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from diversification and hedging decisions**

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# Family firms, agency costs and risk aversion – Empirical evidence from diversification and hedging decisions\*

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# Family firms, agency costs and risk aversion – Empirical evidence from diversification and hedging decisions

## **Abstract:**

We analyse whether family firms differ from non-family firms in terms of business segment and geographical diversification or the application of currency hedging instruments. This analysis is based on a unique dataset of 339 publicly listed companies (1,561 firm years) in the German Prime Standard from 2002 to 2006. While there is widespread empirical evidence on differences between family and non-family firms in terms of corporate performance, comparatively little is known about the impact of family firm dimensions on firm behaviour. We try to fill this research gap with a single country study focusing on Germany, an economy where family-control traditionally plays a predominant role in corporate governance.

We find that family firms are less diversified in unrelated business segments. However, there are no differences between family firms and non-family firms in terms of overall and related business segment diversification. For geographical diversification, we do not find convincing evidence for any differences. Finally, our analysis indicates that family firms are less likely to use currency hedging instruments.

In a second step, we go beyond existing research and distinguish between two separate dimensions of family firms: family management and family ownership. Empirical results indicate that those two dimensions have conflictive effects on firm behaviour. Family management, i.e. the involvement of the founding family into firm management, reduces agency costs and thus leads to lower levels of business segment diversification and less currency hedging. In contrast family ownership leads to risk aversion and more business segment diversification. Overall, the family management aspect is more likely to dominate the family ownership aspect.

**JEL Classification: G 32, G 34**

**Keywords:** Family firms, family ownership, family management, risk management, risk aversion, agency costs, diversification, derivatives, hedging, corporate governance

## I Introduction

Since Berle and Means' pathbreaking book *The modern corporation and private property* (1932), the image of widely-held corporations characterized by a separation of ownership and control has dominated the financial economics literature for decades. However, recent empirical research on comparative corporate governance around the world contributed largely to the view that the Berle and Means (1932) model of atomistic shareholder structures holds not true for many developed and emerging economies (e.g. LaPorta et al. 1999, Holderness et al. 1999, Claessens et al. 2000, Faccio and Lang 2002). Instead, not only the majority of private entities but even large public corporations are characterized by concentrated ownership which is very often associated with family control.<sup>1</sup>

As a consequence family firms<sup>2</sup> have become an emerging but still young field of research within the financial economics literature. While there is widespread empirical evidence on differences between family and non-family firms in terms of corporate performance, little is known about the reasons and differences in firm behaviour. This paper tries to fill this research gap with an empirical analysis that considers risk management as one distinct aspect of firm behaviour. In particular, we focus on different dimensions of risk reducing behaviour on a firm level: business segment diversification, geographical diversification and the application of currency hedging strategies. The study focuses on Germany, an economy where family ownership and control traditionally play a predominant role in corporate governance. Indeed, Germany provides a very fruitful research environment for family firms for at least two reasons: First, family capitalism is much more prevalent in Germany than for example in the U.S. (cf. e.g. LaPorta et al. 1999). Despite the dominance of family firms, the German capital market provides an almost equally weighted control group of non-family firms. Second, Germany differs from anglo-saxon countries in several institutional dimensions: legal origin, corporate governance and investor protection (e.g. LaPorta et al. 1998 and 2000).

We contribute to the literature in several dimensions: First, to our knowledge there is currently no analysis of family firms and risk management for a continental European country, such as Germany, which differs from the U.S. in terms of ownership concentration, legal protection of minority shareholders and other corporate governance aspects. In this regard, we test whether existing empirical evidence from Anderson and Reeb (2003b) for the U.S. holds true under a different institutional setting for a continental European country. Second, we measure business segment diversification more accurately than Anderson and Reeb (2003b) who focused on a simplistic binary variable based on the existence of more than

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<sup>1</sup> For example, LaPorta et al. (1999) identify the ultimate controlling shareholders of 30 listed firms with a market capitalization of at least \$500 million for 27 wealthy economies. They conclude that widely-held firms are only prevalent in economies with very good shareholder protection (such as U.K. or U.S.). In other (developed) countries, firms are usually controlled by the state and more often by the (founding) family. Faccio and Lang (2002) conclude that more than 60% of all listed firms in France, Italy and Germany are family firms. Of course, family ownership is even more prevalent in unlisted firms in continental European countries as shown by Franks et al. (2008). They analyse a sample of the largest (private and public) 1,000 firms in Germany, France, Italy and UK at two points of time, in 1996 and 2006. Although they find a trend for a decline of family capitalism over time, they show that in 2006 families (in 45.1% of all cases) are still the most prevalent type of ultimate controlling owners within the largest (private and public) firms in Germany.

<sup>2</sup> Our definition of a family firm refers to the corporate ownership and management participation (membership in the management or supervisory board) of the founding family. Therefore, we have investigated the name of each founder(s) for every company in our dataset. In this sense, our definition of founding family ownership includes ownership of (a) one single founder, (b) cumulative ownership of different members of the founding family or (c) in the case of an entrepreneurial team even cumulative ownership of more than one founding family. If the terms family firms, family ownership and family management are used in the remainder of the paper, they are always based on this concept.

one business segment and the number of business segments. In this sense it is especially interesting that our study uses the Entropy measure of industry concentration in order to distinguish between diversification in related and unrelated fields of business. Third, beyond business segment diversification we include two other aspects of risk management in our analysis: geographic diversification based on information about sales in different geographic regions and unique hand-collected data about currency derivatives<sup>3</sup>. Finally, we extend the analysis of Anderson and Reeb (2003b) by separating between two different dimensions within the family firm: family management, i.e. the representation of members of the founding family in the management or supervisory board<sup>4</sup> and family ownership, i.e. stock ownership of the founding family.

For our analysis, we conduct extensive research on the firms' history and the founders of the German Prime Standard firms. As a result, we conclude that German companies evolve mainly from four sources: They are (a) former state-owned companies, (b) former co-operatives (Genossenschaften) (c) corporate spin-offs or (d) founded by individuals, families or even an entrepreneurial team. Within category (d) we distinguish between family and non-family firms. Thereby, according to our definition a firm classifies as a family firm if the corporate ownership of the founding family is at least 25% and/or a member of the founding family is represented in the management or supervisory board. Germany offers an excellent environment to study the influence of family control on firm behaviour: From the 339 firms in our sample 220 qualify at least in one of the sample years as a family firm. Within the entire sample of 1,561 firm years founding families compromise the most important shareholder group with an average ownership stake of 19.71%. In the 914 firm years, in which a firm qualifies as a family firm according to our definition, the average founding family ownership is even more substantial with 33.24%.

We find that family firms in comparison to non-family firms are resistant to diversify in unrelated business segments. However, we do not find any differences between family and non-family firms in terms of overall or related diversification. Based on currency hedging activities we find again statistically and economically significant differences between family firms and non-family firms. In fact, family firms are less likely to use hedging instruments for currency risks. For geographical diversification, we find no convincing evidence for differences between family firms and non-family firms.

In a second step we have repeated our analysis for all aspects of firm behaviour but separated the effects of family management and family ownership. This seems to be useful since theory suggests conflictive effects of these two dimensions of family firms. Consistent with theoretical considerations we find that family management leads to lower levels of diversification and hedging. In contrast we find evidence that family ownership has oppositional effects and leads to higher levels of diversification. We interpret our results in a way that family ownership and family management are two different dimensions of a family firm that can have opposite effects on firm behaviour.

The remainder of the paper is structured as follows: Section II describes differences between family and non-family firms as well as testable hypothesis for this paper. Section III briefly

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<sup>3</sup> To our knowledge, there is so far no empirical study focusing on family firms and hedging activities using derivative data from the firms' annual reports. However, there are several studies focusing on the relationship between managerial ownership and hedging decisions, like e.g. Geczy et al. (1997) or Spano (2007).

<sup>4</sup> Traditionally, Germany is classified by a two-tier corporate governance structure with the management board being responsible for the management decisions concerning the daily business and the supervisory board for appointing the members of the management board and monitoring them.

summarizes related literature. Section IV describes the construction of our data set and the definition of our variables. Section V presents descriptive statistics and section VI our empirical results on diversification levels and hedging activities while Section VII concludes and provides avenues for future research.

## **II Family firms, agency costs and risk aversion**

Family firms differ from non-family firms in several dimensions. First, the founding families tend to hold large and undiversified equity positions in their firms. Second, because the founding family functions as a major shareholder over more than one generation, family firms might take a more long-term orientated management approach and emphasize firm survival as a major goal of their business strategy (James 1999). Hence, this form of “patient capital” and long-term orientation might prevent family firms from economic short-termism and managerial myopia commonly associated with widely-held corporations (Stein 1988 and 1989, Lavery 1996). Third, their large ownership stake and inside knowledge about the firm’s business activities allows the founding families to overcome the free rider problem of monitoring commonly associated with atomistic shareholder structures (Grossman and Hart 1980, Shleifer and Vishny 1986). Hence, founding families have both the incentives as well as the means to effectively monitor management and thus can alleviate the classical agency conflict between management and shareholders. Fourth, if – as is common in many cases - members of the founding family are not only large shareholders but also directly involved in top management or supervisory board activities, the classical management-shareholder conflict is further reduced or even non-existing. Management style in family firms is often dominated by family ties and emotional relationships rather than a pure economic rationality (Gomez-Mejia et al. 2001). Furthermore, Bertrand and Schoar (2006) argue that family values and culture influence the family business. Finally, the founding family might be resistant to give up control over the family business resulting in concentrated equity holdings, domination of the management and supervisory board composition and a divergence of cash-flow from voting rights.

Under the contractual view of the firm developed by Berle and Means (1932), Coase (1937), Jensen and Meckling (1976), Fama (1980) and Fama and Jensen (1983a, 1983b) the owners (principals) of the firm face the classical agency problem how to reassure the managers (agents) not to expropriate or waste their funds on self-dealing, entrenchment strategies or inefficient investment projects.<sup>5</sup> In such a setting both the principal and the agent are rational actors who seek to maximize their individual utility. Agency costs are incurred if there is room for opportunistic behaviour and interests of owners and managers diverge. The two main options of corporate governance to alleviate this moral hazard problem are alignment of interests between managers and shareholders or the introduction of effective monitoring mechanisms.

One important agency conflict between owners and managers arises from different attitudes towards firm-specific risk. Classical portfolio theory suggests that under the assumption of perfect capital markets shareholders can diversify the firm-specific risk within their portfolio. This might not hold true for founding families who tend to hold large and undiversified equity positions in their firms. As a consequence, and based on their large influence on business

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<sup>5</sup> Besides this manager-shareholder conflict (agency conflict I), the second major conflict discussed in the corporate governance literature arises between controlling shareholders and minority shareholders (agency conflict II). Here, the major concern is about the expropriation of minority shareholders through private benefits of control. For an excellent overview of the field of corporate governance cf. Shleifer and Vishny (1997).

policies, family members might seek to compensate the missing diversification on a portfolio level by the application of different risk reducing strategies on the firm level. Thus, family firms in comparison to non-family firms might exhibit a stronger risk aversion. We expect them to use more income smoothing techniques within the firm, such as diversification<sup>6</sup> and hedging<sup>7</sup>, to reduce the risk associated with cyclical businesses, regional market insecurities, cost and demand shocks or financial distress. We pose this as *risk aversion hypothesis of family ownership* (cf. Amihud and Lev 1981 for a similar theoretical argument why managers engage in conglomerate mergers) and expect family firms in comparison to non-family firms to be more diversified in terms of business segment and geographical diversification. Furthermore, we expect them to show an increased usage of currency hedging instruments as an alternative way for income smoothing.

Other authors argue that income smoothing techniques such as diversification and hedging are related to agency costs (e.g. Denis et al. 1997, Aron 1988). From a theoretical perspective, diversification has both costs and benefits. The majority of empirical research suggests that diversification has negative value implications.<sup>8</sup> Nevertheless, there are several possible reasons why managers in firms with atomistic shareholder structure might benefit from diversification: because of the prestige and reputation of managing larger firms (Stulz 1990), because managerial compensation is related to firm size (Gabaix and Landier 2008, Jensen and Murphy 1990), because diversification reduces employment risk (Amihud et al. 1983), or because diversification increases managerial entrenchment (Shleifer and Vishny 1989). Similar arguments can be applied for hedging and agency costs. Hedging cannot per se increase firm value, but it may reduce for example employment risk and hinder managers from investing in poor projects by limiting the available free cashflows (Stulz 1990). Hence, agency costs might explain why firms might apply cashflow smoothing techniques, such as diversification and hedging.<sup>9</sup>

Agency costs in family firms might be lower if members of the founding family are involved into the management of the family firm. Based on this argument of lower agency costs in family firms we would expect them to use less income smoothing than non-family firms. Hence, we expect that family management leads to lower levels of diversification (both business segment and geographical diversification) and currency hedging. Consequently, we pose this as *agency cost hypothesis of family management*.<sup>10</sup>

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<sup>6</sup> Diversification has an income smoothing effect if firms invest into different business or geographical segments with not perfectly correlated income streams. Hence, they can reduce cashflow volatility.

<sup>7</sup> Following Modigliani and Miller (1958) financial risk management at a corporate level does neither increase nor decrease firm value in a neoclassical world. However, when taking market imperfections into consideration the question whether financial risk management is meaningful becomes more difficult to answer. Especially large, undiversified shareholders like founding-families might try to reduce the variability of the firm's returns, since they are not able to diversify firm specific risk. For a similar argumentation in the context of managerial ownership, cf. Smith and Stulz (1985).

<sup>8</sup> Cf. Martin and Sayrak (2003) for an excellent literature review on corporate diversification and firm value.

<sup>9</sup> Cf. Tufano (1998) for a discussion on costs and benefits of hedging, especially in the context of agency costs.

<sup>10</sup> Aron (1988) proposes a different role of diversification within a principal-agent-setting. One common problem in a principal-agent-relationship arises from information asymmetries and the fact that the agent's behaviour is not perfectly observable to the principal. In his model, Aron (1988) points out that it is easier to judge about both managerial ability and effort if the firm is engaged in more than one line of business. In this sense, corporate diversification can be seen as a way to make the agent's actions better observable and thus mitigate the principal-agent-problem between the shareholders and the manager. However, if the founding family is involved in the management of the firm, interests between shareholders and management are better aligned and agency costs reduced. Hence, we expect the principal-agent-problem ceteris paribus to be lower in family firms than in non-family firms. Consequently, it is not necessary to tie managerial compensation to observable ability and effort.

We argue that family ownership and family management have conflictive effects on risk management. Whether the *risk aversion hypothesis of family ownership* or the *agency cost hypothesis of family management* is prevailing for family firms according to a definition that combines both dimensions remains an empirical question. In comparison to previous research on diversification (for example Anderson and Reeb 2003b), we consider those two conflicting effects and perform our analysis in two steps. In a first step, we analyse differences in risk management between family and non-family firms. In a second step, we distinguish between the two distinct dimensions of family firms: family management and family ownership.<sup>11</sup>

### III Related Literature

Within the last years empirical studies analysing the influence of family control on different aspects of firm behaviour became increasingly popular. Most of the comparatively young strand of literature focuses on the United States and in particular on differences between family and non-family firms in terms of corporate performance. Several authors study the influence of family control on corporate performance (cf. e.g. Anderson and Reeb 2003a, Villalonga and Amit 2006 and Fahlenbrach 2008 for the U.S., Claessens et al. 2002 for several southeast Asian countries, Cronquist and Nilson 2003 for Sweden, Gorriz and Fumas 2005 for Spain, Andres 2008 for Germany, Bloom and Van Reenen 2007 for France, Germany, Great Britain and the U.S., Barontini and Caprio 2006 for Europe, Sraer and Thesmar 2007 for France). Within those contributions there seems to be a consensus that family firms have a superior performance, especially if the founder is still active in management.

Surprisingly, the underlying economic reasons for the observed differences between family and non-family firms in terms of corporate performance are much less investigated. Nevertheless, there are some contributions on the impact of family control on different aspects of firm behaviour: Several authors study differences in corporate disclosure policies and earnings management (Wang 2006, Ali et al. 2006 and Chen et al. 2008 for the U.S.), debt financing (Anderson et al. 2003 for the U.S.), risk aversion (Mishra and McConaughy 1999, Anderson and Reeb 2003b for the U.S.), succession decisions (Bennedsen et al. 2007 for Denmark, Cucculeli and Micucci 2008 for Italy), investment decisions (Andres 2007 for Germany, Fahlenbrach 2008 for the U.S.), labor strategies (Sraer and Thesmar 2007), acquisition decisions (Caprio et al. 2007 for Europe) or corporate control (Klasa 2008, Villalonga and Amit 2007 for the U.S.). However, the empirical analysis focusing on the impact of family firms on certain aspects of firm behaviour is still a young and emerging field in economics and corporate finance.

Our study focuses on the question whether family firms differ from non-family firms in terms of firm-level risk management measured by corporate diversification and currency hedging. In this sense, our study is certainly most closely related to the paper of Anderson and Reeb (2003b) which focuses on the relationship between founding family-ownership, corporate diversification and leverage for the U.S. They find that family firms are less diversified measured by a binary variable that is one if the firm has more than two business segments and zero otherwise and measured by the number of business segments. Furthermore, they use

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Thus there are reduced benefits of multiple lines of business within family firms. Although illuminated from a different perspective, we again expect family management to reduce the level of corporate diversification.

<sup>11</sup> For a similar procedure in the context of family firms and downsizing decisions cf. Block (2008).



leverage as another measure of risk aversion but do not find any difference between family and non-family firms in terms of capital structure decisions.<sup>12</sup>

## IV Data set and definition of variables

### Description of the Data Set

Our dataset is constructed as follows: (1) The German stock exchange is organized in two main markets: an EU-regulated market and a regulated unofficial market (open market) which is regulated by the stock exchange itself. Within the EU-regulated market a firm can choose between a listing in two transparency levels: General and Prime Standard. While firms in the General Standard have to fulfil the EU-regulated minimum transparency requirements, firms in the Prime Standard have to fulfil additional transparency standards. Hence, the Prime Standard is the transparency level in Germany with the highest reporting and disclosure requirements.<sup>13</sup> Since our analysis requires detailed financial statement information, for example on the firms' business segments, we restrict our sample on all companies which have ever been a member of the Prime Standard since its introduction in March 2003. We start off by identifying the universe of 418 German firms whose stock has been listed in the Prime Standard of the German stock exchange (Deutsche Börse) in at least one of the five years between 2002 and 2006.<sup>14</sup> The choice of the sampling period results from data availability constraints: The Prime Standard was introduced in March 2003 and the year 2006 was the last year where financial statements were available while constructing the data set.

(2) Due to industry specifics we exclude 49 companies from the financial service sector from our sample. We use the two-digit SIC-Codes 60-65 and 67 (US SIC Division H: Finance, Insurance and Real Estate) to identify those financial firms.

(3) We exclude 13 companies for which we do either not have any industry classification, management and supervisory board data or ownership data (the reason for the missing ownership data is that most of those firms have their Initial Public Offering during the calendar year 2006).

(4) Our definition of equity ownership refers to ownership of voting rights. In principal, German companies can issue common and preference shares. To issue dual class shares has been common in Germany for a long time-period. While holders of common shares have a voting right in the shareholders assembly, holders of preference shares do usually not. Usually every firm issues at least common shares and potentially additional preference shares. However, there are seven exceptions in our sample with unlisted common stock. Since their ownership structure with dispersed ownership of preference shares and heavily concentrated

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<sup>12</sup> Cf. Ampenberger et al. (2008) for an empirical analysis of capital structure and payout policy decisions of family firms in Germany. In contrast to Anderson and Reeb (2003b) the authors find that family firms in Germany exhibit a lower leverage ratio than their non-family counterparts.

<sup>13</sup> Firms in the General Standard have to fulfil the minimum requirements for EU-regulated markets, such as IFRS-reporting, disclosure of director dealings', ad hoc disclosure, compliance with disclosure of ownership stakes beyond legally defined control thresholds according to *Wertpapierhandelsgesetz (WpHG)* or compliance with mandatory takeover-bid rules according to *Wertpapiererwerbs- und Übernahmegesetz (WpÜG)*. In addition to these minimum requirements, Prime Standard firms are for example required to report company news in English language, publish quarterly reports in German and English language, record a company calendar in the Internet and organise at least one analyst conference per year.

<sup>14</sup> In principal, we have used the composition of the Prime Standard at calendar year end to identify the sample firms. However, we have used the starting composition of the Prime Standard in March 2003 as year-end 2002. Thus, our sample period covers five years from 2002 to 2006.

ownership of voting rights is untypical for German Prime Standard firms, we have decided to exclude them from our analysis.<sup>15</sup>

(5) Since our definition of a family firm is based on ownership and board representation of the founding family, we investigate the company history and origin of the remaining universe of 349 non-financial Prime Standard firms. We primarily use the history section of *Hoover's Company Profiles* from the *Hoovers Online database* to identify the company founders' names. We complement missing information by collecting information from company homepages and conducting press research from *Factiva* and *LexisNexis*. Despite an extensive research in different sources we are not able to investigate every company's history. Thus, from the remaining 349 non-financial Prime Standard companies we have to drop 10 firms because we cannot find any information about the name of the founder(s) or the origin of the firm.

For the remaining 339 firms, we find that German companies evolve mainly from four sources: (a) Seven Prime Standard firms are formerly state-owned companies (state ownership can occur either on a federal, state or municipal level) which have been privatized, such as e.g. Deutsche Post AG, Fraport AG or TUI AG. The identification as formerly state-owned firms is straightforward for some of those cases: For example, formerly state-owned Deutsche Bundespost was reorganized because of Germany's heavy costs of reunification, privatized and went public as Deutsche Post AG in 1995. However, the history of other formerly state-owned firms is more complicated: TUI AG was founded in 1923 as Preussische Bergwerks- und Hütten Aktiengesellschaft (Preussag AG) in Berlin to operate formerly state-owned mining companies, saltworks and smelters. Later it became the state-run VEBA group. During post-world-war II decades it was engaged in a diversified portfolio of industries, such as steel, shipbuilding, chemical industry or oil exploration. In 1959, Preussag made a public offering and ten years later Westdeutsche Landesbank (West LB) became a major shareholder. In 1989, Preussag was reorganized into a holding company with four business units: coal, oil, natural gas and plant construction. Since the beginning of the 1990s some M&A-driven restructuring activity (acquisition of Hapag-Lloyd in 1997 and Canada-based CP-ships in 2005, sale of plant engineering and shipbuilding units to Babcock Borsig in 1999 and VGT-Lehnkering logistics operation to investors in 2004) including a name change from Preussag to TUI transferred the formerly state-owned business into a modern, world-wide operating travel and logistics firm. With the exit of West LB as major shareholder in 2004, TUI became a diversified held firm. However, because of its roots as a steel and mining conglomerate during the Weimarer Republic we consider it as a formerly state-owned company without individual founder(s).<sup>16</sup> The case of Fraport AG shows that we take state-ownership at different levels (municipal, state and federal level) into account. Fraport AG, which was founded in 1924 and partly controlled by the city of Frankfurt, the state of Hesse and German government before the airport operator (among other they operate and manage Frankfurt Airport and Frankfurt-Hahn Airport) was privatized by an IPO in 2001. Hence, we classify it as a formerly state-owned firm. (b) Six companies, such as e.g. Südzucker AG or Stada Arzneimittel AG have initially been created as co-operatives (Genossenschaften) and later on went public. (c) 22 companies, such as Infinion Technologies AG or Debitel AG are corporate

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<sup>15</sup> The seven firms (35 firm years) which are excluded from our sample are: Draegerwerk AG, Garant Schuh AG, Hornbach Holding AG, Jungheinrich AG, ProSieben Sat1 Media AG and Sanacorp Pharmahandel AG. Those firms have issued non-voting preference shares which are listed in the German Prime Standard in at least one of the sample years, while the voting shares are not listed. An alternative way of treatment would be to consider the voting rights of the unlisted common stocks in our analysis. This kind of treatment does not change our results.

<sup>16</sup> For a detailed description of the company history of TUI AG cf. its Hoover Company Profile. For a detailed analysis of the reorganization activity and its impact on the stock market performance cf. Dittman et al. (2008).

spin-offs. While the former was an equity carve-out from Siemens AG in 2000, the latter was a corporate spin-off from Daimler AG (formerly Daimler-Chrysler AG) in 1991. In such cases, we consider them as spin-offs from large corporations without any individual founder(s).<sup>17</sup> (c) Finally, the majority of the firms (304 companies) is founded by one single entrepreneur, a founding family or alternatively by an entrepreneurial team of more than one founder (founding family). Within that category, our sample includes a broad range of firms in terms of origin and business models. First, it covers traditional old economy companies emerging during the Germany's period of industrialization in the 19<sup>th</sup> century such as e.g. MAN AG founded by Carl August Reichenbach and Carl Buz in 1844, Bayer AG created by Friedrich Bayer in 1863, or the Linde Group founded by Carl von Linde in 1876. Second, our sample covers firms founded during the post-second-world-war period when Germany experienced its economic miracle ("Wirtschaftswunder"), such as the publishing house Axel Springer AG, founded by the Springer-brothers in 1946 or formerly state-owned Deutsche Lufhansa AG, founded in 1953. Finally, our sample covers also successful new economy start-ups from industries such as internet, biotech or solar energy. They were founded and went public just in the last decade. Some of the companies in our sample were not originally founded under their current name, e.g. the Westag and Getalig AG which was originally founded by Joseph Ellendorf as Möbelfabrik Joseph Ellendorf. However, in this case the founding Ellendorf family is still present as a major shareholder. Hence, such name changes have no influence on our classification of founding family ownership.

In order to classify the 304 individually founded firms as a family or non-family firm we have hand-collected information on the complete ownership and board structures (management and supervisory board) of all German Prime Standard firms during the sample period. The core of this data comes from *Hoppenstedt Aktienführer*. *Hoppenstedt* collects annual data on ownership structures, management and supervisory board composition of publicly listed German firms. Nevertheless, we further use *Bureau van Dijk's Amadeus database*, *Commerzbank's Wer gehört zu wem* and web research in order to verify ownership information.

### **Classification of family firms**

In the absence of a widely accepted academic definition of a family firm we classify our family firms in several steps. In a first step, we calculate the cumulative equity ownership of the founding family and identify whether family members are present in either the management or supervisory board. If a company was founded by a team of entrepreneurs, as e.g. in the case of Daimler AG (by Gottlieb Daimler and Carl Benz) or the enterprise software company SAP AG (by Dietmar Hopp, Haso Plattner, Hans-Werner Hector, Claus Wellenreuther and Klaus Tschira) we calculate the founding family ownership as the cumulated ownership fractions of all company founders and their families. Our definition of equity ownership refers to ownership of voting rights. In a second step, we consider a firm to

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<sup>17</sup> One might discuss whether the founder of the parent company should also qualify as the entrepreneur of the spin-off. Occasionally, such as for example in the case of Adlink AG, this might be a reasonable argumentation. Adlink AG was founded as a corporate spin-off of United Internet and went public in 2001. The parent company itself was created by entrepreneur Ralph Dommeruth in 1988 and ten years later went public. When Adlink was spun off, Dommeruth still held a significant share in the parent company and was CEO of United Internet AG that in turn was the majority owner of Adlink AG at the time of its IPO. However, in the majority of cases (e.g. the Siemens AG spin-offs Epcos AG or Infinion AG), the corporate spin off took place after decades of company history as a division of a large multi-business corporation. In many cases, the original entrepreneurs, such as the engineer Werner von Siemens and craftsman Johann Halske in the Siemens example were even not alive any more at the time of the spin-off. Consequently, we classify them as corporate spin-offs and do not consider them as founded by the entrepreneur of the parent company.

be a family business if (a) the calculated ownership fraction of the founding family is at least 25% and/or (b) one of the members of the founding family is represented in either the management or the supervisory board. In contrast to many other empirical studies on founding family ownership (e.g. Anderson and Reeb 2003a, Gorriz and Fumas 2005 and Villalonga and Amit 2006) our definition of a family firm is more restricted reflecting the typically more concentrated ownership structures in Germany (among others e.g. LaPorta et al. 1999 or Faccio and Lang 2002).<sup>18</sup> Moreover, 25% is an important control threshold according to the German stock corporation act.<sup>19</sup> Based on this definition we have created a dummy variable called family firm which is one if the firm qualifies as a family business according to our definition and zero otherwise. Overall, our sample consists of 339 firms and 1,561 firm years: 914 family firm years and 647 non-family firm years.<sup>20</sup> For an overview of the sample composition over time cf. table 1.

- Insert table 1 about here -

In a second step, we test whether differences in firm behaviour are driven by family ownership or board representation. Therefore, we substitute the dummy variable family firm in all our regression models by two variables: family management and family ownership. Family management is constructed as a dummy variable that equals one if a member of the founding family is represented in either the management or supervisory board and zero otherwise. Family ownership is the cumulated ownership fraction of the founding family.

### **Definition of dependent variables and data sources**

(1) As a first measure we investigate business segment diversification on a firm-level. Diversification in different business segments with not perfectly correlated income streams is one way to reduce firm-specific risk. Following the diversification literature we use multiple measures of business segment diversification: (a) we count the number of business segments (based on four-digit SIC codes), (b) we use the share of sales generated outside the firm's main business segment classified by the 4-digit SIC code segment with highest sales (c) we calculate a Herfindahl-Index of diversification for sales based on the four-digit and two-digit SIC codes of the business segments. The Herfindahl-Index  $H$  is calculated as the sum of all squared sales generated in each business segment (as indicated by the four-digit or two-digit SIC-Codes). For reasons of easier interpretation we use  $1-H$  as measure of diversification. Thus, our measure increases with a higher diversification level. (d) We calculate three Entropy measures of industry diversification: total, related and unrelated diversification. For a detailed description of these continuous measures and their advantages compared to the Herfindahl-Index see Jaquemin and Berry (1979).

(2) Furthermore, we use information on geographical diversification to (a) calculate the number of geographic segments, (b) calculate the foreign sales as the share of sales generated

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<sup>18</sup> Recent empirical studies on family firm performance and behavior for France (Sraer and Thesmar 2007) and Germany (Andres 2007, 2008) use similar family ownership thresholds in order to adjust for the more concentrated ownership structures in continental Europe.

<sup>19</sup> In Germany, several important company decisions (e.g. changes in the articles of incorporation, dismissal of supervisory board members, conditional capital increase, capital decrease) require a super majority of at least 75% of all votes in the shareholder assembly. In this regard, the ownership stake of 25% is an important control threshold (blocking minority).

<sup>20</sup> In principal, firms can change their status as family and non-family firms during the sample period. In such cases, firm year observations are split between the group of family firms and the control group. However, such changes in family firm status are comparatively rare within our sample. Overall, 219 firms are classified as a family firm in at least one year of the sample period.

outside Europe and (c) calculate a Herfindahl-Index of the different geographic segments based on sales. Again, we use 1-H as our measure of diversification. However, there is a high variation how the *Worldscope database* reports geographic segments both in terms of number and the level of detail. For example, sometimes only large geographic regions, such as Europe, Asia/Pacific or North America are reported while in other cases geographic segments are reported even on a country level. For reasons of comparability we decided to aggregate the data on geographic segments to the following four regions: Europe including Germany, America (covering both North and South America), Asia/Pacific (covering Asian countries like Japan, China or Korea and pacific countries such as Australia or New Zealand) and other countries.<sup>21</sup>

(3) Currency hedging activities are considered as an alternative way to smooth cashflows and reduce firm-specific risk. Therefore, we have a unique dataset of hand-collected information on the usage of currency derivatives from annual reports. First, we construct (a) a dummy variable which is one if the firm hedges currency risk and zero otherwise. It is worth to mention that we consider neither the extent of hedging nor the instruments which are used to construct this dummy variable because our interest lays solely on the question whether the firm hedges at all. There is a stark heterogeneity in the accuracy of reporting. Hence, not all firms have detailed information on the nominal values of their currency derivatives. Firms which do not state anything about their hedging activities are not considered in our analysis.<sup>22</sup> Additionally, we construct two continuous measures for hedging activities. The first one (b) is the natural logarithm of the nominal value of currency derivatives divided by the natural logarithm of sales outside Europe. The second one (c) is the natural logarithm of the nominal value of currency derivatives divided by the natural logarithm of the firm's total assets. The natural logarithm is used for all measures since the distribution of total assets, foreign sales and the nominal value of currency derivatives is highly skewed. Both continuous measures are set to zero for firms which do not hedge at all.

### **Definition of control variables**

In our analysis, we use a set of control variables (for a detailed overview of all variables cf. table 2): Firm size (FIRM SIZE) is measured as the natural logarithm of total assets and is included in all specifications to account for the fact that larger firms are usually more diversified, have a professional finance department and thus use more sophisticated risk management methods. Firm age (FIRM AGE) is the number of years since the firms' foundation. It is calculated as the current sample year minus the founding year of the firm. We

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<sup>21</sup> There are some limitations to these measures of business segment and geographic diversification as already noted by e.g. Gompers et al. (2005): First, firms have discretion in what businesses they compose together to one business segment. Thus, some companies that pool different businesses together into one business segment may be equally or even more diversified than others which report multiple business segments. Secondly, another measurement problem is that *Worldscope* reports only a maximum of ten business segments. Within our sample there are nine firm year observations where the maximum of ten business segments is reported. Hence, the bias from this reporting problem is not severe in comparison to the sample size of 1,561 firm year observations. Nevertheless, we decided to exclude the nine firm year observations from our analysis because of this measurement error. Concerning the geographic diversification there is some discretion concerning the choice of and assignment to the different regions.

<sup>22</sup> However, firms using IFRS or US-GAAP accounting standard are obliged to report the usage of financial hedging instruments. Thus, we assume that if firms provide no information about hedging activities in their annual reports but use IFRS or US-GAAP accounting standard they do not use any hedging instrument. Nevertheless, we perform all analysis reported in section VI without this assumption as well. In this alternative analysis we consider only those firms explicitly stating whether they have currency derivatives or not. However, the main results remain unchanged.

expect older firms to be more diversified and more sophisticated in terms of risk management techniques. Family firms might experience lower agency costs of free cash flow and depend more on internal financing. Thus, we control for the level of cash holdings (LIQUIDITY) measured by cash and cash equivalents divided by total assets. We use an operating profit margin calculated as earnings before interest, taxes, depreciation and amortization divided by total assets (PROFITABILITY) as a proxy for firm profitability. One potential concern is that family firms are not randomly assigned to different industries. In particular, instead of applying risk-reducing strategies at the firm level, founder families might prefer to invest in low-risk businesses and industries. Consequently, we include a measure of firm-specific risk (FIRM SPECIFIC RISK). Firm-specific risk captures the part of stock price volatility that is unique to an individual firm and thus related to specific operations or capital structure decisions. It is calculated as the residuals' sum of squares (SSE) from a regression of the individual stock returns on the returns of the market (CDAX) over the preceding calendar year based on stock prices from calendar year end.<sup>23</sup> Decisions about diversification and hedging are dependent on alternative governance mechanisms. Consequently, we include the cumulative corporate ownership of large outside shareholders with an ownership stake of at least 5% in our analysis (OUTSIDE BLOCKHOLDERS). Monitoring by outside shareholders might be an alternative corporate governance device in order to alleviate the classical shareholder-manager conflict. Finally, in some of our specifications for the analysis of hedging strategies, we use the share of foreign sales which is computed as the share of sales outside Europe as a percentage of total sales (FOREIGN SALES) to control for the existence of currency risk. Information about financial statements and stock prices is retrieved from *Thomson Financials Worldscope* and *Datastream databases*. Information about board size, board composition and outside shareholdings is hand-collected from *Hoppenstedt stock guide*.

## V Descriptive Statistics

Table 3 presents descriptive statistics for several firm characteristics. Mean and median values for the entire sample of family and non-family firms are reported. The final column of the table presents t-statistics for difference-in-means tests between family and non-family firm year observations. T-statistics are corrected for serial correlation. The sample consists of 1,561 firm year observations, of which 59% (914 firm year observations) are from family firms and 41% (647 firm year observations) are from non-family firms.

- Insert table 3 about here -

Family firms differ from non-family firms in several firm characteristics. Family firms are both younger and smaller than non-family firms. Family firms are on average 27 years old and have an average stock market history of six years as compared to an average firm age of 58 years and an average stock market history of 18 years for non-family firms. In terms of firm size, differences between family firms and non-family firms are even more drastic. On average, family firms have total assets of 1,130 million € sales of 1,274 million € and 6,644 employees. In contrast, non-family firms are much larger with sample means for total assets of 9,685 million €, sales of 6,744 million € and employees of 26,065.

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<sup>23</sup> One might argue that a measure of total risk (market risk plus firm-specific risk) is more suitable than firm-specific risk in our context. However, we have used total risk as an alternative control variable in our analysis. Results remain unchanged and are therefore robust to the usage of total risk as an alternative measure of firm risk.

Our univariate analysis also indicates significant differences in diversification levels between family firms and non-family firms. A first glance on diversification measures shows that based on the number of 4-digit business segments, the Entropy index of total diversification and based on the number of geographical segments family firms seem to be more focused than non-family firms. The average number of 4-digit business segments is 2.080 for family firms as compared to 2.594 for non-family firms. The average Entropy index of total diversification is 0.388 for family firms, which is significantly less than 0.557 for non-family firms. A similar result occurs for geographical diversification with an average number of 2.146 geographic segments for family firms compared to 2.642 for non-family firms.

Since we use ownership structure and board composition as the discriminating variables between family and non-family firm year observations differences concerning those characteristics are not surprising. While the average founding family ownership in family firms is 33.2 %, it is only 1.0 % for non-family firms. In contrast, outside block ownership (with ownership stakes of at least 5%) seems to be much more prevalent in non-family firms with an average cumulated ownership stake of 39.0% compared to 14.3% in family firms. Finally, family firms have both smaller management and supervisory boards. While the average management (supervisory) board has 3.034 (5.256) members in the case of family firms, it has 3.637 (9.731) members in the case of non-family firms.

## **VI Empirical results**

### **Methodology**

Despite the panel structure of our data we use pooled regressions (OLS-regressions with continuous dependent variables, poisson regressions for count data as dependent variables and probit regression<sup>24</sup> models for binary dependent variables) to exploit cross-sectional variation rather than a time-variation through a fixed-effects model. Ownership structures in Germany are rather concentrated and sticky. Hence, firm status as either a family firm or non-family firm does not exhibit a lot of variation over time making a fixed-effects model not very useful in this context. Of course, we do not only use Huber-White-robust estimators to allow for heteroscedasticity in the error term as is common in the analysis of micro-level data but also apply clustered standard errors to account for the panel structure of the data set. We control for several factors: firm size, firm age, firm specific risk, firm profitability, liquidity, and monitoring by outside blockholders. We include both year and industry dummies in our analysis. In all our models, we calculated variance inflation factors (VIFs) to analyse whether there is multicollinearity between our independent variables. However, the VIFs are consistently below 2.5 in all our models, which indicates that there are no multicollinearity problems in our analysis.

### **Business segment diversification**

Our analysis of differences between family and non-family firms concerning diversification strategies considers both business segment and geographic diversification. As stated before, we expect that the *agency cost hypothesis of family management* and the *risk aversion hypothesis of family ownership* lead to contrary effects. Hence, the question whether family firms according to our definition which combines family ownership and management show different levels of diversification cannot be answered by theory, but remains an empirical question.

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<sup>24</sup> Alternatively, we perform the regressions with a logit model. However, the results remain unchanged.

Table 4 presents our results on business segment diversification. We start with an analysis of the number of business segments based on 4-digit SIC-Codes in a pooled poisson regression model commonly applied with positive, censored count data. We find that family firms have less business segments based on the 4-digit SIC Code than non-family firms. Our results are statistically significant at a 5%-level. However, the number of business segments is a rather simple measure for diversification since it does not consider the distribution of sales among the different business segments. Hence, we will not discuss the results of this measure in greater detail. In a next step we perform pooled OLS-regressions on several continuous measures of diversification. For sales outside the main business segment, we find no differences between family firms and non-family firms. Next, we analyse the Herfindahl-Index for sales. Although family firms differ from non-family firms in terms of Herfindahl-Index based on the 2-digit SIC Code, there is no statistically significant difference for the Herfindahl-Index based on the 4-digit SIC Code. At a first glance this result seems surprising, but the consequences of corporate diversification might largely depend on the level of relatedness between different business segments. Since the Herfindahl-Index based on 4-digit SIC Codes is a measure of the overall diversification level and the Herfindahl-Index based on 2-digit SIC Codes is a measure of the unrelated diversification level, our results seem to support the hypothesis that family firms differ from non-family firms in terms of unrelated diversification, but not in terms of total diversification. To investigate this issue in greater detail, we apply the Entropy measure of diversification, which is construction-conditioned suitable to distinguish between related and unrelated diversification.<sup>25</sup> The Entropy measures of industry diversification distinguish between diversification in related (diversification within a 2-digit SIC-Code) and unrelated fields (diversification across 2-digit SIC-Codes), whereby the total diversification is simply the sum of unrelated diversification plus related diversification. Our analysis indicates that family firms are more focused based on the Entropy index for unrelated diversification. However, we do not find any difference between family and non-family firms in terms of related or total diversification. Overall, we interpret our results in a way that there is no difference between family firms and non-family firms in terms of overall and related diversification. However, for unrelated diversification, we find evidence that family firms are more focused on their core business.

At this point, an interpretation of the control variables is of order. Besides the influence of the founding family we find that firm size<sup>26</sup> has a positive and significant coefficient in all models except for models (3) and (7). Thus, larger firms in general are more diversified than smaller firms. Not surprisingly, we also find that higher levels of diversification are correlated with less firm specific risk in most models.

- Insert table 4 about here -

A priori it is unclear whether the observed difference between family and non-family firms in terms of related diversification level is driven by family ownership or family management. Therefore, we perform the same analysis but distinguish between the two effects by including a dummy variable that has the value one if a member of the founding family participates in

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<sup>25</sup> For a detailed discussion of the differences between Herfindahl-Index and Entropy Index, please cf. Jaquemin and Berry (1979).

<sup>26</sup> An OLS-regression assumes a linear relationship between the dependent and the independent variables. As robustness test for non-linear size effects we divided our sample in three equally sized parts (small, medium and large firms). We find that our results remain qualitatively unchanged for small and medium firms. For large firms, neither family management nor family ownership can explain the level of diversification. One explanation for this might be that outliers in our diversification measures exist especially for large firms.



the management or supervisory board and the percentage of stock ownership held by the founding family. The *agency cost hypothesis of family management* suggests that family management leads to less diversification. For family ownership, the *risk aversion hypothesis of family ownership* predicts higher levels of diversification.

Our results are presented in table 5. As expected by our hypothesis, we find that family ownership and family management have contrary effects on the level of business segment diversification. We start with an analysis of the sales outside the main business segment. Here, we find that family management has a negative influence, while family ownership has a positive influence (both statistically significant at the 1%-level). We continue with two measures of total diversification: For both the Herfindahl-Index for sales based on the 4-digit SIC Code and for the Entropy Index for total diversification we find that family ownership has a positive influence on the level of diversification, while family management has a negative influence. This result is not only statistically significant, but has a high economic significance as well. The coefficient for family management indicates that after controlling for several other factors the involvement of the founding family into the management or supervisory board of the firm leads to a reduction of the Entropy Index for total diversification by 0.12. Since the mean of the Entropy Index for all firms is 0.459, this translates into a difference of about 26 percent. For family ownership, the coefficient is even larger with 0.21. In other words, for family firms with a hypothetical family ownership of 100% the Entropy Index compared to firms with no family ownership is 0.21 higher, a difference of about 45 percent compared to the mean of the Entropy Index. An additional indication for the economic importance of family firm characteristics provides the fact that both the coefficient for family management and family ownership are larger than the coefficient for firm size. For unrelated diversification measured by the Herfindahl-Index for sales based on the 2-digit SIC Code and by the Entropy Index for unrelated diversification, we find that family management has a negative influence on the level of diversification, while family ownership has no influence. This result is statistically significant at the 1%-level for the Herfindahl-Index and at the 5%-level for the Entropy Index. Again, this result has a high economic significance. The coefficient for Entropy Index for unrelated diversification shows that family management leads to a drop of 0.10. Since the average Entropy Index for unrelated diversification is 0.302, this is a difference of about one-third relative to the sample mean. In terms of related diversification, which is measured by the Entropy Index for related diversification, we find weak evidence at the 10%-confidence interval that family ownership has a positive influence. Family management seems to have no influence on related business segment diversification.

As in our models based on the simple distinction between family and non-family firms, firm size has a positive and statistically significant impact on the level of diversification in most models, while firm-specific risk has a negative influence.

- Insert table 5 about here -

In summary, we find that family firms show less unrelated diversification, but similar levels of related and total diversification. However, there is strong evidence that the two dimensions commonly used to define family firms in the empirical literature, namely founding-family ownership and founding family management, have contrary effects. Our findings for these two aspects of family firms are mainly in line with our hypothesis. The *risk aversion hypothesis of family ownership* predicts higher levels of diversification, which we find for total and related diversification. However, family ownership has no influence on unrelated diversification. At a first glance, this result seems surprising. Considering the *risk aversion hypothesis of family ownership* we would expect diversification in unrelated business

segments to be especially beneficial for founding family shareholders since income streams from unrelated business segments are *ceteris paribus* less correlated than income streams from related business segments. However, our empirical results indicate the opposite: firms with high founding-family ownership prefer to diversify *within* a certain field of business rather than engaging in completely new business areas. One potential explanation is based on the fact that family firms commonly use the family network to recruit for key management positions. This kind of “family nepotism” considers only a limited pool of human talent (Bertrand and Schoar 2006). Hence, family firms might lack the relevant human resources for diversification into totally new business areas although this would be beneficial for the founding families from a risk aversion perspective. The *agency cost hypothesis of family management* predicts less diversification due to lower principal-agent conflicts. Our results show that founding-family management participation leads to less total and unrelated diversification, but we do not find differences for related diversification. This result makes sense from two different perspectives: We hypothesize that income streams from related business segments within the same 2-digit SIC-Code might be highly correlated and thus have a much lower cashflow smoothing effect than diversification across 2-digit-SIC-Codes. Hence, from an agency perspective related diversification is less costly than unrelated diversification. Moreover, this result supports our view that founding family members in top management positions lack the necessary human resources for a diversification in unrelated fields of business.

### **Geographical diversification**

Our results on geographical diversification are presented in table 6. In contrast to business segment diversification we find only weak evidence that family firms show differences in terms of geographical diversification compared to non-family firms. For the overall number of geographic segments, we find that family firms show less geographical diversification. However, the number of segments is a rather weak measure of diversification, as already discussed for business segment diversification. There are no differences for the share of sales outside Europe and for the Herfindahl-Index for sales. In fact, it seems that firm size is the driving factor behind geographic diversification since the coefficient for firm size is statistically highly significant in all models.

- Insert table 6 about here -

Table 7 shows our results for geographic diversification with the distinction between family ownership and family management. Again, we expect family ownership to have a positive influence on geographical diversification (*risk aversion hypothesis of family ownership*) and family management to have a negative impact (*agency cost hypothesis of family management*). However, we find that the coefficients for family management and family ownership are statistically insignificant in models (2) and (3). For the number of geographical segments, founding family management participation has a negative influence. Family ownership seems to have no impact on geographic diversification. Hence, we have to reject the *risk aversion hypothesis of family ownership*. For the *agency cost hypothesis of family management*, we find only very weak support based on the conceptually weakest of the three measures for geographical diversification. Hence, we have to reject this hypothesis as well. Again, the main driver for differences in levels of geographical diversification is firm size, which is statistically significant at the 1%-level in all of our models.

- Insert table 7 about here -

Overall, we do not find convincing evidence for differences between family firms and non-family firms in terms of geographical diversification, even if we separate family ownership from family management. Since - based on our regression models - firm size is the driving factor behind our results, we argue that geographical diversification is simply a consequence of firms' growth and market competition. This seems plausible because if firms grow, they may be forced to enter new geographical markets in order to remain competitive in a global economy, independent of their ownership or board structure.

### **Hedging activities**

Table 8 presents our results on currency hedging decisions for family firms in comparison to non-family firms. Again, we expect that family ownership and family management have conflictive effects. Hence, theory provides no clear-cut prediction whether family firms are more likely to use hedging instruments. In model (2) we use the same dummy variable for currency hedging as in model (1), but restrict our sample to firms which have at least two geographic segments (and hence a significant foreign risk exposure). Please note that we include the variable sales outside Europe measured in percent as an additional control variable in models (1) to (3) since the hedging decisions is expected to depend on the firm's exposure to currency risk.<sup>27</sup>

The results for the dummy variables in models (1) and (2) show that family firms are less likely to hedge currency risk. For both continuous variables, we find the same results which are again statistically significant at the 5% and 10%-level. Not surprisingly, we find that firm size and sales outside Europe measured in percent are positively correlated with the hedging activities, reflecting the fact that larger firms may invest more money and effort into financial risk management and that a higher currency risk exposure may lead to more hedging. It is worth to mention that these results are not only statistically highly significant, but also economically significant. For example, the coefficient for family firms in model (3) indicates that the ratio of the natural logarithm of derivatives' nominal values to the natural logarithm of assets is 0.063 smaller for family firms compared to non-family firms. Since the mean of the dependent variable is 0.323, this translates into a difference of about 20 percent.

- Insert table 8 about here -

Again, it is not obvious if the results are driven by family ownership or by family management. According to our hypothesis, we expect family ownership to have a positive influence on hedging activities (*risk aversion hypothesis of family ownership*) and family management to have an oppositional effect (*agency cost hypothesis of family management*).

Therefore, we perform the same analysis but distinguish between the two effects by including a dummy variable for family management and the percentage of stock ownership held by the founding family. The results can be found in table 9. We find that our results from the first analysis are caused by family management. The coefficient for family management is negative and statistically significant at the 1%-level for models (1) to (3) and at the 5%-level for model (4). Again, firm size and sales outside Europe measured in percent have a positive influence on the hedging activities.

- Insert table 9 about here -

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<sup>27</sup> The control variable is not included in model (4) since the parameter sales outside Europe is the denominator of the dependent variable in that model.

In summary, there is strong evidence that family firms are less likely to hedge currency risk exposure. The results for the separate analysis of family ownership and family management support our hypothesis only partially. While the *agency cost hypothesis of family management* cannot be rejected, we have to reject the *risk aversion hypothesis of family ownership* because family ownership seems to have no effect on firms' hedging activities.

## VII Conclusion

Our analysis shows that in the majority of the German Prime Standard firms the founding family continues to remain an important shareholder and in many cases members of the founding family are involved in the management and supervisory board. We investigate whether these family firms differ from their non-family counterparts in terms of firm-level risk management. We find that family firms are usually more focused on their core business segments and especially resistant to diversify in unrelated fields. Furthermore, they are less likely to use hedging strategies to reduce currency risk exposure. However, we do not find convincing evidence that family firms are more focused in terms of geographic diversification.

Additionally, we find that founding family ownership and founding family management do often lead to contrary effects. Hence, it is necessary to separate these two dimensions of family firms. Most previous studies of family firms (e.g. Anderson and Reeb 2003 for corporate diversification) often combine these two aspects in a way that they demand that the founding family holds a certain percentage of the firm's stocks and/or is involved in the board of directors (or correspondingly a two-tier board structure for empirical studies in continental Europe). However, our study is unique in a way that it goes beyond this common family firm definition. In fact, regarding our results for German listed companies, the common way of defining family firms seems to be inaccurate and may lead to non-significant results if both effects are oppositional and neutralizing each other. For example, our results show that family management leads to less total diversification, whereas family ownership leads to more total diversification in related business fields. Overall (and based on a combination of both dimensions), we find no differences between family firms and their non-family counterparts in our analysis of total diversification potentially because oppositional effects of family management and family ownership are neutralizing each other. In other aspects it seems that one dimension is dominating the other dimension and thus even differences between family and non-family firms are observed. Taking this relatively new feature of our study into consideration it might be worthwhile to consider those two dimensions separately for future research on family firms.

Overall, our results are in the majority of cases in line with the *agency cost hypothesis of family management* and the *risk aversion hypothesis of family ownership*. Family ownership leads to more risk aversion and hence more diversification. In contrast, family management has a negative impact on diversification and currency hedging. However, we do not find results that support the *risk aversion hypothesis of family ownership* for hedging activities since family ownership has no influence on hedging. We show that firms with high family ownership try to reduce risk by diversifying in related rather than unrelated business segments. On the other hand, firms with members of the founding-family present in the management show less diversification in unrelated business segments, but similar levels of related diversification. For geographical diversification, we find that neither family ownership nor family management has significant influence. Consequently, we hypothesize that

geographical diversification is simply a consequence of firm growth and hence mainly driven by firm size.

For family firms in general, it seems that the *agency cost hypothesis of family management* is more likely to dominate the *risk aversion hypothesis of family ownership*. Hence, family firms due to their reduced principal-agent conflicts have lower levels of unrelated diversification and less currency hedging. On the other hand, in some cases both hypotheses neutralize each other. For example, we find no differences in terms of total diversification between family firms and non-family firms, most likely because the effects of family ownership and family management have opposite effects. Our results concerning diversification are in line with the study of Anderson and Reeb (2003b) for the U.S. in a way that we find similar results for Germany concerning the number of business segments. In both countries, family firms have a significant lower number of business segments than non-family firms. However, our analysis goes beyond Anderson and Reeb (2003b) concerning several aspects and thus extends existing empirical research: we apply more precise measures of business segment diversification including a distinction between related and unrelated diversification, include geographical diversification and finally distinguish between family management and family ownership as already in detail discussed.

There are several avenues for future research. First, we argue that founding families hold large equity stakes in their firms and might thus be unable to diversify their wealth on a portfolio level. Based on this argument we analyse whether we can observe risk reduction based on corporate diversification in firms where the founding family is a large shareholder. Although we can reject this hypothesis of greater diversification in family firms it remains unclear whether the founding families use other instruments of risk reduction. Instead of a diversification on the firm level through conglomerate building they can diversify their wealth by founding different, legally separated entities. In this sense, it is interesting to analyse whether different firms have the same ultimate owner and are organized as family business groups. It has already been documented that family business groups are a widespread phenomenon especially in emerging markets (e.g. Claessens et al. 2000, Khanna 2000). In these countries the ultimate ownership for the majority of firms is concentrated in the hands of a few entrepreneurial families. Such business groups can function as effective risk sharing instruments and potentially increase performance (cf. Khanna and Palepu 2000, Khanna and Yafeh 2005). Second, it might be interesting to analyse how firms' business strategies differ by founder and family characteristics, such as age, education or former employment history of the founder or the family generation invested and involved in the firm management. Third, one limitation of our study is the focus on only publicly listed firms. In this sense a natural extension is to consider private German firms, where family control is even more prevalent than in public entities. Finally and of course, there are several other aspects of firm behaviour to study differences between family and non-family firms, such as e.g. executive compensation, board structures, innovation or social responsibility.

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**Table 1: Composition of sample**

<b>Year</b>	<b>Firms</b>	<b>Family Firms</b>	<b>Non-Family Firms</b>
2002	306	193	113
2003	307	187	120
2004	308	182	126
2005	316	174	142
2006	324	178	146
	1561	914	647

Note: This table shows the development of the sample composition over time. Column 1 presents the five sample years between 2002 and 2006, column 2 the number of firms in each year and column 3 and 4 the number of family and non-family firms in each year.

**Table 2: Definition of main variables**

Variable group	Variable name	Description of variable
Control variables	Dummy Family Firm	Dummy which is one if (a) the cumulative ownership stake of the founding family is at least 25% and/or (b) a member of the founding family is represented in either the management or supervisory board
	Dummy Family Management	Dummy which is one if a member of the founding family is represented in either the management or supervisory board
	Founding Family Ownership	Percentage of stock ownership held by all members of the founding family
	Outside Blockholders	Stock ownership of outside block owners (which have an ownership stake of at least 5%)
	Firm Size	Natural logarithm of totals assets
	Liquidity	Cash and cash equivalents / total assets
	Profitability	Earnings before interest, taxes, depreciation and amortization (EBITDA) / total assets
	Firm Specific Risk	Residuals' sum of squares from a regression of the individual stock returns on the returns of the market (CDAX)
	Firm Age	Number of years since the firm's incorporation
Business segments	Number Business Segement (4 digit SIC Code)	Number of buiness segments as reported based on 4-digit US SIC Codes
	Sales Outside Main Segment	Sales generated outside the main segment as indicated by the primary 2-digit SIC Code with highest sales
	Herfindahl Index Sales (2 digit SIC Code)	1 - Herfindahl-Index for the different business segments (sales based on 2-digit SIC-Codes)
	Herfindahl Index Sales (4 digit SIC Code)	1 - Herfindahl-Index for the different business segments (sales based on 4-digit SIC-Codes)
	Entropy Index (Total Diversification)	Entropy Index based on total diversification
	Entropy Index (Related Diversification)	Entropy Index based for related diversification (within 2-digit-SIC-Codes)
	Entropy Index (Unrelated diversification)	Entropy Index based for unrelated diversification (across 2-digit-SIC-Codes)
Geographical segments	Number Geographical Segments	Number of geographical segments (sales) based on four regions: Europe, America, Asia/Pacific, Other
	Foreign Sales	Sales outside Europe / total sales
	Herfindahl-Index Sales (Geographical)	1 - Herfindahl-Index for the different regions (sales)
Hedging activities	Dummy Currency Hedging	Dummy which is one if the firm uses any currency hedging instruments and zero otherwise
	Nominal Value (ln) / Firm Size	Natural logarithm of nominal value of foreign exchange hedging instruments divided by natural logarithm of firm's total assets; Zero if firm does not hedge foreign exchange risk
	Nominal Value (ln) / Foreign Sales (ln)	Natural logarithm of nominal value of foreign exchange hedging instruments divided by natural logarithm of firm's total sales outside europe; Zero if firm does not hedge foreign exchange risk

Table 3: Descriptive Statistics

	All Firms		Family Firms		Non-Family Firms		t-test
	Mean	Median	Mean	Median	Mean	Median	
<b>Corporate Governance Aspects</b>							
Founding Family Ownership [%]	19.7	5.11	33.2	33.5	1.05	0	20.21***
Outside Blockholders [%]	24.6	18.2	14.3	6.65	39.0	31.5	-9.33***
Size Management Board	3.281	3	3.034	3	3.637	3	-3.40***
Size Supervisory Board	7.110	6	5.256	3	9.731	9	-8.16***
<b>Firm Size and age</b>							
Assets (in billion €)	4.632	0.123	1.130	0.069	9.685	0.525	-3.21***
Sales (in billion €)	3.508	0.140	1.274	0.075	6.744	0.604	-3.31***
Employees	14,577	724	6,644	362	26,065	3,572	-3.13***
Firm Age	39	17	27	14	58	35	-6.36***
IPO Age	11	6	6	5	18	7	-6.35***
<b>Accounting figures</b>							
Leverage	0.531	0.550	0.495	0.490	0.582	0.612	-3.34***
Liquidity	2.285	1.644	1.735	2.441	2.070	1.560	1.73*
Profitability	0.082	0.105	0.045	0.098	0.140	0.111	-2.00*
Firm Specific Risk	0.459	0.389	0.512	0.458	0.376	0.305	6.53***
<b>Dependent variables</b>							
Number of 4-digit SIC Codes	2.295	2	2.080	2	2.594	2	-3.75***
Entropy Index	0.459	0.438	0.388	0.296	0.557	0.559	-3.60***
Number of Geographical Segments	2.352	2	2.146	2	2.642	3	-4.78***
Foreign Sales [%]	20.7	14.5	18.1	10.2	24.3	21.7	-2.72**
Dummy Currency Hedging	0.485	0	0.348	0	0.685	1	-7.39***

Note: Accounting information is obtained from Thomson's Worldscope Database. Information on ownership structure is hand-collected from the Hoppenstedt Stock Guide. The sample consists of all non-financial firms in the German Prime Standard between 2002 and 2006. Firms are classified as family firms if the founding family has an ownership stake of at least 25% and/or a member of the founding family participates in the management or supervisory board. \*\*\*, \*\* and \* indicate significance on the 1%-, 5%- and 10%-level respectively. The t-statistics are corrected for serial correlation. A detailed definition of all variables can be found in table 2.

Table 4: Business Segment Diversification A

Model	I	II	III	IV	V	VI	VII
Dependent variable:	Number Business Segement (4-digit SIC Code)	Sales Outside Main Segment	Herfindahl Index Sales (2-digit SIC Code)	Herfindahl Index Sales (4-digit SIC Code)	Entropy Index (Total Diversification)	Entropy Index (Related Diversification)	Entropy Index (Unrelated Diversification)
<b>Dummy for Family Firm</b>	<b>-0.11**</b> <b>(-2.02)</b>	<b>-0.027</b> <b>(-1.19)</b>	<b>-0.045*</b> <b>(-1.85)</b>	<b>-0.037</b> <b>(-1.37)</b>	<b>-0.064</b> <b>(-1.42)</b>	<b>0.0096</b> <b>(0.26)</b>	<b>-0.073*</b> <b>(-1.89)</b>
Firm Size	0.057*** (3.85)	0.015** (2.26)	0.0055 (0.79)	0.019** (2.50)	0.039*** (2.92)	0.023*** (2.74)	0.016 (1.35)
Profitability	-0.027 (-1.59)	-0.0053 (-1.65)	-0.0027 (-1.16)	-0.0067* (-1.77)	-0.011 (-1.58)	-0.0066 (-1.12)	-0.0041 (-1.13)
Liquidity	-0.046 (-0.34)	0.030 (0.54)	0.051 (0.97)	0.024 (0.35)	0.040 (0.36)	-0.042 (-0.56)	0.082 (1.01)
Outside Blockholders	-0.033 (-0.37)	0.014 (0.37)	0.022 (0.52)	0.0064 (0.14)	0.026 (0.33)	-0.0039 (-0.071)	0.030 (0.44)
Firm Specific Risk	-0.21** (-2.29)	-0.066* (-1.71)	-0.073** (-2.05)	-0.079* (-1.75)	-0.14* (-1.92)	-0.030 (-0.57)	-0.11** (-2.01)
Firm age	0.00018 (0.27)	0.00027 (0.93)	0.00019 (0.60)	0.00039 (1.17)	0.00058 (0.93)	0.00037 (0.95)	0.00021 (0.39)
Constant	0.56** (2.18)	0.13 (0.87)	0.28** (2.16)	0.14 (0.90)	0.17 (0.58)	-0.20 (-1.22)	0.37* (1.76)
Observations	1370	1370	1370	1370	1370	1370	1370
Number of clusters	317	317	317	317	317	317	317
Adj. R-squared	...	0.14	0.16	0.15	0.17	0.10	0.18
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Model	Poisson	Pooled OLS	Pooled OLS	Pooled OLS	Pooled OLS	Pooled OLS	Pooled OLS

Note: The table shows regression results with different business segment diversification measures as dependent variables. Model (1) is a pooled poisson regression and models (2) to (7) are pooled OLS regressions. Dummy for Family Firm equals one if the founding family owns at least 25% of the firm's voting rights and/or if a member of the founding family is present in the management or supervisory board. Firm size is measured as the natural log of assets. Profitability is measured as EBITDA divided by total assets. Liquidity is measured as cash and cash equivalents divided by total assets. Outside blockholders is computed as the total ownership share of all outsiders which own more than 5% of the voting rights. Firm specific risk is the idiosyncratic risk of the firm. Firm age is measured as years since incorporation. The standard errors of the coefficients are corrected for serial correlation on a firm level and for heteroscedasticity using the Huber-White-Sandwich estimator based on White (1980). T-statistics are presented in parentheses. A detailed definition of all variables can be found in table 2. \*\*\*, \*\* and \* indicate significance on the 1%-, 5%- and 10%-level respectively.

Table 5: Business Segment Diversification B

Model	I	II	III	IV	V	VI	VII
Dependent variable:	Number Business Segement (4 digit SIC Code)	Sales Outside Main Segment	Herfindahl Index Sales (2-digit SIC Code)	Herfindahl Index Sales (4-digit SIC Code)	Entropy Index (Total Diversification)	Entropy Index (Related Diversification)	Entropy Index (Unrelated Diversification)
<b>Family Management</b>	<b>-0.10*</b> (-1.87)	<b>-0.067***</b> (-2.75)	<b>-0.070***</b> (-2.69)	<b>-0.082***</b> (-2.88)	<b>-0.12***</b> (-2.62)	<b>-0.020</b> (-0.57)	<b>-0.10**</b> (-2.54)
<b>Founding Family Owership</b>	<b>0.080</b> (0.81)	<b>0.12***</b> (2.59)	<b>0.060</b> (1.18)	<b>0.14***</b> (2.60)	<b>0.21**</b> (2.27)	<b>0.13*</b> (1.83)	<b>0.075</b> (0.96)
Firm Size	0.057*** (3.72)	0.013** (2.01)	0.0042 (0.60)	0.017** (2.25)	0.037*** (2.72)	0.023*** (2.68)	0.014 (1.20)
Profitability	-0.027 (-1.55)	-0.0063* (-1.82)	-0.0033 (-1.40)	-0.0079* (-1.92)	-0.012* (-1.69)	-0.0073 (-1.17)	-0.0048 (-1.31)
Liquidity	-0.038 (-0.28)	0.039 (0.73)	0.057 (1.09)	0.034 (0.53)	0.055 (0.50)	-0.035 (-0.47)	0.090 (1.11)
Outside Blockholders	-0.0021 (-0.023)	0.038 (0.98)	0.031 (0.72)	0.035 (0.77)	0.070 (0.87)	0.028 (0.49)	0.043 (0.60)
Firm Specific Risk	-0.20** (-2.26)	-0.062 (-1.63)	-0.071** (-2.01)	-0.074* (-1.67)	-0.14* (-1.85)	-0.026 (-0.50)	-0.11** (-1.99)
Firm Age	0.00022 (0.32)	0.00025 (0.88)	0.00017 (0.55)	0.00038 (1.13)	0.00056 (0.91)	0.00037 (0.96)	0.00018 (0.36)
Constant	0.51** (2.01)	0.12 (0.85)	0.28** (2.28)	0.13 (0.86)	0.14 (0.52)	-0.22 (-1.36)	0.37* (1.83)
Observations	1370	1370	1370	1370	1370	1370	1370
Number of clusters	317	317	317	317	317	317	317
Adj. R-squared		0.15	0.16	0.16	0.18	0.11	0.18
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Model	Poisson	Pooled OLS	Pooled OLS	Pooled OLS	Pooled OLS	Pooled OLS	Pooled OLS

Note: The table shows regression results with different business segment diversification measures as dependent variables. Model (1) is a pooled poisson regression and models (2) to (7) are pooled OLS regressions. Dummy Family Management equals one if a member of the founding family is present in the management or supervisory board and zero otherwise. Founding Family Ownership is the cumulative ownership of the founding family. Firm size is measured as the natural log of assets. Profitability is measured as EBITDA divided by total assets. Liquidity is measured as cash and cash equivalents divided by total assets. Outside blockholders is computed as the total ownership share of all outsiders which own more than 5% of the voting rights. Firm specific risk is the idiosyncratic risk of the firm. Firm age is measured as years since incorporation. The standard errors of the coefficients are corrected for serial correlation on a firm level and for heteroscedasticity using the Huber-White-Sandwich estimator based on White (1980). T-statistics are presented in parentheses. A detailed definition of all variables can be found in table 2. \*\*\*, \*\* and \* indicate significance on the 1%-, 5%- and 10%-level respectively.

**Table 6: Geographical Diversification A**

<b>Model</b>	<b>I</b>	<b>II</b>	<b>III</b>
Dependent variable:	Number of Geographical Segments	Foreign Sales	Herfindahl Index Sales (Geographical)
<b>Dummy for Family Firm</b>	<b>-0.091**</b> <b>(-2.02)</b>	<b>-0.022</b> <b>(-0.92)</b>	<b>-0.040</b> <b>(-1.64)</b>
Firm Size	0.066*** (6.45)	0.031*** (4.72)	0.031*** (5.22)
Profitability	0.0079 (0.12)	-0.021 (-0.69)	-0.032 (-1.06)
Liquidity	0.23** (2.12)	0.094 (1.56)	0.078 (1.38)
Outside Blockholders	-0.093 (-1.36)	-0.00090 (-0.025)	-0.017 (-0.43)
Firm Specific Risk	0.088 (0.99)	0.071* (1.84)	0.051 (1.32)
Firm Age	0.000091 (0.22)	-0.00030 (-1.09)	0.00016 (0.64)
Constant	0.16 (0.78)	-0.018 (-0.14)	0.020 (0.19)
Observations	1358	1358	1358
Number of clusters	315	315	315
Adj. R-squared	...	0.17	0.24
Year Dummies	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes
Model	Poisson	Pooled OLS	Pooled OLS

Note: The table shows regression results with different geographical diversification measures as dependent variables. Model (1) is a pooled poisson regression, models (2) and (3) are pooled OLS regressions. Dummy for Family Firm equals one if the founding family owns at least 25% of the firm's voting rights and/or if a member of the founding family is present in the management or supervisory board. Firm size is measured as the natural log of assets. Profitability is measured as EBITDA divided by total assets. Liquidity is measured as cash and cash equivalents divided by total assets. Outside blockholders is computed as the total ownership share of all outsiders which own more than 5% of the voting rights. Firm specific risk is the idiosyncratic risk of the firm. Firm age is measured as years since incorporation. The standard errors of the coefficients are corrected for serial correlation on a firm level and for heteroscedasticity using the Huber-White-Sandwich estimator based on White (1980). T-statistics are presented in parentheses. A detailed definition of all variables can be found in table 2. \*\*\*, \*\* and \* indicate significance on the 1%-, 5%- and 10%-level respectively.



**Table 7: Geographical Diversification B**

<b>Model</b>	<b>I</b>	<b>II</b>	<b>III</b>
Dependent variable:	Number of Geographical Segments	Foreign Sales	Herfindahl Index Sales (Geographical)
<b>Dummy Family Management</b>	<b>-0.091*</b>	<b>-0.014</b>	<b>-0.036</b>
	<b>(-1.84)</b>	<b>(-0.49)</b>	<b>(-1.29)</b>
<b>Founding Family Ownership</b>	<b>-0.080</b>	<b>-0.024</b>	<b>-0.019</b>
	<b>(-0.89)</b>	<b>(-0.43)</b>	<b>(-0.36)</b>
Firm Size	0.064***	0.031***	0.031***
	(6.20)	(4.71)	(5.09)
Profitability	0.016	-0.020	-0.031
	(0.25)	(-0.66)	(-1.01)
Liquidity	0.23**	0.094	0.079
	(2.11)	(1.56)	(1.39)
Outside Blockholders	-0.12*	-0.0043	-0.020
	(-1.67)	(-0.11)	(-0.49)
Firm Specific Risk	0.087	0.070*	0.050
	(0.98)	(1.82)	(1.29)
Firm Age	0.000065	-0.00030	0.00016
	(0.16)	(-1.07)	(0.63)
Constant	0.19	-0.019	0.019
	(0.93)	(-0.15)	(0.19)
Observations	1358	1358	1358
Number of clusters	315	315	315
Adj. R-squared	...	0.16	0.24
Year Dummies	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes
Model	Poisson	Pooled OLS	Pooled OLS

Note: The table shows regression results with different geographical diversification measures as dependent variables. Model (1) is a pooled poisson regression, models (2) and (3) are pooled OLS regressions. Dummy Family Management equals one if a member of the founding family is present in the management or supervisory board and zero otherwise. Founding Family Ownership is the cumulative ownership of the founding family. Firm size is measured as the natural log of assets. Profitability is measured as EBITDA divided by total assets. Liquidity is measured as cash and cash equivalents divided by total assets. Outside blockholders is computed as the total ownership share of all outsiders which own more than 5% of the voting rights. Firm specific risk is the idiosyncratic risk of the firm. Firm age is measured as years since incorporation. The standard errors of the coefficients are corrected for serial correlation on a firm level and for heteroscedasticity using the Huber-White-Sandwich estimator based on White (1980). T-statistics are presented in parentheses. A detailed definition of all variables can be found in table 2. \*\*\*, \*\* and \* indicate significance on the 1%-, 5%- and 10%-level respectively.

Table 8: Hedging Decisions A

Model	I	II	III	IV
Dependent variable:	Dummy Currency Hedging	Dummy Currency Hedging*	Nominal Value (ln) / Firm Size	Nominal Value (ln) / Foreign Sales (ln)
<b>Dummy for Family Firm</b>	<b>-0.37**</b>	<b>-0.38*</b>	<b>-0.063**</b>	<b>-0.074**</b>
	<b>(-2.19)</b>	<b>(-1.85)</b>	<b>(-2.03)</b>	<b>(-2.12)</b>
Foreign Sales	2.024***	1.842***	0.340***	...
	(5.38)	(3.76)	(4.71)	
Firm Size	0.48***	0.52***	0.092***	0.11***
	(7.67)	(5.93)	(11.2)	(12.3)
Profitability	0.15	0.24	0.022	-0.039
	(0.54)	(0.61)	(0.65)	(-0.97)
Liquidity	0.095	-0.70	0.048	0.060
	(0.25)	(-1.18)	(0.79)	(0.90)
Outside Blockholders	-0.48*	0.085	-0.069	-0.067
	(-1.71)	(0.24)	(-1.40)	(-1.16)
Firm Specific Risk	-0.060	-0.062	-0.020	-0.0046
	(-0.21)	(-0.16)	(-0.40)	(-0.082)
Firm Age	0.0018	0.0028	0.00077**	0.00076*
	(0.69)	(0.73)	(2.26)	(1.95)
Constant	-0.73	-1.33	-0.78***	-0.91***
	()	()	(-4.95)	(-5.31)
Observations	1314	845	1148	1170
Number of clusters	308	215	296	304
Adj. R-squared	...	...	0.62	0.59
Pseudo R-squared	0.46	0.47	...	...
Year Dummies	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes
Model	Probit	Probit	Pooled OLS	Pooled OLS

Note: The table shows regression results for currency hedging activities. Models (1) and (2) are probit regressions, models (3) and (4) are pooled OLS regressions. Dummy for Family Firm equals one if the founding family owns at least 25% of the firm's voting rights and/or if a member of the founding family is present in the management or supervisory board. Foreign sales is computed as the share of sales outside Europe. Firm size is measured as the natural log of assets. Profitability is measured as EBITDA divided by total assets. Liquidity is measured as cash and cash equivalents divided by total assets. Outside blockholders is computed as the total ownership share of all outsiders which own more than 5% of the voting rights. Firm specific risk is the idiosyncratic risk of the firm. Firm age is measured as years since incorporation. The standard errors of the coefficients are corrected for serial correlation on a firm level and for heteroscedasticity using the Huber-White-Sandwich estimator based on White (1980). T-statistics are presented in parentheses. A detailed definition of all variables can be found in table 2. \*\*\*, \*\* and \* indicate significance on the 1%-, 5%- and 10%-level respectively.

\* Sample is restricted to firms which have more than two geographical segments.

**Table 9: Hedging Decisions B**

Model	I	II	III	IV
Dependent variable:	Dummy Currency Hedging	Dummy Currency Hedging*	Nominal Value (ln) / Firm Size	Nominal Value (ln) / Foreign Sales (ln)
<b>Dummy Family Management</b>	<b>-0.47***</b> <b>(-2.66)</b>	<b>-0.62***</b> <b>(-2.89)</b>	<b>-0.084***</b> <b>(-2.61)</b>	<b>-0.083**</b> <b>(-2.22)</b>
<b>Founding Family Ownership</b>	<b>0.16</b> <b>(0.47)</b>	<b>0.64</b> <b>(1.30)</b>	<b>0.055</b> <b>(0.97)</b>	<b>-0.0082</b> <b>(-0.12)</b>
Foreign Sales	2.018*** (5.39)	1.834*** (3.77)	0.346*** (4.82)	
Firm Size	0.47*** (7.47)	0.51*** (5.77)	0.090*** (10.9)	0.11*** (12.0)
Profitability	0.17 (0.62)	0.25 (0.63)	0.024 (0.71)	-0.037 (-0.93)
Liquidity	0.11 (0.30)	-0.73 (-1.24)	0.054 (0.89)	0.064 (0.94)
Outside Blockholders	-0.46 (-1.56)	0.23 (0.63)	-0.059 (-1.17)	-0.073 (-1.25)
Firm Specific Risk	-0.066 (-0.23)	-0.055 (-0.14)	-0.023 (-0.46)	-0.0068 (-0.12)
Firm Age	0.0015 (0.61)	0.0023 (0.58)	0.00076** (2.28)	0.00074* (1.94)
Constant	-1.21 ( )	-1.81 ( )	-0.77*** (-4.95)	-0.90*** (-5.26)
Observations	1314	845	1148	1170
Number of clusters	308	215	296	304
Adj. R-squared	...	...	0.62	0.59
Pseudo R-squared	0.46	0.47	...	...
Year Dummies	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes
Model	Probit	Probit	Pooled OLS	Pooled OLS

Note: The table shows regression results for currency hedging activities. Models (1) and (2) are probit regressions, models (3) and (4) are pooled OLS regressions. Dummy Family Management equals one if a member of the founding family is present in the management or supervisory board and zero otherwise. Founding Family Ownership is the cumulative ownership of the founding family. Foreign sales is computed as the share of sales outside Europe. Firm size is measured as the natural log of assets. Profitability is measured as EBITDA divided by total assets. Liquidity is measured as cash and cash equivalents divided by total assets. Outside blockholders is computed as the total ownership share of all outsiders which own more than 5% of the voting rights. Firm specific risk is the idiosyncratic risk of the firm. Firm age is measured as years since incorporation. The standard errors of the coefficients are corrected for serial correlation on a firm level and for heteroscedasticity using the Huber-White-Sandwich estimator based on White (1980). T-statistics are presented in parentheses. A detailed definition of all variables can be found in table 2. \*\*\*, \*\* and \* indicate significance on the 1%-, 5%- and 10%-level respectively.

\* Sample is restricted to firms which have more than two geographical segments.