

ARE FAMILY FIRMS MORE CONSERVATIVE IN INNOVATION INVESTMENTS?

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ABSTRACT

In the past decade, both family ownership and intangible innovation gained much attention from scholars. Management studies recently find a positive relationship between family ownership and the productivity of R&D policy. In finance, however, there has been no significantly recognized research on the impact of concentrated ownership on firms' innovation strategies, and evidences from some international datasets are controversial. On one hand, as family owners are more concerned with long-term growth, they might be more willing to forgo the short-term saving of R&D expenses for long-term R&D outcomes under their efficient family-influenced monitoring system. On the other hand, as family owners are concerned with reputation and price discount, they might be willing to give up the long-term uncertain payoffs to avoid the short-term decrease in earnings. This paper aims to provide a US market empirical evidence of this relationship to help solve the family firms' innovation puzzle.

INTRODUCTION

Context

The Conference Board's CEO challenge 2012 conducts a survey on 776 CEOs and reports that managing innovation is now one of the top-five risk management aspects (Lev et al., 2012), raising the importance of measuring "innovation and technological risks". Roughly fifty percent of the most common intangible form of innovation, R&D expenditures, are spent on human capital compensation and makes the adjustment costs extremely high, implying high operation risk (Lev et al., 2012). Among all corporate governance factors, ownership structure should play an important role on how executive managers make their innovative decisions under an agency framework and a game theoretic context. Till now, most of academic research that links between innovation and ownership structure are looking either from management viewpoint or mainly into the institutional / blockholder ownership. Very few look at impact of family ownership on firms' innovation strategy and provide mixed results from non-US international markets (Taiwan, India, China, Korea, Spain, Germany, Italy...). From the perspective of family owners who have longer investment horizon and more concern about the reputation and next generation performance of the firms, the underlying motivation for intensive innovation investment decision making lies in whether the long-run benefits outweigh the risk concern that family owners have. It would be interesting to also see how that really affects the type II agency problem between family shareholders and minority shareholders in this type of firm, most notably indicated through the equity market stock performance. This is an important research question as family firms, depending on definition and categorization, counts for about one-third of S&P 500 as well as Fortune 1000 firms (Anderson & Reeb, 2003).

Long-term/ Medium term/ Short-term Impact

This paper aims at providing an empirical support to the main hypothesis that corporate ownership structure plays an important role in the firms' innovation activity. In more detail, family firms potentially follow different R&D strategies from their nonfamily counterparts, because the unique ownership structure characterizes family firms with a different type of agency problems as well as short-term vs. long-term motivations.

An R&D project can play a positive signaling effect on firms' future performance, but at the same time, large upfront R&D expenditures can drag the firms' reported earnings down and becomes a concern for short-term investors. The impact of R&D strategy on firms' financial market performance therefore is a puzzle. Compared to nonfamily firms, family firms on one hand may be more willing to go for long-term projects with later payoffs as they have longer investment horizons. On the other hand, they may have higher loss aversion and higher R&D productivity as the results of more reputation concerns and better monitoring. This puzzle makes it unclear whether family firms on average are more or less conservative in R&D policy.

Putting the results that we may find (hopefully with statistical significance), we can then proceed to test the relationship of ownership structure and innovation under the influence of other factors such as CEO types and external financing. From a long-term vs. short-term risk-based approach, we hope to build a model to extract the risk factor of intangible investments.

This school of innovation and corporate governance research is not completely new, but it is still understudied. Further accumulation of empirical evidence as well as supporting game theoretic explanation will provide much economic implications in corporate governance with respect to innovation strategies in intangible assets.

Objectives

1. To provide (another) empirical evidence of the impact of family ownership structure on the firms' innovation strategy (including innovation inputs and outputs), using new sample, updated time horizon, and/or new measurements for innovation.
2. To (hopefully) find risk-based explanations for the empirical results found in a game theory setting with rational, utility-maximizing parties based on their potential financial payoffs.
3. To suggest some future research ideas in innovation studies with respect to intangible assets, under the impact of ownership structure and managerial structure from game theory perspectives.

BACKGROUND RESEARCH

The causal relationship between investment and economic growth at country level has long been one of the most important research questions in academia. The same concept, applied at firm level, has also been expanded to include the intangible forms of investments, "innovation". One type of it is the R&D activity that draws much research attention lately as the consequence of the wide spread of technology development and technology-oriented companies.

Research on the role of corporate governance, specifically ownership structure, on the relationship between firms' innovation strategies and their future growth and development has recently gained more importance in management, economics, finance, and their overlapping areas. In general, innovation investments are expected to increase the long-term performance at both firm and country level, but they also imply substantial amount of risks that go alongside with large irreversible upfront expenditures and uncertain deferred future payoffs.

Literature on Innovation

While innovation has been widely known to have long-run positive impact on the survival and growth of firms, it is not a common knowledge how innovation is defined.

Innovation research generally includes the decision to make innovation investment, the amount, the outcome, and the economic impact of it. Per CIS (a Community Innovation Survey periodically collected in the Member States of EU), “innovation expenditures” is “money spent on internal and external R&D or the acquisition of external resources to realize innovation projects” (Classen et al., 2013). Per Ayyagari et al. (2011), innovation broadly includes new products and technologies introductions, knowledge transfers, and new product processes.

In a working paper, Lev et al. (2012) study the differential relationship between R&D and CAPEX under a composition of different risks, and conclude that compared to CAPEX, R&D expenditures are less related to competition risk, and more related to disruptive technology and tax risks. Furthermore, R&D expenditures are strongly related to future restructuring expenses, goodwill impairment, mergers & acquisition. All of these associations are more driven by industries exposed to disruptive technology. This raises a need for risk-based explanation for R&D performance with industry fixed effects, which is hardly done in finance.

Chan, Lakonishok & Sougiannis (CLG, 2001) examine the stock market valuation of R&D expenditures under US accounting standard where R&D spending is expensed and find that R&D itself makes no difference, but R&D intensity in its relative form has not just positive correlation with the stock return but also return volatility. They also suggest a link between high R&D-intensity firms with past poor performance and subsequent excess return using multi-factor risk-based model (market, size, BTM, short- and long-term momentum).

Empirical evidences also show that future earnings volatility are observed to be lower for firms with high R&D intensity (Ciftci et al., 2011) and firms with higher patent counts (Pandit et al., 2011), suggesting that firms that there is a benefit of lower risk for innovation leaders, implying that there might also be a risk for being the innovation followers. The risk is usually in the direct and explicit form of immediate negative impact of expensed R&D on earnings and stock price.

Literature on Family Ownership

Per Chen et al. (2010), family firms are “firms where members of the founding family continue to hold positions in top management, are on the board, or are blockholders of the company”. In a stricter way, family firms are firms with family’s equity holdings of at least 5%.

In ownership concentration literature, family firms are commonly characterized with: larger ownership of family members (less dispersed or more concentrated ownership); tendency of family members to be CEO and Board members; longer investment horizon (poorly diversified portfolios for family owners); greater reputation concerns; smaller type I agency conflicts between owners and managers but larger type II agency conflicts between family and minority shareholders; smaller and less levered; lower capital intensity (PPE) (Anderson & Reeb, 2003).

The combination of family firms’ economic and noneconomic goals affects their strategic behaviors for their own interests, among which innovation strategy is one of them. However, it is controversial whether family firm outperform nonfamily counterparts. Miller et al. (2011) argue that not just the ownership, but also the owner-managerial combination of family firms affects their strategic priorities. For example, lone founders are more influenced by general stakeholders and embrace logics of growth strategies, while family CEOs are more influenced by family stakeholders and embrace logics of conservation strategies.

Literature on the Impact of Family Ownership on Innovation Investment

The possession of unique resources (information, experience, know-how); longer term commitment with multiple life cycles; greater concerns about the firms' reputations; efficient monitoring system; and high exit costs (Anderson & Reeb, 2003), among all, might benefit the implementation of innovation in family firms better. On the other hand, family firms have the tendency to avoid high-intensive and to select modest innovation strategies to reduce the challenges toward their family financial and managerial control (De Massis et al., 2013). In other words, family firms have incentives to spend less innovative investments for risk diversification in their investment portfolios (Chen et al., 2013). Therefore, innovation investment decisions are made based on the trade-off between the potential long-run increase in firms' value and the immediate short-term decrease in firms' earnings and potentially stock price.

Summary of recent empirical findings on the impact of family firms on innovation investments:

Author(s)	Year	Country	Sign	Implications
Chen & Hsu	2009	Taiwan	(-)	Family firms have lower levels of R&D investment.
Chin et al.	2009	Taiwan	(-)	A dominant family firm's presence is negatively associated with patent quantity and quality.
Ayyagari et al.	2011	47 countries	(+)	Access to external financing, ownership by families / individuals is associated with greater innovation.
Miller et al.	2011	Fortune 1000	(+) (-)	Lone founders pursue a strategy of growth and earn superior shareholder returns. Family businesses pursue a conservation strategy and gain average total returns.
Anderson et al.	2012	US	(-)	Family firms invest less in R&D due to the dominance of risk diversification consideration.

Chrisman & Patel	2012	US (S&P 1500)	(-)	Family firms invest less into R&D than nonfamily firms.
Block	2013	US (S&P 500)	(-) (-)	Family ownership has negative effect on R&D intensity. Family ownership has negative effect on number of patent citations.
Chen et al.	2013	Taiwan	(+)	Family firms invest more in innovation than nonfamily firms.
Choi et al.	2013	Korea	(+)	Controlling owners significantly promote R&D.
Classen et al.	2013	Germany	(-) (+)	Family SMEs invest in innovation less intensively compared to nonfamily counterparts. Family SMEs tend to outperform nonfamily SMEs in terms of innovation outcomes.
De Massis et al.	2013		(-)	Family firms have a lower level of innovation investments compared to nonfamily firms.
Lodh et al.	2013	India	(+)	Family ownership has positive impact on innovation productivity.
Nieto et al.	2013	Spain	(-)	Family firms perform fewer innovation efforts and are less inclined to turn to external sources.

The first finding on more innovation conservatism in family firms compared to their nonfamily counterparts proves to be consistent in most studies. One possible explanation is that family owners are more risk adverse toward the R&D sunk costs with uncertain payoffs and R&D projects with high R&D intensity (Patel & Chrisman, 2013).

The second finding on innovation outcomes in family firms appears to have inconsistent results. This can partly be explained by the variety of the innovation output measures used. Tests looking at patent data tend to find negative relationship, while studies using productivity tend to find positive relationship.

HYPOTHESIS DEVELOPMENT

It is assumed that market is efficient and all participants (here including family owners, CEOs, and minority shareholders) are all rational wealth maximizers. There exists the agency problem due to the separation of ownership and management in public firms, where the agents (managers, CEOs) act on their own interests rather than on other stakeholders' interests.

Miller et al. (2011) hypothesize that lone founder firms (family firms at the early stage) are “associated with growth strategy – one that pursues superior investment in R&D, promotion, capital expenditures, embraces leverage, builds up cash reserves, and eschews dividends” and “above average returns to shareholders”. They also hypothesize that traditional family firm (family firms at mature stage) are “associated with a conservation (i.e. non-growth) strategy – one that minimizes investments in R&D, promotion, cash holdings and capital expenditures, avoids leverage, and awards generous dividends” and “below average shareholder returns”.

Both of these hypotheses are statistically supported with empirical evidences, suggesting that the puzzle in family firms' strategies can be partially explained by the social context of ownership concentration and owner-management relationships. Using individual identities and family logics might help shed some light on managerial behaviors, specifically innovation policy.

Family ownership identification will follow Chen, Chen, Cheng, and Shevlin (2010).

- To use ExecuComp and IRRC to identify key insiders (top executives and directors) for each company and to compile ownership of each insider as well as CEO types.
- To collect from Hoover's Company Records and company proxy statements: identity of founders, whether they are actively involved, and their ownership.

- To compile from proxy statements the identities and ownership of blockholders other than insiders and founding family members.
- To use BusinessWeek classifications of S&P 500 and Corporate Library's voting rights.

The data on innovation will follow Chan, Lakonishok & Sougiannis (2001) & Miller et al. (2011):

- R&D capital = Scaled of past 5-year R&D expenditures with weights 1, 0.8, 0.6, 0.4, 0.2.
- R&D intensity = R&D expenditures/ sales and / total assets.
- Patent registration data (patent counts and patent citations) from UPSTO.

Investments in other tangible and intangible forms are controlled:

- Advertising intensity = advertising expenditures/ sales and / total assets.
- CAPEX/ PPE intensity = capital expenditures/ plant, property & equipment.

Financial information includes accounting data from Compustat and market data from CRSP are chosen from literature on growth and conservation strategies (Miller et al, 2011): financial leverage; cash holdings/ PPE; dividends/ earnings; profitability = natural log of sales....

Firm-level control variables to account for the alternative determinants of technological innovation of firms might include (Miller et al., 2011): firm size; firm age; debt-to-equity ratio "supershares"; firm beta; and two-digit industry SIC code.

Due to the limited accounting information regarding R&D expenditures, as well as limited data available as true proxies for innovation inputs and outputs, we do have measurement errors, but this should not be a major concern because data is achieved from reliable sources rather than hand collected and we are using multiple measures for each variable of interest (three identification of family firms, two R&D-intensity measures, and two R&D outcomes).

For preliminary research, I expect to test (and hopefully reject) the following hypotheses:

H1₀: Family firms and nonfamily firms have the same strategy to invest in innovation. This implies that firms with less than 5% family ownership and firms with 5% or more, or by family CEO positions have different levels of R&D expenditures and R&D intensity.

H2₀: Family firms and nonfamily firms are the same in terms of innovation output. This implies that firms categorized by ownership or by family CEO positions have different numbers of patents or citations.

RESEARCH PLAN AND METHODOLOGY

Sample:

The sample is expected to include all US publicly available firms (1990-2010) from WRDS, excluding financial and utility industry firms as they are heavily regulated.

Research Design:

$$RD_Input_t = Fixed-effects + \delta_{1t} Family_identification_t + \delta_{1t} Adv_t + \delta_{1t} CAPEX_t + \sum \beta_j Control_{jt} + e_t$$

$$RD_Output_t = Fixed-effects + \delta_{1t} Family_identification_t + \delta_{1t} Adv_t + \delta_{1t} CAPEX_t + \sum \beta_j Control_{jt} + e_t$$

Control for Endogeneity:

The first potential endogeneity problem is from selection bias (part of which is survivorship bias). Miller et al. (2011) suggest the use of Heckman two-step treatment effect regressions to check and control for endogeneity. Another solution is to use alternative measures and subsets (Fortune 500, S&P 500, subperiods) for robustness tests. Patent count for example is not a perfect indicator for R&D productivity as many firms decide not to register for their products.

Identifying family firms with 5% block holdings or more also does not provide a full set of family firms. Using multiple measures for the same variables is the best way to deal with this problem and provide robustness check. For innovation, we can use patent count, citation count, number of new products. For family ownership, we can use online rankings, or proxy approximately with voting right. In order to connect equity ownership with executive positions and social context, Miller et al. (2011) find that among closely-held firms, the subgroup of lone founder firms should be separated and characterized with entrepreneurship and growth strategies, while the traditional family firms can be identified with nurturers and conservation strategies. By carefully defining innovation and family firms, the bias can be reduced.

Another endogeneity problem is with omitted variables. This can be partially avoided by identifying the channel through which different owners' incentives are translated into strategic innovation outcomes.

Relating to economic theory, there once has been a question regarding the causal relationship between national level investment and economic growth and one school of researchers find that the causality does not go from (physical) investment to growth as we might think, but from growth to investment through the saving channel. Applying the same reasoning to firm-level context, we may question whether R&D investments for example leads to future excess return, or it is really the case that outperformance gives the firms more chance to retain earnings and investment in R&D projects. This can be easily tested with the Granger causality test with lagged forms of both dependent and independent variables.

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