

## SOCIAL EMBEDDEDNESS OF CORPORATE ELITES AND UNCERTAINTY IN FINANCIAL MARKETS

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### Abstract

In the last decade regulatory pressure includes appeals that corporate elites should reduce their multiple directorships to a minimum. The functionality of this governance mechanism is suggested by agency theory. The embeddedness view counter-argues that social relationships matter for the effectiveness of corporate governance. In particular for ill-structured tasks like stock price valuation social networks solve fundamental coordination problems in markets by reducing the risks of market exchange, by establishing a common base of recognition and by getting actions and blocking actions. For the Swiss banking sector this article shows that the social embeddedness of corporate elites reduces the volatility of stock prices. With respect to regulatory pressure against multiple directorships it recommends a more balanced view. While for investors and stakeholders certain amounts of stock price volatility are surely desirable, exorbitant fluctuations of stock prices – like in financial crises – are definitely not. Social embeddedness should therefore be considered by economic and financial theory: it does prevent the misspecification of regulatory proposals and incentive regimes.

**Keywords:** Social Embeddedness, Corporate Elites, Stock Price Volatility, Banks

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“Law suits for breach of contract appear to be rare (...) Top executives of the two firms may know each other. They may sit together on government or trade committees. They may know each other socially and even belong to the same country club. (...) Carefully planned arrangements may create undesirable exchange relationships (...) Such planning indicates a lack of trust and blunts the demands of friendship, turning a cooperative venture into an antagonistic horse trade” (Macaulay, 1963: 61-64)

### Introduction

For nearly as long as stock corporations have existed, there have been complaints about corporate governance, i.e. the set of processes, customs, policies, laws and institutions affecting the way corporations are directed, administered and controlled (e.g. Berle & Means, 1932; Smith, 1776 (1976)). Over the centuries, these complaints have led to various changes in corporate law and regulation, including up to the present, with laws such as Sarbanes-Oxley (Hermalin, 2005). Reflecting the concern of many reform efforts, this paper focuses on the corporate elite, i.e. “those who occupy formally defined positions of authority (...) as they operate as boards of directors, executive committees or top management teams” (Pettigrew, 1992: 163). In the last decade regulatory pressure – mostly initiated by shareholder activists like pension funds - demands diligent boards of directors including appeals that corporate elites should reduce their multiple directorships to a minimum (Hallock, 1997). The functionality of this governance mechanism is suggested by the dominant theoretical approach within the corporate governance literature – agency theory (Jensen & Meckling, 1976). From this point of view social ties are the major factor limiting the effectiveness of corporate governance (Jensen, 1993). Social ties increase agency problems within corporations by overlaying persons with a web of obligations, for example by giving incentives and opportunities to raise each other's pay, resulting in collusion, cooptation, managerial power, weak control or damped impact of incentives (Hallock, 1997).

However, mainstream economic schemes sometimes overlook or misspecify economic actions when they assume that social ties affect economic behavior only minimally or reduce the efficiency of the price system. The embeddedness view counter-argues that “who knows who” matters for the effectiveness of

corporate governance; even more than individual attributes or institutional arrangements like incentives (Davis, 1996). Social ties create an informational and normative context for the decision making of the corporate elite such that decisions in one company become part of the raw material for decisions at other companies. According to this view, personal contacts provide the kind of rich information not available through other sources and therefore enhance the efficiency of corporate governance.

The embeddedness view on corporate governance has been the objective of several former studies. It has been for example shown that multiple directorships influence firms' propensities to adopt a poison pill (Davis & Greve, 1997), to make acquisitions (Haunschild, 1993), to adopt the multidivisional structure (Palmer, Jennings, & Zhou, 1993), to introduce total quality management (Young, Charns, & Shortell, 2001), or to explain similarity of political behavior (Burris, 2005). Findings also indicate that boards prefer to recruit new directors through social ties (Davis, 1993). Furthermore, multiple directorships have an impact on CEO salaries by setting a reference point for "appropriate" levels of compensation (O'Reilly, Main, & Crystal, 1988), help to prevent performance declines (Vedres & Stark, 2010) and - when strategic and environmental contingencies create a challenging context - improve long-term firm performance by channeling strategically relevant information (Geletkanycz & Boyd, 2011). Altogether the results substantiate the social embeddedness of corporate governance by showing that when evaluating whether it is appropriate to adopt an innovation, to make an important decision, or to determine compensation levels the corporate elite exchanges their information and experiences via social ties.

While the embeddedness view has been extensively analyzed for the adaption of innovations, compensation levels and indicators of company performance (see also Geletkanycz, Boyd, & Finkelstein, 2001; Mizruchi & Stearns, 1988; Pettigrew, 1992; Westphal & Khanna, 2003; Westphal, Seidel, & Stewart, 2001), there is much less research on the "reduction of uncertainty, potentially measured as a reduction in variation in performance" (Pfeffer & Salancik, 2003: xix). This research gap with respect to corporate governance is surprising because the embeddedness argument particularly suggests that social relationships help to overcome fundamental coordination problems which cause uncertainty in markets (Baker, 1984; Beckert, 2009; Granovetter, 1985). According to this, social ties first help to overcome the problem of corporation by reducing the risks of market exchange. Second, social ties help to overcome the valuation problem by establishing a common base of recognition within a field. Third, social networks help to gain an advantage over competitors by getting actions and blocking actions (Beckert, 2009). This research gap may be also highly topical: the increasing instability and volatility of global financial market as indicated by the recent global financial crises may – among other things – be caused by a lack of social embeddedness in global financial markets.

In the following it will be tested whether the uncertainty reduction argument can be applied to corporate governance and in particular to the social embeddedness of corporate elites. It will be analyzed whether the structure of the network in which corporate elites are embedded has an impact on the volatility of stock prices, i.e. whether social embeddedness reduces investors' uncertainty about the future value of company's shares. It is argued that social ties via common board or club membership are an important social mechanism to solve fundamental coordination problems in markets. In particular for ill-structured tasks – like stock price valuation – social networks are helpful by reducing the risks of market exchange, by establishing a common base of recognition and by getting actions and blocking actions. The empirical setting is the Swiss banking sector. The data set contains 150 quarterly observations of 30 banks with 633 different office holders. During their term of office these corporate elites were affiliated with 1,734 different associations leading to 38,996 quarterly links.

Overall the results suggest that the social embeddedness of banking elites has a major impact on the subsequent stock price volatility of their companies. It affects economic performance in ways that some orthodox and neoinstitutional economic schemes do not address. This result stands in contrast to current corporate governance reforms which aim to reduce interlocks and affiliation memberships of corporate elites to a minimum (Dahya & McConnell, 2005; Hermalin, 2005). By underestimating the role of social embeddedness such reforms will most likely have oppositional effects, for example by increasing the instability of financial markets.

## Theory

To develop our theoretical arguments we first review how social embeddedness affects the behavior of corporate elites. We second discuss how social embeddedness is related to the volatility in financial markets. In the third section both literature streams will be combined to deduce empirical testable hypotheses on the link between the social embeddedness of corporate elites and stock price volatility.

### ***Social embeddedness of corporate elites***

The boards and top management teams of the largest companies provide a regular meeting place for the cream of the corporate elite. They are packed with managers and directors which additionally sit on the boards of other companies, governing boards of non-profit institutions, government advisory boards, business policy associations and in prestigious social clubs (Davis, 1994: 225). For example, virtually all large U.S. corporations are linked together in a network of interlocks whereas most corporations reach each other within three steps (Domhoff, 2005). Approximately 20% of all directors sit on two or more boards. In Europe the numbers are comparable. The Netherlands, France, Switzerland, Finland, Sweden, the UK, Italy, and Germany are among the most heavily interlocked European countries (Heemskerk, 2011). For example, in Germany 100% of all directors and 46% of all managers of the Top-100 firms are interlocked; 50% of the directors have more than five additional directorships (Balsmeier & Peters, 2007). In Switzerland the average number of multiple directorships in the Top-200 firms amount 4.5 (Ruigrok, Peck, & Keller, 2006).

This corporate elite has direct control over property and makes investments and decisions that critically determine the direction of an economy (Davis, 1994: 218). Elite research therefore considers the corporate elite as a politically meaningful group (Burris, 2005; Mills, 1956). In former research the social relationships created by common board and club memberships “have been claimed to devices for collusion or cooptation (e.g., Pfeffer & Salancik, 1978), for bank control over corporate decision making (Kotz, 1978), and for the aggregation and advancement of the collective interests of the corporate elite (Useem, 1984)” (Davis, 1996: 154). Proponents of the standard economic view therefore recommend better institutional arrangements, for example independent directors (for an overview see e.g. Geletkanycz & Boyd, 2011; Lin, 1996) or improved incentives (see e.g. Jensen & Murphy, 1990; Jensen, Murphy, & Wruck, 2004), as corporate governance mechanisms to guard against trouble (Davis, 1996).

In contrast, the embeddedness argument suggests that in business relations prisoner's dilemmas can be often obviated by the strength of personal relations. “«Embeddedness refers to the fact that exchanges within a group ... have an ongoing social structure [that], (...)» (Marsden, 1981: 1210), affects economic performance in ways that some orthodox and neoinstitutional economic schemes do not address” (Uzzi, 1996: 676). “The primary significance of interlocks (...) is not in their overlaps with industrial organization or capital flow but as traces or indicators of the social embeddedness of corporate governance.” (Davis, 1996: 154) In contrast to solutions which either trust in institutional arrangements (“undersocialized” view) or in generalized morality (“oversocialized” view) the embeddedness view points out that “better than the statement that someone is known to be reliable is information from a trusted informant that has dealt with that individual and found him so” (Granovetter, 1985: 490). This information is cheap, richer, more detailed and accurate (Carpenter & Westphal, 2001; Granovetter, 1985). Furthermore, to continue relations individuals have an economic motivation to be trustworthy and additionally carry strong social expectation of trust. The daily economic life is thus *not* riddled with mistrust and malfeasance as assumed in the standard economic view because of the widespread preference of transacting with individuals of known reputation (Granovetter, 1985).

Critics of the embeddedness view often counter-argue that in particular social relations provide occasion for malfeasance and conflict (e.g. Fama, 1970; Jensen & Meckling, 1976; Jensen et al., 2004; Smith, 1976). For example, corporate crime such as falsification of balance sheets is often impossible without trustworthy relationships. Also elaborate schemes for kickbacks, voice trading, or bid rigging require close-knit groups of persons with a high level of internal trust. However, distrust and malfeasance also occur in the absence of social embeddedness (Granovetter, 1985). It is therefore important to keep in mind that the embeddedness argument does not make universal predictions of trust or distrust. Instead it points out that the social structure has an impact on economic behavior (Granovetter, 1985). Changing institutional arrangements and incentives structures (e.g., more independent or outside directors, more

pay-for-performance for managers and directors) are therefore likely to have little effect because they underestimate the role of social embeddedness (Davis, 1996; Rost, Inauen, Osterloh, & Frey, 2010).

### ***Uncertainty in financial markets***

From an embeddedness point of view financial markets are social institutions because they reflect “a complex alchemy of politics, culture, and ideology” (Krippner, 2001: 782). Generally, any transaction produces uncertainty about the “future value” of a transaction. The volatility of share prices itself is a major source of uncertainty: since the buyer and seller have contrary expectations about the future value of the share, it will always be in the interest of one or the other party to alter or break the agreement. One key question within embeddedness research is how social relationships between market actors help to converge or disperse expectations about the future value of transactions thereby reducing or enlarging the uncertainty in markets (Baker, 1984; Beckert, 2011; Beunza & Stark, 2012; Fligstein, 2001; White, 1981). In contrast to the standard economic view, the embeddedness view first argues that due to social fragmentation in large empirical markets the volatility of prices is *not* dampened but instead accelerated. It second asks how social relationships are used by market actors to reduce their uncertainty about the future value of transactions. In the following both arguments of the embeddedness view will be developed in more detail.

### ***Ideal-typical vs. empirical markets***

In the standard economic view financial markets are assumed to be hyper-rational having an exclusive economic structure. Although it has long been recognized that many empirical markets depart radically from this theoretical model, the perfectly competitive market remains fundamental to mainstream economic theory (Baker, 1984; Hirschman, 1982; White, 1981). In these ideal-typical markets, actors are not limited in their ability to communicate with all other actors and to search for full information to find the best price, i.e. one takes the public existence of information as a basis (Fama, 1970; Smith, 1776 (1976)). Actors therefore develop expansive micro-networks, i.e. they are engaged in high numbers exchange relationships leading to a very competitive and atomistic market without bargaining, negotiation, remonstrance or mutual adjustment. If actors face complex or difficult relationships they can simply move on to the legion of other market actors willing to do business; i.e. social relations become frictional matters (Granovetter, 1985). On a macro-level this behavior produces an undifferentiated overall market network: there is no reason for multiple subgroups to form. Under ideal-typical conditions aggressive competition thus causes bid-ask spreads to narrow and converge, which decreases the volatility of prices (Baker, 1984).

The embeddedness view counter-argues that empirical markets radically deviate from this ideal-typical model. Especially in large markets actors develop restrictive micro-networks, i.e. they have low number of exchange relationships and trade with those in proximity, due to bounded rationality and opportunism. First, actors' limited information-reception and -processing abilities force them to restrict the search for potential trade partners. Second, in restrictive networks the relative ease of communication and high visibility of actors' behavior made it easy to spot opportunists and apply sanctions. On a macro-level this behavior increases structural differentiation, reduces competition, and impairs market performance because market exchange becomes more decentralized, diffused, and fragmentary. In particular the decline in the pervasiveness of communication in a large market causes actors' bid-ask spreads to widen and diverge, resulting in an increase in price volatility (Baker, 1984).

Baker (1984) gives empirical support for the embeddedness argument suggesting that large empirical markets develop a fragmented structure. For stock option markets he shows that in particular large markets do not follow “ideal-typical” models of the market because the micro-networks between traders tend to be restrictive, a fact which results in exacerbated and not in dampened option price volatility. Furthermore, the study of Lincoln et al. (1996) supports that the volatility of year-to-year profitability is lower in less fragmented networks because cohesive ties buffer groups from uncertainty.

### ***Uncertainty reduction***

From an embeddedness point of view social relationships are not only the major source for uncertainty in large empirical markets – i.e., they do not only explain why empirical markets do not follow “ideal-

typical” models of the market – but they also help to overcome three fundamental coordination problems which cause uncertainty in markets (Beckert, 2009).

First, social networks help to overcome the problem of corporation by reducing the risks of market exchange (Beckert, 2009). Positive experiences with exchange partners in previous transactions or knowing trustworthy persons who were involved in previous transactions increase the likelihood to accept contract risks (Granovetter, 1985; Uzzi, 1997). Networks further facilitate the traveling of information and thus enhance corporation by effectively sanctioning defectors (Fehr & Fischbacher, 2004).

Second, social networks help to overcome the valuation problem by establishing a common base of recognition within a field (Beckert, 2009). The valuation criteria for complex, ill-structured products – for example, for used cars (Akerlof, 1970) or for company stocks (Baker, 1984) – are contested, change over time and differ between groups. By diffusing information social networks establish interactive processes of recognition within a field that reduce uncertainty in the market (Callon, Méadel, & Rabeharisoa, 2002).

Third, social networks help to gain an advantage over competitors by getting actions and blocking actions (Beckert, 2009). The power of actors is unequally distributed in markets reflecting the political and historical nature of social networks (Powell, 2003). Social networks allow reducing uncertainty with regard to profit by establishing market barriers, reciprocal agreements, standard setting or cartels, by achieving a monopoly position, or by positioning in niche markets (Beckert, 2009; Djelic, 2006; Li & Berta, 2002).

The former assumptions have been indirectly supported in empirical research. For example Uzzi (1996; 1997) shows for the New York apparel economy that firms which are embedded in a social exchange system have higher survival chances than do firms which only maintain arm's-length market relationships. Uzzi (1996; 1997) thus underpins that social relationships help to overcome coordination problems, in particular the problem of corporation, which cause uncertainty in markets, here measured by the survival chances of firms. Furthermore, there exist a host of studies which empirically test the link between social embeddedness and profit making. As market uncertainty simultaneously creates opportunities for profit making such results can be viewed as indirect evidence. For example, Burt (1997: 339) demonstrates that “managers with more social capital get higher returns to their human capital because they are positioned to identify and develop more rewarding opportunities”. The finding substantiates that social relationships help to overcome coordination problems, in particular by gaining advantage over competitors. Furthermore, for the largest 1,696 Hungarian enterprises from 1987 to 2001 the study of Vedres and Starke (2010) supports that social embeddedness of corporate elites prevents performance declines. However, as indicated by the exemplary empirical evidence, there exist only few studies which directly test the link between social embeddedness and market uncertainty, i.e. widely fluctuating share prices. This research gap in particular exists for the area of corporate governance.

### ***Social embeddedness of corporate elites and uncertainty in financial markets***

In the following the stock market is characterized as a social structure represented by the social networks of managerial elites and other market actors, for example of investors. In the hypotheses, the subsequent stock price volatility of a company is viewed as a consequence of the social embeddedness of corporate elites. The assumption of a direct link between certain characteristics of managerial elites and indicators of firm performance is in line with most corporate governance theories, for example agency theory, upper echelons theory, or resource dependency theory (Gomez-Mejia, Tosi, & Timothy, 1987; Hambrick, 2007; Hambrick & Mason, 1984; Haynes & Hillman, 2010; Hillman, Cannella, & Paetzold, 2000; Jensen & Murhpy, 1990; Jensen & Zajac, 2004). The basic premise is that corporate elites deal with the firm responsibilities individually because they are in the strategic position and have control over rare resources and events, for example expert knowledge or exchange partners (Lin, Enselin, & Vaughn, 1981; Pettigrew, 1992). It will be argued that the common membership in social clubs, in business associations and on boards allows members of the corporate elite to share information, to devise alliances and to make friends not only with their peers but also with investors and other business persons. Consequently, the embeddedness of corporate elites is viewed as an important social mechanism which helps market actors to converge their expectations about the future value of company shares by reducing the risks of market exchange, by establishing a common base of recognition and by gaining advantages over competitors. In detail it is argued that corporate elites occupying a central network position via board and club

membership, embedded in less fragmented networks, acting as brokers between fragmented sub-groups, embedded in fragmented sub-groups with some member turnover, and embedded in industry-diversified fragmented sub-groups reduce stock price volatility by more quickly aligning their actions and by sending non-ambiguous signals in the market.

### ***Network centrality***

The membership in social clubs, in business associations and on boards connects the corporate elite not only directly but also indirectly with other market actors. To describe the embeddedness in a network of relationships an actor's centrality is of interest (Freeman, 1979). The degree centrality, i.e. the number of relationships that an actor has, can be interpreted in terms of the immediate risk for catching which information is flowing through the network: actors occupying degree centrality positions have the ability to access a larger portion of actors in the network and are likely to be perceived as having higher status by the rest of network members (Perry-Smith & Shalley, 2003; Wasserman & Faust, 1994). In addition, central actors have a higher likelihood of exposure to various disparate social circles within a network. Therefore, actors occupying central network positions have access to more favorable perspectives and outlooks, for example first-hand information about general economic developments, exchange partners, or competitors, and higher perceptions of freedom and power, which provide the confidence and personal discretion needed for calculated risk-taking (Ibarra & Andrews, 1993; Perry-Smith & Shalley, 2003).

Overall the former arguments suggests that centrality in networks may help to overcome fundamental coordination problems which cause uncertainty in financial markets. First, the better information access, the calculated risk-taking, and the higher status of corporate elites occupying central network positions should increase the trust of other market actors, for example of investors, in their short- and long-term strategic actions, thereby reducing the risks of market exchange. Second, the higher network exposure of central corporate elites helps to overcome the valuation problem with regard to company stocks by establishing a common base of recognition within the market field. Third, central corporate elites have more freedom and power which can be used to gain an advantage over competitors and thereby reducing uncertainty with regard to profit. Based on these reasons we expect that corporate elites which occupy a more central position in business networks reduce investors' uncertainty, i.e. it is assumed that the volatility of share prices of companies in which central corporate elites are employed is lower compared to the volatility of share prices of companies in which less central corporate elites are employed.

*Hypothesis 1. Corporate elites occupying a central network position via board and club membership reduce investors' uncertainty measured by the volatility of share prices of their companies.*

### ***Network fragmentation***

Social networks - and in particular large social networks - are characterized by social fragmentation (Granovetter, 2005; Useem, 1984; Uzzi, 1997; Vedres & Stark, 2010). The restrictiveness of ego-networks can be explained by actors' limited information-reception and -processing abilities, limited time capacities, and the higher risk of opportunism when trading with strangers (Baker, 1984; Granovetter, 1973). Corporate elites are thus not embedded in a cohesive, dense network structure. Instead, common membership in social clubs, in business associations and on boards will result in several cohesive sub-groups (which sometimes overlap) (Moody & White, 2003; Simmel, (1922) 1964; Vedres & Stark, 2010). Dense ties among the members within a sub-group provide a basis for trust and a means for coordinating action (Coleman, 1990), and typically exists between people who share similarities (Ibarra, 1992; Lincoln & Miller, 1979). Dense sub-groups are therefore more likely to connect people with similar perspectives, outlooks, common interests, and similar approaches to problems (Granovetter, 1973). Furthermore, "information flowing in a strongly tied network tends to be redundant and travel circular paths, such that an actor will tend to receive the same information from different individuals" (Perry-Smith & Shalley, 2003: 94). In fragmented networks the different sub-groups do not or only to a small degree overlap (Simmel, (1922) 1964; Vedres & Stark, 2010). Distant, less connected sub-groups are more likely to contain people with different perspectives, outlooks, diverse interests, and different approaches to problems (Burt, 1992; Granovetter, 1973). Information about other sub-groups is mostly second-hand information which is less trustworthy; further, rumor reaches a group from different, unreliable sources and often contradicts each other.

The former arguments imply that while dense ties among the members of one sub-group may help to overcome fundamental coordination problems which cause uncertainty in financial markets, the embeddedness in distant, less connected sub-groups will boost these problems (Baker, 1984). Social fragmentation seems in particular important for corporate elites belonging to the same company: it can result in the fact that contradictory company information diffuses in the market. In some companies the corporate elite will be more fragmented as their members belong to different social circles outside their focal company, while in other companies the corporate elite will be less fragmented as their members belong to the same social circle outside their company. It is expected that less fragmented corporate elites reduce investors' uncertainty. First, corporate elite who belong to the same social circle reduce the risk of market exchange because dense ties among members provide a basis for trust and a means for coordinating action. Second, less fragmented corporate elites establish a common base of recognition, and thereby reduce valuation problems by sending non-ambiguous information about their companies in the market. Third, corporate elite belonging to the same social circle share more similarities and trust each other which can be used for mutual agreements and concerted actions thereby reducing uncertainty with regard to profit.

*Hypothesis 2. Corporate elites embedded in less fragmented networks reduce investors' uncertainty measured by the volatility of share prices of their companies.*

### **Brokerage between fragmented groups**

As mentioned before sub-groups in fragmented networks sometimes overlap (Moody & White, 2003; Simmel, (1922) 1964). It implies that some persons will act as brokers by connecting two sub-groups via their membership which would be disconnected otherwise (Vedres & Stark, 2010). Persons who act as brokers between otherwise disconnected sub-groups “are multiple insiders, participating in dense cohesive ties that provide close familiarity with the operations of the members in their group” (Vedres & Stark, 2010: 1156). This combination of familiarity and diversity facilitates entrepreneurship by providing trust and mutual understanding *and* by accessing non-redundant information and new ideas in the environment (Burt, 2005; Obstfeld, 2005; Rost, 2011; Uzzi & Spiro, 2005).

With respect to fundamental coordination problems which cause uncertainty in financial markets it implies that the problems of social fragmentation can be partially overcome by brokerage. First, brokerage reduces the risk of market exchange because multiple insiders are considered as trustworthy by multiple groups and have first-hand access to a diversity of relevant information. Second, brokers reduce valuation problems because first-hand information about their companies quickly diffuses in the market. Third, multiple insiders reduce uncertainty with regard to profit; they can use their information and control benefits to gain an advantage over competitors (Burt, 1997).

*Hypothesis 3. Corporate elites acting as brokers between fragmented sub-groups reduce investors' uncertainty measured by the volatility of share prices of their companies.*

### **Turnover in fragmented groups**

Sub-groups in social networks are either characterized by stable memberships over time or by some turnover (Vedres & Stark, 2010). In the following it is argued that sub-groups with turnover have the opportunity to access new and non-redundant information (Granovetter, 1973) *by simultaneously* maintaining a basis for trust (Vedres & Stark, 2010). The sub-group concept implies that independent of turnover there exists a core of steady members. However, sub-groups with some turnover are more likely to connect people with varying interests and diverse approaches to problems (Perry-Smith & Shalley, 2003). Membership turnover also enhance the diffusion of information beyond the focal group.

Turnover in fragmented sub-groups is expected to help to overcome coordination problems which cause uncertainty in financial markets. Corporate elites who belong to sub-groups with a higher member turnover should reduce investors' uncertainty. First, group turnover facilitates the traveling of information in fragmented networks such that first-hand information about the corporate elite becomes more easily observable in the market. For other market actors, for example investors, it reduces contract risks. Second, by diffusing information group turnover also facilitates the valuation problem for company stocks by establishing common expectations. Third, turnover allows group members to access new, non-redundant information, thereby promoting entrepreneurship.

*Hypothesis 4. Corporate elites embedded in fragmented sub-groups with high turnover reduce investors' uncertainty measured by the volatility of share prices of their companies.*

#### **Industry-diversity in fragmented groups**

Group diversity, i.e. the amount of dispersion among members, has been identified as an important performance driver (Reagans & Zuckerman, 2001; van Knippenberg & Schippers, 2007; Williams & O'Reilly, 1998). In particular task-oriented diversity (e.g. tenure, function, education, industry) should increase team outcomes due to differences in information, knowledge, and perspectives (Williams & O'Reilly, 1998). With respect to corporate governance it has been empirically supported that task-oriented diversity increases the performance of corporate elites (for an overview Hambrick, 2007). In the following we will focus on one aspect of task-related diversity, namely the exposure to a diversity of industries due to multiple board and association memberships. Persons associated with many industries gain insights in different approaches to problems and are confronted with different business problems and industry cycles. Industry diversity therefore promotes the generation of novel and appropriate ideas, processes, or solutions by increasing the domain-relevant knowledge, i.e. an individual's knowledge of facts, circumstances, and issues surrounding a given problem or area, and the creativity-relevant skills, i.e. an individual's ability to generate different alternatives and to think outside the box (Amabile, 1996; Perry-Smith & Shalley, 2003).

Corporate elites affiliated with sub-groups in which members accumulate diverse industry insights by current board and association membership are expected to reduce investors' uncertainty. First, the exposure to a diversity of business information reduces the risk of market exchange; corporate elites anticipate potential market risks earlier and are in a good position to take countermeasures. Anticipation and countermeasures facilitate the trust of other market participants, for example of investors, in the corporate elite. Second, the existence of diverse industries implies that first-hand information about group members can travel in diverse groups and, thus, reaches many market actors. The travelling of information reduces valuation problems by establishing a common base of recognition. Third, industry diversity increases the domain-relevant knowledge and the creativity-relevant skills within a sub-group; both can be used to gain an advantage over competitors thereby reducing uncertainty with regard to profit.

*Hypothesis 5. Corporate elites embedded in industry-diversified fragmented sub-groups reduce investors' uncertainty measured by the volatility of share prices of their companies.*

## **Data and Method**

### **Sample**

To address the research question, we had to identify a relevant market in networks terms. "Business (...) groups forming one market do not exist as named places on the economic landscape" (Vedres & Stark, 2010: 1155), i.e. boundaries are not given prior to the analysis. To define market boundaries we restrict our analysis to the Swiss banking industry, i.e. to one industry in one country. The sample restriction offers the following advantages to investigate the social networks of corporate elites: First, in Switzerland banks play an important economic role implying that bank elites are a politically meaningful group which is strongly connected to governing boards of non-profit institutions, government advisory boards, business policy associations, and prestigious social clubs. Second, in Switzerland bank elites sit on the boards of many other companies, i.e. the interlock network still centralized around the leading banks (Ruigrok et al., 2006).<sup>1</sup> Swiss banks offer the following advantages to investigate the effects of embeddedness on stock market volatility: First, for national and international market actors, and in particular for investors, Swiss banks are one of the most popular industries in Switzerland. Second, banks belong to the same industry implying that business cycles are comparable. Performance measurements like stock price volatility therefore more or less dependent on the same external shocks.

We assembled the complete histories of personnel ties of the elites among the 30 Swiss banks which are listed on the Swiss stock exchange (SWX) spanning quarterly data for the years 2004-2008. We define

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<sup>1</sup> In contrast to the United States the interlock network in most European countries still centralized around the leading banks (Heemskerck, 2011; Nollert, 1998; Ruigrok et al., 2006). As in most countries in the United States banks traditionally maintained a commanding position at the core of the interlocked network (Mintz & Schwartz, 1985). A raft of reforms however substantially reduced the power of banks and financial institutions by restricting their exercise of control (Davis, 1994).

corporate elites as “those who occupy formally defined positions of authority (...) as they operate as boards of directors, executive committees or top management teams” (Pettigrew, 1992: 163). Swiss banks have a one-tier board structure meaning that the board consists of executive directors, in the following also called managers, and non-executive directors (Ruigrok et al., 2006). Personnel data on corporate elites were transcribed directly from company reports and trade registers where Swiss banks are obliged to register information about personnel interrelations including not only board memberships in other profit organizations but also memberships in governing boards of non-profit institutions, government advisory boards, business policy associations and social clubs. For each bank, we have manually recoded the names of all corporate elites who held office in the period studied and the names of affiliations for various spellings, misspellings, and different languages. Affiliations are defined as board memberships in profit and in non-profit organizations, for example, in trade, educational, political, social, cultural associations or pension funds. We also recoded the exact dates when elites assumed and left office. The final data set contains 150 quarterly observations of 30 banks with 633 different office holders. During their term of office these corporate elites were affiliated with 1,734 different associations (1,036 profit and 671 non-profit associations) leading to 38,996 quarterly links.

Before introducing the measurements, Table 1 to Table 3 offer some descriptive information on the sample. Table 1 shows how many different profit and non-profit associations occur in the sample differentiated by industry sector or typ. For profit-companies we find many firms of the financial industry, e.g. private equity firms, the real estate industry, e.g. real estate companies, and the banking industry, e.g. private banks. For non-profit associations we find many economic associations, e.g. the Business round table, followed by political/administrative associations, e.g. party or governing boards, educational associations, e.g. the Swiss Banking School, and social associations, e.g. golf clubs or social foundations. Table 2 shows the number of multiple directorships differentiated by whether the office holder is a manager or director, by year and by the most popular industry sectors or association types. On average managers are affiliated with 3 and directors with 4.6 associations. The membership in profit organizations dominates compared to the membership in non-profit associations; and here in particular the membership in bank boards. With respect to non-profit associations managers are mostly affiliated with economic associations while directors additionally sit in political and educational associations. Table 3 additionally shows the time structure of the sample. In the 30 banks there is a continuous turnover of corporate elites. Due to the turnover in corporate elites but also due to the turnover in association memberships the number of links and the number of included associations continuously changes over time.

**Table 1.** Number of different associations in the data sample

<b>Associations</b>	<b>1765</b>
<i>Companies:</i>	<i>1091</i>
– financial industry	244
– real estate industry	105
– banking industry	105
– accounting industry	64
– IT/ telecommunication industry	55
– conveyance industry	49
– media industry	48
– consulting industry	42
– pharmaceutical industry	41
– hotel industry	40
– insurance industry	38
– industrial plan industry	34
– energy/ water industry	33
– foodstuff industry	32
– automotive industry	27
– healthcare industry	25
– other consumer goods (e.g. furniture)	23

Table 1. Continued

– service industry	22
– textile industry	15
– extractive industry	13
– watch/ opto-mechanics industry	11
– education industry	11
– stock exchange	7
– luxury good industry	7
<i>Non-profit associations:</i>	674
– economic associations	198
– political/administrative associations	124
– educational associations	116
– social associations	109
– pension associations	66
– cultural associations	61

Table 2. Number of multiple directorships per director and year

Year	Overall	Companies:	Banks	Financial industry	Non-profit associations:	Economic associations	Political associations	Educational associations
<b>Managers</b>								
2004	2.94	2.30	1.43	0.47	0.64	0.26	0.04	0.07
2005	3.11	2.33	1.43	0.45	0.78	0.28	0.04	0.09
2006	3.10	2.29	1.45	0.44	0.81	0.28	0.04	0.09
2007	3.13	2.22	1.28	0.59	0.91	0.37	0.03	0.15
2008	3.05	2.11	1.24	0.53	0.94	0.36	0.06	0.16
Overall	3.06	2.25	1.37	0.50	0.81	0.31	0.04	0.11
<b>Directors</b>								
2004	4.57	3.31	1.45	0.30	1.26	0.40	0.32	0.15
2005	4.83	3.43	1.48	0.39	1.41	0.40	0.35	0.18
2006	4.99	3.56	1.47	0.44	1.42	0.42	0.33	0.18
2007	5.16	3.71	1.49	0.65	1.45	0.40	0.28	0.23
2008	5.38	3.86	1.56	0.74	1.52	0.41	0.27	0.24
Overall	4.99	3.58	1.49	0.50	1.41	0.41	0.31	0.20

Table 3. Time structure of the sample

Year	Quarter	N persons	N new persons	N leaving persons	N links	N associations
2004	1	433	17	3	1631	883
2004	2	444	14	4	1681	904
2004	3	455	16	0	1710	916
2004	4	456	1	3	1711	928
2005	1	459	9	3	1795	929
2005	2	489	25	20	1899	1015
2005	3	474	6	8	1901	1011
2005	4	475	9	14	1905	1018
2006	1	464	8	1	1881	1030
2006	2	476	12	16	1921	1050
2006	3	463	5	2	1891	1038
2006	4	466	5	16	1898	1042
2007	1	464	14	16	1882	1004
2007	2	458	9	17	1866	996
2007	3	451	11	5	1860	997
2007	4	451	5	19	1861	1000
2008	1	457	24	8	1841	993
2008	2	466	13	24	1865	1006
2008	3	455	10	11	1831	994
2008	4	454	11	13	1829	999
Total		460.5	224	203	1832.95	989.2

## Measurements

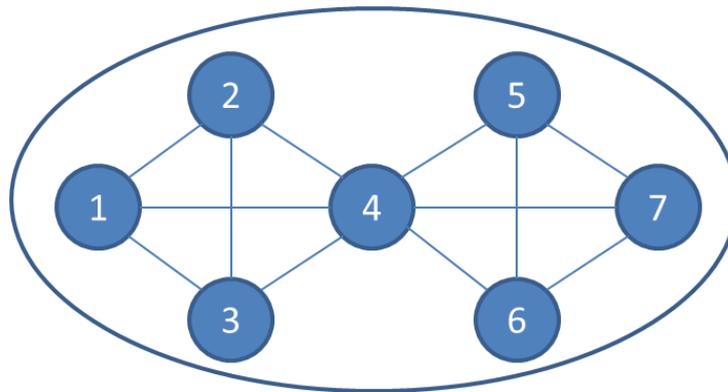
### Network centrality

For each bank and each quarterly period we counted the degree centrality (Freeman, 1979), i.e. the number of relationships that managers and directors of a bank had due to their memberships in different associations.

### Network fragmentation

To measure network fragmentation we relied on the idea of dense social groups within networks, namely on the idea of n-clans (Mokken, 1979; Wasserman & Faust, 1994). All members of an n-clan are in an n-clique and connected by a path of length N or less in which each person is also a member of the n-clique. We used the parameter  $n = 4$  and  $N = 2$  implying that a clan consists of a minimum of four persons. To be a member of this clan, each person has to reach all other members either directly or indirectly through one other member. As demonstrated in Figure 1 all seven actors are members of an n-clan ( $n=4$ ,  $N=2$ ) because each members of the clique including persons 1 to 4 can reach each member of the clique including persons 4 to 7 indirectly in two steps via person 4. The idea of n-clans relaxes the strict assumption underlying clique concepts that all members of a subgroup are directly connected with each other but still assumes that social groups are cohesive. It further allows for group overlap, that is, a person can be a member of many social groups (Vedres & Stark, 2010). This assumption reflects social reality and explains diffusion processes in social structures (Lin, Dayton, & Greenwald, 1978; Milgram, 1967).<sup>2</sup> For each bank and each quarterly period we counted with how many different n-clans the corporate elite is connected due to their affiliation memberships (Borgatti, Everett, & Freeman, 2002).

**Figure 1.** Example of an N-clan ( $N=4$ ,  $K=2$ )



*Legend:* All members of an n-clan are in an N-clique and connected by a path of length K or less in which each person is also a member of the n-clique. We use the parameter  $N = 4$  and  $K = 2$  implying that a clan consists of a minimum of four persons. To be a member of this clan, each person has to reach all other members either directly or indirectly through one other member.

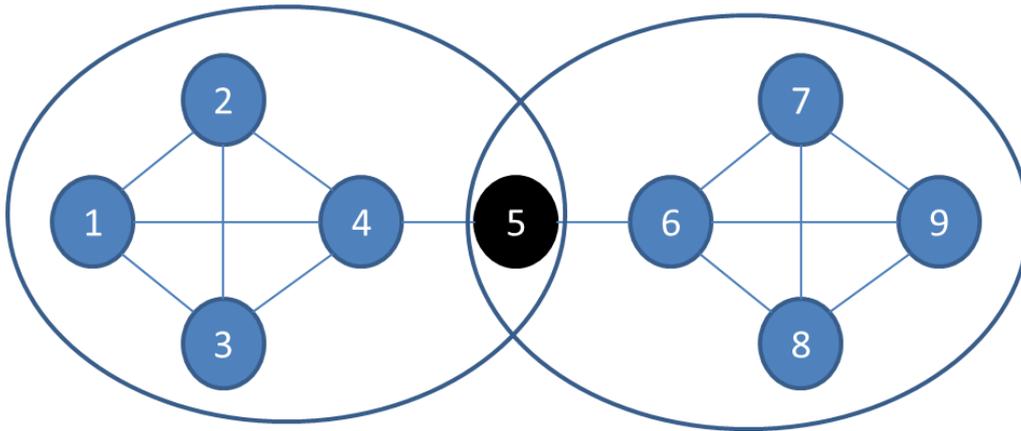
### Brokerage between fragmented groups

We define brokers as persons who connect the members of two n-Clans via membership in both clans (for a similar idea see Vedres & Stark, 2010; Watts, 1999); i.e. a member of clan 1 can reach all other members of clan 2 only indirectly through the broker. As shown in Figure 2 actor 5 is a broker between two n-clans ( $n=4$ ,  $N=2$ ) because he can reach all members of the clan including persons 1 to 4 in two steps via actor 4 and all members of the clan including persons 6 to 9 in two steps via actor 6. Information between both 4-member-groups however only reaches the other group via the structural bridge 4-5-6, i.e. via a path that is controlled by actor 5. In line with structural hole theory of Burt (1992) actor 5 has

<sup>2</sup> We prefer the concept of n-clan rather than that of a k-plex as introduced by Vedres and Stark (2010) because it results in a smaller number of subgroups in social networks. A k-plex is a maximal subgraph with the following property: each vertex of the induced subgraph is connected to at least  $n-k$  other vertices, where  $n$  is the number of vertices in the induced subgraph. For example, when introducing the parameters  $n = 4$  and  $k = 2$ , a k-plex consists of a minimum of four persons. To be a member of the k-plex, each person has directly to reach at least two other members. K-plex would for example split the N-clan in Figure 1 in two overlapping subgroups both including actor 4.

information and control benefits. “A structural hole between two clusters in a network need not mean that people in the two clusters are unaware of one another. It simply means that they are so focused on their own activities that they have little time to attend to the activities of people on the other cluster. A structural hole indicates that the people on either side of the hole circulate in different flows of information” (Burt, 1997: 341). Furthermore, “the disconnected contacts communicate through the manager, giving the manager an opportunity to adjust his or her image with each contact, which is the structural foundation for managerial robust action (Padgett & Ansell, 1993) (...) (T)he tertius negotiates for favorable terms” (Burt, 1997: 341). For each bank and each quarterly period we counted how often the corporate elite acts as a broker due to their affiliation memberships (Borgatti et al., 2002).

**Figure 2.** Example of brokerage between N-clans

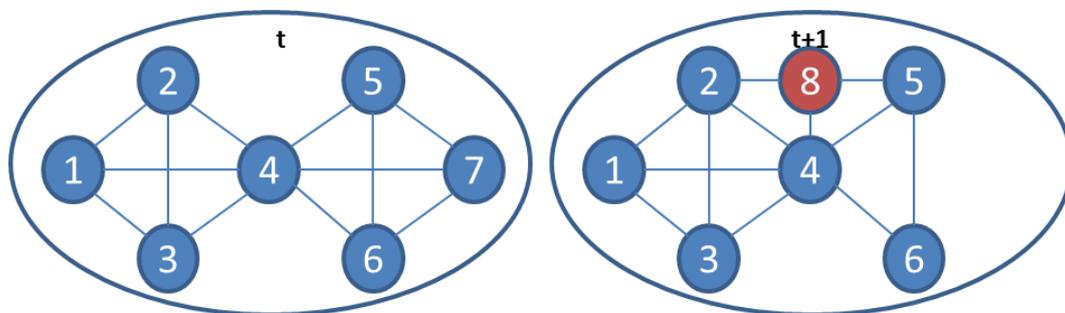


*Legend:* A broker connects the members of two N-Clans via membership in both clans. Both N-Clans would be disconnected otherwise. It implies that a member of clan 1 can reach all other members of clan 2 only indirectly through the broker.

**Turnover within fragmented groups**

We define membership turnover in n-clans as the percentage of surviving corporate elites within quarterly periods (for a similar idea see Simmel, 1898; Vedres & Stark, 2010). We compared the number of persons who were clan members in time period  $t$  and  $t+1$  with the total number of clan members in time period  $t$ . Figure 3 gives an example. In period 1, the n-clan consists of the seven actors 1 to 7. In period 2, actor 7 is not anymore a clan member and actor 8 arrived as a new member. The group stability of the clan amounts  $6/7=0.86$ , i.e. our measurement only considers exists of tenured members. Reenters are considered after one period of time, i.e. in the example actor 8 would be included as a tenured member in period 3. For each bank and each quarterly period we counted the group stability of the n-clans with which the corporate elite was connected by taking the average score of all members.

**Figure 3.** Example for group stability within an N-clan between two time periods



*Legend:* The concept of group stability compares the members of an N-clan between two time periods. It is calculated by dividing the number of stable members, i.e. those who were clan members in  $t$  and  $t+1$ , by the total number of clan members in time period  $t$ . In the example from the seven members in time period  $t$  six members survived to time period  $t+1$ . Group stability therefore amounts  $6/7=0.86$ .

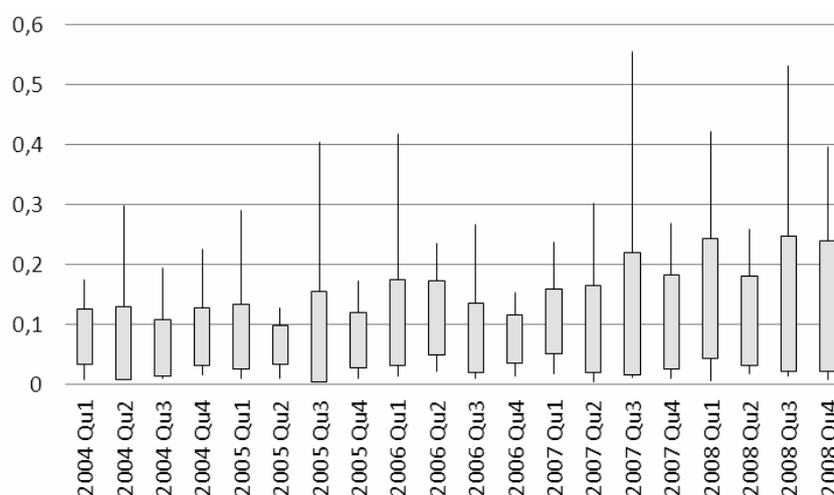
### *Industry-diversity within fragmented groups*

We define industry diversity as the diversity of industry backgrounds which are represented by the members of an n-clan. We distinguish between 24 different industries (see Table 1). For each n-clan we counted a normalized Herfindahl index. The index sums up the squared share of board memberships in each industry sector within the n-clan. The final index was subtracted by 1 such that the value “0” indicates absolute industry homogeneity, i.e. all clan members are affiliated to the same industry, and the value “1” indicates absolute industry diversity, clan members are maximally dispersed in the 24 different industries. For each bank and each quarterly period we finally counted the industry diversity of the n-clans with which the corporate elite is connected by taking the average score of all members.

### *Volatility of share prices*

The amount of risk associated with a bank was measured by volatility, that is, the variation of stock prices of a bank over each quarterly period. For each bank we gathered daily stock price data and used 3 months of data. Data were obtained from Datastream. We calculated the standard deviation by calculating the difference between the daily price and the average price over the length of time. We squared the differences, divided the sum of squares by our days range and finally took the square root. Figure 4 shows the stock price volatilities of the included 30 banks over time. It first demonstrates that there is variance in the sample, i.e. the volatility of some banks is rather small while the volatility of other banks is rather big. It second shows that the volatility has increased during the financial crisis, i.e. from the third quarterly period of 2007 to the last quarterly period of 2008.

**Figure 4.** Stock price volatility of the 30 banks in the sample



### *Control variables*

We control for company size as measured by the quarterly assets of a bank, bank performance as measured by bank's income from interest rates and shareholder performance as measured by the dividend yield. Data were obtained from Datastream. We further include several corporate governance indicators. We measured whether there was a change in major shareholder, defined as persons or institutions who own 5% or more of bank shares (1=yes, 0=no). Data were obtained from the Swiss stock exchange. We included board size by counting the number of corporate elites acting as board members within a bank and the percentage of non-executive directors by counting how many directors act in a supervising but not in a management position. Board tenure counts the number of days an average member of the corporate elite has spent in its current position within the bank. Industry diversity within a board was computed as a normalized Herfindahl index. For each bank board the index sums up the squared share of additional board memberships in the 24 industry sectors. The index was transformed such that the value “1” indicates absolute industry diversity implying that a bank's board is maximally dispersed within the 24 different industries. Finally, we calculated the international diversity of the board. We gathered data on the nationality of each director and computed a normalized Herfindahl index. The index takes the value

“1” in the case of a maximum of international diversity. All control variables are measured on a quarterly basis.

Table 4 gives a summary of the descriptive statistics of all variables and their bivariate correlations. All variables are approximately normally distributed, i.e. the kurtosis and skewness remains in the interval  $\leq \pm 1.96$  (no figures).

## Method

To test our hypotheses we apply panel fixed effect models, i.e. the models consider that we have quarterly information about the same banks. The fixed effect approach tests whether a change of the independent variables within a bank is associated with a change of the dependent variable within a bank, i.e. it will be tested whether changes in the social embeddedness of the corporate elite are associated with changes in stock price volatility. To consider the problem of causality our dependent variable is the subsequent stock price volatility of a bank, i.e. the volatility in the quarterly period  $t+1$ . We additionally control whether the empirical results are stable if current stock price volatility is included.

## Empirical Results

Table 5 summarizes the regression results. In the first column the subsequent price volatility of a bank is predicted by the control variables, in the second column our measurements of the social embeddedness of bank elites are introduced and in the third column current stock price volatility is additionally considered. Finally, the fourth column checks for the robustness of the results by excluding control variables, therefore minimizing potential problems of multicollinearity.

As indicated in column I, bank volatility increases with bank size and board diversity, i.e. in boards which consist of a diversity of national backgrounds and in which the elite is affiliated with a diversity of industries due to multiple directorships. The findings can be best explained by enlarged communication and coordination problems within these banks. Overall the control model explains 10.12% of stock price volatility.

Column II additionally considers the social embeddedness of corporate elites outside their banks. As predicted in hypothesis 1 network centrality reduces the subsequent stock price volatility of a bank while network fragmentation enlarges its stock price volatility as supposed in hypothesis 2. Furthermore, as predicted in hypothesis 3, brokerage between fragmented groups reduces stock volatility. The effect is however weak, i.e. only significant at the 10% level. In line with hypothesis 4, turnover within fragmented groups reduces the volatility of share prices (consider that the item is reversed coded, i.e. higher values indicate group stability or no turnover). Finally, as predicted in hypothesis 5 industry diversity within fragmented groups strongly reduces the volatility of share prices. Overall the embeddedness model significantly increases the explanatory power to predict stock price volatility (Likelihood-ratio test = 25.46\*\*\*) and explains 14.29% of the variance.

Column III additionally controls for current stock price volatility. The empirical findings with regard to social embeddedness are stable while the explanatory power of the model increases to 19.04% (Likelihood-ratio test = 18.45\*\*\*). Finally, column IV demonstrates that the findings are stable if control variables are excluded. Without control variables the explanatory power of the former model is reduced to 15.10%.

Apart from statistical significance the economic importance of the obtained effects is of interest. Figure 5 shows the marginal effects of social embeddedness by relying on the regression results in column III. A central position in social networks, even though statistically highly significant, has a negligible impact on a reduction in volatility. The strongest effect size can be obtained with respect to network fragmentation. In companies in which the corporate elite is embedded in non-fragmented networks stock price volatility is reduced by 7% as compared to companies in which the corporate elite is embedded in highly fragmented networks. A volatility reduction of 7% is of economic importance: it corresponds to 13% of the total variance of stock price volatility as obtained in our sample (Minimum: .32%, Maximum: 55.43%). The empirical finding corresponds with embeddedness theory suggesting that empirical markets strongly deviate from ideal-typical markets; due to the restrictiveness of micro-networks market exchange becomes more decentralized, diffused, and fragmentary (Baker, 1984; Hirschman, 1982; White, 1981).

**Table 4.** Descriptive statistics and correlations

<b>ID</b>	<b>Variables</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	
1	Ln Volatility t+1	-2.65	.82	-5.76	-.59																
2	Ln Volatility	-2.65	.82	-5.76	-.59	.74															
3	Network centrality	49.64	29.27	.00	128.00	-.13	-.14														
4	Network fragmentation	26.09	24.64	.00	128.00	-.14	-.15	.57													
5	Brokerage between fragmented groups	6.41	9.61	.00	95.00	-.09	-.09	.23	.41												
6	Turnover within fragmented groups (reverse)	.42	.39	.00	1.00	-.05	-.14	.07	.20	.25											
7	Industry diversity within fragmented groups	.20	.14	.00	.46	-.14	-.10	.18	.19	.17	.28										
8	Ln assets	16.19	2.01	11.51	21.60	.00	-.01	.42	.46	.34	.16	.19									
9	Dividend yield	1.00	.01	.89	1.05	-.03	.02	.08	.07	.11	.11	.24	.01								
10	Log bank profit from interest	11.73	1.78	7.00	16.31	-.10	-.11	.45	.51	.36	.15	.15	.97	.03							
11	Change major shareholder	.28	.45	.00	1.00	.13	.13	-.14	-.07	-.05	-.02	-.09	.14	-.13	.03						
12	Board size	15.35	4.40	7.00	29.00	-.15	-.14	.51	.49	.27	.10	.06	.48	.03	.49	-.03					
13	Percent of non-executives	.61	.11	.24	.86	-.28	-.29	.18	-.10	.02	.03	.07	.04	.05	.11	-.15	-.15				
14	Board tenure (days)	2218.19	1103.94	30.60	6170.30	-.13	-.15	.20	-.21	-.13	.03	-.01	-.15	.05	-.10	-.27	.15	.32			
15	Industry diversity board	.77	.16	.00	.93	-.09	-.11	.20	.23	.23	.14	.10	.34	.03	.41	-.17	.16	.25	.07		
16	International diversity board	.14	.21	.00	.75	.50	.49	.10	-.03	.06	-.09	-.09	.37	-.06	.27	.26	.19	-.30	-.31	-.09	

Legend: N=570

**Table 5.** Effects of social networks of managerial elites on bank volatility in the next time period

Column Variables	I			II			III			IV			Sig.			
	Coef.	Std.Err.	t	Sig.	Coef.	Std.Err.	t	Sig.	Coef.	Std.Err.	t	Sig.				
Volatility	-	-	-	-	-	-	-	-	0.24	0.04	5.43	***	0.29	0.04	6.89	***
Network centrality	-	-	-	-	-0.01	0.00	-2.58	**	-0.01	0.00	-2.18	*	-0.01	0.00	-1.99	*
Network fragmentation	-	-	-	-	0.01	0.00	2.80	**	0.01	0.00	2.69	**	0.01	0.00	2.74	**
Brokerage between fragmented groups	-	-	-	-	-0.00	0.00	-1.89	†	-0.00	0.00	-1.82	†	-0.00	0.00	-1.65	†
Turnover within fragmented groups (reverse)	-	-	-	-	0.12	0.06	1.96	*	0.15	0.06	2.57	**	0.16	0.06	2.73	**
Industry diversity within fragmented groups	-	-	-	-	-0.71	0.21	-3.36	***	-0.61	0.21	-2.92	***	-0.85	0.18	-4.86	***
Log assets	0.91	0.17	5.37	***	0.80	0.18	4.51	***	0.61	0.18	3.47	***	-	-	-	-
Dividend yield	-0.39	2.62	-0.15		1.92	2.66	0.72		0.41	2.60	0.16		-	-	-	-
Log bank profit from interest	-0.15	0.10	-1.56		-0.17	0.10	-1.70	†	-0.12	0.10	-1.20		-	-	-	-
Change major shareholder	-0.02	0.07	-0.34		-0.04	0.07	-0.61		-0.04	0.07	-0.65		-	-	-	-
Board size	0.00	0.01	0.04		0.01	0.02	0.69		0.01	0.02	0.79		-	-	-	-
Percent of non-executives	-0.80	0.47	-1.70	†	-0.33	0.48	-0.69		-0.18	0.48	-0.38		-	-	-	-
Board tenure	0.00	0.00	0.17		0.00	0.00	-1.22		0.00	0.00	-0.72		-	-	-	-
Industry diversity board	0.96	0.30	3.24	***	0.83	0.30	2.79	**	0.68	0.29	2.37	*	-	-	-	-
International diversity board	1.71	0.43	3.96	***	1.44	0.44	3.27	**	1.06	0.44	2.43	*	-	-	-	-
_cons	-15.57	3.79	-4.11	***	-15.77	3.80	-4.15	***	-11.35	3.79	-2.99	***	-1.73	.15	-11.59	***
Number of observations			570				570				570				570	
Number of groups			30				30				30				30	
R-square (within)			0.1012				0.1429				0.1904				0.1510	
Likelihood-ratio test			-				25.46	***			18.45	***			-	

*Legend:*

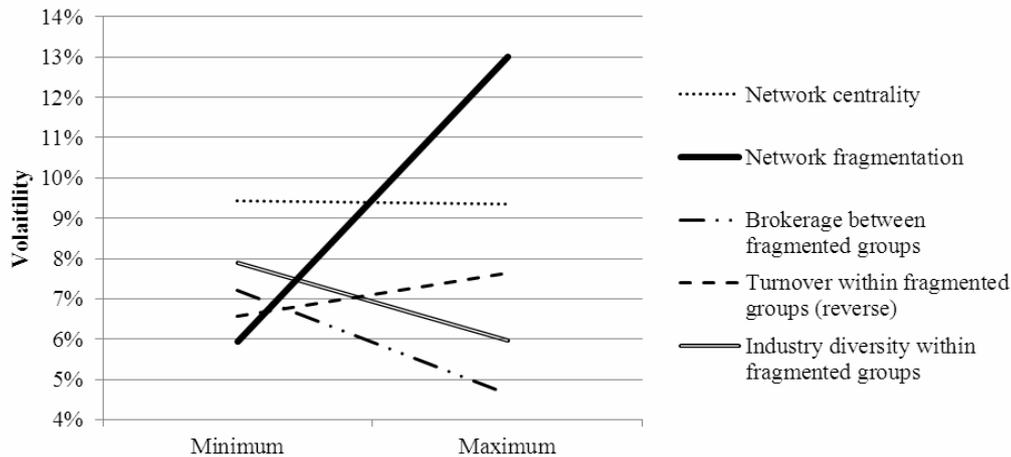
Dependent variable volatility t+1

Panel Fixed effect model

\*\*\* p &lt; .001, \*\*p &lt; .01, \*p &lt; .05, †p &lt; .10

Further, even though brokerage is statistically only weakly significant it is of economic importance. The stock price volatility of banks in which corporate elites act as brokers between fragmented network clusters is reduced by 3% corresponding to a 5% reduction of the total variance of stock price volatility in the sample. Finally, industry diversity in networks diminishes volatility by 2% (corresponding to a 3% reduction of the total variance of stock price volatility as obtained in the sample) and member turnover in social groups weakens volatility by 1% (corresponding to a 2% reduction of the total variance of stock price volatility as obtained in the sample).

**Figure 5.** Marginal effects of social embeddedness on stock price volatility



*Legend:* Marginal effects were calculated for the regression model in Table 5, Column III.

## Discussion

The empirical findings give temporary support for the embeddedness view on corporate governance: multiple directorships have an impact on stock price volatility. Personal contacts provide the kind of rich information not available through other sources, in particular not through public sources as argued by the mainstream economic view and the underlying efficient market hypothesis (Fama, 1970; Smith, 1776 (1976)). Markets lack a rich and common rating language. The language problem is particularly severe where the judgments to be made are highly subjective, as for example about the future company value. It has been shown that bank elites embedded in less-fragmented social networks or acting as broker between fragmented social clusters reduce investors' uncertainty. For investors corporate elite embedded in less-fragmented social networks, i.e. belonging to the same social circle, reduce the risk of market exchange as dense ties among members provide a basis for trust and a means for coordinating action, reduce valuation problems by establishing a common base of recognition within the market and reduce uncertainty with regard to profit because they share similarities and trust each other which is useful for mutual agreements and concerted actions. Brokers between loosely connected social circles overcome problems of social fragmentation in empirical markets. They reduce the risk of market exchange because they are considered as trustworthy by multiple groups and have first-hand access to a diversity of relevant information, reduce valuation problems because first-hand information about their companies quickly diffuses in the market, and reduce uncertainty with regard to profit because information and control benefits are useful to gain advantages over competitors. Multiple directorships thus do matter for the effectiveness of corporate governance: they help to reduce volatility in financial markets.

From a practical point of view the results suggest that personal ties between corporate elites and other market actors dampen the volatility in financial markets. Regulatory pressure against multiple directorships will therefore most likely not improve the efficiency of corporate governance but rather worsen it. Beneficiaries may be hedge funds and other financial investors having an interest in extremely volatile stock prices but not the majority of shareholders and the public. With respect to the increasing globalization and deregulation of financial markets social embeddedness is expected to increase in importance. Large markets are by nature highly fragmented. Taken this together with current corporate governance reforms trying to prevent multiple directorships, it may – among other things – explain why financial crises in the last decades occur more frequently, more unpredictably and more heavily.

From a theoretical point of view our results suggest that standard economic theory, and in particular financial theory, should start to include sociological aspects in their models and predictions. Within these models the social character of markets is mostly neglected by oversimplifying these institutions as hyper-efficiently. Even though the new paradigm of behavioral finance recognizes that the existing standard theory is only true within specific boundaries, it focuses on the identification of psychological decision attributes which for complex, ill-structured tasks – like the stock valuation of investors – give rise to great variability in decision outcomes. It is considered that under risk and uncertainty, individuals use simple rules of thumb or heuristics (Basov, Blanckenberg, & Gangadharan, 2007), which lead to so called decision anomalies (Ellsberg, 1961), and that human decisions can be constrained by emotions (Naqvi, Shiv, & Bechara, 2006). However, behavioral finance still neglects social embeddedness (one exception may be current research on herding). Furthermore, psychological or behavioral economics broadens the standard economic model in terms of bounded self-interest (Frey, 1997; Frey & Benz, 2004). It suggests that individuals can derive utility from the activity itself (Deci, 1975; Frey & Jegen, 2001). Again, theoretical developments stop at the individual level and characteristics of groups and social networks are not considered. As shown in this research and before social embeddedness has to be considered in economic theory: it does can prevent the misspecification of economic actions.

With respect to further research is interesting to investigate the link between social embeddedness and uncertainty in financial markets more deeply, for example in different time periods, i.e. in times of financial crisis and in stable time periods, in different institutional settings, e.g. in globalized, fragmented economies and less globalized, less fragmented economies, or under different incentives regimes, e.g. in countries putting multiple directorships under pressure and in less regulated countries. It will improve our understanding on the link between social embeddedness and uncertainty in financial markets.

The empirical setting of this study has limitation which is important when interpreting the results. First, the results are restricted to one country and one industry. The findings may differ in other institutional settings. Second, the ego-networks are empirically restricted to the outgoing ties of Swiss banking elites. With respect to network fragmentation and brokerage we therefore only obtain parts of the network. Even though it is impossible to collect data on the whole network of all corporate elites in all industries over the world, the results may change if more parts of the network would be included. Further research may partially overcome this weakness by including the second-order networks, i.e. the networks of actors with which the focal corporate elite is connected.

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