tobin's Q is the market value of the equity plus the book value of the total liability (the book value of the total asset – the book value of the equity) divided by the book value of the total assets. Working capital growth is the yearly working capital growth rate, defined as an increment of yearly working capital divided by working capital of the last fiscal year. Short debt change is the yearly short-term debt increment, defined as the difference between short-term debt this fiscal year and the last fiscal year, measured in 1 billion US dollars. Advertising is yearly advertising expense divided by sales. Research is yearly research and development expense divided by sales. Firm age is the difference between the incorporation year and a fiscal year. Return volatility is firm idiosyncratic risk, defined as the standard deviation of stock returns for the previous 36 months. Alpha is an annualized average monthly risk-adjusted return of stock. Monthly risk-adjusted return is the difference between the monthly before-expense return and the risk premium, defined as the vector of betas times the vector of Fama and French three factors (1993) realized in month t. We estimate the betas by a rolling regression following Gil-Bazo and Ruiz-Verdu (2009). Ln cash is the natural logarithm of cash. Sales/asset is the ratio of sales to the book value of the total assets. Expense/asset is ratio of selling, general administrative expense to the book value of the total assets. Cost/asset is the ratio of costs of goods to the book value of the total assets. Depreciation/asset is the ratio of depreciation and amortization to the book value of the total assets. The sample comprises 658 firms from S&P 500 (US), FTSE100 (UK), DAX 30 (Germany), CAC 40 (France) and FTSE MIB 40 (Italy) in the 2011 index company lists. Robust standard errors are reported in parentheses. Asterisks denote statistical significance at 10 percent (*), 5 percent (**) and 1 percent level (***) respectively.

Table 4 Performance before and during the crisis of family firms, founder firms, and non-family firms

	Non-family firms (I)				All family firms (II)				Founder firms (III)				Difference in Mean			
	Obs	Mean		Std. Dev.	Obs	Mean		Std. Dev.	Obs	Mean		Std. Dev.	(I)-(II)		(I)-(III)	
OROA (before crisis, 2006-2008)	425	0.111		0.074	229	0.113		0.072	85	0.116		0.081	-0.002		-0.005	
OROA (during crisis, 2009-2010)	425	0.096		0.072	229	0.100		0.072	85	0.111		0.087	-0.004		-0.015	*
Difference in OROA (during-before)	425	-0.016	***	0.046	229	-0.014	***	0.050	85	-0.005		0.055	-0.002		-0.010	*
Tobin's Q (before crisis, 2006-2007)	413	2.205		1.321	221	2.438		1.465	83	2.811		1.749	-0.233	**	-0.607	***
Tobin's Q (during crisis, 2008-2010)	413	1.756		1.016	221	1.896		1.106	83	2.148		1.290	-0.125		-0.380	***
Difference in Tobin's Q (during -before)	413	-0.449	***	0.681	221	-0.541	***	0.764	83	-0.664	***	1.038	0.093		0.215	**

This table reports the means, standard deviations and tests between means of performance before and during the financial crisis of family firms, founder firms, and non-family firms from 2006 to 2010. Family firms are defined as the sum of all of the four subgroups of firms: (1) founder firms; (2) heir firms; (3) family-owned firms; and (4) Leader/owner firms. Founder firms are firms where the founder/founders of the firm holds/hold a position as a board member, CEO, or a blockholder (has at least a 5 percent share holding). Heir firms are firms where the heir/heirs (by blood or by marriage) of the founder/founders of the firm holds/hold a position either as a board member, CEO, or a blockholder (has at least a 5 percent share holding). Family-owned firms are firms where one individual or several members from the same family together hold more than 10 percent of outstanding shares either directly or indirectly through another family firm or fund which the individual or the family controls or owns. Leader/owner firms are firms where the CEO or a board member is simultaneously a significant shareholder with an outstanding ownership stake of at least 5 percent. Non-family firms are all remaining sample firms that do not fulfill our criteria of family firms. Size is the natural logarithm of the book value of the total assets of a firm. OROA is earnings before interests and taxes (EBIT) divided by the book values of the total assets. Tobin's Q is the market value of the equity plus the book value of the total liability (the book value of the total asset – the book value of the equity) divided by the book value of the total assets. The sample comprises 658 firms from S&P 500 (US), FTSE100 (UK), DAX 30 (Germany), CAC 40 (France) and FTSE MIB 40 (Italy) in the 2011 index company lists. Robust standard errors are reported in parentheses. Asterisks denote statistical significance at 10 percent (*), 5 percent (**) and 1 percent level (***) respectively.

Table 5 Performance of family firms vs. non-family firms during the financial crisis

	Dependent Variable					
	OROA			Tobin's Q		
Crisis_acc	-0.001		Crisis_mkt	-2.139	***
	(0.018)			(0.381)	
Family*Crisis_acc	0.005		Family*Crisis_mkt	0.075	
	(0.004)			(0.092)	
Size	-0.023	***	Size	-0.373	***
	(0.008)			(0.076)	
Capital structure	0.000		Capital structure	0.029	***
	(0.000)			(0.010)	
Ln employee	0.015	*	Ln employee	0.214	*
	(0.009)			(0.124)	
Investment	-0.075	**	Investment	-0.516	
	(0.033)			(0.541)	
Advertising	-0.583	*	Advertising	-4.515	
	(0.329)			(4.149)	
Research	0.097		Research	1.622	
	(0.083)			(1.432)	
Firm age	0.003	**	Firm age	0.085	***
	(0.001)			(0.022)	
Return volatility	0.186	***	Return volatility	0.666	
	(0.061)			(0.613)	
Size*Crisis_acc	-0.001		Size*Crisis_mkt	0.161	***
	(0.002)			(0.046)	
Capital structure*Crisis_acc	0.001	**	Capital structure*Crisis_mkt	-0.025	**
	(0.000)			(0.011)	
Ln employee*Crisis_acc	0.000		Ln employee*Crisis_mkt	-0.032	
	(0.002)			(0.044)	
Investment*Crisis_acc	-0.067	**	Investment*Crisis_mkt	-0.734	
	(0.026)			(0.591)	
Advertising*Crisis_acc	0.271	***	Advertising*Crisis_mkt	7.622	***
	(0.078)			(1.976)	
Research*Crisis_acc	0.089	***	Research*Crisis_mkt	-0.626	
	(0.034)			(1.203)	
Firm age*Crisis_acc	0.000	*	Firm age*Crisis_mkt	0.001	
	(0.000)			(0.001)	
Return volatility*Crisis_acc	-0.106	**	Return volatility*Crisis_mkt	0.357	
	(0.045)			(0.297)	
_cons	0.136		_cons	1.024	
	(0.084)			(1.242)	
Within R-sq	0.144		Within R-sq	0.268	
N	2022		N	2022	

This table reports results of the firm fixed effect model regression of firm performance before and during the financial crisis from 2006 to 2010. Family* Crisis_acc is an interaction between the variables Family and Crisis_acc. Crisis_acc is a dummy which is one if the fiscal year is 2009 or 2010. This variable indicates the years when the financial crisis significantly strikes the real economy. Family*Crisis_mkt is an interaction between the variables Family and Crisis_mkt. Crisis_mkt is a dummy which is one if the fiscal year is 2008, 2009 or 2010. This variable indicates the years when the financial crisis significantly strikes the financial market. Family is a dummy variable, which is one if the sample firm is a family firm. Family firms are the sum of all the four subgroups of firms: (1) founder firms; (2) heir firms; (3) family-owned firms; and (4) Leader/owner firms. Founder firms are firms where the founder/founders of the firm holds/hold a position as a board member,CEO, or a blockholder (has at least a 5 percent share holding). Heir firms are firms where the heir/heirs (by blood or by marriage) of the founder/founders of the firm holds/hold a position either as a board member, CEO, or a blockholder (has at least a 5 percent share holding). Family-owned firms are firms where one individual or several members from the same family together hold more than 10 percent of the outstanding shares either directly or indirectly through another family firm or fund which the individual or the family controls or owns. Leader/owner firms are firms where the CEO or a board member is simultaneously a significant shareholder with an outstanding ownership stake of at least 5 percent. OROA is earnings before interests and taxes (EBIT) divided by the book values of the total assets. Tobin's Q is the market value of the equity plus the book value of the total liability (the book value of the total asset – the book value of the equity) divided by the book value of the total assets. Size is the natural logarithm of the book value of the total assets of a firm. Capital structure is the book value of the total liability (the book value of the total asset – the book value of the equity) divided by the book value of the total equity. Investment is the capital expenditure divided by the PPE of the last fiscal year. Ln employee is natural logarithm of the number of employees of the firm. Advertising is yearly advertising expense divided by sales. Research is yearly research and development expense divided by sales. Firm age is the difference between the incorporation year and a fiscal year. Return volatility is firm idiosyncratic risk, defined as the standard deviation of stock returns for the previous 36 months. Size*Crisis_mkt (Size*Crisis_acc), Capital Structure*Crisis_mkt(Capital Structure*Crisis_acc), Ln employee*Crisis_mkt (Ln employee*Crisis_acc), Investment*Crisis_mkt(Investment*Crisis_acc),Advertising*Crisis_mkt(Advertising*Crisis_acc),Research*Crisis_mkt(Research*Crisis_acc), Firm age*Crisis_mkt (Firm age*Crisis_acc) and Return volatility*Crisis_mkt (Return volatility*Crisis_acc) are interactions between Crisis_mkt (Crisis_acc) and Size, Capital Structure, Ln employee, Investment, Advertising, Research, Firm age and Return volatility respectively. The sample comprises 658 firms from S&P 500 (US), FTSE100 (UK), DAX 30 (Germany), CAC 40 (France) and FTSE MIB 40 (Italy) in the 2011 index company lists. Robust standard errors are reported in parentheses. Asterisks denote statistical significance at 10 percent (*), 5 percent (**) and 1 percent level (***) respectively.

Table 6 Fixed effect estimation of founder firm outperformance in OROA during the crisis

	Dependent Variable				
	OROA			Tobin's Q	
Crisis_acc	-0.001		Crisis_mkt	-2.156	***
	(0.018)			(0.391)	
Founder*Crisis_acc	0.017	**	Founder*Crisis_mkt	0.107	
	(0.009)			(0.177)	
Heir*Crisis_acc	0.001		Heir*Crisis_mkt	0.195	
	(0.006)			(0.118)	
Family_owned*Crisis_acc	0.001		Family_owned*Crisis_mkt	-0.055	
	(0.007)			(0.105)	
Leader_owner*Crisis_acc	-0.009		leader_owner*Crisis_mkt	-0.094	
	(0.008)			(0.127)	
Size	-0.024	***	Size	-0.379	***
	(0.008)			(0.077)	
Capital structure	0.000		Capital structure	0.030	***
	(0.000)			(0.010)	
Ln employee	0.016	*	Ln employee	0.222	*
	(0.009)			(0.125)	
Investment	-0.068	**	Investment	-0.529	
	(0.031)			(0.566)	
Advertising	-0.611	*	Advertising	-4.585	
	(0.329)			(4.205)	
Research	0.120		Research	1.706	
	(0.082)			(1.454)	
Firm age	0.003	**	Firm age	0.086	***
	(0.001)			(0.022)	
Return volatility	0.184	***	Return volatility	0.691	
	(0.063)			(0.624)	
Size*Crisis_acc	-0.001		Size*Crisis_mkt	0.166	***
	(0.002)			(0.047)	
Capital structure*Crisis_acc	0.001	**	Capital structure*Crisis_mkt	-0.025	**
	(0.000)			(0.011)	
Ln employee*Crisis_acc	0.000		Ln employee*Crisis_mkt	-0.034	
	(0.002)			(0.046)	
Investment*Crisis_acc	-0.069	***	Investment*Crisis_mkt	-0.685	
	(0.027)			(0.613)	
Advertising*Crisis_acc	0.274	***	Advertising*Crisis_mkt	7.676	***
	(0.074)			(2.048)	
Research*Crisis_acc	0.080	**	Research*Crisis_mkt	-0.672	
	(0.035)			(1.195)	
Firm age*Crisis_acc	0.000		Firm age*Crisis_mkt	0.001	
	(0.000)			(0.001)	
Return volatility*Crisis_acc	-0.108	**	Return volatility*Crisis_mkt	0.348	
	(0.046)			(0.308)	
_cons	0.126		_cons	1.021	
	(0.082)			(1.250)	
Within R-sq	0.149		Within R-sq	0.270	
N	2022		N	2022	

This table reports results of firm fixed effect model regressions of firm performance before and during the financial crisis from 2006 to 2010. Founder*Crisis_acc (Founder*Crisis_mkt), Heir*Crisis_acc (Heir*Crisis_mkt), Family_owned*Crisis_acc(Family_owned*Crisis_mkt) and Leader_owner*Crisis_acc (Leader_owner*Crisis_mkt) are interactions between dummy variable: Founder, Heir, Family_owned, or Leader_owner and dummy variable: Crisis_acc (Crisis_mkt). Crisis_acc is a dummy which is one if the fiscal year is 2009 and 2010. This variable indicates the years when the financial crisis significantly strikes real economy. Crisis_mkt is a dummy which is one if fiscal year is 2008, 2009 and 2010. This variable indicates the years when the financial crisis significantly strikes the financial market. Founder firms are firms where the founder/founders of the firm holds/hold a position as a board member,CEO, or a blockholder (has at least a 5 percent share holding). Heir firms are firms where the heir/heirs (by blood or by marriage) of the founder/founders of the firm holds/hold a position either as a board member, CEO, or a blockholder (has at least a 5 percent share holding). Family-owned firms are firms where one individual or several members from the same family together hold more than 10 percent of the outstanding shares either directly or indirectly through another family firm or fund which the individual or the family controls or owns. Leader/owner firms are firms where the CEO or a board member is simultaneously a significant shareholder with an outstanding ownership stake of at least 5 percent. OROA is earnings before interests and taxes (EBIT) divided by the book values of the total assets. Tobin's Q is the market value of the equity plus the book value of the total liability (the book value of the total asset – the book value of the equity) divided by the book value of the total assets. Size is the natural logarithm of the book value of the total assets of a firm. Capital structure is the book value of the total liability (the book value of the total asset – the book value of the equity) divided by the book value of the total equity. Investment is the capital expenditure divided by the PPE of the last fiscal year. Ln employee is natural logarithm of the number of employees of the firm. Advertising is yearly advertising expense divided by sales. Research is yearly research and development expense divided by sales. Firm age is the difference between the incorporation year and a fiscal year. Return volatility is firm idiosyncratic risk, defined as the standard deviation of stock returns for the previous 36 months. Size*Crisis_mkt (Size*Crisis_acc),Capital Structure*Crisis_mkt(CapitalStructure*Crisis_acc),Lnemployee*Crisis_mkt (Lnemployee*Crisis_acc), Investment*Crisis_mkt(Investment*Crisis_acc),Advertising*Crisis_mkt(Advertising*Crisis_acc),Research*Crisis_mkt(Research*Crisis_acc), Firm age*Crisis_mkt (Firm age*Crisis_acc) and Return volatility*Crisis_mkt (Return volatility*Crisis_acc) are interactions between Crisis_mkt (Crisis_acc) and Size, Capital Structure, Ln employee, Investment, Advertising, Research, Firm age and Return volatility respectively. The sample comprises 658 firms from S&P 500 (US), FTSE100 (UK), DAX 30 (Germany), CAC 40 (France) and FTSE MIB 40 (Italy) in the 2011 index company lists. Robust standard errors are reported in parentheses. Asterisks denote statistical significance at 10 percent (*), 5 percent (**) and 1 percent level (***) respectively.

Table 7 IV two stage OLS estimation of founder firm outperformance in OROA during the crisis

First stage regression			Second stage regression		
Dependent variable: Founder			Dependent variable: Difference in OROA		
Old firm	-0.141	***	Founder	0.059	*
	(0.024)			(0.031)	
Difference in Size	0.078		Difference in Size	-0.060	***
	(0.064)			(0.011)	
Difference in Capital structure	0.002		Difference in Capital structure	0.001	
	(0.003)			(0.001)	
Difference in Ln employee	0.014		Difference in Ln employee	0.047	***
	(0.073)			(0.012)	
Difference in Advertising	7.763	**	Difference in Advertising	-0.246	
	(3.572)			(0.553)	
Difference in Research	-0.329		Difference in Research	-0.389	**
	(1.417)			(0.162)	
Difference in Return volatility	-0.626		Difference in Return volatility	-0.128	
	(0.397)			(0.081)	
Difference in Investment	-1.143	***	Difference in Investment	0.103	*
	(0.342)			(0.057)	
_cons	0.174	***	_cons	-0.011	*
	(0.028)			(0.005)	
R-squared	0.0019		R-squared	0.1082	
N	574		N	574	

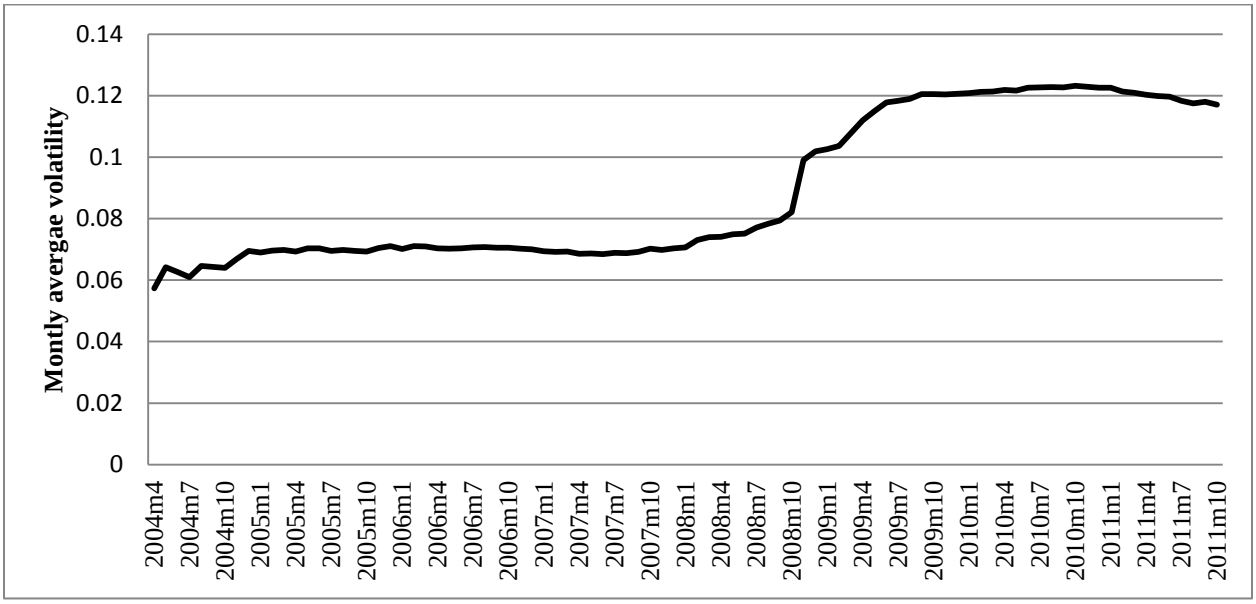
This table reports results of IV two stage OLS regression of firm performance before and during the financial crisis on founder dummy. Founder is a dummy which equals one if a firm is a founder firm. Founder firms are firms where the founder/founders of the firm holds/hold a position as a board member,CEO, or a blockholder (has at least a 5 percent share holding). Difference in OROA is the difference between average OROA of the period from 2009-2010 and average OROA of the period from 2006-2008.OROA is the earnings before interests and taxes (EBIT) divided by the book values of the total assets. Old firm is a dummy variable, which is one if the sample firm is incorporated before 1960. Difference in Size is the difference between the average size of the period from 2009-2010 and the average size of the period from 2006-2008.Size is the natural logarithm of the book value of the total assets of a firm. Difference in capital structure is the difference between the average capital structure of the period from 2009-2010 and the average capital structure of the period from 2006-2008.Capital structure is the book value of the total liability (the book value of the total asset – the book value of the equity) divided by the book value of the total equity. Difference in Investment is the difference between the average investment of the period from 2009-2010 and the average investment of the period from 2006-2008. Investment is the capital expenditure divided by the PPE of the last fiscal year. Difference in Ln employee is the difference between average Ln employee of the period from 2009-2010 and the average Ln employee of the period from 2006-2008. Ln employee is the natural logarithm of the number of employees in the firm. Difference in advertising is the difference between the average advertising of the period from 2009-2010 and average Advertising of the period from 2006-2008.Advertising is yearly advertising expense divided by the sales. Difference in research is the difference between the average research of the period from 2009-2010 and the average research of the period from 2006-2008. Research is the yearly research and the development expense divided by the sales. Difference in return volatility is the difference between the average return volatility of the period from 2009-2010 and the average return volatility of the period from 2006-2008.Return volatility is firm idiosyncratic risk, defined as the standard deviation of stock returns for the previous 36 months. The sample comprises 658 firms from S&P 500 (US), FTSE100 (UK), DAX 30 (Germany), CAC 40 (France) and FTSE MIB 40 (Italy) in the 2011 index company lists. Robust standard errors are reported in parentheses. Asterisks denote statistical significance at 10 percent (*), 5 percent (**) and 1 percent level (***) respectively.

Table 8 Fixed effect estimation of an alternative measure of market performance (Alpha)

	Dependent variable: Alpha			
Crisis_mkt	0.060	*	0.060	*
	(0.034)		(0.032)	
Family*Crisis_mkt	0.007			
	(0.008)			
Founder*Crisis_mkt			0.013	
			(0.010)	
Heir*Crisis_mkt			0.008	
			(0.011)	
Family_owned*Crisis_mkt			-0.001	
			(0.009)	
Leader_owner*Crisis_mkt			-0.016	
			(0.013)	
Size	-0.007		-0.008	
	(0.008)		(0.008)	
Capital structure	0.005	**	0.006	***
	(0.002)		(0.002)	
Ln employee	0.001		0.002	
	(0.010)		(0.010)	
Investment	0.055		0.071	*
	(0.038)		(0.039)	
Advertising	0.400		0.357	
	(0.284)		(0.287)	
Research	-0.077		-0.039	
	(0.088)		(0.096)	
Firm age	-0.004	***	-0.004	***
	(0.001)		(0.001)	
Return volatility	0.188		0.170	
	(0.184)		(0.178)	
Size*Crisis_mkt	-0.005		-0.003	
	(0.004)		(0.004)	
Capital structure*Crisis_mkt	-0.005	**	-0.006	**
	(0.002)		(0.002)	
Ln employee*Crisis_mkt	0.004		0.003	
	(0.003)		(0.004)	
Investment*Crisis_mkt	-0.048		-0.063	
	(0.039)		(0.040)	
Advertising*Crisis_mkt	-0.002		0.036	
	(0.125)		(0.129)	
Research*Crisis_mkt	0.042		0.003	
	(0.085)		(0.088)	
Firm age*Crisis_mkt	0.000		0.000	
	(0.000)		(0.000)	
Return volatility*Crisis_mkt	-0.075		-0.058	
	(0.180)		(0.174)	
_cons	0.242	***	0.239	***
	(0.066)		(0.065)	
Within R-sq	0.057		0.059	
N	1296		1296	

This table reports results of firm fixed effect model regressions of risk-adjusted return of stock before and during the financial crisis from 2006 to 2010. Family*Crisis_mkt, Founder*Crisis_mkt, Heir*Crisis_mkt, Family_owned*Crisis_mkt and Leader_owner*Crisis_mkt are interactions between dummy variable: Family, Founder, Heir, Family_owned, or Leader_owner and dummy variable Crisis_mkt. Crisis_mkt is a dummy which is one if fiscal year is 2008, 2009 or 2010. This variable indicates the years when the financial crisis significantly strikes the financial market. Family is a dummy variable, which is one if the sample firm is a family firm.Founder firms are firms where the founder/founders of the firm holds/hold a position as a board member,CEO, or a blockholder (has at least a 5 percent share holding). Heir firms are firms where the heir/heirs (by blood or by marriage) of the founder/founders of the firm holds/hold a position either as a board member, CEO, or a blockholder (has at least a 5 percent share holding). Family-owned firms are firms where one individual or several members from the same family together hold more than 10 percent of the outstanding shares either directly or indirectly through another family firm or fund which the individual or the family controls or owns. Leader/owner firms are firms where the CEO or a board member is simultaneously a significant shareholder with an outstanding ownership stake of at least 5 percent. Alpha is annualized average monthly risk-adjusted return of stock. Monthly risk-adjusted return is the difference between monthly before-expense return and risk premium, defined as the vector of betas times the vector of Fama and French three factors (1993) realized in month t. We estimate the betas by a rolling regression following Gil-Bazo and Ruiz-Verdu (2009). Size is the natural logarithm of the book value of the total assets of a firm. Capital structure is the book value of the total liability (the book value of the total asset – the book value of the equity) divided by the book value of the total equity. Investment is the capital expenditure divided by the PPE of the last fiscal year. Ln employee is natural logarithm of the number of employees of the firm. Advertising is yearly advertising expense divided by sales. Research is yearly research and development expense divided by sales. Firm age is the difference between the incorporation year and a fiscal year. Return volatility is firm idiosyncratic risk, defined as the standard deviation of stock returns for the previous 36 months. Size*Crisis_mkt, Capital Structure*Crisis_mkt, Ln employee*Crisis_mkt, Investment*Crisis_mkt, Advertising*Crisis_mkt, Research*Crisis_mkt, Firm age*Crisis_mkt and Return volatility*Crisis_mkt are interactions between Crisis_mkt and Size, Capital Structure, Ln employee, Investment, Advertising, Research, Firm age and Return volatility respectively. The sample comprises 456 firms from S&P 500 (US) in the 2011 index company lists. Robust standard errors are reported in parentheses. Asterisks denote statistical significance at 10 percent (*), 5 percent (**) and 1 percent level (***) respectively.

Table 9 Monthly average return volatility of the sample firms



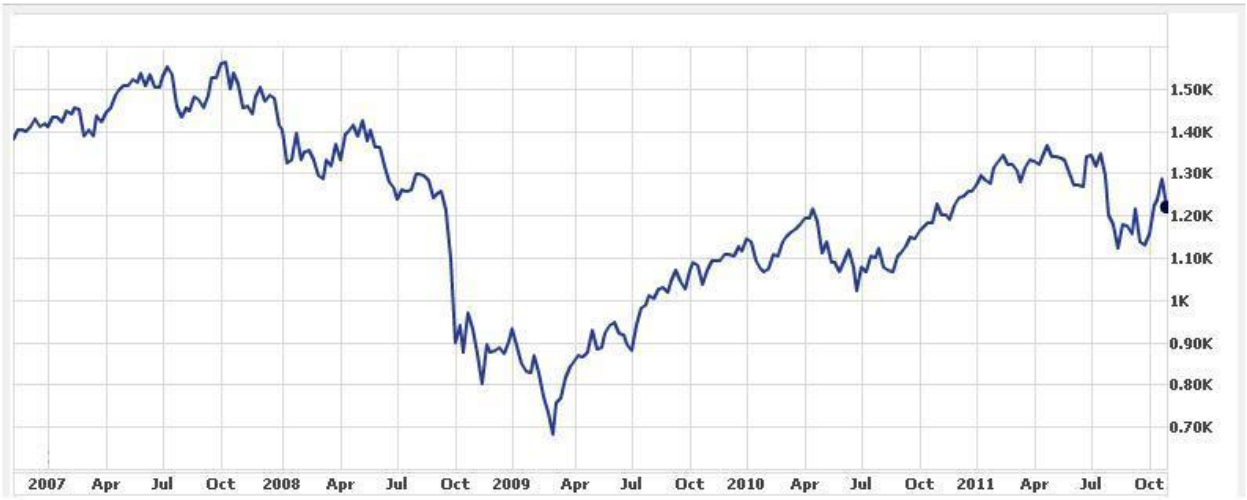
Notes: This table shows the average monthly return volatility of the sample. Return volatility is firm idiosyncratic risk, defined as the standard deviation of stock returns for the previous 36 months. Source: Datastream.

Table 10 Finance and investment strategy of founder firms during the crisis

	Dependent Variable			
	Investment		Capital structure	
Crisis_acc	-0.048	**	4.551	***
	(0.024)		(1.678)	
Founder*Crisis_acc	-0.022	**	0.878	*
	(0.010)		(0.464)	
Heir*Crisis_acc	-0.004		-0.325	
	(0.008)		(0.413)	
Family_owned*Crisis_acc	0.012	*	-0.041	
	(0.007)		(0.219)	
Leader_owner*Crisis_acc	-0.012		-0.527	
	(0.009)		(0.396)	
Size	0.001		0.888	*
	(0.008)		(0.472)	
Tobin's Q	0.018	***	0.010	
	(0.004)		(0.172)	
Firm age	-0.003			
	(0.002)			
Ln cash	0.000			
	(0.003)			
Profitability			-2.276	
			(1.952)	
Tangibility			2.413	
			(1.454)	
Dividend payout			5.106	
			(6.847)	
Non-debt tax shield			16.769	
			(10.533)	
Return volatility			0.057	
			(5.380)	
Size*Crisis_acc	0.002		-0.411	***
	(0.003)		(0.135)	
Tobin's Q*Crisis_acc	0.004		-0.379	**
	(0.003)		(0.169)	
Firm age*Crisis_acc	0.000			
	(0.000)			
Ln cash*Crisis_acc	0.000			
	(0.002)			
Profitability*Crisis_acc			1.162	
			(1.933)	
Tangibility*Crisis_acc			-0.282	
			(0.489)	
Dividend payout*Crisis_acc			7.557	
			(4.646)	
Non-debt tax shield*Crisis_acc			6.017	
			(6.451)	
Return volatility*Crisis_acc			-7.391	
			(5.515)	
_cons	0.202	**	-7.632	
	(0.087)		(5.518)	
Within R-sq	0.220		0.038	
N	2504		2432	

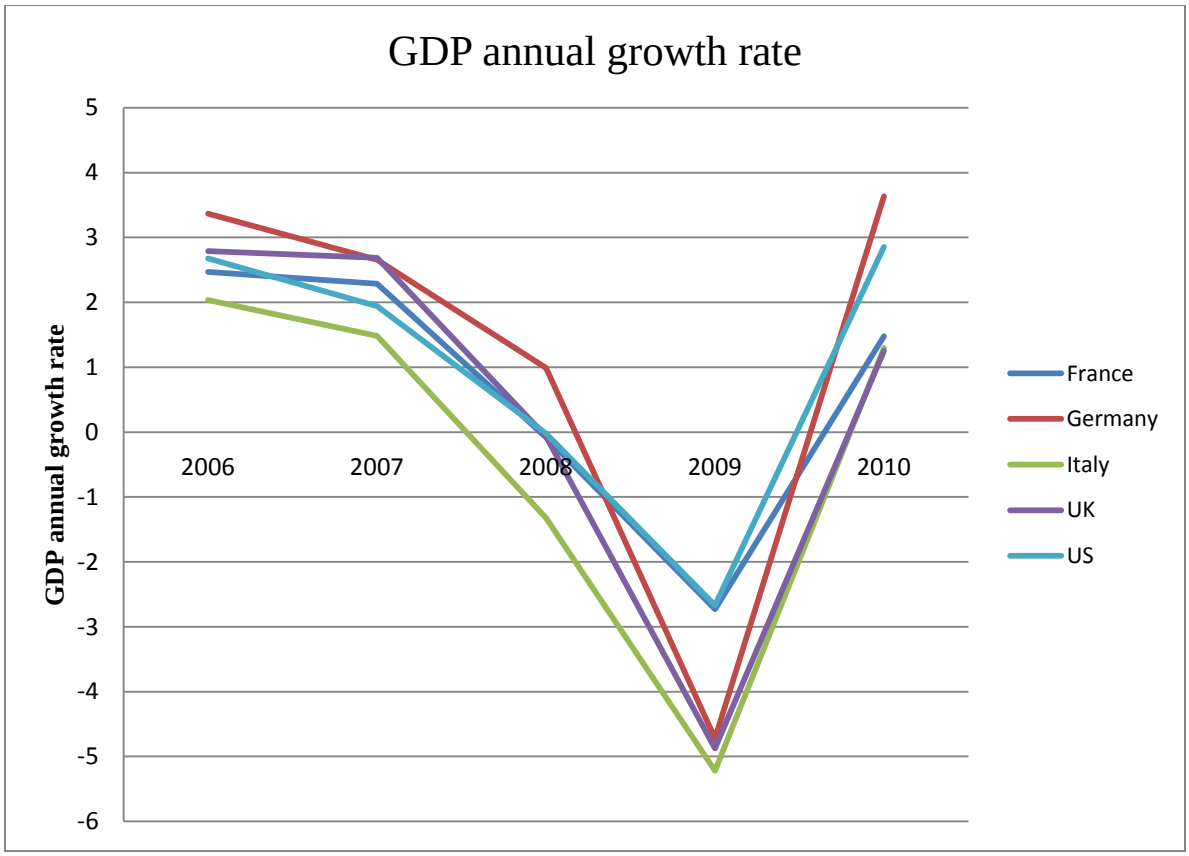
This table reports results of firm fixed effect model regressions of firm accounting performance before and during the financial crisis from 2006 to 2010. Founder*Crisis_acc, Heir*Crisis_acc, Family_owned*Crisis_acc and Leader_owner*Crisis_acc are interactions between dummy variable: Founder, Heir, Family_owned, or Leader_owner and dummy variable: Crisis_acc. Crisis_acc is a dummy which is one if the fiscal year is 2009 and 2010. This variable indicates the years when the financial crisis significantly strikes real economy. Founder is a dummy which equals one if a firm is a founder firm. Founder firms are firms where the founder/founders of the firm holds/hold a position as a board member,CEO, or a blockholder (has at least a 5 percent share holding). Heir firms are firms where the heir/heirs (by blood or by marriage) of the founder/founders of the firm holds/hold a position either as a board member, CEO, or a blockholder (has at least a 5 percent share holding). Family-owned firms are firms where one individual or several members from the same family together hold more than 10 percent of the outstanding shares either directly or indirectly through another family firm or fund which the individual or the family controls or owns. Leader/owner firms are firms where the CEO or a board member is simultaneously a significant shareholder with an outstanding ownership stake of at least 5 percent. Investment is the capital expenditure divided by the PPE of the last fiscal year. Capital structure is the book value of the total liability (the book value of the total asset – the book value of the equity) divided by the book value of the total equity. Ln cash is the natural logarithm of cash. Size is the natural logarithm of the book value of the total assets of a firm. Tobin's Q is the market value of equity plus the book value of total liability (book value of total asset -book value of equity) divided by the book value of the total assets. Firm age is the difference between the incorporation year and a fiscal year. Profitability is Operating Return on Assets of last fiscal year. Tangibility is tangible assets divided by the book values of the total assets. Dividend payout is the dividend divided by the sales. Non-debt tax shield is the depreciation and amortization divided by the book value of the total assets. Return volatility is firm idiosyncratic risk, defined as the standard deviation of stock returns for the previous 36 months. Size*Crisis_acc, Capital Structure*Crisis_acc, Ln employee*Crisis_acc, Investment*Crisis_acc,Ln cash*Crisis_acc, Advertising*Crisis_acc, Research*Crisis_acc, Firm age*Crisis_acc and Return volatility*Crisis_acc, Profitability*Crisis_acc, Tangibility*Crisis_acc, Dividend payout*Crisis_acc, Non-debt tax shield*Crisis_acc and Tobin's Q*Crisis_acc are interactions between Crisis_acc and Size, Capital Structure, Ln employee, Investment, Ln cash, Advertising, Research, Firm age, Return volatility, Profitability, Tangibility, Dividend payout, Non-debt tax shield and Tobin's Q respectively. The sample comprises 658 firms from S&P 500 (US), FTSE100 (UK), DAX 30 (Germany), CAC 40 (France) and FTSE MIB 40 (Italy) in the 2011 index company lists. Robust standard errors are reported in parentheses. Asterisks denote statistical significance at 10 percent (*), 5 percent (**) and 1 percent level (***) respectively.

Appendix 1 S&P index slumps in September 2008



Source: Yahoo finance (finance.yahoo.com)

Appendix 2 GDP annual growth rate for the US, the UK, Germany, France, and Italy



Source: world Bank

Appendix 3 Descriptive statistics of heir firms, family-owned firms, leader/owner firms, and non-family firms in 2008

	Non-family firms (1)			Heir firms (2)			Family-owned firms (3)			Leader/owner firms (4)			Difference in Mean					
	Obs	Mean	Std Dev.	Obs	Mean	Std. Dev.	Obs	Mean	Std.Dev.	Obs	Mean	Std.Dev.	(1)-(2)		(1)-(3)		(1)-(4)	
Size	428	9.602	1.535	74	9.308	1.068	159	9.259	1.376	132	9.184	1.401	0.294		0.344	**	0.418	***
Capital Structure	428	3.837	6.051	74	1.814	2.222	159	2.682	4.265	132	2.411	4.070	2.023	***	1.155	**	1.425	**
Investment	391	0.125	0.079	68	0.126	0.077	150	0.143	0.102	118	0.159	0.110	-0.001		-0.019	**	-0.035	***
Ln Employee	420	3.064	1.421	70	3.259	1.477	152	3.243	1.471	128	2.901	1.592	-0.194		-0.179		0.163	
ROA	351	0.054	0.080	49	0.071	0.068	92	0.041	0.102	93	0.047	0.099	-0.017		0.012		0.007	
OROA	425	0.110	0.080	74	0.116	0.072	158	0.113	0.078	131	0.111	0.078	-0.006		-0.003		-0.001	
Tobin's Q	419	1.632	1.000	73	1.598	0.693	151	1.748	1.194	128	1.743	1.267	0.034		-0.116		-0.111	
Working capital growth	371	-0.291	2.530	65	0.174	1.685	146	-0.101	1.627	113	-0.118	1.707	-0.465		-0.190		-0.173	
Short debt change	426	-0.070	1.993	74	0.000	0.951	158	0.109	1.172	132	0.124	1.018	-0.070		-0.179		-0.194	
Advertising	427	0.008	0.019	74	0.014	0.030	159	0.016	0.033	132	0.017	0.034	-0.006	**	-0.008	***	-0.009	***
Research	427	0.028	0.056	74	0.018	0.038	159	0.024	0.052	132	0.024	0.051	0.010		0.004		0.004	
Firm age	428	53.439	46.681	74	61.311	35.766	159	51.264	48.129	132	46.727	38.115	-7.872		2.175		6.712	
Return volatility	418	0.098	0.065	73	0.091	0.030	150	0.102	0.039	127	0.104	0.035	0.007		-0.004		-0.006	
Alpha	320	0.004	0.023	49	0.009	0.021	77	0.008	0.020	83	0.009	0.023	-0,005		-0.004		-0.005	*
Ln cash	418	6.498	1.601	73	6.196	1.487	156	6.364	1.644	128	6.364	1.494	0.303		0.134		0.134	
Sales/asset	428	0.862	0.702	74	1.027	0.665	159	0.900	0.557	132	0.912	0.637	-0.165	*	-0.038		-0.050	
Expense/asset	346	0.170	0.154	66	0.210	0.186	145	0.188	0.173	116	0.208	0.183	-0.041	*	-0.018		-0.039	**
Cost/asset	428	0.570	0.600	74	0.670	0.574	159	0.560	0.478	132	0.567	0.522	-0.100		0.010		0.002	
Depreciation/asset	414	0.035	0.022	72	0.039	0.023	156	0.036	0.021	125	0.037	0.024	-0.004		-0.001		-0.002	

This table reports means, standard deviations, and tests between means of non-family firms, Heir firms, and Family-owned firms and Leader/owner firms in 2008. Family firms are defined as the sum of all of the four subgroups of firms: (1) founder firms; (2) heir firms; (3) family-owned firms; and (4) Leader/owner firms. Founder firms are firms where the founder/founders of the firm holds/hold a position as a board member, CEO, or a blockholder (has at least a 5 percent share holding). Heir firms are firms where the heir/heirs (by blood or by marriage) of the founder/founders of the firm holds/hold a position either as a board member, CEO, or a blockholder (has at least a 5 percent share holding). Family-owned firms are firms where one individual or several members from the same family together hold more than 10 percent of outstanding shares either directly or indirectly through another family firm or fund which the individual or the family controls or owns. Leader/owner firms are firms where the CEO or a board member is simultaneously a significant shareholder with an outstanding ownership stake of at least 5 percent. Non-family firms are all remaining sample firms that do not fulfill our criteria of family firms. Size is the natural logarithm of the book value of the total assets of a firm. Capital structure is the book value of the total liability (the book value of the total asset – the book value of the equity) divided by the book value of the total equity. Investment is capital expenditure divided by the PPE of the last fiscal year. Ln employee is a natural logarithm of the number of employees in the firm. ROA is net income divided by the book value of the total assets. OROA is earnings before interests and taxes (EBIT) divided by the book values of the total assets. Tobin's Q is the market value of the equity plus the book value of the total liability (the book value of the total asset – the book value of the equity) divided by the book value of the total assets. Working capital growth is the yearly working capital growth rate, defined as an increment of yearly working capital divided by working capital of the last fiscal year. Short debt change is the yearly short-term debt increment, defined as the difference between short-term debt this fiscal year and the last fiscal year, measured in 1 billion US dollars. Advertising is yearly advertising expense divided by sales. Research is yearly research and development expense divided by sales. Firm age is the difference between the incorporation year and a fiscal year. Return volatility is firm idiosyncratic risk, defined as the standard deviation of stock returns for the previous 36 months. Alpha is an annualized average monthly risk-adjusted return of stock. Monthly risk-adjusted return is the difference between the monthly before-expense return and the risk premium, defined as the vector of betas times the vector of Fama and French three factors (1993) realized in month t. We estimate the betas by a rolling regression following Gil-Bazo and Ruiz-Verdu (2009). Ln cash is the natural logarithm of cash. Sales/asset is the ratio of sales to the book value of the total assets. Expense/asset is ratio of selling, general administrative expense to the book value of the total assets. Cost/asset is the ratio of costs of goods to the book value of the total assets. Depreciation/asset is the ratio of depreciation and amortization to the book value of the total assets. The sample comprises 658 firms from S&P 500 (US), FTSE100 (UK), DAX 30 (Germany), CAC 40 (France) and FTSE MIB 40 (Italy) in the 2011 index company lists. Robust standard errors are reported in parentheses. Asterisks denote statistical significance at 10 percent (*), 5 percent (**) and 1 percent level (***) respectively.

Appendix 4 Fixed effect estimation of founder firm outperformance in OROA during the crisis (non-financial firms, US firms, and US-non-financial firms)

	Dependent Variable: OROA					
	Non-financial firms		US firms		US non-financial firms	
Crisis_acc	0.009		-0.008		0.011	
	(0.022)		(0.025)		(0.033)	
Founder*Crisis_acc	0.017	*	0.025	**	0.031	**
	(0.010)		(0.011)		(0.013)	
Heir*Crisis_acc	0.003		0.004		0.005	
	(0.006)		(0.008)		(0.008)	
Family_owned*Crisis_acc	-0.001		0.003		0.001	
	(0.007)		(0.008)		(0.008)	
Leader_owner*Crisis_acc	-0.009		-0.012		-0.011	
	(0.008)		(0.010)		(0.011)	
Size	-0.028	***	-0.036	***	-0.049	**
	(0.010)		(0.014)		(0.019)	
Capital structure	0.000		0.000		-0.001	
	(0.001)		(0.001)		(0.001)	
Ln employee	0.019	*	0.036	**	0.042	**
	(0.010)		(0.016)		(0.018)	
Investment	-0.047		-0.113	***	-0.097	**
	(0.034)		(0.042)		(0.047)	
Advertising	-0.668	**	-0.529		-0.703	**
	(0.323)		(0.356)		(0.350)	
Research	0.122		0.091		0.098	
	(0.082)		(0.093)		(0.097)	
Firm age	0.004	***	0.008	***	0.010	***
	(0.002)		(0.002)		(0.003)	
Return volatility	0.186	**	0.493	***	0.629	***
	(0.077)		(0.143)		(0.171)	
Size*Crisis_acc	-0.003		0.000		-0.002	
	(0.003)		(0.003)		(0.004)	
Capital structure*Crisis_acc	0.001	*	0.001	*	0.002	*
	(0.001)		(0.001)		(0.001)	
Ln employee*Crisis_acc	0.002		-0.002		-0.001	
	(0.002)		(0.002)		(0.003)	
Investment*Crisis_acc	-0.080	***	-0.039		-0.034	
	(0.030)		(0.035)		(0.038)	
Advertising*Crisis_acc	0.255	***	0.248	***	0.260	***
	(0.064)		(0.072)		(0.076)	
Research*Crisis_acc	0.098	***	0.092	**	0.110	**
	(0.037)		(0.043)		(0.046)	
Firm age*Crisis_acc	0.000		0.000		0.000	
	(0.000)		(0.000)		(0.000)	
Return volatility*Crisis_acc	-0.114	**	-0.380	***	-0.484	***
	(0.048)		(0.134)		(0.142)	
_cons	0.112		-0.059		-0.036	
	(0.088)		(0.134)		(0.156)	
Within R-sq	0.163		0.182		0.206	
N	1855		1335		1207	

This table reports results of robustness tests of firm fixed effect model regressions of firm performance before and during the financial crisis from 2006 to 2010. The first column represents the results of non-financial firms. The second column represents the results of US firms. The third column represents the results of US non-financial firms. Founder*Crisis_acc, Heir*Crisis_acc, Family_owned*Crisis_acc, and Leader_owner*Crisis_acc are interactions between dummy variable: Founder, Heir, Family_owned, or Leader_owner and dummy variable: Crisis_acc. Crisis_acc is a dummy which is one if the fiscal year is 2009 and 2010. This variable indicates the years when the financial crisis significantly strikes real economy. Founder firms are firms where the founder/founders of the firm holds/hold a position as a board member,CEO, or a blockholder (has at least a 5 percent share holding). Heir firms are firms where the heir/heirs (by blood or by marriage) of the founder/founders of the firm holds/hold a position either as a board member, CEO, or a blockholder (has at least a 5 percent share holding). Family-owned firms are firms where one individual or several members from the same family together hold more than 10 percent of the outstanding shares either directly or indirectly through another family firm or fund which the individual or the family controls or owns. Leader/owner firms are firms where the CEO or a board member is simultaneously a significant shareholder with an outstanding ownership stake of at least 5 percent. OROA is earnings before interests and taxes (EBIT) divided by the book values of the total assets. Capital structure is the book value of the total liability (the book value of the total asset – the book value of the equity) divided by the book value of the total equity. Investment is the capital expenditure divided by the PPE of the last fiscal year. Ln employee is natural logarithm of the number of employees of the firm. Advertising is yearly advertising expense divided by sales. Research is yearly research and development expense divided by sales. Firm age is the difference between the incorporation year and a fiscal year. Return volatility is firm idiosyncratic risk, defined as the standard deviation of stock returns for the previous 36 months. Size*Crisis_acc, Capital Structure*Crisis_acc, Ln employee*Crisis_acc, Investment*Crisis_acc, Advertising*Crisis_acc, Research*Crisis_acc, Firm age*Crisis_acc and Return volatility*Crisis_acc are interactions between Crisis_acc and Size, Capital Structure, Ln employee, Investment, Advertising, Research, Firm age and Return volatility respectively. The sample comprises 542 non-financial firms from S&P 500 (US), FTSE100 (UK), DAX 30 (Germany), CAC 40 (France) and FTSE MIB 40 (Italy) in the 2011 index company lists. Robust standard errors are reported in parentheses. Asterisks denote statistical significance at 10 percent (*), 5 percent (**) and 1 percent level (***) respectively.

Appendix 5 Fixed effect estimation of OROA, Tobin's Q and Alpha (US firms present in the S&P 500 list in each year during the period of 2006-2010)

	Dependent Variable											
	OROA				Tobin's Q				Alpha			
Crisis_acc	-0.025		-0.021		Crisis_mkt	-0.633		-0.412	***	0.097	***	0.029	***
	(0.031)		(0.030)			(0.673)		(0.094)		(0.026)		(0.004)	
Family*Crisis_acc	0.009				Family*Crisis_mkt	-0.098				0.000			
	(0.006)					(0.120)				(0.005)			
Founder*Crisis_acc			0.029	**	Founder*Crisis_mkt			-0.016				0.003	
			(0.013)					(0.119)				(0.009)	
Heir*Crisis_acc			0.010		Heir*Crisis_mkt			0.204				0.005	
			(0.008)					(0.170)				(0.011)	
Family_owned*Crisis_acc			-0.002		Family_owned*Crisis_mkt			0.121				0.001	
			(0.008)					(0.197)				(0.010)	
Leader_owner*Crisis_acc			-0.015		leader_owner*Crisis_mkt			-0.317	*			-0.013	
			(0.012)					(0.171)				(0.012)	
Size	-0.052	**	-0.052	***	Size	-0.258	*	-0.114		-0.003		-0.003	
	(0.020)		(0.019)			(0.143)		(0.112)		(0.010)		(0.010)	
Capital structure	0.000		-0.001		Capital structure	0.000		0.007	**	0.005	***	0.000	
	(0.001)		(0.001)			(0.069)		(0.003)		(0.002)		(0.000)	
Ln employee	0.016		0.014		Ln employee	0.066		-0.120		-0.002		-0.006	
	(0.018)		(0.017)			(0.120)		(0.110)		(0.011)		(0.009)	
Investment	-0.149	***	-0.135	***	Investment	-0.713		-1.198	**	-0.001		-0.013	
	(0.053)		(0.049)			(0.962)		(0.572)		(0.044)		(0.025)	
Advertising	-0.651	*	-0.699		Advertising	2.416		4.060		0.608	**	0.530	**
	(0.342)		(0.349)			(4.405)		(3.430)		(0.276)		(0.235)	
Research	0.057		0.091		Research	2.943	*	1.260		-0.099	*	-0.053	
	(0.087)		(0.093)			(1.714)		(1.408)		(0.056)		(0.054)	
Firm age	0.009	***	0.009	***	Firm age	0.054	**	0.029		-0.005	***	-0.009	***
	(0.003)		(0.003)			(0.021)		(0.022)		(0.001)		(0.002)	
Return volatility	0.437	**	0.457	**	Return volatility	4.044		-4.480	***	0.365	**	-0.040	
	(0.183)		(0.184)			(3.315)		(1.046)		(0.161)		(0.099)	
Size*Crisis_acc	0.001		0.001		Size*Crisis_mkt	0.112		-0.042	***	-0.006	*	0.000	
	(0.003)		(0.003)			(0.078)		(0.010)		(0.004)		(0.001)	
Capital structure*Crisis_acc	0.001		0.001		Capital structure*Crisis_mkt	0.001		-0.008	**	-0.005	**	0.000	
	(0.001)		(0.001)			(0.069)		(0.004)		(0.002)		(0.001)	
Ln employee*Crisis_acc	-0.001		0.000		Ln employee*Crisis_mkt	-0.089	*	0.034	*	0.004		0.000	
	(0.003)		(0.003)			(0.048)		(0.020)		(0.003)		(0.001)	
Investment*Crisis_acc	-0.045		-0.056		Investment*Crisis_mkt	-0.610		0.295		0.005		0.028	
	(0.038)		(0.037)			(0.959)		(0.438)		(0.041)		(0.024)	
Advertising*Crisis_acc	0.113		0.149	**	Advertising*Crisis_mkt	2.380		1.348	**	-0.071		-0.049	
	(0.075)		(0.075)			(1.950)		(0.647)		(0.090)		(0.057)	
Research*Crisis_acc	0.097	**	0.089	*	Research*Crisis_mkt	-2.290	*	-1.002	**	0.031		-0.038	
	(0.049)		(0.052)			(1.208)		(0.491)		(0.045)		(0.026)	
Firm age*Crisis_acc	0.000		0.000		Firm age*Crisis_mkt	-0.002		0.000		0.000	**	0.000	
	(0.000)		(0.000)			(0.001)		(0.000)		(0.000)		(0.000)	
Return volatility*Crisis_acc	-0.327	*	-0.353	**	Return volatility*Crisis_mkt	-3.468		5.058	***	-0.237		0.136	*
	(0.176)		(0.176)			(3.240)		(0.963)		(0.153)		(0.080)	
_cons	0.093		0.094		_cons	1.015		2.310		0.235	***	0.496	***
	(0.169)		(0.165)			(1.884)		(1.705)		(0.073)		(0.113)	
Within R-sq	0.193		0.205		Within R-sq	0.196		0.249		0.086		0.107	
N	1037		1037		N	1037		1037		1016		1016	

This table reports results of firm fixed effect model regressions of firm performance before and during the financial crisis from 2006 to 2010. Family*Crisis_acc (Family*Crisis_mkt), Founder*Crisis_acc (Founder*Crisis_mkt), Heir*Crisis_acc (Heir*Crisis_mkt), Family_owned*Crisis_acc (Family_owned*Crisis_mkt) and Leader_owner*Crisis_acc (Leader_owner*Crisis_mkt) are interactions between dummy variable: Family, Founder, Heir, Family_owned, or Leader_owner and dummy variable: Crisis_acc (Crisis_mkt). Crisis_acc is a dummy which is one if the fiscal year is 2009 and 2010. This variable indicates the years when the financial crisis significantly strikes real economy. Crisis_mkt is a dummy which is one if fiscal year is 2008, 2009 and 2010. This variable indicates the years when the financial crisis significantly strikes the financial market. Founder is a dummy which equals one if a firm is a founder firm. Family is a dummy variable, which is one if the sample firm is a family firm. Family firms are the sum of all the four subgroups of firms: (1) founder firms; (2) heir firms; (3) family-owned firms; and (4) Leader/owner firms. Founder firms are firms where the founder/founders of the firm holds/hold a position as a board member,CEO, or a blockholder (has at least a 5 percent share holding). Heir firms are firms where the heir/heirs (by blood or by marriage) of the founder/founders of the firm holds/hold a position either as a board member, CEO, or a blockholder (has at least a 5 percent share holding). Family-owned firms are firms where one individual or several members from the same family together hold more than 10 percent of the outstanding shares either directly or indirectly through another family firm or fund which the individual or the family controls or owns. Leader/owner firms are firms where the CEO or a board member is simultaneously a significant shareholder with an outstanding ownership stake of at least 5 percent. OROA is the earnings before interests and taxes (EBIT) divided by the book values of the total assets. Tobin's Q is the market value of the equity plus the book value of the total liability (the book value of the total asset – the book value of the equity) divided by the book value of the total assets. Alpha is annualized average monthly risk-adjusted return of stock. Monthly risk-adjusted return is the difference between monthly before-expense return and risk premium, defined as the vector of betas times the vector of Fama and French three factors (1993) realized in month t. We estimate the betas by a rolling regression following Gil-Bazo and Ruiz-Verdu (2009). Size is the natural logarithm of the book value of the total assets of a firm. Capital structure is the book value of the total liability (the book value of the total asset – the book value of the equity) divided by the book value of the total equity. Investment is the capital expenditure divided by the PPE of last fiscal year. Ln employee is natural logarithm of the number of employees of the firm. Advertising is yearly advertising expense divided by sales. Research is yearly research and development expense divided by sales. Firm age is the difference between the incorporation year and a fiscal year. Return volatility is firm idiosyncratic risk, defined as the standard deviation of stock returns for the previous 36 months. Size*Crisis_mkt (Size*Crisis_acc), Capital Structure*Crisis_mkt(CapitalStructure*Crisis_acc),Lnemployee*Crisis_mkt(Lnemployee*Crisis_acc),Investment*Crisis_mkt(Investment*Crisis_acc),Advertising*Crisis_mkt(Advertising*Crisis_acc),Research*Crisis_mkt(Research*Crisis_acc), Firm age*Crisis_mkt (Firm age*Crisis_acc) and Return volatility*Crisis_mkt (Return volatility*Crisis_acc) are interactions between Crisis_mkt (Crisis_acc) and Size, Capital Structure, Ln employee, Investment, Advertising, Research, Firm age and Return volatility respectively. The sample only comprises 370 US firms from S&P 500 list. These firms must stand on the list in each year from 2006 to 2010. Robust standard errors are reported in parentheses. Asterisks denote statistical significance at 10 percent (*), 5 percent (**) and 1 percent level (***) respectively.