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## Foundation Owned Firms in Germany - a Field Experiment for Agency Theory

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# **Foundation Owned Firms in Germany - a Field Experiment for Agency Theory**

February, 2015

## **Abstract**

This paper analyzes the governance and performance of firms which, according to simplistic agency theory, should not be viable. These firms are fully or partially owned by a foundation which itself is not owned by natural or legal persons. Therefore, residual claimholders have restricted or no influence on corporate governance. The lack of owners strengthens other stakeholders, in particular employees. Relative to matching family firms, German foundation owned firms are larger in terms of employees and operating revenue, and substitute labor for material, but not for capital. Their hiring and firing policy is about the same. They follow a more conservative financing policy, their financial performance is somewhat weaker.

**JEL Classification Codes:** G32, G34, G35, L25

**Key Words:** foundation owned firms, agency theory, corporate finance, corporate governance

# 1 Introduction

Over the last decades the discussion on corporate governance became more detailed by taking into account the impact of socio-economic culture and legal systems. Yet, in all discussions owners of a firm play an important role for corporate governance as residual claimholders. They push the firm's managers for profitability even though their power varies according to the legal setting and the costs and benefits of exercising control. If there are no residual claimholders, then other stakeholders of the firm might extract pecuniary and non-pecuniary benefits from the firm instead of pursuing profitable long-term investments. This might endanger competitiveness of the firm and therefore its viability.

Hence, it may appear paradoxical that there exist various small and big firms in Europe, in particular in Denmark and in Germany, which are partially or fully owned by a foundation. A foundation is a legal entity which has no owners<sup>4</sup>. Big foundation owned firms in Germany include Bertelsmann, Bosch, Körber, Mahle, ThyssenKrupp, ZF Friedrichshafen, Aldi, and Lidl. In Denmark, firms owned partially by a foundation, comprise a quarter of the largest 100 Danish corporations; their market value represents about half of the market value of the Danish stock index (Hansmann and Thomsen (2013)). Two important examples are Møller, the world's largest container shipping company, and Carlsberg, in Sweden IKEA is foundation owned.

Most foundations in Germany are charitable. They provide financial support for charitable purposes including hospitals, poor people, research projects, ecological projects. In charitable foundations the beneficiaries have no formal impact on the foundation's policy. If such a foundation is the sole owner of a firm, then there may be nobody pressing the firm for high profits. Such a strict separation of ownership and control should lead to strong agency problems as discussed by Fama and Jensen (1983). Also, capital market control is absent. This provides room for the employees and other stakeholders of the firm to pursue their own objectives. Agency theory suggests that the financial performance of these firms is inferior, and that they may not be viable in the long run. Hence, these firms provide an excellent field experiment for agency theory.

The purpose of this paper is to analyze the policy and performance of foundation owned firms in Germany and thereby refine our understanding of agency problems and mechanisms to mitigate them. First, we compare foundation owned firms (FoFs) to matching firms which are not owned by foundations (traditional ownership). Second, we compare different subsets of foundation owned firms, in particular firms owned by charitable foundations and firms owned by family foundations. A family foundation usually provides restricted financial support to the founder's family. The family often retains some rights to govern the foundation's policy and that of the foundation owned firm. Thus, the family retains largely the role of owners, constraining the influence of other stakeholders. Hence, corporate governance of these firms might be similar to that of firms with traditional ownership. Both comparisons should provide insights into the strengths and weaknesses of agency theory. All firms are for-profit, i.e. non-charitable.

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<sup>4</sup> For more legal details see Kronke (1988).

Our sample includes 164 German firms which are partially or fully owned by a foundation. We use matching firms of similar size in the same industry. Most foundation owned firms originate from family firms. The vast majority of the matching firms are family firms. Only about 1/8 of the foundation owned firms and of the matching firms are listed at some stock exchange. Therefore, the paper analyzes annual statements of firms. These statements are taken from the period 2003 to 2012 as published by Orbis.

The main findings of the paper can be summarized as follows. On average, FoFs are much larger than matching firms in terms of employees, operating revenue, and total assets. They appear to use a different production policy characterized by more vertical integration, i.e., they rely less on outsourcing which is common nowadays in many industries. This appears to be particularly strong in firms with ownership of a charity foundation. These findings suggest that FoFs act more in the interest of their employees by retaining jobs inside the firm. But FoFs do not pay higher wages. Also, their hiring and firing policy, measured by the sensitivity of personnel expense to changes in operating revenue, is similar to that of matching firms.

FoFs follow a more conservative financing policy, stabilizing their long-term existence. Leverage tends to be lower than in matching firms. FoFs also appear to pay less money to their owners. Return on assets is apparently somewhat smaller, regardless of whether charity or family foundations are owners. The median return on assets of FoFs is about 6.7 percent, compared to 7.5 percent of matching firms. Thus, the difference is fairly small.

Some FoFs and matching firms are listed at a stock exchange. We neither find a significant listing effect on financial performance of FoFs nor of matching firms. Possibly, capital market control is weak in Germany. Alternatively, capital market control may undermine long-term orientation of management and thereby neutralize positive listing effects<sup>5</sup>.

These findings cast serious doubts on the simplistic agency theory based view that only firms with natural persons as owners thrive in the long run. But, in line with agency theory, FoFs are clearly more labor-intensive in the interest of the more powerful employees. The weaker role of natural persons as owners likely strengthens the role of employees. This might also explain the somewhat weaker financial performance. But there is no indication that the stronger employee orientation endangers the firms' existence. Some FoFs date from the 19<sup>th</sup> century, the average age is above 25 years. Apparently, there exist mechanisms in foundation owned firms which preserve the long-term orientation of the management.

We are not the first ones to look into these issues. Thomsen (1996), Thomsen and Rose (2004), Thomsen and Hansmann (2013) do not find inferior financial performance of Danish FoFs relative to other Danish firms listed at a stock exchange. Hansmann and Thomsen (2013) find, however, that greater managerial distance between the board of the foundation and that of the FoF improves financial performance. "Greater managerial distance" means less personal overlap between the two boards, more outside ownership in the FoF, more diversification in the foundations' investments, and more administrative independence of the foundation from the firm. Also, Danish FoFs which are listed at a stock exchange display better financial performance suggesting a positive impact of capital market control.

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<sup>5</sup> Short-termism due to analyst coverage is reported by He and Tian (2013).

In another early study Herrmann (1996), and Herrmann and Franke (2002) analyze German FoFs. Their benchmark is other German firms listed at some exchange. Based on annual statements from 1990 to 1992 they also find higher labor intensity, but lower salary levels in German FoFs. They find a slightly better financial performance of FoFs, however. This finding does not need to be inconsistent with the finding of the current study since different benchmarks are used.

The simplistic agency theory is also challenged by Bøhren and Josefson (2013). They analyze the relation between ownership and financial performance in Norwegian banks. Some of these banks have no owners, others are commercial banks with full ownership, and others are hybrid banks with partial ownership. The paper finds that banks without owners earn the highest and commercial banks the lowest return on assets in a sampling period including the recent crisis. Apart from the crisis, commercial banks do not outperform the other banks.

The paper is organized as follows. In section 2, we provide more details about the motives of founders of foundations, and about the regulation of foundations in Germany. In section 3, we derive some hypotheses on corporate governance of FoFs. Section 4 shows descriptive statistics. Section 5 presents our empirical findings. After some robustness results in section 6 we discuss the findings in section 7. Section 8 concludes.

## **2 Institutional Background of Foundations and Foundation Owned Firms**

### **2.1 Motives for Setting up a Foundation**

Foundations with ownership in a firm are set up mostly by successful entrepreneurs who are strongly interested in preserving their firms in the long run. Usually, the founder transforms a family firm with a traditional ownership structure into an FoF hoping that then the firm thrives "forever". The foundation gets an ownership stake in the firm which usually cannot be sold. A related motive for setting up an FoF may be that the entrepreneur feels grateful to her employees and wishes to preserve their jobs for a long time. Moreover, some founders are happy to erect a personal monument through a foundation named after them so that future generations remember them. Motives differ with regard to the beneficiaries of the foundation. Founders of a charitable foundation may wish to support society through funding research projects and other charitable activities by setting up a charitable foundation. These foundations are tax-exempt, i.e., they pay neither corporate nor income taxes<sup>6</sup>. The founder can subtract donations to charity foundations from taxable income to a limited extent.

Founders of a family foundation may be afraid that changes in ownership due to heritage or conflicts between family members may endanger the stability of the family firm. One way to stabilize the ownership structure is to set up a family foundation which then becomes a partial or an exclusive owner. It financially supports the members of the founder's family and, perhaps, other natural persons related to previous owners of the firm. Usually, the supported persons cannot sell their claims against the foundation. Since the foundation charter usually

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<sup>6</sup> This is different in the USA. A foundation is only tax-exempt if it holds less than 20 percent of the equity of some firm.

prevents the foundation from selling its ownership stake in the firm, the ownership structure of the firm is stabilized. Conflicts between claimholders may affect the foundation, but only to a lesser extent the policy of the FoF. The family foundation is not tax-exempt.

Another motive for setting up a foundation is regulatory arbitrage. A family firm may be set up as a partnership (Kommanditgesellschaft) in which at least one partner has full liability. A family foundation can take the position of an unlimited liability partner and thereby remove full liability of all natural persons without changing the legal form of the firm. The alternative of changing the partnership to a corporation would involve the dissolution of hidden reserves in the balance sheet which are then taxable. Moreover, before the mid-nineties, contrary to law, German courts did not force partnerships having no natural person as an unlimited partner, to publish their annual statements. Many partnerships were happy to keep their annual statements secret by making the foundation an unlimited partner. In our sample we have 14 family foundations which are fully liable partners in a partnership, but mostly have no equity stake, i.e., they cannot claim part of the firm's profit. Instead, these foundations get a fixed fee for management and for bearing the unlimited liability risk. Total assets of such a foundation tend to be small. As a fully liable partner the foundation is entitled to manage the firm. The members of the founder's family usually have some impact on the management of the foundation. The incentive for removing full liability of all natural persons may be particularly strong in firms with low profitability and/or high profitability risk.

Another regulatory arbitrage relates to the German codetermination law. Firms with many employees are subject to codetermination. Aldi and Lidl, two very big retail store chains, have set up various small regional partnerships which own the supermarkets. The family foundations are similar to holding firms of the regional partnerships. Thereby, Aldi and Lidl bypass the codetermination law. At the same time the ownership structure of the store chains is stabilized by transferring ownership to the family foundations.

## **2.2 The Regulation of Foundations**

Setting up a foundation requires the founder to design a foundation charter with many rules which specify the purpose of the foundation, restrict its activities, and prescribe how the foundation should be managed. When the foundation owns an equity stake in a firm, then the charter contains rules about the equity stake and usually about the corporate governance of the firm including requirements for the management board. The foundation charter has to be approved by the German federal state which registers the foundation. It is very difficult to change the charter once it has been approved by the state. A change requires state approval. The foundation charter is an important and effective device for the founder to impose his will "forever" on the foundation and the FoF. In particular, the long run existence of the foundation should be assured. Usually, the foundation is not allowed to sell its ownership stake in the FoF. Also, foundations are forced to preserve their capital. Thus, they must not pay money to beneficiaries if this undermines their capital.

Regulation of foundations is mostly governed by the German states. The state offices responsible for foundations also check the annual statements of foundations. But this appears

more as a formal check, the offices usually do not interfere in the foundations' policies as long as the charter is observed. Differences between German states in handling foundations are substantial. In Baden-Württemberg, a charitable foundation is tax-exempt if the foundation has no material impact on the management of the FoF. Therefore, charitable foundations in Baden-Württemberg (such as Bosch foundation and Mahle foundation) may own almost all equity claims, but have no voting rights in the FoF. A separate management firm is set up with a strong position in the supervisory board of the FoF. It may act as a fiduciary of the foundation. In other states the charitable foundation itself may have a strong influence on the supervisory board of the FoF (such as Koerber in Hamburg) without endangering its tax privileges.

### **3 Implications for Foundation Owned Firms**

#### **3.1 Family Firms and FoFs**

What do typical motives for setting up a foundation and regulation imply for corporate governance of FoFs? For a long time, the discussion focused on public versus closely held firms (Berle and Means (1932), Jensen and Meckling (1976)). Fama (1980) explains separation of ownership and control as an efficient form of economic organization which is disciplined by competition from other firms and competition among managers. Separation of ownership and control is typical for a public firm, but not for a closely held firm, such as most family firms.

An FoF mostly originates from a family firm. The entrepreneurial family that has managed a family firm successfully so far, likely wants to preserve the successful elements of the business model by setting up an FoF. Therefore, it is intuitive that the corporate governance model of the FoF, as far as it is nailed down in the charter, inherits many features of the existing corporate governance model. This suggests that differences between the corporate governance in FoFs and family firms may be smaller than differences between family firms and public firms. Whenever an FoF or a family firm is listed, this may create a hybrid model with additional elements of capital market control.

The role of owners in a family firm is controversial. Owners with a relational/stewardship attitude adopt a stakeholder orientation including employees, customers, and suppliers, while owners with an individualistic attitude maximize their private benefits (Bau and Chirico (2014), Bingham et al (2011)). Empirically, both papers find a relational attitude in family firms which primarily benefits employees (see also Hillman and Keim (2001)). While family firms may suffer from tensions within the controlling family, from conflicts between the family and employees, and excessive valuation of socio-emotional wealth by family members, they may reduce agency problems and promote long-term oriented corporate governance (van Essen et al (2015)). In their meta-analysis van Essen et al (2015) conclude that the performance of US family firms drops dramatically after the first generation so that then they are outperformed by public firms. Similarly, Villalonga and Amit (2006) find that the descendants of the founder might be poor managers. But van Essen et al (2015) also find that listed family firms perform well when family members with large stakes monitor professional

executives, and transparent and liquid capital markets assure effective monitoring of family owners<sup>7</sup>.

Bezemer et al (2015) argue that a stakeholder culture prevails in the Netherlands. This is also true in Germany. An important reason for the stakeholder perspective in family firms could be the long-term presence of the family in the firm (Anderson and Reeb (2003)). In these firms other stakeholders are dealing with the same family for longer periods than in public firms promoting stronger ties. Anderson and Reeb (2003) argue that the family's reputation more likely creates longer lasting economic consequences of relationship building with stakeholders relative to public firms, supporting more stakeholder orientation in family firms.

If the entrepreneur has a stakeholder orientation, then this orientation may be similar in the hitherto existing family firm and the FoF. Hence, the setup of FoFs may be endogenous in the sense that entrepreneurs with a strong employee orientation are inclined to perpetuate this orientation by changing their firms into FoFs. Therefore, this change does not need to strengthen the role of employees. But it is also conceivable that the move to an FoF makes managers more powerful. Depending on their attitudes, their power might translate into more power of employees. Employees are always present in the firm, their representatives often talk to managers. Other stakeholders such as customers and/or suppliers may actually lose some power if the role of the family as a reputational anchor is weakened by setting up an FoF. Therefore, we conjecture that a weaker control of residual claimants translates into more employee control. FoFs may be managed with a stronger focus on the interests of employees. We call this employee-focused approach to corporate governance the employee approach.

### **3.2 Stakeholder versus Employee Approach to Corporate Governance**

Matching firms are mostly family firms. We call their approach to corporate governance the stakeholder approach. Our hypotheses in this subsection compare corporate governance under the stakeholder and the employee approach<sup>8</sup>.

*Hypothesis 1: More employee orientation raises (a) the average income of employees, (b) the number of jobs, and (c) makes jobs safer.*

As anecdotal evidence, the CEO of ZF Friedrichshafen, one of the biggest automotive suppliers worldwide, recently said that the firm is strongly vertically integrated (Müller (2015)). Input from other suppliers is preferably used whenever demand exceeds internal production capacity. Even though the official argument for strong vertical integration is to protect business know-how, such a policy tends to raise the number of jobs within the firm to the benefit of employees. Here, we briefly discuss mechanisms to raise the number of jobs, and make jobs safer.

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<sup>7</sup> Lins et al (2013) find that family firms, relative to other firms, are more conservative, invest less in a crisis, and their financial performance is lower. O'Boyle et al (2012) find in their meta-analysis a slightly positive, insignificant performance effect of family involvement.

<sup>8</sup> For a very good discussion of shareholder and stakeholder approaches see Kallifatides et al (2010), Ch. 1 and 22.



(1) Hypothesis 1 assumes that the optimal number of jobs is higher under the employee than under the stakeholder approach<sup>9</sup>. The number of jobs can be raised by substituting labor for capital or for material. Consider the reverse substitution. A common approach to substitute capital for labor is to buy advanced labor-saving technical equipment. This may permit substantial cost cutting as illustrated by various stages of industrialization. Alternatively, outsourcing is a typical approach to substitute material for labor. Since the eighties many industrial firms used outsourcing because it was expected to lower the overall cost, and increase benefits from specialization of suppliers. While substitution of labor for capital lowers depreciation, substitution of labor for material lowers material expense. Both types of substitution would raise personnel expense and might also strengthen job security. Therefore, employees are likely to support both types of substitution.

Substituting labor for capital should raise a firm's ratio "Personnel expense/depreciation" and to a lesser extent the ratio "Personnel expense/material expense" since material expense does not need to change. Substituting labor for material is a form of vertical integration. This should raise the ratio "Personnel expense/material expense", but its effect on the ratio "Personnel expense/depreciation" depends on the used technology. Using more labor often involves additional use of technical equipment and, thus, may raise depreciation. For illustration, suppose a firm merges with another one for vertical integration. Then, after the merger, in the "consolidated annual statement" personnel expense and depreciation are added over both firms if there are no synergy effects. Hence, "Personnel expense/depreciation" may stay about the same.

Vertical integration may have strong implications for other accounting items, too. Before a merger, each firm has its own material expense and its own operating revenue. As an approximation, the operating revenue of the firm with the first production stage equals the material expense of the firm with the second production stage. In the "consolidated annual statement" the material expense of the second firm is netted against the operating revenue of the first firm so that operating revenue and material expense of the merged firm are reduced. As the merger lowers the operating revenue, the ratio "Personnel expense/operating revenue" increases<sup>10</sup>. This should not be interpreted as lower labor productivity. It is a pure "accounting effect" of consolidation.

Thus, it is dangerous to compare accounting figures of firms with different degrees of vertical integration. Some results are derived in Appendix 1. Vertical integration implies that "Material expense/operating revenue" of the integrated firm is smaller than the average of this ratio of two independent firms. Vertical integration also raises "Personnel expense/operating revenue" if labor intensity measured by "Personnel expense/(operating revenue – material expense)" is the same for both firms. Hence, it lowers "Material expense/personnel expense", a fortiori. It lowers turnover "Operating revenue/total assets" if turnover is the same for both firms before the merger.

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<sup>9</sup> Hillman and Keim (2001) find that firms improving their relations with employees often raise shareholder value. Thus, there does not need to be a conflict between the stakeholder and the employee approach.

<sup>10</sup> A merger involves a change in the legal structure. If labor substitutes for material in a given firm, then operating revenue does not need to be affected.

A more sophisticated approach to production and employment policy is to analyze the long-term production function under the stakeholder and the employee approach. We assume that the production function is a Cobb-Douglas function

$$\ln OR = \alpha \ln PE + \beta \ln ME + \gamma \ln DE + \delta \ln OE$$

with OR = operating revenue, PE = personnel expense, ME = material expense, DE = depreciation, and OE = expenses for other production factors.  $\alpha$ ,  $\beta$ ,  $\gamma$ , and  $\delta$  are the elasticities of the operating revenue with respect to the production factors. These elasticities should add to 1,  $\alpha + \beta + \gamma + \delta = 1$ .

To model the difference between the stakeholder and the employee approach, we assume that operating revenue is maximized under the stakeholder approach, while a weighted average of operating revenue and personnel expense is maximized under the employee approach. The objective function is maximized with respect to PE, ME, DE, and OE, subject to the budget constraint  $PE + ME + DE + OC = TC$ . Assume the total production cost TC to be given. Optimization under the stakeholder approach implies for every production factor: "elasticity of OR with respect to production factor = factor cost/total production cost". This is shown in Appendix 2.

For the employee approach we assume that the objective function is a weighted average of the operating revenue and the personnel expense

$$\kappa OR + (1 - \kappa) PE, 0 < \kappa < 1.$$

This objective function attaches some weight to personnel expense representing the interests of employees. Maximizing this objective function raises the elasticity of operating revenue with respect to personnel expense and the personnel expense. It lowers the elasticities of operating revenue with respect to the expenses for the other production factors and their expenses. The elasticities with respect to the other production factors decline by the same percentage. The ratio "Material expense/depreciation" is the same under the stakeholder and the employee approach. Hence, the latter approach implies substitution of labor for material, and at the same time substitution of labor for capital. For details see Appendix 2.

The previous discussion motivates a more detailed

*Hypothesis 2: More employee orientation raises the elasticity of OR with respect to personnel expense and the ratio "Personnel expense/operating revenue"; it lowers the elasticity of OR with respect to material expense and the ratio "Material expense/operating revenue".*

(2) Over the last decades many firms streamlined their product portfolio to improve their competitiveness by focusing on core competences. This led to spin-offs and closures of product lines, the number of employees and operating revenue declined. With a stronger employee orientation, FoFs may abstain from such a policy. This might explain higher numbers of employees, higher operating revenue, and higher total assets. In other words, it might explain why FoFs tend to be larger than matching firms.

(3) Job security can be strengthened through various channels including high profitability, firm growth, and a conservative financing policy. Internally driven operating revenue growth often requires more employees so that layoffs are remote. But more growth may also be associated with more risk. Substituting labor for other production factors might also strengthen job security by enhancing the firm's flexibility in moving employees between different jobs according to production needs.

If the power of residual claimants is reduced in an FoF, then creditors may have a stronger impact on corporate governance including financing policy. To mitigate this impact, the firm can lower its leverage. Also, a less risky investment policy should reduce the creditors' impact. Hence, there should be more room for employee influence<sup>11</sup>. Chen et al (2012) find that firms with unionized workers (in which employee orientation is likely to be stronger) invest less risky and pay lower bond coupons than other firms. Croci et al (2011) find that family firms (in which employee orientation tends to be stronger than in public firms) invest less risky and obtain more long-term debt. This suggests that a more conservative investment and financing policy benefits employees. High equity also reduces the need to react to losses by immediate cost cutting, including layoffs of employees. The alternative of raising new equity capital may not exist for FoFs because foundations often have small financial reserves so that they cannot provide new money. Therefore, a conservative financing policy should stabilize the firm and strengthen job security. Hence, we obtain

*Hypothesis 3: More employee orientation motivates a more conservative financing policy.*

Finally, if the stakeholder approach deviates from the employee approach, then the additional benefits to employees should come at a cost in terms of financial performance. The counterargument that ownership structure should not matter for financial performance (Demsetz and Villalonga (2001)) is based on a pure shareholder value approach: Profit maximizing shareholders choose the ownership structure so that it is endogenous and has no impact on financial performance. Here, we compare financial performance under the employee and the stakeholder approach. Given the very inflexible ownership structure in FoFs, the counterargument is likely invalid. This motivates

*Hypothesis 4: More employee orientation lowers financial performance.*

Of course, differences between the stakeholder and the employee approach are constrained by market control through competitive forces as argued by Fama (1980). An FoF has to produce goods and services at price and quality levels which are attractive to customers relative to those of competitors. Also, profitability has to be preserved. Otherwise, the FoF will gradually decline and eventually fail.

### **3.3 Heterogeneity in Governance of FoFs**

Even though all FoFs may share some properties relative to matching firms, there exists substantial heterogeneity among FoFs. First, consider an FoF where a charitable foundation is

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<sup>11</sup> Istitieh and Rodriguez-Fernandez (2006) discuss the role of non-financial stakeholders in capital structure.

the single owner. Then the lack of residual claimants may give much power to employees. Some counterbalance may be established by managers and by external directors who supervise the FoF and its managers. Their approach to corporate governance and their qualification are crucial. Sometimes the supervisors are managers of other firms, sometimes retired CEOs of the FoF, or other honorable persons. Even though these supervisors get some pay, this often appears to be modest. The expectation is that these persons are intrinsically motivated to act in the spirit of the founder. The same expectation may also govern the screening process for new managers. Whether this expectation is justified in the long run, is subject to serious doubts.

Second, consider a family foundation. The charter often reserves some managerial power for the family, and, at the same time, may stabilize the quality of the firm's management by assigning top management positions to outsiders. In most cases, the family retains some power. Since the family receives financial support from the foundation which is funded by the FoF, the family is likely to act in its own interest by constraining employee orientation in the FoF to a level which does not materially impair financial performance. Hence, we expect less employee orientation in firms owned by family foundations. This motivates

*Hypothesis 5: Employee orientation is weaker in firms owned by family foundations than in those owned by charitable foundations.*

This hypothesis implies that the effects stated in the previous hypotheses for FoFs relative to matching firms should be weaker in FoFs owned by family foundations relative to those owned by charitable foundations.

Third, consider the case in which the foundation takes the role of the unlimited partner in a partnership. The founder and her family may still be powerful in the foundation. It is not obvious whether this setup of a foundation affects corporate governance of the firm. One hypothesis states that the removal of full liability of natural partners weakens their impact on governance and financial performance. Another hypothesis states that full liability of natural persons overly constrains risk taking of the firm so that the new setup removes this impediment to successful corporate policy. Only the data can tell which effect is stronger.

## **4 Descriptive Statistics and Methods**

### **4.1 Data**

In 2007 Fleschutz published a list of 419 German FoFs. This list includes for-profit- and not for-profit-firms. Also, parent companies and subsidiaries are included. Marc Eulerich from the University of Duisburg/Essen recently updated this list which now includes 740 firms. He was kind enough to provide us his new list which appears to be very carefully derived. In this paper we only analyze for-profit-firms. We use a for profit-firm of the Eulerich list in our analysis only if certain requirements are satisfied. First, we exclude many small FoFs. The minimum annual operating revenue in our sampling period from 2003 to 2012 is 380,000 €, minimum total assets are 49,000 €. Second, as FoFs operate in a broad range of industries, we

need to compare them with suitable matching firms. These do not always exist. For example, for the big discount chain stores Aldi and Lidl there are no matching firms. Therefore, we exclude these FoFs. We also exclude financial firms. Third, we only consider operating units as FoFs or matching firms, i.e. legal entities with operating revenues generated within this entity. Such an entity may be a subsidiary of another firm. Fourth, since we obtain the data of annual statements from Orbis, we exclude those FoFs for which Orbis does not provide (enough) data. These are mostly small FoFs as Orbis covers a very wide range of German firms.

Fifth, the definition of an FoF is complicated by the fact that we need to distinguish between voting rights and financial equity stakes, i.e. profit claims. Often, these rights differ substantially. For example, the Bosch foundation has no voting rights, but more than 90 percent of the equity stake. In our sample we include a firm as an FoF if a) the foundation has limited liability in the firm and has at least 2 percent of the voting rights or 2 percent of the equity stake or b) if the foundation is a partner in the firm with full liability. We obtain the foundation's share of equity stakes from Hoppenstedt, shares of voting rights from Orbis as far as possible. In addition, we hand-collect data from public registers of annual statements and check them. Since there often exist pyramid structures of firms, we derive the effective shares of the foundation in the FoF (similar to Franks and Mayer (1997)). This leaves us with 164 for-profit-FoFs.

Since only 21 FoFs are listed, we only use accounting data covering the years 2003 to 2012. 10 FoFs always use IFRS for their annual reports during the sampling period, 130 FoFs always use German accounting standards, 24 FoFs change accounting rules. A firm is obliged to use IFRS if its shares or bonds are listed at a stock exchange.

Sometimes total assets and/or operating revenue of a firm change dramatically from one year to the next. This can be due to mergers or split-offs, but also due to data errors. Whenever in a time series of total assets, operating revenue, or number of employees we see a decline of more than 50 percent or an increase of more than 100 percent from one year to the next for the same firm, we only use the data starting after the dramatic change. This implies that for this firm all time series cover less than 10 years. This also happens if Orbis does not provide data for all 10 years. In fact, there is various missing data for smaller firms. We winsorize data at the 1 percent- and at the 99 percent-quantile to avoid extreme outliers. To eliminate inflation effects, all accounting numbers are deflated to the 2003-price level using the Eurostat BIP-deflator for Germany.

German matching firms are also taken from Orbis. As in other papers (for example Strebulaev and Yang (2013)), for each FoF we select matching firms by industry and size. We use two digit US SIC codes for industry classification. But whenever there are more than 100,000 German firms in a two digit US SIC industry, we use the three digit US SIC codes for a finer classification. Size is either measured by operating revenue or by total assets if operating revenue is not reported by ORBIS. Both numbers are correlated with 0.945. If possible, we select for each FoF five matching firms which belong to the same industry and are closest in size. Our sample contains 757 matching firms. Hence, on average, for each FoF we use 4.6

matching firms. By using several matching firms, we try to neutralize idiosyncrasies of single matching firms.

As mentioned before, 21 of the 164 FoFs are listed which is about 1/8. Among the 757 matching firms 89 are listed, slightly less than 1/8. As documented by Franks and Mayer (1997), there are only few firms in Germany without a block holder. Even though this has changed to some extent in the last 15 years due to changes in tax laws, the typical situation is still characterized by at least one block holder. This concentrated ownership may explain that in Germany stakeholder orientation appears to be prevalent. The strong importance of family firms for the German economy is also documented in Gottschalk (2014). Hence, a natural starting point is stakeholder orientation for matching firms, combined with stronger employee orientation in FoFs.

## 4.2 Descriptive Statistics

Next, the paper presents some descriptive statistics of various accounting numbers. For each FoF and each matching firm we use the time series of its accounting numbers and then take averages. Descriptive statistics based on these averages are presented for the FoFs and for the matching firms. A) Medians of average accounting numbers are shown for all FoFs and all matching firms, together with an indication whether the medians differ significantly. B) Then medians are presented for various subsets of FoFs together with the medians of the corresponding matching firms. That sheds some light on the heterogeneity of FoFs.

### 4.3.1 Summary Statistics

Table 1 provides some summary statistics about our sample of German FoFs. The 164 FoFs can be split into 14 FoFs where the foundation has full liability (also counted as having all voting rights) and 150 FoFs where the foundation has limited liability. In 105 cases the foundation is charitable, in 55 cases non-charitable. In 4 cases a charitable foundation and a non-charitable family foundation share ownership in an FoF. These cases are excluded when we analyze FoFs related to either a charitable or a non-charitable foundation.

- Table 1 -

The lower part of Table 1 shows various accounting numbers for FoFs and for the matching firms. For each firm we derive an average number as a simple average of its numbers within the sampling period. Total assets, operating revenue, and the number of employees are much higher in FoFs relative to matching firms. This suggests that FoFs are much larger than matching firms. It is not surprising that the frequency distributions of these figures are strongly right-skewed. Several reasons may explain the bigger size of FoFs. First, a successful entrepreneur is more likely than an unsuccessful entrepreneur to transform her firm into an FoF. Firms of successful entrepreneurs are likely to have a higher market share in their products and services market than matching firms so that these firms should be larger. Hence, we expect a "birth-bias" towards large FoFs. Second, if the entrepreneurs have a strong

employee orientation already before the setup of a foundation, then their firms would follow strategies to employ more people. For example, they may offer a broader portfolio of products and services instead of focusing on core competences. This would reinforce the "birth-bias". If the FoF continues this policy, then it would stay large.

But it should be noted that the median operating revenue of FoFs relative to matching firms is not always larger than 100 percent. It is about 100 percent in the "education/health"-industry and below 100 percent in "chemicals/rubber/plastics", "gas/electricity", and "other services". Thus, the size discrepancy between FoFs and matching firms appears to be partly industry driven. Therefore, we control for the industry when we analyze firm fixed effects later on.

In 112 (52) FoFs the foundation has at least (less than) 50 percent of the voting rights. In 84 (80) FoFs the foundation has at least (less than) 50 percent of the equity stake.

#### *4.3.2. Production and Employment Policy*

To get a deeper understanding of the employment policy of FoFs relative to matching firms, we look at the average number of employees, the average income per employee, and at some average accounting ratios. For each firm an average ratio  $a/b$  is a simple average of its annual ratios. As the frequency distributions of these ratios are sometimes strongly skewed, we present the medians of these averages for FoFs and matching firms and check the significance of the median difference by the Pearson chi-squared-test. The p-value indicates the probability that both medians are the same. To facilitate reading, we do not report the median of the matching firms, but the ratio of the median of the FoFs, divided by the median of the matching firms. Hence, a ratio of more than 100 percent indicates a lower median of the matching firms. In the upper part, the tables show the results for all FoFs. Then we split the FoFs into different binary subgroups and show the results for the subgroups. First, we distinguish FoFs where the foundation has at least 50 percent of voting rights (Maj. Vote, yes) or not (Maj. Vote, no). Second, we distinguish FoFs where the foundation has at least 50 percent of the equity stake, i.e. financial equity claims (Maj. owner, yes) or not (Maj. owner, no). The impact of a foundation or a management firm on the FoF likely depends on its voting share, but not on its equity share. Third, we distinguish FoFs where the foundation is a partner with full liability (Full liability, yes) or not (Full liability, no). Finally, we distinguish FoFs where the foundation is charitable (Charity, yes) or not, i.e. a family foundation (Charity, no).

- Table 2 -

Table 2 shows that the median number of employees in FoFs is 624 while it is 320 for matching firms, i.e. FoFs employ on average about twice as many people. The difference in these medians is strongly significant supporting Hypothesis 1(b). This also holds for all subgroups of FoFs, except for no-charity-FoFs and full liability-FoFs. This supports a weaker employee orientation of FoFs owned by family foundations (Hypothesis 5).

The average income of employees (= personnel expense/number of employees), shown in the lower part of Table 2, appears to be very similar for FoFs and matching firms falsifying

Hypothesis 1(a). These numbers do not provide evidence that employees exploit FoFs through higher income. For that reason we do not use average income in our regressions later on.

Hypothesis 2 states that the ratio "Personnel expense/operating revenue" should be higher for FoFs, while the ratio "Material expense/operating revenue" should be lower. Table 3 supports this hypothesis. The median "Personnel expense/operating revenue" ratio is almost 1/3 higher for FoFs than for matching firms while "Material expense/operating revenue" is about 1/5 lower. "Personnel expense/operating revenue" is also clearly higher for all subgroups, while "Material expense/operating revenue" is lower. The differences in medians for all FoFs are strongly significant. This is not true for all subgroups. In particular, it does not hold for FoFs without majority vote- and full liability-FoFs. In no-majority vote-FoFs we expect a small impact of the foundation on corporate governance so that outside investors should be more powerful. Full liability-FoFs are owned by family foundations so that employee orientation should be weaker (Hypothesis 5).

- Table 3 -

The findings in Table 3 suggest that in FoFs, relative to matching firms, "Personnel expense/material expense" should be even higher than "Personnel expense/operating revenue". Table 4 confirms this. For all FoFs "Personnel expense/material expense" is about 70 percent higher relative to matching firms. Again, the difference is strongly significant for all FoFs and most subgroups, but not for no-majority vote-FoFs, full liability-FoFs and no-charity-FoFs.

- Table 4 -

"Personnel expense/depreciation", however, is basically the same for FoFs and matching firms (lower part of Table 4). It should be noted that Orbis always shows the sum of depreciation and amortization under the heading "depreciation". Substitution of labor for capital appears to be similar in FoFs and matching firms. Hence, Table 4 suggests that, relative to matching firms, FoFs substitute labor for material, but not for capital. This is consistent with more vertical integration.

The median turnover (upper part of Table 5) is clearly lower for all FoFs than for the matching firms, and the difference is strongly significant. It is also significantly lower for each subgroup, except for full liability-FoFs. This also supports more vertical integration in FoFs.

- Table 5 -

The ratio "(Personnel expense + material expense + depreciation)/operating revenue" may be taken as an indicator of cost efficiency of production. For all FoFs, this ratio is significantly lower than for the matching firms (lower part of Table 5). It is also lower for all subgroups, but the difference in medians is insignificant except for the majority vote-FoFs. Thus, this ratio provides weak evidence for lower cost efficiency of production in FoFs.

Summarizing these findings, there is no evidence that FoFs substitute labor for capital relative to matching firms. But FoFs substitute labor for material relative to matching firms, consistent



with more vertical integration. This policy and a broader portfolio of products and services likely stabilizes employment in FoFs. Wages are about the same in FoFs and matching firms.

More job security might also show up in a smaller coefficient of variation (= standard deviation/mean) of a firm's personnel expense. The lower part of Table 6 shows the medians of the coefficients of variation for several ratios. They are smaller for FoFs than for matching firms. But the coefficients for personnel expense do not differ significantly.

- Table 6 -

The upper part of Table 6 shows medians of log growth rates of operating revenue. These growth rates are driven by many factors, including product innovation and product improvement by the firm and by its competitors, by mergers and acquisitions, and spin-offs and changes in vertical integration. Due to a lack of data, we cannot separate these drivers of growth rates<sup>12</sup>. We interpret operating revenue growth roughly as an indicator of a firm's aggressiveness in improving its competitiveness.

The median growth rate of operating revenue is insignificantly lower for all FoFs than for matching firms. But the difference in means (3.4 percent versus 4.5 percent) is clearly significant. This is weak evidence that FoFs are less aggressive in improving competitiveness. Growth rates are particularly low in FoFs where the foundation has the majority of votes, the majority of equity claims, or full liability. In these subgroups, growth rates are also much smaller than in matching firms. The difference in growth rates is, however, significant only for FoFs with a majority vote of the foundation. As aggressiveness likely raises risk, it does not come as a surprise that the FoFs' coefficient of variation is smaller for operating revenue, personnel and material expense, and depreciation, relative to matching firms. The difference is significant only for the latter two.

#### 4.3.3 *Financing Policy*

Table 7 portrays the financing policy of FoFs and matching firms. It shows the ratio "Shareholder funds/total assets" in the upper part and the ratio "Cash flow/(total assets – shareholder funds)" in the lower part. Cash flow is defined as net income plus depreciation including amortization. Both ratios provide a similar answer, supporting Hypothesis 3. Their medians are higher for all FoFs, they are also higher for the subgroups except for full liability-FoFs and no-charity-FoFs. Significance is mixed. Thus, financing policy appears to be more conservative in FoFs where the foundation is a majority owner, has limited liability, or is charitable, in line with Hypothesis 5. Surprisingly, there is no significant result for majority vote-FoFs.

- Table 7 -

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<sup>12</sup> Data on R&D-expenses is available only for very few firms.

#### 4.3.4 Financial Performance

If employees can extract more benefits from FoFs, then one would expect weaker financial performance of FoFs. Table 8 shows medians for "Return on assets", "Return on equity", and "Return on sales". The median return on assets is lower for all FoFs (6.7 percent) than for matching firms (7.5 percent) and also for all subgroups except for full liability-FoFs. But the difference in medians is significant only for charity-FoFs. Thus, there is very weak evidence that, apart from full liability-FoFs, FoFs earn lower returns on assets than matching firms. Hence, Hypothesis 4 is weakly supported, at best.

- Table 8 -

The picture looks quite different for returns on equity. Now, all FoFs as well as all subgroups of FoFs have clearly lower returns than matching firms. The explanation is that, apart from full liability-FoFs, most FoFs have relatively more equity capital. The differences in medians are significant except for full liability-FoFs, and no-charity-FoFs.

"Return on sales" again provides a very different picture. The median is higher for all FoFs and all subgroups except for no-charity-FoFs. This is presumably explained by lower operating revenues of FoFs, due to more vertical integration. But all the differences in medians are insignificant.

Even though the median analysis provides insightful results, it can be misleading. For illustration, consider the atypical full liability-FoFs. Their median RoA exceeds that of matching firms by 1/3, their "Shareholder funds/total assets" is lower by 1/10. Yet, their return on equity is 27 percent lower. How is that possible? Looking at the RoA of the 14 full-liability FoFs and of the matching firms, the frequency distribution of the matching firms has much higher standard deviation, skewness, and kurtosis. Even though the median RoA of FoFs is higher by 1/3, the mean RoA is 20 percent lower (7.5 percent compared to 9.2 percent). Therefore, means and medians provide no clear answer. This may also be due to the small number of full liability-FoFs. Next, we use regression analysis to get deeper insights into the differences between FoFs and matching firms.

## 4.2 Methods

We use panel regressions with firm fixed effects. Random effects are infeasible because the residuals strongly correlate with explanatory variables. Firm fixed effects are necessary because heterogeneity of firms might otherwise cause a missing variables problem.

We employ firm fixed effects regressions in two ways. A) When we analyze Cobb-Douglas functions and the hiring and firing policy of firms, we are primarily interested in sensitivities to certain explanatory variables. We estimate the sensitivities separately for FoFs and matching firms, and check whether these sensitivities are significantly different. If they are, then this indicates different policies of FoFs and matching firms. B) In all other cases we follow a two step-procedure. First, we panel-regress some variable on explanatory variables to estimate the fixed effects for FoFs and for matching firms. We also run this regression with

different sensitivities for FoFs and matching firms. As the sensitivities never differ significantly, we estimate the firm fixed effects from the regression with unique sensitivities for all firms. Second, we try to find out the determinants of firm fixed effects by OLS-regressing them on a dummy variable for FoFs and on other time-invariant explanatory variables, such as industry dummies. This permits us to find out whether the firm fixed effects are significantly higher/lower for FoFs than for matching firms.

## 5 Regression Analysis

### 5.1 Production and Employment Policy

#### 5.1.1 Cobb-Douglas Function

To analyze production and employment policy, we use panel regressions to estimate the Cobb-Douglas function for FoFs and for matching firms. As regressors we use personnel and material expense, and depreciation. Even though today it is common to estimate translog-production functions with linear and quadratic terms, we only use linear terms because we are interested in the elasticities of operating revenue with respect to these expenses. In particular, we want to find out whether the differences in the elasticities between FoFs and matching firms are significant.

All panel regressions use firm fixed effects and year dummies. Firm heterogeneity due to variation across industries should be captured by firm fixed effects. The explanatory power of each regression<sup>13</sup> is given by "within R squared".

The first column of Table 9 shows the Cobb-Douglas function-elasticities estimated separately for all FoFs and for their matching firms. Also, the differences between the elasticities for FoFs and matching firms are shown together with their significance. The elasticities for personnel expense, material expense, and depreciation add up to about 0.96 for the FoFs, and to 0.66 for the matching firms. The elasticity for personnel expense is more than twice as high for FoFs than for matching firms. The difference is significant. The elasticity for material expense is insignificantly lower for FoFs. That provides some support for the employee approach (Hypothesis 2). The elasticities for depreciation are quite small and not significantly different. Hence, FoFs appear to substitute labor for material (vertical integration), but not for capital.

The regression in the second column in Table 9 excludes full liability-FoFs and their corresponding matching firms. The findings are similar. The third and the fourth column show the results for no-charity- and charity-FoFs, respectively. Again, the qualitative results in each column are similar to "all FoFs". But the elasticity differences are much stronger for charity than for no-charity FoFs, in line with Hypothesis 5.

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<sup>13</sup> Consider a panel regression  $y_{i,t} = a + \beta x_{i,t} + v_i + \varepsilon_{i,t}$  where  $v_i$  is the fixed effect of firm  $i$ . Let  $y_i$  and  $x_i$  be the means over time. Then, it follows  $(y_{i,t} - y_i) = \beta (x_{i,t} - x_i) + \varepsilon_{i,t}$ . The within R squared denotes the variance of  $\hat{\beta}(x_{i,t} - x_i)$ , divided by the variance of  $(y_{i,t} - y_i)$ . This measure excludes the contribution of the estimated firm fixed effects to explaining the variance of  $y$ .

- Table 9 -

### *5.1.2 A Simple Test of Vertical Integration*

As argued before, the ratio "Personnel expense/material expense" should increase with substitution of labor for material, i.e. vertical integration. Here we use a two step-procedure. In the first step, we regress the ratio on the operating revenue, on leverage, and on leverage squared to derive firm fixed effects. Leverage is defined as  $(1 - \text{shareholder funds}/\text{total assets})$ . We include leverage in the first step because it later turns out to be relevant in the analysis of returns on assets. In the second step, we OLS-regress the firm fixed effects on various FoF-characteristics. As there exists an error in variables-problem for the firm fixed effects, one would like to adjust for that in the second regression. A way around this problem is the Hausman-Taylor method (Hausman and Taylor (1981)). It requires suitable instrumental variables. These are difficult to find in our setting. Therefore, we follow Lewis and Linzer (2005, p. 363) who conclude: "Indeed, OLS with robust standard errors is probably the best approach, except when information about the sampling in the dependent variable is not only available, but highly reliable". For large samples they suggest to use White standards errors, correcting for heteroscedasticity.

The results in Table 10a) suggest that vertical integration, measured by "Personnel expense/material expense", is stronger in smaller firms. In larger firms, economies of scale may render outsourcing more profitable. Leverage turns out to be insignificant.

- Table 10 -

In the first OLS-regression of the firm fixed effects (Table 10b)), the FoF-dummy (which is 1 for an FoF and 0 otherwise) has a strongly significant positive coefficient indicating that fixed effects are clearly higher for FoFs than for matching firms. That supports more vertical integration in FoFs. In the next regression, we distinguish between charity-FoFs and no-charity-FoFs. The coefficient for charity-FoFs is significant and more than twice than that for no-charity-FoFs. But their difference is insignificant. For limited liability-FoFs the coefficient is also significantly positive. The very high coefficient for full liability-FoFs is insignificant, perhaps due to the small number of these FoFs. Again, the difference in coefficients is not significant.

Next, we regress the firm fixed effects on the FoF-dummy and the interaction variable FoF-dummy times "vote share of the foundation in the FoF". We still find a significantly positive coefficient for the FoF-dummy, but the interaction term is insignificant. A similar finding is obtained if we replace vote by equity share. Overall, these regressions support Hypothesis 2 that FoFs are more vertically integrated than matching firms. This appears to be particularly strong in charity-FoFs and, thus, supports Hypothesis 5.

### 5.1.3 Hiring and Firing Policy

Job security is important for most employees. Therefore, we next analyze hiring and firing policies. Orbis shows the annual numbers of employees of firms and, thus, annual changes in these numbers, i.e. the fluctuation. It is composed of employee motivated fluctuation (employees leave because of retirement or other personal reasons) and firm driven fluctuation (the firm hires and fires employees). Since firms do not publish information on motives for fluctuation, we relate fluctuation to changes in operating revenue, presumably the most important driver apart from mergers, acquisitions, and spin-offs. We measure fluctuation by annual changes in personnel expense or the number of employees. As firms may react differently to positive and negative changes in operating revenue, we estimate the sensitivities separately for positive and negative changes. The first panel regression is

$$PE_{i,t}/PE_{i,t-1} = a + b OR_{i,t}^+ + c OR_{i,t}^- + v_i + \text{year dummies} + \varepsilon_{i,t} \quad (1)$$

with  $OR_{i,t}^+ := \max(OR_{i,t}/OR_{i,t-1} - 1, 0)$  and  $OR_{i,t}^- := \min(OR_{i,t}/OR_{i,t-1} - 1, 0)$ .

$PE_{i,t}$  and  $OR_{i,t}$  are the personnel expense and the operating revenue of firm  $i$  in year  $t$ .  $v_i$  is the fixed effect for firm  $i$ . In regression (1) personnel expense growth is assumed to be equally sensitive to small and large changes in OR. This may not be true. Therefore, we run a second regression where we only include annual changes in OR of at least 10 percent,

$$PE_{i,t}/PE_{i,t-1} = a + b OR_{i,t}^{++} + c OR_{i,t}^{--} + v_i + \text{year dummies} + \varepsilon_{i,t} \quad (2)$$

with  $OR_{i,t}^{++} := \max(OR_{i,t}/OR_{i,t-1} - 1.1, 0)$  and  $OR_{i,t}^{--} := \min(OR_{i,t}/OR_{i,t-1} - 0.9, 0)$ .

As personnel expense can change without hiring and firing people, we also run the same regressions replacing the personnel expense by the number of employees.

- Table 11 -

Table 11a) reports the findings for equation (1), Table 11b) for equation (2). In each table, the left hand side analyzes personnel expense, the right hand side the number of employees. We estimate the regression coefficients separately for matching firms, limited liability- and full liability-FoFs. The table also shows the differences between the coefficients and their significance levels. Table 11a), left hand side, shows that the sensitivity of personnel expense growth to positive operating revenue growth is similar for limited liability-FoFs and matching firms, but very weak for full liability-FoFs. The sensitivity to negative OR growth is again similar for matching firms and limited liability-FoFs, but significantly stronger for full liability-FoFs. They appear to react much stronger by cutting personnel expense, perhaps because their leverage ratio relative to matching firms is highest (Table 7). A higher leverage indicates lower financial reserves which may induce faster cost cutting in times of declining operation revenue. Considering only operating revenue changes of at least 10 percent up or down (equation (2)) in Table 11b), all significant coefficients are stronger relative to those for equation (1). All firms appear to react harsher to stronger OR changes.

The right hand side of Table 11 confirms the results, using the number of employees instead of personnel expense. But employment reacts weaker than personnel expense to operating

revenue with one exception. This indicates that firms use flexibility in working hours to accommodate changes in operating revenue before they incur the costs of hiring and firing. The exception is the sensitivity of employment to positive OR-growth for the full liability-FoFs. This is now strongly significant and even higher than for the other firms. Differences in the coefficients, however, are insignificant with one exception.

We repeat the exercise of Table 11, but now distinguish between matching firms, charity-FoFs, and no-charity-FoFs (results are not shown). For these three groups the estimated coefficients for positive OR-growth are not significantly different. The same is true for negative OR-growth. This falsifies Hypotheses 1(c) and 5. Summarizing, our findings do not support the conjecture that limited liability-FoFs or charity-FoFs follow a more lenient hiring and firing policy in their reaction to operating revenue growth. However, full liability-FoFs appear to react more harshly than the other firms to a decline in OR. Hence, job safety in relation to operating revenue should be about the same in matching firms and limited liability-FoFs, but somewhat inferior in full liability-FoFs.

## 5.2 Payout Policy

Next, we compare the payout policy of FoFs and matching firms. Apart from a lower leverage (Table 7), FoFs can strengthen their equity capital by lower payouts to owners. As argued before, a more conservative financing policy likely supports job security and may be induced by more employee orientation (Hypothesis 3). Also, an FoF owned fully by a charitable foundation, may feel little pressure to pay out a substantial fraction of profits. For anecdotal evidence, the big profitable charity-FoFs Bosch, Mahle, and Körber pay out about 3 percent, 4 percent, and 10 percent, respectively, of their profits, compared to an average of about 40 percent for the big German corporations listed in the DAX.

As the firms in our sample are composed of corporations and partnerships, it is not possible to measure payouts as in corporations. There is no official payout in partnerships. Therefore, we start from the accounting identity for firm  $i$  in year  $t$ ,

$$\text{equity capital}_{i,t-1} + \text{net income}_{i,t} + \text{newly raised equity}_{i,t} - \text{equity payout}_{i,t} = \text{equity capital}_{i,t}.$$

We define

$$\begin{aligned} \text{net payout}_{i,t} &= \text{equity payout}_{i,t} - \text{newly raised equity}_{i,t} = \\ &\text{net income}_{i,t} + \text{equity capital}_{i,t-1} - \text{equity capital}_{i,t}. \end{aligned}$$

This definition allows us to infer the net payout from the available data.

The decision on the net payout in year  $t$  may be driven by the firm's return on equity and the deviation of the leverage from a target leverage in the previous year. Many firms appear to adjust their financing policy to a long-term target leverage ratio (Hovakimian (2004)). As the cost of financial distress may increase with leverage in a convex manner while the tax shield may increase linearly, the payout ratio might react to leverage in a non-linear manner. Therefore, we also include the squared leverage in the regression for the payout ratio  $\text{PoR}_{i,t}$

(:= net payout<sub>i,t</sub>/equity<sub>i,t-1</sub>). The payout ratio may react differently to positive and negative returns on equity. Therefore, we estimate the sensitivities separately.

$$\text{PoR}_{i,t} = a + b \text{RoE}_{i,t-1}^+ + c \text{RoE}_{i,t-1}^- + d \text{lev}_{i,t-1} + e \text{lev}_{i,t-1}^2 + v_i + \varepsilon_{i,t}. \quad (3)$$

$\text{RoE}_{i,t-1}^+$  and  $\text{RoE}_{i,t-1}^-$  is the positive resp. negative return on equity in year (t-1).  $\text{lev}_{i,t-1}$  is (1 – shareholder funds/total assets) in year (t-1).  $v_i$  is the fixed effect for firm i.

The payout ratio may be influenced in some years by raising substantial new equity capital so that the payout ratio is smaller than –1. In other years, the payout ratio may be higher than 1 because of spin-offs and other divestments. Since these years are exceptional, they are not representative for the normal payout policy. Also, payout ratios tend to be extreme whenever equity is close to 0. Therefore, we exclude payout ratios below –0.9 and above 0.9. Moreover, in some firms equity is sometimes negative. We also exclude these firms.

- Table 12 -

The estimation results are presented in Table 12. In the first column, only payout ratios between –0.9 and 0.9 are included, in the next column only ratios between –0.8 and 0.8, and so forth. The payout ratio increases significantly with a higher positive return on equity (Table 12a)). But there is no significant reaction to negative returns on equity. Firms may stop payouts when they incur losses. Leverage has no significant impact, but the squared leverage has a strongly significant, negative impact when payout ratios between –0.9 and 0.9 are considered. This suggests that the payout ratio declines in leverage in a concave manner, i.e. the higher the leverage, the stronger is the marginal decline in the payout ratio. Significance is weaker or disappears when payout ratios are restricted to a smaller range. We also estimate the panel regression with interaction terms FoF x RoE and FoF x lev. But these interaction terms turn out to be insignificant. Therefore, we do not report these results.

Next, we analyze the estimated firm fixed effects in an OLS-regression. We regress the fixed effects on the FoF-dummy and on an IFRS-dummy. The IFRS-dummy is 1 if the firm uses IFRS for its annual reports and 0 if the firm uses German accounting principles<sup>14</sup>. Results are displayed in Table 12b). For all ranges of payout ratios, the FoF-dummy is negative and strongly significant. That indicates that FoFs have lower payout ratios and supports our earlier conclusion that FoFs follow a more conservative financing policy (Hypothesis 3). An interaction term for charity-FoFs is always insignificant (not shown). Family foundations apparently do not enjoy higher payout ratios than charity foundations. This is inconsistent with Hypothesis 5.

Surprisingly, the payout ratio is negatively affected by IFRS accounting. Hung and Subramanyam (2007) analyze the effects of switching from German accounting rules to IFRS and document that in many firms equity capital increases because many assets are valued at market prices under IFRS instead of historical cost. A higher equity lowers the return on equity. This might explain the negative IFRS effect on the payout ratio.

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<sup>14</sup> According to § 315a (2) of the German Commercial Code listed firms have to publish a consolidated annual statement according to IFRS, beginning in 2005. Non-listed firms can choose to publish a consolidated annual statement according to IFRS or the German accounting rules (§ 315a (3)). Non-consolidated annual statements have to be published according to the German accounting rules.

### 5.3 Financial Performance

Hypothesis 4 claims that FoFs earn a lower return on assets than matching firms because of their stronger employee orientation. As argued before, we consider return on assets (RoA) a better measure for financial performance than return on equity or return on sales because the latter appear to be biased due to a more conservative financing policy, and more vertical integration of FoFs, respectively. Again, we use a two step-procedure. In the first step we run panel regressions of RoA on a size measure of the firm and on its operating revenue growth. The size measure is either operating revenue or the sum of personnel and material expense. The first size measure may be more affected by vertical integration than the second one. Operating revenue growth may proxy for product innovation and other improvements in competitiveness, it should contribute to financial performance. We also use leverage and leverage squared as regressors. The effect of a low leverage might be a generous spending policy as stated by the free cash flow argument (see Jensen (1986), Core et al (2005) for agency problems related to excess endowments). Hence, an increase in leverage might constrain generous spending and thereby increase RoA. The effect of a high leverage might be a shortage of funds available for investments and thereby lead to underinvestment (Myers (1977)). An increase of a high leverage might reinforce this shortage and thereby lower RoA.

- Table 13 -

RoA increases with firm size indicating economies of scale effects (Table 13a)). As FoFs likely have a broader portfolio of products and services than matching firms, a positive size effect is consistent with both, economies of scale and scope effects. This effect is strongly significant for both size measures. Also, the positive effect of growth is strongly significant, as expected. The leverage effect is inversely u-shaped and strongly significant. That supports the free cash flow argument for low levels of leverage and the underinvestment argument for high levels of leverage.

In the second step, we OLS-regress the estimated firm fixed effects on different FoF-characteristics. We use the fixed effects estimated in the first step using ln OR as the size measure (column (2) in Table 13a)). The first regression in Table 13b) shows a significantly negative coefficient for the FoF-dummy. This suggests that FoFs have significantly smaller RoAs than matching firms in support of Hypothesis 4. The interaction term for charity-FoFs is insignificant so that the return on assets is about the same for FoFs owned by charitable foundations and those owned by family foundations.

We always include as a regressor the standard deviation of the firm's RoA, derived from the time series of the firm's RoA. This coefficient is always positive and strongly significant. Hence, firms with higher risk, proxied by the standard deviation, tend to earn higher returns on equity. We also include the IFRS-dummy because accounting rules may have a strong effect on RoA. As argued before, under IFRS various assets are valued at market instead of historical cost. That raises total assets. Hence, IFRS might lower RoA. This is strongly confirmed in all regressions. In the second regression, we replace the charity x FoF-interaction dummy by the full liability x FoF-interaction dummy. This dummy has a significantly negative impact on RoA. It suggests that full liability-FoFs earn a lower RoA.



This may partly explain why these FoFs exist. Full liability is more dangerous for natural persons if RoAs are lower.

In the third regression, we analyze listing effects. We include a dummy for firms listed at a stock exchange and an interaction dummy for listed FoFs. Both dummies are insignificant. Listing does not have a noticeable effect on RoA. Capital market control does not appear to improve RoA.

In the fourth regression, we include, in addition, our proxy for vertical integration "Personnel expense/material expense" averaged over time (PPM). It should not vary much over time and show up in firm fixed effects if at all. For the FoFs, the positive coefficient of the PPM-interaction term is weakly significant. Significance disappears in the other regressions. Surprisingly, for the matching firms the PPM coefficient is twice as high and clearly significant. Matching firms would appear to earn higher RoAs if they were more vertically integrated. These findings cast doubt on the profitability of outsourcing. Possibly, some matching firms have overdone outsourcing<sup>15</sup>.

In the fifth regression, we drop the listing variables and include, through interaction terms, the voting share of the foundation and its square, and the age of the FoF, measured in 2013 by the number of years since the setup as an FoF. The age of the foundation has no impact on RoA. Thus, it appears as if FoFs follow rather stable policies right from the start. They may actually inherit these policies from the days before the foundation setup.

The vote-effect is inversely u-shaped and clearly significant. This is in line with some studies of corporate governance which suggest that a stronger owner improves financial performance by reducing agency problems, but a very strong owner lowers it because she may extract private benefits from the firm (McConnell and Servaes (1990), Himmelberg et al (1999)). But the empirical evidence on the relation between ownership structure and financial performance is controversial (see the excellent overview in Demsetz and Villalonga (2001)). Not surprisingly, the positive effect of the parabola on the fixed effects of FoFs is balanced by a stronger negative effect of the FoF-dummy (−0.075 instead of −0.031). When the vote share of the FoF is replaced by its equity share, then this share has no significant effect (not shown in the table). This does not come as a surprise because the equity share should not matter for corporate governance. The final regression is another check on full liability-FoFs. It confirms their negative impact on RoA, already shown in the second regression.

## 6. Robustness Checks

We do many robustness checks some of which are described in the following.

(1) Under IFRS and German accounting principles firms can manage their earnings through various channels. The most important is arguably depreciation and amortization. Therefore, we repeat the analysis of financial performance by replacing  $\text{RoA} = \text{EBIT}/\text{TA}$  by

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<sup>15</sup> Recently, the CEO of Epson said in an interview that profitability of Epson is driven by strong vertical integration so that Epson keeps control over all production stages (Fritz (2015)).

EBITDA/TA. EBITDA equals EBIT plus depreciation including amortization. The firm fixed effects on EBITDA/TA are derived from the last regression in Table 13a). For these firm fixed effects we run the same regressions as in Table 13b). The analysis yields similar results. Therefore, we do not report them.

(2) The panel regressions for RoA assume that the sensitivities are the same for FoFs and matching firms. This assumption is dangerous because the previous findings indicate that the production policy of FoFs differs from that of matching firms. Therefore, we also include interaction terms for FoFs in the first step. But all the interaction terms are insignificant.

(3) One might ask whether the firm's payout ratio depends on its risk. Possibly, more risky firms pay out less to stabilize solvency. Therefore, we rerun the OLS-regressions of firm fixed effects in table 12b) and include as an additional regressor the standard deviation of the firm's return on assets. Its coefficient is positive and weakly significant if the payout ratios are restricted to the range (-0.9; 0.9). For smaller ranges, significance disappears. This suggests that the risk of a firm has a very small impact on its payout policy.

(4) Somewhat tricky is the estimation of the Cobb-Douglas function. In Table 9 we report the results for a log-linear Cobb-Douglas function. Linearity is a strong restriction which may not fit the data well. Therefore, we also run a panel regression for a quadratic function (translog production function) in personnel and material expense. We estimate the slopes separately for matching firms and FoFs. We have four linear terms, four quadratic terms, and two cross-terms. The coefficients of three linear terms are insignificant, all the other coefficients are significant with varying sign. That makes it hard to interpret these coefficients in terms of the stakeholder and the employee approach. Therefore, we do not present the results here. But these results indicate that the findings for the log-linear Cobb-Douglas function in Table 9 need to be interpreted with caution.

(5) We also check whether the number of matching firms has a strong impact on our findings. It turns out that the results are quite similar if we move from 5 to 4 or 3 matching firms, but the findings change more if we move to 2 or 1 matching firm. This is to be expected because with one matching firm the specifics of this firm matter a lot and may distort our findings.

(6) Finally, we run a logistic regression to find out strong predictors for a firm to be an FoF or a matching firm. The results are shown in Table 14.

- Table 14 -

A very important predictor is the size measure "Operating revenue". In the first regression size is omitted, in the second regression the positive coefficient is strongly significant. The Hosmer-Lemeshow p-value which measures the goodness of fit of the model, strongly increases from about 58 to about 86 percent. Hence, a high "Operating revenue" predicts a firm to be an FoF. The other predictors are the same in both regressions. Annual growth of operating revenue tends to be smaller in FoFs, but is insignificant. Strongly significant are "Personnel expense/material expense" (PPM) and leverage. As expected, FoFs are more labor-intensive and less leveraged. Also, a lower average return on assets and a lower standard deviation of this return clearly predict a firm to be an FoF. The Hosmer-Lemeshow

p-values indicate a very good fit of the models. Overall, these findings confirm the previous findings.

It should be noted that both, the size measure "Operating revenue" and the ratio "Personnel expense/material expense" are positive and strongly significant. This supports the two employment pillars of FoF-policy. The first pillar indicates a broader product and services portfolio offered by FoFs, the second pillar more vertical integration. Operating revenue is higher in FoFs even though vertical integration lowers it. Apparently, the first pillar dominates so that the operating revenue is higher in FoFs.

## **7. Discussion**

The existence of foundation owned firms is at odds with the economic principle that a firm should be governed by its residual claimholders. According to agency theory, natural residual claimholders are suited best to govern a firm. In a family firm, members of the family typically govern and manage the firm or they hire specialized managers and supervise them. Thus, agency problems may be negligible. In the absence of residual claimholders firms might be exploited by other stakeholders and run into trouble in the long run, in particular if they compete with firms governed by residual claimholders. Hence, comparing FoFs and other firms offers an excellent field experiment for agency theory.

The motives for setting up a foundation range from creating a monument for the founder over stabilizing the long-term existence of a firm and its jobs, providing money for charitable purposes and for family members, to regulatory arbitrage. Previous experience as an entrepreneur may have inspired the founder to set up a foundation and design its long-term charter. This endogeneity may also dictate the particular features of the foundation setup. Given the heterogeneity in motives and, perhaps, corporate governance implications, the paper distinguishes different subsets of FoFs. Since there have not been important changes in the German legal regulation of foundations in the last 15 years, it is difficult to link the setup of a foundation to exogenous events. Therefore, this paper takes the particular setup of a foundation together with the FoF as exogenous.

Endogeneity is also typical of corporate policies which are analyzed in this paper. Often, corporate figures are obtained from annual reports and their interdependencies are investigated. As the management decides about corporate policy, it has a strong impact on most of these numbers so that they are not independent. Hence, empirical estimates may be biased because regressors may be influenced by the regressand. This holds for FoFs and for matching firms. Our premise is that the estimated differences between both types of firms are robust to these biases. This premise is difficult to test. If possible, we address the same question by different tests to check robustness of the findings.

FoFs typically originate from family firms. Empirical evidence suggests that family owners often adopt a stakeholder orientation which also benefits employees. Our basic conjecture is that FoFs are more employee oriented than matching firms, perhaps with the exception of full liability-FoFs which are driven by regulatory arbitrage. In the following discussion we first

exclude these. As stated in Hypothesis 1, employee orientation might imply higher average income of employees in FoFs, more and safer jobs. The evidence partly supports this hypothesis. FoFs appear to provide more jobs than matching firms, but they do not pay higher average income, and also their hiring and firing policy is not significantly different from that of matching firms.

More jobs can be offered if a firm offers a broader portfolio of products and services. The much higher number of employees in many FoFs indicates such a policy. Stronger labor intensity can be achieved by substituting labor for capital and/or labor for material. Our findings do not support substitution of labor for capital, neither for all FoFs, nor for the various subgroups of FoFs. But the ratios "Personnel expense/operating revenue" and "Personnel expense/material expense" strongly support substitution of labor for material which also holds for all subgroups of FoFs. Thus, Hypothesis 2 is supported. It might be that the entrepreneur who sets up a foundation has a strong employee orientation already before the setup. Alternatively, the setup of a foundation may be viewed as a signal for more employee orientation of the firm so that managers, including perhaps the founder's family, feel obliged to live up to this view by a corresponding policy. Substituting labor for material suggests more vertical integration in FoFs. This integration has strong effects on accounting numbers, in particular on material expense and operating revenue if legally separate firms are merged. Therefore, a high ratio "Personnel expense/operating revenue" or "Personnel expense/material expense" must not be interpreted as low labor productivity.

More vertical integration is also supported by the ratio "Personnel expense/material expense". This ratio appears to be particularly high for charity-FoFs. Charitable foundations are likely to be more employee oriented than family foundations. The difference between charity- and non-charity-FoFs is not significant, however. Also, the voting share and the equity share of the foundation do not have significant effects. Thus, there is weak support for Hypothesis 5, at best.

Moreover, the estimates of a simple Cobb-Douglas function indicate a stronger role of employees in FoFs. The elasticity of operating revenue with respect to personnel expense is significantly higher for FoFs than for matching firms. This effect is driven by charity-FoFs, providing some support for Hypothesis 5. The elasticity with respect to material expense is lower in FoFs, but the difference to matching firms is insignificant. The elasticity with respect to depreciation is similar for FoFs and matching firms. This confirms that FoFs do not substitute labor for capital. Possibly, it is cheaper to substitute labor for material than for capital.

Hypothesis 3 states that FoFs follow a more conservative financing policy. This is clearly supported by our findings. FoFs tend to have lower leverage ratios and lower payout ratios. This may enable FoFs to retain employees even in times when they are not needed. Thus, employment may be stabilized by financial reserves. But, in contrast to Hypothesis 5, it does not matter for the payout ratio whether the FoF is owned by a charitable or a family foundation.

Descriptive statistics of financial performance of FoFs, measured by return on assets, suggest weaker performance of FoFs relative to matching firms. But the differences in medians are insignificant. Panel regressions of the return on assets with firm fixed effects provide a more transparent answer. As expected, they indicate economies of scale/scope effects. They also indicate a positive effect of operating revenue growth. Firms with higher growth appear to earn higher returns. These firms may be more innovative and follow more aggressive strategies. For low levels of leverage, a higher leverage raises RoA, consistent with free cash flow effects. For high levels of leverage, a higher leverage lowers RoA, consistent with underinvestment effects. As FoFs mostly have a lower leverage than matching firms, the free cash flow effect may be more relevant for FoFs than for matching firms.

An analysis of the firm fixed effects clearly indicates that FoFs underperform matching firms in terms of RoA. This supports Hypothesis 4. But there is no significant difference among charity- and no-charity-FoFs so that Hypothesis 5 is not supported. The effect of voting shares is inversely u-shaped indicating that a small or a large voting share of FoFs lowers RoA. The equity share, however, has no impact on RoA. This is not surprising because an equity stake does not provide influence on corporate governance.

There are a few surprising findings. First, our proxy for vertical integration "Personnel expense/material expense" always has a positive effect on RoA. It is significant, however, only for matching firms. That questions the common argument that outsourcing is a good strategy. Possibly, matching firms benefit from outsourcing, but tend to overdo it. The economic effect of this proxy is rather small, however. This may explain why including the square of this ratio does not improve the explanatory power of the regressions.

Second, listing at a stock exchange has no effect on RoA. Capital market control does not appear to improve financial performance. FoF-managers often claim that their long-term orientation is stronger than that of listed firms because short-term results are considered less important. Possibly, the pressure of stock investors for short-term performance has a negative impact which balances benefits of external control<sup>16</sup>.

Third, the firm's risk, proxied by the standard deviation of its return on assets, has a strongly significant positive impact on the average return on assets. Possibly, investors are only ready to invest in a firm with higher risk if they can expect a higher return on assets. This is supported in our study by accounting numbers. But it is also in line with studies of stock returns which indicate higher average returns for firms with higher systematic and possibly unsystematic risk.

Finally, the age of the foundation setup does not matter. It may be that the entrepreneurial founder established a corporate policy before the setup of the FoF which is preserved later on in the FoF. In this case, the setup of the foundation is a mechanism to stabilize the corporate governance of the entrepreneur or her family. This stabilization is supported by the charter of the foundation which is extremely difficult to change. Some discussions with CEOs of foundations indicate that they spend much effort to make sure that the spirit of the founder is

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<sup>16</sup> Bezemer et al (2015) find that Dutch firms which reinforce their shareholder value orientation end up with lower financial performance.

not only kept in high regard by managers of the foundation, but also by managers of the FoF. That could explain the missing impact of age. This is also consistent with Franks et al (2012) who find that family control persists in countries with inactive markets for corporate control. Germany might belong to these countries. If this is true, then family driven corporate governance would be perpetuated in FoFs.

Overall, our findings mostly indicate a significantly negative effect of foundation ownership on financial performance. This suggests that the stronger employee orientation of FoFs is costly in terms of financial performance. But this is not due to higher average income. It is not explained by a more lenient hiring and firing policy. Possibly, various drivers together explain the lower performance. For example, FoFs appear to be less aggressive as measured by the growth in operating revenue. Or there may be less pressure on labor productivity. Also offering a broader portfolio of products and services may lower the return on assets. Together, these drivers could lower financial performance in a significant manner even though the separate effects are insignificant. Further investigations are necessary.

Our findings on RoA are not necessarily inconsistent with those of Herrmann and Franke (2002) and those of Thomsen (1996), Thomsen and Rose (2004), and Thomsen and Hansmann (2013) for Denmark. They do not find lower RoAs for FoFs. These papers compare FoFs with public firms, while we compare them with mostly family firms. If family firms earned a higher return on assets than public firms, then our study would use a stronger benchmark. But recent findings indicate a lower RoA for smaller Danish FoFs relative to public firms, as communicated by Thomsen. Interestingly, the papers on Danish FoFs find a positive listing effect.

We do not run regressions on return on equity and on return on sales. Since equity tends to be higher in FoFs, return on equity will be downward biased for FoFs due to a smaller leverage. As operating revenue, a proxy for sales, tends to be downward biased in FoFs, return on sales will be upward biased.

Finally, we discuss the findings for full liability-FoFs, a special class of FoFs driven by regulatory arbitrage. One might assume that these FoFs should be similar to matching firms. But this is only partially supported by the findings. They should be interpreted with caution, however, because the number of these FoFs is small. It appears that they also substitute labor for material relative to their matching firms. In fact, their median ratio "Personnel expense/material expense" is highest relative to their matching firms. They appear to be harsher in their firing policy. Their leverage is not significantly different from that of matching firms. But their financial performance appears to be weaker. This is true, even if differences in risk, proxied by the standard deviation of the return on assets, are taken into consideration. Lower returns on assets reinforce the risk borne by partners with unlimited liability. Therefore, they may wish to escape this risk by setting up a full liability-FoF. This would indicate some reverse causality between financial performance and setting up this type of FoF.

## 8 Conclusion

This paper looks into the policy and performance of German foundation owned firms (FoFs), a very unusual class of firms. In these firms the role of natural persons as residual claimholders is weakened or eliminated providing room for strong agency problems. Therefore analyzing these firms allows us to derive important insights into agency problems. Entrepreneurs usually set up a foundation together with an FoF to assure the long run existence of the firm. Typically, these firms originate from family firms and, thus, may inherit corporate governance features observed in family firms. Some founders have a stakeholder orientation and wish to preserve jobs for their esteemed employees, they may also wish to support charitable purposes or family members. Alternatively, family foundations may be set up for regulatory arbitrage.

In those FoFs in which natural persons have a weak position as residual claimholders, employees might earn rents in the form of more jobs, higher wages, and more job security. Our findings suggest that employees do not receive higher income, but FoFs appear to have a broader portfolio of products and services, and to substitute labor for material compared to non-FoFs. We do not find evidence that FoFs substitute labor for capital. These findings are similar for FoFs regardless of whether their setup is driven by regulatory arbitrage or not. Also, the hiring and firing policy of FoFs is hardly different from that of matching firms. Full liability-FoFs appear to follow a harsher firing policy. Thus, some aspects of the employment policy of FoFs provide some support for agency theory, others do not.

FoFs use a more conservative financing policy, as shown by a lower leverage and a lower payout ratio. This stabilizes FoFs financially and, perhaps, also employment. As suggested by agency theory, return on assets in FoFs tends to be smaller relative to matching firms. This may come from stronger employee orientation, but it cannot be attributed to a single driver. Financial performance is about the same in FoFs owned by charitable and those owned by family foundations, it appears to be weaker in firms with ownership of a fully liable foundation. As the age of the FoF does not matter, this suggests that the founder follows a similar corporate policy already before the setup of the FoF.

Summarizing, our findings do not support the simplistic view of agency theory that in competitive markets only firms, in which natural persons play a strong role as owners, will survive in the long run. Apparently, other stakeholders try to make sure that the firm follows a sustainable business policy as prescribed by the foundation charter. There is still much room for further research. Still unresolved is the important question whether some single element of corporate governance explains lower financial performance of foundation owned firms or whether a bunch of elements is required for explanation. A comparison with FoFs in Denmark and other European countries should reveal more insights into the drivers of the policy and the performance of FoFs. More insights into the governance systems of FoFs and matching firms should help to better understand the conditions which drive a wedge between corporate policy and financial performance of foundation owned and other firms.

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## Appendix 1: Ratio Analysis

(1) We show that ME/OR declines with vertical integration. Consider firms 1 and 2. Firm 1 produces at production stage 1 the operating revenue  $OR_1$  with material expense  $ME_1$ . Firm 2 produces at production stage 2 the operating revenue  $OR_2$  with material expense  $ME_2$  being equal to  $OR_1$ . The average ratio is  $.5 (ME_1/OR_1 + ME_2/OR_2)$ . If both firms integrate, then the material expense is only  $ME_1$ , the operating revenue of the new firm is only  $OR_2$ . Therefore we need to show that

$$.5 (ME_1/OR_1 + OR_1/OR_2) > ME_1/OR_2, \text{ or,}$$

$$ME_1/OR_1 - ME_1/OR_2 > ME_1/OR_2 - OR_1/OR_2.$$

As  $ME_1/OR_1 > ME_1/OR_2$  and  $ME_1/OR_2 < OR_1/OR_2$ , the result follows. Hence, vertical integration lowers ME/OR.

(2) We show that PE/OR increases with vertical integration if both firms produce with the same labor intensity. Labor intensity is measured by personnel expense over some measure of value added (= operating revenue - material expense). For firm 1, labor intensity is  $PE_1/(OR_1 - ME_1)$ , for firm 2,  $PE_2/(OR_2 - ME_2)$ . We now show that under equal labor intensity a merger raises PE/OR,

$$.5 [PE_1/OR_1 + PE_2/OR_2] < [PE_1 + PE_2]/OR_2, \text{ or}$$

$$.5 [(PE_1/(OR_1 - ME_1))(OR_1 - ME_1)/OR_1 + (PE_2/(OR_2 - ME_2))(OR_2 - ME_2)/OR_2]$$

$$< [(PE_1/(OR_1 - ME_1))(OR_1 - ME_1) + (PE_2/(OR_2 - ME_2))(OR_2 - ME_2)]/OR_2$$

Given equal labor intensity this condition simplifies to

$$.5 [(OR_1 - ME_1)/OR_1 + (OR_2 - ME_2)/OR_2]$$

$$< [(OR_1 - ME_1) + (OR_2 - ME_2)]/OR_2$$

As  $ME_2 = OR_1$ , we get

$$.5 [-ME_1/OR_1 - ME_2/OR_2] < -ME_1/OR_2, \text{ or}$$

$$ME_1/OR_2 - ME_1/OR_1 < ME_2/OR_2 - ME_1/OR_2.$$

As the lhs is negative, and the rhs is positive, the inequality holds. Therefore, vertical integration raises PE/OR.

(3) If vertical integration raises PE/OR and lowers ME/OR, then ME/PE should be lowered, a fortiori. But it is open whether vertical integration raises or lowers  $(PE + ME)/OR$ . The same is true for  $(PE + ME + DE)/OR$ .

(4) We check whether vertical integration lowers turnover  $OR/TA$ . If  $a_1/b_1 = a_2/b_2$ , then any weighted average of these ratios is equal to  $(a_1 + a_2)/(b_1 + b_2)$ . Hence, if turnover of firm 1 and 2 is the same, then

$$.5 (OR_1/TA_1 + OR_2/TA_2) = (OR_1 + OR_2)/(TA_1 + TA_2) > OR_2/(TA_1 + TA_2).$$

The last term in the inequality is the turnover of the merged firm. Hence, merging two firms with the same turnover lowers turnover.

## Appendix 2: Analysis of Elasticities

As the objective function in the stakeholder approach is given by the special case  $\kappa = 1$  of the objective function in the employee approach, we derive the optimal solution for the employee approach.

Max  $\kappa$  OR + (1- $\kappa$ ) PE, s.t. the budget constraint PE + ME + DE + OE = TC

with  $\alpha + \beta + \gamma + \delta = 1$  and  $\ln \text{OR} = \alpha \ln \text{PE} + \beta \ln \text{ME} + \gamma \ln \text{DE} + \delta \ln \text{OE}$ .

The FOCs are ( $\lambda$  is the Lagrange-multiplier of the budget constraint)

PE\*:  $\kappa \alpha \text{OR/PE} + (1-\kappa) = \lambda$  and

ME\*:  $\kappa \beta \text{OR/ME} = \lambda$ .

The FOCs for DE and OE are the same as that for ME except for replacing  $\beta$  by the corresponding elasticities and replacing OR/ME by OR/DE resp. OR/OE. Solving the FOCs for the elasticities and adding the equations yields (because  $\alpha + \beta + \gamma + \delta = 1$ )

$\kappa + (1-\kappa) \text{PE/OR} = \lambda \text{TC/OR}$ .

Replacing  $\lambda$  from this equation in the FOCs yields the rewritten FOCs

PE\*:  $\text{PE/TC} = \alpha + (1-\alpha) B =: \alpha(\text{FoF})$

ME\*:  $\text{ME/TC} = \beta(1-B) =: \beta(\text{FoF})$

with  $B := (1-\kappa) \text{PE/OR} / [\kappa + (1-\kappa) \text{PE/OR}]$  so that  $0 < B < 1$ .

The rewritten FOCs for DE and OC are the same as for ME except for replacing  $\beta$  by the corresponding elasticities and replacing ME/TC by DE/TC resp. OE/TC.

For the stakeholder approach  $\kappa = 1$  so that  $B = 0$ . Then, the FOCs imply for each production factor that its elasticity equals its cost share. Assuming that the matching firms follow the stakeholder approach, the estimated elasticities for the matching firms should be  $\alpha$ ,  $\beta$ ,  $\gamma$  and  $\delta$ . If FoFs follow the employee approach with  $\kappa < 1$ , then  $\alpha(\text{FoF})$  is clearly higher than  $\alpha$  while the other elasticities are lowered by the factor  $(1-B)$ . Therefore, the personnel expense increases, while the expense for each other production factor declines.

## Appendix 3: Tables

**Table 1:** Summary statistics for foundation owned firms (FoFs) and matching firms

In the lower part of the table descriptive statistics for average ( $\bar{\cdot}$ ) total assets, average ( $\bar{\cdot}$ ) operating revenue and average ( $\bar{\cdot}$ ) number of employees across firms are shown. For each firm an average number ( $\bar{\cdot}$ ) is a simple average of its numbers within the sampling period.

|                 | All FoFs | Charity-FoFs | No-charity-FoFs | Limited liability-FoFs | Full liability-FoFs |
|-----------------|----------|--------------|-----------------|------------------------|---------------------|
| Number of firms | 164      | 105          | 55              | 150                    | 14                  |

| FoFs   | # of obs | Mean  | Median | 25%-quantile | 75%-quantile |
|--|----------|-------|--------|--------------|--------------|
| ( $\bar{\cdot}$ ) Total assets (mill EUR)      |          |       |        |              |              |
| FoFs   | 164      | 1,070 | 80.8   | 20.9         | 458          |
| Matching firms                                 | 757      | 451   | 51.7   | 15.9         | 181          |
| ( $\bar{\cdot}$ ) Operating revenue (mill EUR) |          |       |        |              |              |
| FoFs   | 151      | 1,200 | 151    | 49.6         | 730          |
| Matching firms                                 | 531      | 532   | 109    | 33.6         | 311          |
| ( $\bar{\cdot}$ ) Number of Employees          |          |       |        |              |              |
| FoFs   | 164      | 5,588 | 624    | 171          | 3,156        |
| Matching firms                                 | 757      | 2,050 | 320    | 106          | 1,093        |
| FoF-vote                                       | 164      | 0.699 | 0.944  | 0.316        | 1.000        |
| >0.5   | 112      | -     | -      | -            | -            |
| <0.5   | 52       | -     | -      | -            | -            |
| FoF-equity stake                               | 164      | 0.542 | 0.565  | 0.063        | 1.000        |
| >0.5   | 84       | -     | -      | -            | -            |
| <0.5   | 80       | -     | -      | -            | -            |

**Table 2:** The upper part of this table shows the medians of firms' average ( $\bar{O}$ ) numbers of employees for the full sample of FoFs and for binary subgroups of FoFs. The lower part shows the medians of firms'  $\bar{O}$  "Personnel expense/number of employees". Ratio (FoF/matching) is the ratio of the FoF-median and that of the matching firms (in percent). The p-value is the probability that the medians of FoFs and matching firms are the same (null hypothesis).

|   | <b>Median FoF</b> | <b>Ratio (FoF/matching)</b> | <b>p-value</b> |
|---|-------------------|-----------------------------|----------------|
| <b><math>\bar{O}</math> Number of employees</b>     |                   |                             |                |
| Full sample<br>(F: 164 obs, M: 752 obs)             | 624               | 195.05%                     | 0.000          |
| Majority vote                                       |                   |                             |                |
| no (F: 52 obs, M: 230 obs)                          | 653               | 187.77%                     | 0.091          |
| yes (F: 112 obs, M: 522 obs)                        | 618               | 203.30%                     | 0.003          |
| Majority owner                                      |                   |                             |                |
| no (F: 80 obs, M: 358 obs)                          | 817               | 205.54%                     | 0.036          |
| yes (F: 84 obs, M: 394 obs)                         | 466               | 175.90%                     | 0.022          |
| Full liability                                      |                   |                             |                |
| no (F: 150 obs, M: 686 obs)                         | 535               | 191.06%                     | 0.001          |
| yes (F: 14 obs, M: 66 obs)                          | 2,396             | 239.21%                     | 0.141          |
| Charity   |                   |                             |                |
| no (F: 55 obs, M: 263 obs)                          | 558               | 147.67%                     | 0.236          |
| yes (F: 105 obs, M: 476 obs)                        | 624               | 207.68%                     | 0.017          |
|   |                   |                             |                |
| <b><math>\bar{O}</math> Income of employees (€)</b> |                   |                             |                |
| Full sample<br>(F: 164 obs, M: 746 obs)             | 46,723            | 99.94%                      | 0.931          |
| Majority vote                                       |                   |                             |                |
| no (F: 52 obs, M: 227 obs)                          | 47,909            | 98.60%                      | 0.665          |
| yes (F: 112 obs, M: 519 obs)                        | 46,199            | 99.87%                      | 0.932          |
| Majority owner                                      |                   |                             |                |
| no (F: 80 obs, M: 355 obs)                          | 47,023            | 98.85%                      | 0.920          |
| yes (F: 84 obs, M: 391 obs)                         | 46,357            | 99.50%                      | 0.921          |
| Full liability                                      |                   |                             |                |
| no (F: 150 obs, M: 680 obs)                         | 46,852            | 100.18%                     | 0.928          |
| yes (F: 14 obs, M: 66 obs)                          | 39,791            | 87.49%                      | 0.141          |
| Charity   |                   |                             |                |
| no (F: 55 obs, M: 262 obs)                          | 47,918            | 102.71%                     | 0.536          |
| yes (F: 105 obs, M: 471 obs)                        | 46,237            | 98.36%                      | 0.829          |

**Table 3:** The upper part of this table shows the medians of firms'  $\emptyset$  "Personnel expense/ operating revenue" for the full sample of FoFs and for binary subgroups of FoFs. The lower part shows the medians of firms'  $\emptyset$  "Material expense/operating revenue". Ratio (FoF/matching) is the ratio of the FoF-median and that of the matching firms (in percent). The p-value is the probability that the medians of FoFs and matching firms are the same (null hypothesis).

|   | <b>Median FoF</b> | <b>Ratio (FoF/matching)</b> | <b>p-value</b> |
|---|-------------------|-----------------------------|----------------|
| <b><math>\emptyset</math> "Personnel expense / operating revenue"</b> |                   |                             |                |
| Full sample<br>(F: 151 obs, M: 724 obs)                               | 0.247             | 130.79%                     | 0.002          |
| Majority vote   |                   |                             |                |
| no (F: 50 obs, M: 224 obs)  | 0.223             | 111.31%                     | 0.274          |
| yes (F: 101 obs, M: 500 obs)  | 0.255             | 137.76%                     | 0.000          |
| Majority owner  |                   |                             |                |
| no (F: 76 obs, M: 349 obs)  | 0.229             | 121.83%                     | 0.030          |
| yes (F: 75 obs, M: 375 obs)   | 0.255             | 133.76%                     | 0.001          |
| Full liability  |                   |                             |                |
| no (F: 139 obs, M: 662 obs)   | 0.245             | 130.19%                     | 0.000          |
| yes (F: 12 obs, M: 62 obs)  | 0.261             | 123.76%                     | 0.344          |
| Charity   |                   |                             |                |
| no (F: 51 obs, M: 258 obs)  | 0.228             | 138.91%                     | 0.005          |
| yes (F: 96 obs, M: 453 obs)   | 0.249             | 121.79%                     | 0.004          |
| <b><math>\emptyset</math> "Material expense / operating revenue"</b>  |                   |                             |                |
| Full sample<br>(F: 134 obs, M: 646 obs)                               | 0.373             | 79.07%                      | 0.002          |
| Majority vote   |                   |                             |                |
| no (F: 40 obs, M: 195 obs)  | 0.390             | 86.62%                      | 0.623          |
| yes (F: 94 obs, M: 451 obs)   | 0.354             | 73.60%                      | 0.001          |
| Majority owner  |                   |                             |                |
| no (F: 63 obs, M: 312 obs)  | 0.399             | 83.81%                      | 0.102          |
| yes (F: 71 obs, M: 334 obs)   | 0.361             | 76.92%                      | 0.010          |
| Full liability  |                   |                             |                |
| no (F: 122 obs, M: 590 obs)   | 0.378             | 80.07%                      | 0.004          |
| yes (F: 12 obs, M: 56 obs)  | 0.328             | 66.56%                      | 0.340          |
| Charity   |                   |                             |                |
| no (F: 45 obs, M: 234 obs)  | 0.422             | 82.97%                      | 0.202          |
| yes (F: 85 obs, M: 399 obs)   | 0.327             | 72.30%                      | 0.004          |



**Table 4:** The upper part of this table shows the medians of firms'  $\bar{X}$  "Personnel expense/material expense" for the full sample of FoFs and for binary subgroups of FoFs. The lower part shows the medians of firms'  $\bar{X}$  "Personnel expense/depreciation". Ratio (FoF/matching) is the ratio of the FoF-median and that of the matching firms (in percent). The p-value is the probability that the medians of FoFs and matching firms are the same (null hypothesis).

|   | <b>Median FoF</b> | <b>Ratio (FoF/matching)</b> | <b>p-value</b> |
|---|-------------------|-----------------------------|----------------|
| <b><math>\bar{X}</math> "Personnel expense / material expense"</b>          |                   |                             |                |
| Full sample<br>(F: 134 obs, M: 644 obs)                                     | 0.804             | 172.79%                     | 0.000          |
| Majority vote<br>no (F: 40 obs, M: 194 obs)<br>yes (F: 94 obs, M: 450 obs)  | 0.739<br>0.874    | 134.86%<br>198.43%          | 0.602<br>0.000 |
| Majority owner<br>no (F: 63 obs, M: 311 obs)<br>yes (F: 71 obs, M: 333 obs) | 0.768<br>0.897    | 173.49%<br>188.87%          | 0.053<br>0.002 |
| Full liability<br>no (F: 122 obs, M: 588 obs)<br>yes (F: 12 obs, M: 56 obs) | 0.804<br>0.890    | 169.72%<br>216.46%          | 0.001<br>0.340 |
| Charity<br>no (F: 45 obs, M: 233 obs)<br>yes (F: 85 obs, M: 398 obs)        | 0.608<br>0.872    | 158.89%<br>166.79%          | 0.193<br>0.001 |
|   |                   |                             |                |
| <b><math>\bar{X}</math> "Personnel expense / depreciation"</b>              |                   |                             |                |
| Full sample<br>(F: 163 obs, M: 745 obs)                                     | 8.717             | 106.80%                     | 0.299          |
| Majority vote<br>no (F: 52 obs, M: 224 obs)<br>yes (F: 111 obs, M: 521 obs) | 7.503<br>9.261    | 91.49%<br>113.81%           | 0.644<br>0.143 |
| Majority owner<br>no (F: 79 obs, M: 351 obs)<br>yes (F: 84 obs, M: 394 obs) | 8.258<br>9.420    | 97.90%<br>120.42%           | 0.803<br>0.118 |
| Full liability<br>no (F: 149 obs, M: 679 obs)<br>yes (F: 14 obs, M: 66 obs) | 8.808<br>7.895    | 108.24%<br>93.40%           | 0.205<br>0.377 |
| Charity<br>no (F: 54 obs, M: 262 obs)<br>yes (F: 105 obs, M: 471 obs)       | 8.156<br>9.070    | 104.50%<br>110.38%          | 0.654<br>0.131 |

**Table 5:** The upper part of this table shows the medians of firms'  $\bar{O}$  "Operating revenue/total assets". The lower part shows the medians of firms'  $\bar{O}$  "(Personnel expense + material expense + depreciation) /operating revenue". Ratio (FoF/matching) is the ratio of the FoF-median and that of the matching firms (in percent). The p-value is the probability that the medians of FoFs and matching firms are the same (null hypothesis).

|  | <b>Median FoF</b> | <b>Ratio (FoF/matching)</b> | <b>p-value</b> |
|--|-------------------|-----------------------------|----------------|
| <b><math>\bar{O}</math> Operating revenue / total assets"</b>                |                   |                             |                |
| Full sample<br>(F: 151 obs, M: 730 obs)                                      | 1.394             | 78.40%                      | 0.001          |
| Majority vote  |                   |                             |                |
| no (F: 50 obs, M: 228 obs)   | 1.249             | 72.92%                      | 0.003          |
| yes (F: 101 obs, M: 502 obs)   | 1.491             | 80.62%                      | 0.031          |
| Majority owner   |                   |                             |                |
| no (F: 76 obs, M: 353 obs)   | 1.388             | 75.04%                      | 0.033          |
| yes (F: 75 obs, M: 377 obs)  | 1.394             | 81.68%                      | 0.023          |
| Full liability   |                   |                             |                |
| no (F: 139 obs, M: 668 obs)  | 1.371             | 77.58%                      | 0.000          |
| yes (F: 12 obs, M: 62 obs)   | 1.914             | 100.94%                     | 0.752          |
| Charity  |                   |                             |                |
| no (F: 51 obs, M: 259 obs)   | 1.485             | 79.08%                      | 0.066          |
| yes (F: 96 obs, M: 458 obs)  | 1.299             | 74.89%                      | 0.002          |
|  |                   |                             |                |
| <b><math>\bar{O}</math> (Pers exp + mat exp + depr) / operating revenue"</b> |                   |                             |                |
| Full sample<br>(F: 133 obs, M: 639 obs)                                      | 0.724             | 96.67%                      | 0.036          |
| Majority vote  |                   |                             |                |
| no (F: 40 obs, M: 192 obs)   | 0.710             | 98.69%                      | 0.862          |
| yes (F: 93 obs, M: 447 obs)  | 0.724             | 95.84%                      | 0.040          |
| Majority owner   |                   |                             |                |
| no (F: 62 obs, M: 308 obs)   | 0.719             | 96.14%                      | 0.210          |
| yes (F: 71 obs, M: 331 obs)  | 0.724             | 96.47%                      | 0.117          |
| Full liability   |                   |                             |                |
| no (F: 121 obs, M: 583 obs)  | 0.724             | 97.02%                      | 0.110          |
| yes (F: 12 obs, M: 56 obs)   | 0.719             | 92.63%                      | 0.340          |
| Charity  |                   |                             |                |
| no (F: 44 obs, M: 231 obs)   | 0.715             | 94.01%                      | 0.426          |
| yes (F: 85 obs, M: 396 obs)  | 0.724             | 98.17%                      | 0.350          |

**Table 6:** The upper part of this table shows the medians of firms'  $\sigma$  "ln (Operating revenue/operating revenue year before)". The lower part of this table shows the medians of firms' coefficients of variation for various  $\sigma$  accounting numbers and financial performance measures for the full sample of FoFs. Ratio (FoF/matching) is the ratio of the FoF-median and that of the matching firms (in percent). The coefficient of variation of a firm is the standard deviation of the time series of the accounting number or performance measure, divided by its average. Ratio (FoF/matching) is the ratio of the FoF-median and that of the matching firms (in percent). The p-value is the probability that the medians of FoFs and matching firms are the same (null hypothesis).

|   | <b>Median FoF</b> | <b>Ratio (FoF/matching)</b> | <b>p-value</b> |
|---|-------------------|-----------------------------|----------------|
| <b><math>\sigma</math> "ln (Operating revenue / operating revenue year before)"</b> |                   |                             |                |
| Full sample<br>(F: 149 obs, M: 729 obs)   | 0.036             | 85.09%                      | 0.281          |
| Majority vote<br>no (F: 50 obs, M: 227 obs)<br>yes (F: 99 obs, M: 502 obs)          | 0.039<br>0.033    | 102.50%<br>72.81%           | 0.898<br>0.082 |
| Majority owner<br>no (F: 76 obs, M: 352 obs)<br>yes (F: 73 obs, M: 377 obs)         | 0.040<br>0.024    | 104.41%<br>51.46%           | 0.899<br>0.125 |
| Full liability<br>no (F: 137 obs, M: 667 obs)<br>yes (F: 12 obs, M: 62 obs)         | 0.036<br>0.028    | 81.86%<br>72.58%            | 0.348<br>0.752 |
| Charity<br>no (F: 51 obs, M: 259 obs)<br>yes (F: 94 obs, M: 457 obs)                | 0.034<br>0.036    | 91.31%<br>80.18%            | 0.759<br>0.220 |
|   |                   |                             |                |
| <b>Coefficients of variation</b>  |                   |                             |                |
| Operating revenue<br>(F: 149 obs, M: 730 obs)                                       | 0.137             | 86.71%                      | 0.288          |
| Personnel expense<br>(F: 164 obs, M: 750 obs)                                       | 0.107             | 95.54%                      | 0.667          |
| Material expense<br>(F: 128 obs, M: 625 obs)  | 0.156             | 82.98%                      | 0.016          |
| Depreciation<br>(F: 163 obs, M: 743 obs)  | 0.171             | 87.69%                      | 0.038          |
| Return on assets<br>(F: 164 obs, M: 757 obs)  | 0.445             | 88.12%                      | 0.073          |
| Return on equity<br>(F: 163 obs, M: 743 obs)  | 0.488             | 82.85%                      | 0.105          |

**Table 7:** The upper part of this table shows the medians of firms'  $\emptyset$  "Shareholder funds/total assets" for the full sample of FoFs and for binary subgroups of FoFs. The lower part shows the medians of firms'  $\emptyset$  "Cash flow/(total assets – shareholder funds)". Cash flow = net income + depreciation. Ratio (FoF/matching) is the ratio of the FoF-median and that of the matching firms (in percent). The p-value is the probability that the medians of FoFs and matching firms are the same (null hypothesis).

|   | <b>Median FoF</b> | <b>Ratio (FoF/matching)</b> | <b>p-value</b> |
|---|-------------------|-----------------------------|----------------|
| <b><math>\emptyset</math> "Shareholder funds / total assets"</b>              |                   |                             |                |
| Full sample<br>(F: 164 obs, M: 757 obs)                                       | 0.380             | 119.24%                     | 0.012          |
| Majority vote   |                   |                             |                |
| no (F: 52 obs, M: 231 obs)  | 0.393             | 116.95%                     | 0.086          |
| yes (F: 112 obs, M: 526 obs)  | 0.379             | 122.94%                     | 0.119          |
| Majority owner  |                   |                             |                |
| no (F: 80 obs, M: 360 obs)  | 0.358             | 109.97%                     | 0.387          |
| yes (F: 84 obs, M: 397 obs)   | 0.411             | 133.12%                     | 0.021          |
| Full liability  |                   |                             |                |
| no (F: 150 obs, M: 691 obs)   | 0.392             | 122.49%                     | 0.005          |
| yes (F: 14 obs, M: 66 obs)  | 0.272             | 89.66%                      | 0.769          |
| Charity   |                   |                             |                |
| no (F: 55 obs, M: 266 obs)  | 0.320             | 102.75%                     | 0.748          |
| yes (F: 105 obs, M: 478 obs)  | 0.398             | 122.85%                     | 0.009          |
|   |                   |                             |                |
| <b><math>\emptyset</math> "Cash flow /(total assets - shareholder funds)"</b> |                   |                             |                |
| Full sample<br>(F: 164 obs, M: 756 obs)                                       | 0.161             | 120.15%                     | 0.102          |
| Majority vote   |                   |                             |                |
| no (F: 52 obs, M: 230 obs)  | 0.167             | 114.09%                     | 0.282          |
| yes (F: 112 obs, M: 526 obs)  | 0.157             | 119.55%                     | 0.349          |
| Majority owner  |                   |                             |                |
| no (F: 80 obs, M: 359 obs)  | 0.151             | 106.86%                     | 0.694          |
| yes (F: 84 obs, M: 397 obs)   | 0.172             | 133.48%                     | 0.021          |
| Full liability  |                   |                             |                |
| no (F: 150 obs, M: 690 obs)   | 0.161             | 122.52%                     | 0.087          |
| yes (F: 14 obs, M: 66 obs)  | 0.156             | 99.56%                      | 0.769          |
| Charity   |                   |                             |                |
| no (F: 55 obs, M: 265 obs)  | 0.130             | 98.15%                      | 1.000          |
| yes (F: 105 obs, M: 478 obs)  | 0.172             | 124.94%                     | 0.081          |

**Table 8:** This table shows the medians of firms' Ø financial performance measures for the full sample of FoFs and for binary subgroups of FoFs. First, return on assets is shown, second, return on equity, and third, return on sales. Ratio (FoF/matching) is the ratio of the FoF-median and that of the matching firms (in percent). The p-value is the probability that the medians of FoFs and matching firms are the same (null hypothesis).

|   | <b>Median FoF</b> | <b>Ratio (FoF/matching)</b> | <b>p-value</b> |
|---|-------------------|-----------------------------|----------------|
| <b>Ø Return on assets<br/>(EBIT / total assets)</b>     |                   |                             |                |
| Full sample<br>(F: 164 obs, M: 757 obs)                 | 0.067             | 89.10%                      | 0.351          |
| Majority vote   |                   |                             |                |
| no (F: 52 obs, M: 231 obs)                              | 0.067             | 79.22%                      | 0.176          |
| yes (F: 112 obs, M: 526 obs)                            | 0.067             | 94.10%                      | 0.755          |
| Majority owner  |                   |                             |                |
| no (F: 80 obs, M: 360 obs)                              | 0.066             | 86.10%                      | 0.387          |
| yes (F: 84 obs, M: 397 obs)                             | 0.068             | 94.50%                      | 0.562          |
| Full liability  |                   |                             |                |
| no (F: 150 obs, M: 691 obs)                             | 0.066             | 88.23%                      | 0.182          |
| yes (F: 14 obs, M: 66 obs)                              | 0.082             | 133.38%                     | 0.769          |
| Charity   |                   |                             |                |
| no (F: 55 obs, M: 266 obs)                              | 0.064             | 99.35%                      | 0.980          |
| yes (F: 105 obs, M: 478 obs)                            | 0.069             | 85.74%                      | 0.033          |
|   |                   |                             |                |
| <b>Ø Return on equity<br/>(EBT / shareholder funds)</b> |                   |                             |                |
| Full sample<br>(F: 164 obs, M: 757 obs)                 | 0.157             | 75.91%                      | 0.000          |
| Majority vote   |                   |                             |                |
| no (F: 52 obs, M: 231 obs)                              | 0.154             | 72.29%                      | 0.004          |
| yes (F: 112 obs, M: 526 obs)                            | 0.158             | 76.86%                      | 0.009          |
| Majority owner  |                   |                             |                |
| no (F: 80 obs, M: 360 obs)                              | 0.155             | 72.32%                      | 0.004          |
| yes (F: 84 obs, M: 397 obs)                             | 0.158             | 79.03%                      | 0.012          |
| Full liability  |                   |                             |                |
| no (F: 150 obs, M: 691 obs)                             | 0.158             | 75.69%                      | 0.000          |
| yes (F: 14 obs, M: 66 obs)                              | 0.150             | 72.83%                      | 0.141          |
| Charity   |                   |                             |                |
| no (F: 55 obs, M: 266 obs)                              | 0.160             | 77.00%                      | 0.246          |
| yes (F: 105 obs, M: 478 obs)                            | 0.156             | 74.13%                      | 0.000          |
|   |                   |                             |                |
| <b>Ø Return on sales<br/>(EBT / operating revenue)</b>  |                   |                             |                |
| Full sample<br>(F: 151 obs, M: 730 obs)                 | 0.047             | 107.74%                     | 0.363          |
| Majority vote   |                   |                             |                |
| no (F: 50 obs, M: 228 obs)                              | 0.054             | 112.55%                     | 0.435          |
| yes (F: 101 obs, M: 502 obs)                            | 0.043             | 102.09%                     | 0.985          |
| Majority owner  |                   |                             |                |
| no (F: 76 obs, M: 353 obs)                              | 0.047             | 107.52%                     | 0.688          |
| yes (F: 75 obs, M: 377 obs)                             | 0.046             | 107.56%                     | 0.613          |
| Full liability  |                   |                             |                |
| no (F: 139 obs, M: 668 obs)                             | 0.047             | 107.21%                     | 0.446          |
| yes (F: 12 obs, M: 62 obs)                              | 0.043             | 118.67%                     | 0.752          |
| Charity   |                   |                             |                |
| no (F: 51 obs, M: 259 obs)                              | 0.037             | 89.45%                      | 0.759          |
| yes (F: 96 obs, M: 458 obs)                             | 0.047             | 102.92%                     | 0.575          |

**Table 9:** This table shows the results of panel regressions estimating the Cobb-Douglas function  $\ln OR_{i,t} = \alpha \ln PE_{i,t} + \beta \ln ME_{i,t} + \gamma DE_{i,t} + v_i + \epsilon_{i,t}$ . PE is the personnel expense, ME the material expense, and DE depreciation.  $v_i$  is the fixed effect for firm  $i$ . Year dummies are included. The coefficients are estimated separately for matching firms (mat) and for FoFs. Difference is "coefficient for FoFs – coefficient for matching firms", with asterisks indicating significance. The first column in each table includes all FoFs and their matching firms, the second column includes only limited liability-FoFs and their matching firms, the third column includes only no-charity-FoFs and their matching firms, the fourth column includes only charity-FoFs and their matching firms. Year dummies and regression constants are included, but not shown. Standard errors are adjusted for clustering (firm) effects and heteroscedasticity.

| In OR                 | All FoFs | Lim Liab FoFs | No-Char FoFs | Char FoFs |
|-----------------------|----------|---------------|--------------|-----------|
| In PE                 |          |               |              |           |
| mat                   | 0.202**  | 0.229**       | 0.217***     | 0.258*    |
| FoF                   | 0.574*** | 0.573***      | 0.399***     | 0.729***  |
| difference            | 0.372**  | 0.344*        | 0.182        | 0.471**   |
| In ME                 |          |               |              |           |
| mat                   | 0.427*** | 0.406***      | 0.585***     | 0.344***  |
| FoF                   | 0.345**  | 0.340**       | 0.561***     | 0.189     |
| difference            | -0.082   | -0.066        | -0.024       | -0.155    |
| In DE                 |          |               |              |           |
| mat                   | 0.033**  | 0.024         | 0.029*       | 0.037     |
| FoF                   | 0.040    | 0.044         | 0.036        | 0.009     |
| difference            | 0.007    | 0.020         | 0.013        | -0.028    |
| within R <sup>2</sup> | 0.6869   | 0.6798        | 0.8135       | 0.6622    |
| # of obs              | 5,052    | 4,557         | 1,802        | 3,148     |

\*, \*\*, \*\*\* statistically significant at 10%, 5%, 1%

**Table 10:** Analysis of the "Personnel expense/material expense"-ratio (PPM)

**10a)** This part displays the fixed effect panel regression  $PPM_{i,t} = a + b \ln OR_{i,t} + c \text{lev}_{i,t} + d \text{lev}_{i,t}^2 + v_i + \epsilon_{i,t}$ .  $v_i$  is the fixed effect for firm  $i$ .  $\text{lev}_{i,t}$  is  $(1 - \text{shareholder funds}/\text{total assets})$  of firm  $i$  in year  $t$ . Year dummies and regression constants are included, but not shown. Standard errors are adjusted for clustering (firm) effects and heteroscedasticity.

| PPM                   | Regression coefficients |
|-----------------------|-------------------------|
| ln OR                 | -0.558*                 |
| lev                   | -0.048                  |
| lev <sup>2</sup>      | 0.085                   |
| within R <sup>2</sup> | 0.0097                  |
| # of obs              | 5,378                   |

\*, \*\*, \*\*\* statistically significant at 10%, 5%, 1%

**10b)** This part displays OLS-regressions of firm fixed effects  $v_i$ , derived in part 10a). FoF, no-char-FoF, char-FoF, lim liab-FoF and full liab-FoF are dummies which are equal to 1 if a firm is of that type, 0 otherwise. FoF x vote share and FoF x equity share are interaction variables of the FoF-dummy and the foundation's vote share resp. the equity share in the FoF. "Difference" is that between the two sensitivities above in the same column, with asterisks indicating significance. Industry dummies and regression constants are included, but not shown. Significance is based on White standard errors correcting for heteroscedasticity.

| Firm fixed effects | Regression Coefficients |         |         |        |         |
|--------------------|-------------------------|---------|---------|--------|---------|
| FoF                | 1.301***                | -       | -       | 2.401* | 1.879** |
| no-char- FoF       | -                       | 0.689   | -       | -      | -       |
| char-FoF           | -                       | 1.639** | -       | -      | -       |
| difference         | -                       | -0.950  | -       | -      | -       |
| lim liab-FoF       | -                       | -       | 1.276** | -      | -       |
| full liab-FoF      | -                       | -       | 1.557   | -      | -       |
| difference         | -                       | -       | -0.281  | -      | -       |
| FoF x vote share   | -                       | -       | -       | -1.540 | -       |
| FoF x equity share | -                       | -       | -       | -      | -1.041  |
| adj R <sup>2</sup> | 0.2152                  | 0.2161  | 0.2142  | 0.2165 | 0.2155  |
| # of obs           | 778                     | 761     | 778     | 778    | 778     |

\*, \*\*, \*\*\* statistically significant at 10%, 5%, 1%

**Table 11:** This table shows the results of firm fixed effects panel regressions estimating hiring and firing policy. Year dummies and regression constants are included, but not shown. "Differences" are differences between coefficients of the same regressor, with asterisks indicating significance. They are presented like in a covariance matrix. The first difference is that between mat and lim liab, the second is that between mat and full liab, and in the line below the third is that between lim and full liab. Standard errors are adjusted for clustering (firm) effects and heteroscedasticity.

**11a)** This part shows the results for equation (1). On the left hand side  $PE_t/PE_{t-1}$  is the dependent variable, on the right hand side it is  $EMP_t/EMP_{t-1}$ . PE is personnel expense, EMP the number of employees. Sensitivities are estimated separately for matching firms (mat), limited liability-FoFs (lim liab) and full liability-FoFs (full liab).

| $PE_t/PE_{t-1}$       | Coeff    | differences      | $EMP_t/EMP_{t-1}$     | Coeff    | differences   |
|-----------------------|----------|------------------|-----------------------|----------|---------------|
| $OR_t^+$              |          |                  | $OR_t^+$              |          |               |
| mat                   | 0.409*** | -0.050; -0.228** | mat                   | 0.155*** | -0.021; 0.146 |
| lim liab              | 0.359*** | -0.178           | lim liab              | 0.134*   | 0.167         |
| full liab             | 0.181    |                  | full liab             | 0.301*** |               |
| $OR_t^-$              |          |                  | $OR_t^-$              |          |               |
| mat                   | 0.270*** | 0.007; 0.297***  | mat                   | 0.142*** | 0.078; 0.129  |
| lim liab              | 0.277*** | 0.290**          | lim liab              | 0.220**  | 0.051         |
| full liab             | 0.567*** |                  | full liab             | 0.271*** |               |
| within R <sup>2</sup> | 0.2895   |                  | within R <sup>2</sup> | 0.0764   |               |
| # of obs              | 5,346    |                  | # of obs              | 4,822    |               |

\*, \*\*, \*\*\* statistically significant at 10%, 5%, 1%

**11b)** This part shows the results for equation (2). On the left hand side  $PE_t/PE_{t-1}$  is the dependent variable, on the right hand side it is  $EMP_t/EMP_{t-1}$ .

| $PE_t/PE_{t-1}$       | Coeff    | differences       | $EMP_t/EMP_{t-1}$     | Coeff    | differences    |
|-----------------------|----------|-------------------|-----------------------|----------|----------------|
| $OR_t^{++}$           |          |                   | $OR_t^{++}$           |          |                |
| mat                   | 0.485*** | -0.080; -0.381*** | mat                   | 0.176*** | -0.017; 0.085  |
| lim liab              | 0.405*** | -0.301*           | lim liab              | 0.159*   | 0.102          |
| full liab             | 0.104    |                   | full liab             | 0.261*   |                |
| $OR_t^{--}$           |          |                   | $OR_t^{--}$           |          |                |
| mat                   | 0.442*** | 0.005; 0.320***   | mat                   | 0.213*** | 0.106; 0.238** |
| lim liab              | 0.447*** | 0.315*            | lim liab              | 0.319*** | 0.132          |
| full liab             | 0.762*** |                   | full liab             | 0.451*** |                |
| within R <sup>2</sup> | 0.2764   |                   | within R <sup>2</sup> | 0.0693   |                |
| # of obs              | 5,346    |                   | # of obs              | 4,822    |                |

\*, \*\*, \*\*\* statistically significant at 10%, 5%, 1%



**Table 12:** Analysis of the Payout Ratio

**12a)** This part displays the findings for the panel regression of the payout ratio (equation (3)). Only firms are included that have positive equity in the whole sample period. Firm fixed effects, year dummies, and regression constants are included, but not shown. Standard errors are adjusted for clustering (firm) effects and heteroscedasticity.

| PoR <sub>t</sub>                | (-0.9; 0.9) | (-0.8; 0.8) | (-0.5; 0.5) | (-0.4; 0.4) |
|---------------------------------|-------------|-------------|-------------|-------------|
| RoE <sup>+</sup> <sub>t-1</sub> | 0.076***    | 0.066***    | 0.022*      | 0.022**     |
| RoE <sup>-</sup> <sub>t-1</sub> | 0.028       | -0.001      | -0.033      | -0.026      |
| lev <sub>t-1</sub>              | -0.044      | -0.091      | -0.105      | -0.160      |
| lev <sub>t-1</sub> <sup>2</sup> | -0.337**    | -0.251*     | -0.110      | -0.032      |
| within R <sup>2</sup>           | 0.0824      | 0.0683      | 0.0493      | 0.0570      |
| # of obs                        | 3,399       | 3,376       | 3,247       | 3,186       |

\*, \*\*, \*\*\* statistically significant at 10%, 5%, 1%

**12b)** This part displays OLS-regressions of firm fixed effects  $v_i$ , derived in part 12a). FoF and IFRS are dummies which are equal to 1 if a firm is an FoF, resp. if the firm uses IFRS. Only firms are included which do not switch from IFRS to German accounting standards or vice versa in the sample period. Industry dummies, and regression constants are included, but not shown. Significance is based on White standard errors correcting for heteroscedasticity.

| Firm fixed effects  | (-0.9; 0.9) | (-0.8; 0.8) | (-0.5; 0.5) | (-0.4; 0.4) |
|---------------------|-------------|-------------|-------------|-------------|
| FoF                 | -0.042**    | -0.033**    | -0.030***   | -0.024***   |
| IFRS                | -0.087***   | -0.079***   | -0.031      | -0.020      |
| adj. R <sup>2</sup> | 0.0447      | 0.0447      | 0.0306      | 0.0196      |
| # of obs            | 558         | 556         | 551         | 548         |

\*, \*\*, \*\*\* statistically significant at 10%, 5%, 1%

**Table 13:** RoA-Analysis

**13a)** This part shows the findings from a fixed effects panel regression estimating return on assets  $RoA_{i,t} = a + b \text{ size}_{i,t} + c \text{ growth}_{i,t} + d \text{ lev}_{i,t} + e \text{ lev}_{i,t}^2 + v_i + \varepsilon_{i,t}$ .  $v_i$  is the fixed effect for firm  $i$ . Size is measured in regression (1) by  $\ln(\text{personnel expense} + \text{material expense})$ , in regression (2) and (3) by  $\ln \text{OR}$ . In the last column, EBIT/TA is replaced by EBITDA/TA. Year dummies and the constant are included in the regression, but not shown. Standard errors are adjusted for clustering (firm) effects and heteroscedasticity.

| Financial Performance              | RoA=EBIT/TA |           | EBITDA/TA |
|------------------------------------|-------------|-----------|-----------|
|                                    | (1)         | (2)       | (3)       |
| $\ln(\text{PE}+\text{ME})$         | 0.013       | -         | -         |
| $\ln \text{OR}$                    | -           | 0.051***  | 0.049***  |
| $\ln(\text{OR}_t/\text{OR}_{t-1})$ | 0.096***    | 0.079***  | 0.077***  |
| lev                                | 0.118*      | 0.150**   | 0.135**   |
| lev <sup>2</sup>                   | -0.230***   | -0.247*** | -0.230*** |
| within R <sup>2</sup>              | 0.1555      | 0.1732    | 0.1695    |
| # of obs                           | 4,534       | 5,464     | 5,335     |

\*, \*\*, \*\*\* statistically significant at 10%, 5%, 1%

**13b)** This part shows the findings of OLS-regressions of firm fixed effects  $v_i$ , estimated in the second regression in 13a), using  $\text{RoA} = \text{EBIT}/\text{TA}$  and  $\ln \text{OR}$  as the size measure. FoF is a dummy which is 1 for an FoF and 0 otherwise.  $\text{char} \times \text{FoF}$ ,  $\text{unlim liab} \times \text{FoF}$  are interaction variables multiplying the FoF-dummy with a dummy which is 1 if the foundation is charitable or has unlimited liability, respectively; otherwise they are 0. "Listed" is a dummy which is 1 for a firm listed at a stock exchange, 0 otherwise.  $\text{FoF} \times \text{Listed}$  is an interaction variable multiplying the FoF-dummy with the listing dummy.  $\text{FoF} \times \text{PPM}$  and  $(1 - \text{FoF}) \times \text{PPM}$  are interaction variables multiplying the first dummy with the ratio "Personnel expense/material expense".  $\text{FoF} \times \text{age}$  is an interaction variable multiplying the FoF-dummy with the age of an FoF. Age is measured by the time between the setup as an FoF and 2013.  $\text{FoF} \times \text{vote share}$  is the vote share of the FoF multiplied by the FoF-dummy.  $\sigma(\text{RoA})$  is the standard deviation of the RoA-time series of a firm. IFRS is a dummy which is 1 if the firm uses IFRS, and 0 otherwise. Only firms are included which do not switch from IFRS to German accounting standards or vice versa in the sample period. Industry dummies and regression constants are included, but not shown. Significance is based on White standard errors correcting for heteroscedasticity.

| Firm fixed effects                        | (1)       | (2)       | (3)       | (4)       | (5)       | (6)       |
|---|-----------|-----------|-----------|-----------|-----------|-----------|
| FoF                                       | -0.040*** | -0.028**  | -0.032*** | -0.031*** | -0.075*** | -0.069**  |
| $\text{char} \times \text{FoF}$           | 0.016     | -         | -         | -         | -         | -         |
| $\text{full liab} \times \text{FoF}$      | -         | -0.042*   | -         | -         | -         | -0.047*   |
| Listed                                    | -         | -         | -0.027    | -0.020    | -         | -         |
| $\text{FoF} \times \text{Listed}$         | -         | -         | 0.004     | -0.063**  | -         | -         |
| $\text{FoF} \times \text{PPM}$            | -         | -         | -         | 0.002*    | 0.002     | 0.002     |
| $(1 - \text{FoF}) \times \text{PPM}$      | -         | -         | -         | 0.004**   | 0.004**   | 0.004**   |
| $\text{FoF} \times \text{age}$            | -         | -         | -         | -         | -0.000    | -0.001    |
| $\text{FoF} \times \text{vote share}$     | -         | -         | -         | -         | 0.278**   | 0.256**   |
| $\text{FoF} \times (\text{vote share})^2$ | -         | -         | -         | -         | -0.221**  | -0.192*   |
| $\sigma(\text{RoA})$                      | 0.990***  | 0.993***  | 0.997***  | 0.915***  | 0.929***  | 0.924***  |
| IFRS                                      | -0.124*** | -0.125*** | -0.106*** | -0.084*** | -0.104*** | -0.104*** |
| adj R <sup>2</sup>                        | 0.3046    | 0.3076    | 0.3074    | 0.2632    | 0.2661    | 0.2677    |
| # of obs                                  | 773       | 789       | 789       | 714       | 697       | 697       |

\*, \*\*, \*\*\* statistically significant at 10%, 5%, 1%

**Table 14:** This table shows the results of a logistic regression to find out which variables predict whether a firm is an FoF or not. For each time-dependent variable we take the average of its observations within the sampling period as a regressor. OR-growth is  $(OR_t/OR_{t-1})$ . PPM = personnel expense/material expense. RoA is return on assets.  $\sigma(\text{RoA})$  is the standard deviation of the firm's return on assets within the sampling period. Industry dummies are included, but not shown. Significance is based on White standard errors correcting for heteroscedasticity. The Hosmer-Lemeshow (HL) p-value indicates the goodness of fit of the logistic regression. If it is less than 10 percent, the model should be rejected as insignificant.

| FoF                  | Coefficients |           |
|----------------------|--------------|-----------|
|                      | In OR        | -         |
| In OR-growth         | -1.754       | -1.890    |
| PPM                  | 0.063***     | 0.071***  |
| Leverage             | -1.563***    | -1.737*** |
| RoA                  | -3.508**     | -3.577**  |
| $\sigma(\text{RoA})$ | -7.836**     | -6.389**  |
| HL p-value           | 0.578        | 0.864     |
| # of obs             | 774          | 774       |
| # of groups          | 10           | 10        |

\*, \*\*, \*\*\* statistically significant at 10%, 5%, 1%