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Corporate Governance and the Design of Board of Directors

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To my father, my mother and my family

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Moursli Mohamed Reda
Gothenburg, August 2015

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Introduction

During the past decades a series of high profile corporate scandals paved the way for a wave of regulatory reforms addressing the governance of publicly traded firms. The concept of good governance practices gained more ground and materialised in governance codes such as the influential 1992 Cadbury Report in the UK and the 2002 Sarbanes-Oxley Act in the US (Dahya et al., 2002; Romano, 2005). In 2003, the European Commission issued a guide for good governance practices, which aimed at harmonising governance practices across Europe. These reforms opened the door for a large debate in the literature regarding what constitutes good governance practices, and how alterations to board composition can impact firm outcomes.

It appears that regulators share similar views regarding board independence in that more independent directors in boardrooms is encouraged, if not imposed. In principle, independent directors are expected to reduce agency costs through a better monitoring of management (Hermalin, 2005) and large shareholders (La Porta et al., 1999; Denis and Sarin, 1999), and contribute with their expertise in improving firm performance (Adams et al., 2010). However, Raheja (2005) and Adams and Ferreira (2007) argue that imposing a quota on the number of independent directors on boards might not be optimal for every firm, especially in the presence of asymmetric information. Moreover, based on empirical evidence, our understanding of the effect of board independence on firm valuation is often limited by endogeneity issues, and the absence of a consensus in the existing literature regarding the direction of this relationship (Hermalin and Weisbach, 1991; Bhagat and Black, 2000; Agrawal and Knoeber, 1996; Bhagat and Bolton, 2009).

Another aspect of this debate is whether busy directors, i.e. directors holding multiple directorships, impact on the working of boars. Besides authors that consider holding multiple directorships as a signal of talent (Fama and Jensen, 1983), a large body of literature argues that busy directors are more time constrained, which may limit their advisory and monitoring roles, and finds that busy directors can harm shareholder value (Lipton and Lorsch, 1992; Cashman et al., 2012; Fich and Shivdasani, 2006).

In the first chapter, "The Effects of Board Independence on Busy Directors and Firm Value: Evidence from Regulatory Changes in Sweden," I investigate the effect of majority-independent boards on firm's market valuation in Sweden. In 2005, a Corporate Governance Code was enacted in Sweden, which mandates firms on the Stockholm Stock Exchange with a *market capitalisation* larger than three billion Swedish kronor to have majority-independent boards. This exogenous change to board structure offers a quasi-experimental setting that allows the measurement of the causal effect of board independence on firm market valuation.

Based on a sample of 6052 director-year observations between 2004 and 2006, I use a regression discontinuity design to compare firms right above and below the threshold of compliance set by the code. After controlling for common firm and board characteristics, I find that the market responded negatively to the independence requirement. Target firms witnessed a decrease in their market valuation, measured as the change in Tobin's Q, ranging from 14% to 23% compared with non-target firms. Using an instrumental variable approach, where I use assignment to treatment to instrument for compliance, I find that target firms that complied with the code witnessed a larger decrease in market valuation compared with non-complying firms. The latter result indicates that the effect of board independence is more pronounced for complying target firms than for firms that did not comply with the code.

Next, I explore whether the increase in the number of independent directors resulted in an increase in the busyness of the boards, which in turn might explain the negative reaction of the market. The motivation for this channel is the fact that the code does not restrict the number of directorships a director can hold. Thus, increasing the number of independent directors on a board might cause the boards to become busier. Using a regression discontinuity design, where the dependent variable is board busyness in 2006, i.e. the sum of outside directorships held by independent directors, I find that independent directors of target firms hold on average two directorships more than their counterparts in non-target firms. This effect is more pronounced when I compare complying firms with non-complying firms. Instrumenting for compliance using assignment to treatment, I find that independent directors of complying firms hold on average 3–4 outside directorships more than counterparts in non-complying firms.

The first contribution of this paper is to a growing literature that exploits regulatory changes to study the causal relationship between board structure and firm outcomes, and mitigate endogeneity issues due to reverse causality.[1] The negative causal effect of board independence on shareholders' wealth in Sweden seems to be in agreement with most conclusions about board independence in the US. Despite the absence of a consensus, the general pattern is that board independence has no significant effect (Hermalin and Weisbach, 1991; Bhagat and Black, 2000) or a negative effect (Agrawal and Knoeber, 1996) on firm value or performance. However, the effects of similar regulatory changes on firm outcomes are contingent on the economic context surrounding the changes, and the corporate culture prevailing in each country. Black and Kim (2012) studies a similar regulatory change in 1999 in South Korea, and find that an increase in board independence is associated with large gains in share price and firm value. Despite similarities in ownership structure in the two countries, private benefits of controlling shareholders are highest in South Korea and are among the lowest in Sweden (Nenova, 2003). The recovery of South Korean firms from the East Asian crisis in 1997, and the introduction of corporate governance reforms that curbed private benefits of control by large owners, can explain the posi-

[1] Recent studies that use a regression discontinuity design to study the effect of board level changes on firm outcomes include Cunat et al. (2012), Iliev (2010), and Black and Kim (2012).

tive reaction of the market to the new reforms.[2] Market conditions in Sweden in 2005 were relatively stable, and the negative reaction of investors to board independence might be a temporary response to market expectations of an increase in board busyness.

The second contribution of this paper is the identification of board busyness as an important factor in determining the relationship between board independence and firm market valuation in Sweden. Post-reform, target firms were faced with a limited supply of independent directors, which created a trade-off between board independence and board busyness. This finding has implications for corporate governance policies, as imposing quotas on board independence might not be optimal for all firms, while in principle one would expect to see a more optimistic reaction from the market towards board independence.

In order for a board to be well functioning, firms incentivise their directors to fulfil their advisory and monitoring duties. Alongside director's compensation and share ownership (see e.g. Jensen and Meckling, 1976; Himmelberg et al., 1999; Bebchuk and Fried, 2003), one important aspect of director's incentives is reputation concerns. According to Fama and Jensen (1983) and Levit and Malenko (2015), the existence of a market for directorships is an incentive for outside directors to monitor the management and signal their expertise to the market. Malenko (2013) also contends that reputational concerns for directors can materialise through their desire to conform with their peers in terms of decision making to preserve a certain level of reputation within corporate boards.

Masulis and Mobbs (2014a,b) argue that directors with multiple directorships might choose to exert more effort in their most valued directorships than in their least preferred ones. This departs from the implicit assumption used in

[2] The weak corporate governance that prevailed in South Korea during the East Asian crisis in 1997 aggravated the negative performance of Korean firms and drastically increased minority shareholder expropriation (Johnson et al., 2000; Mitton, 2002).

the literature where directors value their directorships equally. They measure firm's reputation and prestige using relative firm size.[3] While firm size is a good proxy for a firm's prestige, it does not fully capture the amount of reputation a director can effectively extract from that prestige. Subrahmanyam (2008) contends that social networking can be a valuable source of information regarding the skills of each director. Measuring centrality in a network amounts to capturing the relative importance of a node, which can be an individual or a firm, in terms of information dissemination and connectedness to other nodes in a network (Borgatti, 2005). Tirole (1996) argues not only that the reputation of the firm can impact that of its agents, but also that a group's reputation depends mainly on the reputation of its individuals. In this respect, social network theory can be applied to map the centrality of a board to the network of firms and, thus, be used as an alternative measure to firm size in measuring reputational incentives to directors.

In the second chapter, "The Value of a Directorship in the Eyes of Busy Directors," I study the effects of directors' reputation incentives on their commitment to board duties and assess their impact on the market valuation of firms in Sweden. I use 13 651 director-firm-year observations over a period of eight years to map the social network of Swedish publicly traded firms, and I use network centrality to measure reputational incentives of directors and corporate boards.

First, I investigate if directors commit more time and effort to directorships they consider more prestigious compared with directorships they consider less prestigious. Following Masulis and Mobbs (2014a), I use board meeting attendance to measure directors' commitment to their directorship. I find that the probability of directors missing board meetings is lower (higher) for firms that are considered more (less) prestigious. Second, I test if shareholders' wealth, measured as the change in Tobin's Q, benefits more from the talent and effort of

[3] Many studies empirically investigate the effects of reputational concerns on director's effort and firm outcomes (see e.g. Fos and Tsoutsoura, 2014; Yermack, 2004 and Jiang et al., 2014).

directors in firms viewed as more prestigious than in firms that are considered less prestigious. I find that firms with a higher proportion of directors considering them more prestigious witness a higher market valuation than firms with a lower proportion of directors considering them more prestigious. Third, I use director-level network to evaluate the centrality of individual directors relative to their peers. I identify directors with high reputation and use their board appointments to assess their impact on the market valuation of firms. I find that appointing independent directors with a high reputation impacts shareholders' wealth positively, and vice versa for independent directors with low reputation.

The contribution of this paper is threefold. First I expand on the work of Masulis and Mobbs (2014a,b) and use the network centrality of the firm as a measure of reputation. I find that for Sweden, where the network of corporate boards is highly connected, measures of network centrality seem to capture some aspects of directors' reputational incentives, even after controlling for firm size and relative firm size. Second, I contribute to the literature on social network applied to corporate boards where board network is often used to measure interlock, and director network is used to measure director busyness (see e.g. Larcker et al., 2013 and Fracassi, 2014). I bring another perspective on how connections among directors at the individual and board levels could capture reputational incentives for directors. Finally, I provide a more complete picture of social networks in Swedish boards over time, and empirically identify the importance of board and director networks for the reputation of directors in Sweden. This complements findings by previous studies which establish social networks as an important form of informal governance mechanism in Swedish boards (Sinani et al., 2008; Edling et al., 2012).

The difference in the quality of institutions across countries plays a central role in identifying what drives equity price variations in each market. In fact, the quality of corporate governance, and the extent of law enforcement within a country have an impact on dividend policy, stock return performance, and equity market volatility (La Porta et al., 2000; Harvey, 1995). Chen et al. (2012) find evidence of dividend growth predictability using dividend yield in the US in the pre-World War II period, while Rangvid et al. (2014) find that dividend growth predictability is the dominant form of predictability in international equity markets. Both studies argue that the presence of dividend growth predictability depends on the level of dividend smoothing. I hypothesise that if countries with high investor protection display higher dividend smoothing than countries with low investor protection, dividend growth predictability should be more common in countries with poor investor protection and weak institutions.

I further explore the connection between the quality of institutions in a country and return and dividend predictability in the last chapter, "Investor Protection and the Predictability of Dividends and Returns: A Cross Country Comparison." First, I compare return and dividend growth predictability across 59 countries using the Campbell and Yogo (2006) Bonferroni test of predictability for inference. I use monthly series for return, dividend growth and dividend yield in individual country regressions for the period 1973–2013 and find that dividend growth predictability is dominant in countries with small and medium-sized equity markets, while return predictability is mainly present in larger economies such as the US and Japan. These findings confirm the evidence reported in multi-country studies by Hjalmarsson (2010) and Rangvid et al. (2014). I reach similar conclusions using Cochrane's 2008 long-run coefficients, which measure the proportion of variation in the dividend yield that is due to variation in expectations about returns and dividend growth.

Second, after documenting the presence of dividend growth predictability in most countries, I investigate whether shared governance quality characteristics across countries can explain this predictive pattern. I measure governance quality using eight different indices that are widely used in cross-country comparisons (La Porta et al., 2006; Djankov et al., 2008). To measure the level of minority shareholders' rights, I use the anti-self-dealing and the anti-director rights indices from Djankov et al. (2008). The second aspect of governance quality is the strength of the legal system, which I measure using the rule of law index and corruption index (Kaufmann et al., 2009) and the public enforcement index from Djankov et al. (2008). The last aspect of governance quality is the importance of capital markets to the economy. I use the ratio of market capitalisation to GDP, the ratio of listed companies to the population, and the ratio of the value of shares traded to GDP to capture the importance of capital markets (La Porta et al., 2006; Djankov et al., 2008).

Following Leuz et al. (2003), I use mean clustering to assign countries with similar investor protection quality, law enforcement levels and capital markets development to three clusters. The first cluster contains 31 countries with low investor protection rights, weak legal systems and undeveloped capital markets. The second cluster contains 18 countries with low investor protection, strong legal systems and medium-sized capital markets. The third cluster consists of countries with high investor protection, average legal systems and large capital markets. I estimate predictive regressions for equally weighted and value-weighted portfolios and compute the corresponding Cochrane (2008) long-run coefficients. I find strong evidence of dividend growth predictability in clusters 1 and 2, where weak investor protection is the shared characteristic, suggesting that dividend growth predictability is more linked to lower levels of shareholders' rights protection than to law enforcement and capital markets' development. For countries with large capital markets and high levels of investor protection in cluster 3, return predictability is the dominant form of predictability. Using Campbell and Yogo's (2006) Bonferroni test of predictability, I find that dividend growth predictability is dominant in cluster 2, whereas return predictability is dominant in cluster 3. The main difference between clusters 2 and 3 is the level of investor protection, which lends more support to the hypothesis that dividend growth predictability is characteristic of countries with weak investor protection levels, and vice versa for returns.

The main contribution of this paper is the identification of the quality of investor protection as a factor influencing the type of predictability in a country. I expand on the argument by Rangvid et al. (2014) regarding the role of dividend smoothing for the presence of dividend growth predictability, and find that dividend growth predictability is linked more to lower levels of shareholders' rights protection than to law enforcement and capital market development.

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PAPER 1

The Effects of Board Independence on Busy Directors and Firm Value: Evidence from Regulatory Changes in Sweden.

Moursli Mohamed Reda[*]

Abstract

I use an exogenous change to the rules of corporate governance for Swedish firms in 2005 to identify the causal effects of changes in board structure on firm value. The new rules require there to be at least 50 per cent independent directors on the boards of large firms. This offers a quasi-experimental setting where I test for the effects of changes to board independence on the market valuation of firms measured by Tobin's Q. In order to identify the effects of this shock, and alleviate endogeneity issues inherent to corporate governance studies, I use a regression discontinuity design to capture the reaction of the market to the new governance rules, taking advantage of the fact that only large firms are required to comply with the code. The results indicate that (a) the market reacts negatively to the enactment of the new governance rules, and (b) target firms that complied with the independence requirement have a lower Tobin's Q than non-target firms. I further investigate potential causes behind the estimated negative effect by looking at the busyness of independent directors. The code imposes an increase in the number of independent directors but does not restrict the number of outside directorships they can hold. Thus, an increase in board independence can lead to an increase in board busyness, which can explain the negative reaction from the market. Results indicate that in reaction to the code, target firms have more busy independent directors than non-target firms.

Keywords: Board independence, independent directors, busy directors, corporate governance, Sweden
JEL classification: G32, G34, G38

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1 Introduction

In recent years, the concept of good governance practices has gained ground and formed the basis for a wave of governance codes such as the influential 1992 Cadbury Report in the UK, the 2002 Sarbanes-Oxley Act in the US and the European Commission's guide for good governance practices in 2003. From these codes, it appears that regulators share similar views regarding board independence in that more independent directors in boardrooms is encouraged, if not imposed. In 2005, a Corporate Governance Code was enacted in Sweden (referred to simply as 'the code' below), which mandates large firms to have majority-independent boards. In principle, independent directors are expected to improve the monitoring of management (Hermalin, 2005) and contribute with their expertise in improving firm performance (Adams et al., 2010). However, imposing a quota on the number of independent directors on boards might not be optimal for every firm, as argued by Adams and Ferreira (2007) and Raheja (2005). Moreover, based on empirical evidence, our understanding of the effect of board independence on firm valuation is often limited by endogeneity issues and the absence of a consensus in the existing literature regarding the direction of this relationship (Hermalin and Weisbach, 1991; Bhagat and Black, 2000; Agrawal and Knoeber, 1996; Bhagat and Bolton, 2009).

This paper investigates the effect of imposing a majority-independent board on firm's market valuation measured using Tobin's Q. I take advantage of the exogenous shock to board independence in Sweden caused by the enactment of the code, which mandates large public firms to have at least 50 % of their board members independent of the firm, the management and the largest owner.[1] Based on a sample of 6052 director-year observations, I measure board characteristics and aggregate them at the firm level resulting in a final sample of 239 firms and 735 firm-year observations from 2004 to 2006. The dependent vari-

[1] A firm is defined as large if it is has a market capitalisation larger than three billion Swedish kronor (SEK). All values throughout the paper are reported in SEK. The SEK-USD exchange rate was 0.1259 at the end of 2005.

able of interest is the change in Tobin's Q from year end 2004 to year end 2005, labeled ΔTobin's Q.

I use a regression discontinuity design to compare firms right above and below the threshold of compliance set by the code, which is defined as a *market capitalisation* above three billion. In such a setting, differences in ΔTobin's Q of firms right above and below the cutoff can be attributed to the enactment of the code. The main finding is that target firms witnessed a larger decrease in ΔTobin's Q compared with non-target firms in 2005. This result indicates that the market responded negatively to the independence requirement.[2] The second finding is that boards are busier in target firms than in non-target firms. In fact, independent directors of target firms hold on average two directorships more than their counterparts in non-target firms. One explanation for this is that independent directors are hired from a limited supply pool of directors, which increases board busyness. Finally, using an instrumental variable approach, where I use assignment to treatment to instrument for compliance, I find that target firms that complied with the code witnessed a larger decrease in ΔTobin's Q compared with non-complying firms. Complying target firms also appear to have more busy independent directors post compliance, compared with non-complying firms. The latter findings lend more support to the casual effect of the requirement of majority-independent boards on board busyness and shareholder wealth. The stronger decrease in ΔTobin's Q for complying target firms specifically points to the possibility that the negative market reaction is more pronounced vis-à-vis the majority-independent board requirement, compared with the hiring of individual independent directors per se.

The contribution of this study is twofold. First, I contribute to a growing literature that exploits regulatory changes in corporate governance to identify

[2] I control for firm characteristics, board characteristics, and industry dummies in all specifications. I also include cubic and quadratic effects of the distance from the threshold. In their regression discontinuity designs, Cunat et al. (2012), Black and Kim (2012) and Iliev (2010) also use polynomial regressions.

causal effects of board independence on firm outcomes. The use of a quasi-experimental setting where the change in board independence is exogenous to target firms allows us to mitigate, at least partially, endogeneity problems due to reverse causality and unobservable factors. Studies on the relationship between board structure and firm performance often suffer from severe endogeneity issues. As reported by Hermalin and Weisbach (1998), the direction of causality can go the opposite way where better performing firms might choose better corporate governance practices or changes in board structure come as a response to previous bad firm performance.[3]

In recent years, a growing literature has exploited regulatory changes in corporate governance to identify causal effects of board characteristics on firm outcomes. These exogenous shocks to governance offer quasi-experimental settings where the causal relationship between changes to the board and firm performance can be investigated within a regression discontinuity design (recent examples include Cunat et al., 2012 and Iliev, 2010). In a study closely related to the present paper, Black and Kim (2012) investigate the effects of a regulatory change in 1999 in South Korea, mandating large firms to have a majority-independent board and an audit committee. They find that an increase in board independence is associated with large gains in share price and firm value. Their setting is perhaps the closest to my paper, especially since both of us study two countries with financial markets that are relatively small. However, I find that for a similar regulatory change, the Swedish market reacted differently to board independence compared with the Korean market.

Differences in findings between the current paper and Black and Kim (2012) can be explained by differences in the economic context preceding the adoption of the codes. The South Korean corporate governance reforms in 1999 came after the East Asian financial crisis in 1997 and 1998. Several studies find that

[3]For a discussion of endogneity problems in corporate governance studies see for example (Black et al., 2006; Wintoki et al., 2012; Bhagat and Bolton, 2008)

weak corporate governance had a significant impact on the negative performance of Korean firms before (Joh, 2003) and during the crisis (Johnson et al., 2000; Mitton, 2002; Baek et al., 2004). Mitton (2002) finds that firms with more transparent accounting disclosure, higher outside ownership and lower corporate diversification experienced significantly better stock performance during the crisis. Baek et al. (2004) show evidence that chaebol firms with high ownership concentration and firms where the voting rights of controlling shareholders exceeded ownership rights witnessed large equity drops and worse stock performance than firms with larger foreign equity ownership and better disclosure quality.[4] In Sweden, prior to the enactment of the new code in 2005, there was no major market shock that could lead to market-wide financial instability or firm underperformance. The reforms of corporate governance practices in Sweden in 2005 continued a process that started in the 1990s, and gained momentum in 2001.[5] Unlike Korean boardrooms where outside (independent) directors were introduced in 1999, Swedish boards were already composed of outside directors prior to 2005, and the new code focused mainly on their independence. Finally, changes in South Korean corporate governance code targeted also related party transactions and introduced audit committees, with the aim of reducing self-dealing by large owners and promoting more transparent accounting reporting.

Dissimilarities in terms of corporate structure and corporate culture prevailing in the two countries could also explain differences in the reaction of the two markets to board independence. The structure of the Korean economy, dominated by chaebols, concentrated ownership control and opaque reporting practices, led to a higher expropriation of minority shareholders by controlling own-

[4] Mitton (2002) covers South Korea, Malaysia, the Philippines, and Thailand, whereas Baek et al. (2004) focus on Korean firms. Chaebols are large family run conglomerates in South Korea characterised by complex networks of cross-owned firms ensuring control by the founding chairman's family (Black et al., 2001).

[5] In 2001, the Swedish Shareholders' Association already defined director independence vis-à-vis the management in a revised version of the 1993 Corporate Governance Policy guide.

ers and managers, and aggravated the effects of the financial crisis. The decline in firm value and performance was higher for firms where controlling shareholders could expropriate minority investors (Johnson et al., 2000; Joh, 2003; Mitton, 2002; Baek et al., 2004). The severity of minority expropriation in Korea is in line with findings by Nenova (2003) that private benefits of controlling shareholders are highest in South Korea, and are among the lowest in Sweden. Dyck and Zingales (2004) also report that Scandinavian countries have the lowest levels of private benefits of control compared with 35 developed and developing countries. According to Agnblad et al. (2001) the low incidence of minority shareholder abuse by controlling owners is a result of informal governance mechanisms such as concerns over social status among Swedish owners.

Comparing the reaction of large conglomerates to changes in corporate governance also highlights differences in the corporate culture between Sweden and South Korea. In their advisory report to the South Korean government, Black et al. (2001) state that the Federation of Korean Industries, i.e. a chaebol collective, rejected all of the authors' propositions and recommendations intended to improve corporate governance practices in Korea, and deemed the changes as excessive state intervention. In contrast, in Sweden the overwhelming majority of consultees supported the proposal to establish a Swedish corporate governance code.[6]

The second contribution of this paper is based on the fact that target firms are faced with a limited supply of independent directors, who are often busy, which indicates that board busyness can be a plausible explanation for the results. Results show that the market reacts negatively to an increase in board independence, while in principle one would expect to see a more optimistic reaction from the market. One potential reason that can explain this negative response can be the increase in board busyness due to the hiring of more inde-

[6]See the report of the code group, i.e. Swedish Government Official Reports SOU 2004:130 submitted to the Ministry of Justice in Sweden.

pendent directors. The code requires a majority of independent directors on the board without imposing any restrictions on the number of outside directorships they can hold. This creates a trade-off for firms between board independence and board busyness. In fact, 43% of the directors in large firms hold at least one outside directorship, whereas in smaller firms only 28% of directors are busy. I look at differences in busyness between independent directors of target and non-target firms. I measure board busyness as the sum of outside directorships held by independent directors in a specific board. I find that in 2006, independent directors of target firms held on average two outside directorships more compared with independent directors in non-target firms. This implies that independent directors of target firms are considerably busier than counterparts in non-target firms.

Views regarding busy directors are divided between those who claim that a busy director is a signal of talent (Fama and Jensen, 1983) and those who think that busy directors have less time to allocate to their directorships, which constraints their advisory and monitoring roles. As reported by Lipton and Lorsch (1992), the main problem for busy directors in the US is the insufficient time to fulfil their responsibilities. Empirically, in a study comparing S&P 500 and non-S&P 500 firms, Cashman et al. (2012) find a negative association between board busyness and firm performance. Fich and Shivdasani (2006) study Forbes 500 firms from 1989 to 1995 and find that firms with boards where a majority of outside directors are busy display lower profitability and weaker corporate governance. On the other hand, Ferris et al. (2003) find no evidence in support of restricting the number of board seats held by a director in US firms with asset values exceeding $100 million.

Finally, the negative response of the market to board independence differs from findings in previous studies of board independence in Sweden. While Palmberg (2012) and Randøy and Jenssen (2004) differ largely from the quasi-experimental setting of this paper, they document the importance of market competition and ownership structure to the role played by independent directors on Swedish boards. My paper expands the literature on Swedish boards by identifying board busyness as a third important factor.

The rest of the paper is organised as follows. Section 2 gives a review of the literature on board independence. In Section 3, I discuss the institutional background of the code in more detail. Section 4 presents sample construction and variable definition. Section 5 discusses the identification strategy and the empirical design. Section 6 presents estimation results for board independence. Section 7 addresses busy boards. Finally, Section 8 concludes the paper.

2 Literature review

2.1 The role and motivation of independent directors on the board

Independent directors play essentially two roles in a board. First, they can have an advisory role where they can benefit the board with their expertise (Adams et al., 2010).[7] Second, they can mitigate agency costs by monitoring the management of the firm. From an agency point of view, monitoring the management aims at aligning the objectives of the CEO with those of the shareholders. Hermalin's (2005) model predicts that more independent boards have more control and oversight over managerial actions.

A more relevant type of monitoring for countries like Sweden, where ownership structure is highly concentrated, is the monitoring of majority shareholders. High levels of ownership concentration render the agency between majority and minority shareholders more problematic than between management

[7] For empirical evidence on the benefits of directors' expertise on firm performance, see Field et al. (2013), who find that busy directors can participate in a beneficial transfer of expertise when sitting as outside directors in IPO firms.

and shareholders (Shleifer and Vishny, 1997; Davies, 2000). If large shareholders are seeking private benefits at the expense of other stakeholders, having independent board members is not a desirable outcome for the former. As discussed by La Porta et al. (1999) and Denis and Sarin (1999), an independent board can effectively reduce expropriation opportunities for controlling shareholders. However, in some situations large shareholders can still benefit from the presence of independent directors if they wish to enforce more monitoring of CEOs (Hermalin and Weisbach, 1988, 1998) or if they want to improve performance (Kim et al., 2007). The Swedish corporate governance code takes into account this dual monitoring role of independent directors by requiring independent directors to be independent of the management and the majority owners.

The efficiency of having independent directors on the board has also been questioned at length in the literature. In fact, several theoretical models point to a potential negative effect of board independence on the working of the board of directors. In their paper on friendly boards, Adams and Ferreira (2007) argue that a large number of independent directors on the board can be sub-optimal for the firm if the CEO is reluctant to share information. This is relevant to the change in governance rules in Sweden, given that the code requires a minimum of 50% of independent directors on the board, which might not be the optimal choice for firms. Similarly, Raheja (2005) presents a model where insider directors are assumed to have more knowledge than outside (independent) directors about firm projects and can extract private benefits from it. Assuming that information acquisition by independent directors is costly, she finds that having a more independent board does not always benefit the firm.

2.2 Empirical evidence on board independence

Several studies have empirically tested the implications of board independence on firm performance and the working of the boards. The general pattern is that board independence has no or a negative effect on firm value and performance.

In a study of 142 firms traded on the New York Stock Exchange, Hermalin and Weisbach (1991) find no significant relationship between board independence and Tobin's Q. Similarly, Bhagat and Black (2000) find no significant relationship between board independence and the long-term performance of 934 US public firms. However, Agrawal and Knoeber (1996) document a significant negative relationship between the number of outside directors and firms' Tobin's Q for the 800 largest US firms. In a more recent study on the relationship between board independence and operating performance in US firms, Bhagat and Bolton (2009) report a negative (positive) and significant relationship pre (post) the Sarbanes-Oxley Act in 2002. Finally, in terms of monitoring, Bhagat and Bolton (2008) find that the likelihood of CEO replacement is higher in firms with more independent boards, which associates board independence with increased level of monitoring.

Most of the empirical evidence comes from studies on the US market, and only a few studies investigate board independence in Sweden. Randøy and Jenssen (2004) study the effect of board independence on firm performance in Swedish firms, measured using Tobin's Q and return on equity. Using OLS to estimate their model, they find that the effect of board independence on firm performance is contingent on the degree of market competition faced by firms. Board independence is found to reduce firm performance in highly competitive industries and vice versa for lower competitive industries. Their argument is that market competitiveness serves as an alternative monitoring tool for the board. Though the substitution argument is compelling, their main specification does not seem to address potential endogeneity problems due to reverse causality. More recently, Palmberg (2012) examines the relationship between board independence, family control and financial performance in Sweden. Using a two-way fixed effects model, she finds that independent boards are associated with higher financial performance, whereas more insider board members impact negatively firm performance.

3 Institutional background

The Swedish Corporate Governance code is an initiative by the Swedish government and private corporate sector organisations. The objective of the code is to provide a set of guidelines to promote good governance and to insure that firms listed on the Stockholm Stock Exchange (SSE) are managed efficiently and in the interest of their shareholders. The first version of the code was released in 2004. After circulating the code among practitioners for comments, it was implemented on 1 July 2005. The application of the code is based on the 'comply or explain' principle. Firms should comply with the code, but can deviate from applying some rules if they replace them with alternative solutions. Deviating firms are also mandated to explain why they deviated from the code in their annual corporate governance reports. Though the code is not a law, by including it in the listing requirement of SSE, it is enforced as a soft law (Jonnergård and Larsson, 2007).[8]

In 2005, the code targeted firms on the Stockholm Stock Exchange's A-list and large firms on the O-list. The main differences between firms on the A- and O-lists concern size and ownership structure. Firms on the A-list are usually larger and more diversely held than firms on the O-list.[9] The definition of what constitutes a 'large firm' is important in this context, given that the threshold of assignment to comply with the code depends on it. Initially, the official Swedish Code of Governance (Swedish Government Official Reports SOU 2004:130) came short in this respect, and defined broadly the target group as firms from the A-list and large firms from the O-list. This, however, ensured that firms did not have exact knowledge about the cut-off point prior to the entry into force of the code in April 2005, which is essential to decrease the risks of manipulation by firms. On 7 April 2005, the press release from SSE announcing

[8] See also Johanson and Østergren (2010) for a discussion and comparison of corporate governance codes and independence requirements between Sweden and the UK.

[9] A number of firms on the O-list are fairly large and comparable in size to large firms on the A-list. Examples are Alfa Laval, Castellum and Hennes & Mauritz.

the enactment of the code defined the target group as firms with market capitalisation larger than three billion.

On the 1 July 2008, the code was extended to all firms traded on the Stockholm Stock Exchange, regardless of their listing and size. According to the code group, the decision to initially target large firms was made to allow smaller firms to learn from the implementation experience of large firms, making the latter bear most of the initial costs of implementing the code. Panel A of appendix 1 reports relevant dates for the issue and application of the code and describes the differences between A- and O-list firms.

The code puts emphasis primarily on the composition of the board and on the duties of the management and board members. I focus on the independence requirement, which mandates firms to have at least 50% independent directors on their boards. I consider this rule to be the most important addition of the code given that it has a direct, and a relatively immediate, impact on boards' voting balance. Along with board independence, the code provides guidelines about audit, remuneration and nomination committees. However, these board duties are already discussed in the Swedish Companies Act (SFS 2005:551), which is legally binding for all firms traded on the SSE, and the real addition of the code was mainly the required independence status of committee members. As formulated by the code, the audit and remuneration committees should consist solely of independent directors, whereas nominations of directors should be made by independent directors only. This emphasises the centrality of directors' independence to the code, and supports the use of the code as an exogenous shock to board independence.

Directors are regarded as independent if they are independent of the company and the management. The code also requires that at least two of the independent directors be independent of the controlling shareholder. The code defines a controlling shareholder as a shareholder with at least 10% ownership or voting rights. One shortcoming of the data is that it is impossible to categorise independent directors according to the nature of their independence. The information reported by firms in their corporate governance reports indicates only whether a board member is independent or not. Finally, the code restricts the possibility of holding outside directorships by the CEO to board approval without limiting the number of outside directorships held by other board members. This implies that incumbent or newly appointed independent directors can hold as many outside directorships as they want.

4 Data description

4.1 Sample construction

I use data for publicly traded Swedish firms domiciled in Sweden in 2004, 2005 and 2006. I start with 6052 director-year observations, which I aggregate to firm-level data.[10] I include only firms with data for the period under study, and exclude financial firms and firms for which accounting or ownership data is not available. The final sample consists of 239 firms and 735 firm-year observations. To identify target (large) firms, I take the average of firms' market capitalisation in 2004 and 2005.[11] I measure board independence, *pidr*, as the proportion of independent directors sitting on the board relative to board size. For each firm, I compute the size of a board as its total number of directors, usually corresponding to board information between May and June of each year. The size of the board includes employee directors, and excludes the CEO when he/she

[10] Board and ownership data are hand collected from Boards of Directors and Auditors in Sweden's Listed Companies, and Owners and Power in Sweden's Listed Companies, SIS Ägarservice, respectively. Data on boards of directors is recorded yearly in May or June, after most firms have held their annual general meetings (AGM). Each year, 10–15 firms hold their AGM after the month of June. Some of these firms hold their AGM in the fall period. Firm data is from Thomson Reuters' Datastream.

[11] The results remain unchanged using market capitalisation at the end of 2004 alone, i.e. firms do not switch positions relative to the cut-off point due to differences between the two measures of market capitalisation.

is not on the board. There is no information available on board independence prior to 2006. However, many directors identified as independent in 2006 were sitting on the board of the same firms in 2004 and 2005. Throughout the paper, I consider such directors as independent in both 2004, 2005 and 2006.

Panel A of Table 1 presents firm-level summary statistics for each year separately. Firms above (below) the cut-off point are firms with a market capitalisation larger (smaller) than three billion. On average, compared to small firms, large firms have three more directors in their board rooms, a larger number of employee representatives and a higher proportion of independent directors. The proportion of independent directors increased in large (small) firms from 24% (6%) in 2004 to 40% (18%) in 2006. Panel B of Table 1 presents information about sample construction and firms' compliance rates with board independence before and after the enactment of the rule. In 2004, a total of 37 firms already had majority-independent boards, while in 2005, 31 firms not targeted by the code voluntarily complied with the independence requirement.[12] Finally, in 2005, a total of 72 firms were targeted by the code, 19 of which already had majority-independent boards in 2004, leaving 53 targeted firms in the analysis.[13]

4.2 Dependent variables and controls

The main dependent variable is the change from 2004 to 2005 in the market valuation of the firm measured using Tobin's Q ratio. The use of Tobin's Q in corporate governance studies follows the work of Morck et al. (1988) who argue that Tobin's Q can reflect the value added to firms of intangible factors such as governance (see also Hermalin and Weisbach, 2001, for more details). I compute Tobin's Q as the market value of the firm plus its total debt relative to the

[12] Among the 18 non-targeted firms that had a majority-independent board in 2004, 14 have data for the whole period. Thus, in 2005, 17 (31–14) non-targeted firms reached 50% board independence.

[13] I systematically exclude from the sample all firms with a majority-independent board in 2004.

replacement costs of its assets, measured as the book value of total assets. From Table 1, we can see that the average Tobin's Q for target firms in 2005 is 1.43, which is lower than the average of 2.40 among non-target firms. However, it seems that the variability in Tobin's Q for non-target firms, with a standard deviation of 3.201, is three times as large as that for large firms.

Firms in the sample differ largely in size, both measured in terms of market capitalisation and asset value. In order to capture potential heterogeneity across them, I control for firm size, leverage and growth opportunities. I use the natural logarithm of total sales to measure firm size. Leverage is the ratio of long-term debt to total assets, and I use an indicator variable if a firm has R&D expenses to capture growth opportunities. Finally, I control for industry effects by including one-digit industry classification.

In terms of board characteristics, I control for board size measured as the number of directors on the board including employee directors. The number of employee directors on Swedish boards is rather large, and influences all measures that use board size in their denominator, which justifies controlling for the proportion of employee directors on the board.[14] I include a dummy variable that indicates if the CEO is not sitting in the board. This measure captures differences between firms where CEOs have no voting power and firms where CEOs can vote, and can be viewed as a proxy of director's independence from the management. Following Bøhren and Strøm (2010), I include age dispersion, measured as the standard deviation of directors' age. I define *CEO busy* as the number of outside directorships held by the CEO of a firm. This measure can be thought of as a proxy for the bargaining power of the CEO relative to the board. This is a result of the restriction put by the code on the number of outside directorships held by the CEO, subjecting them to board approval. Finally, I include

[14]According to the Swedish Board Representation Act employees can elect employee representatives to the board. Two employee representatives can be elected in firms with 25 or more employees, and three employee representatives can be elected in firms with 1000 employees or more.

ownership concentration as a control. Given that the decision to comply with the code is voted at the AGM, the presence of large controlling shareholder certainly influences the outcome of votes on what changes to bring to the corporate governance practices of a firm.

5 Identification strategy and empirical design

5.1 Regression discontinuity design

I use a regression discontinuity design in my estimation, benefiting from the exogenous variation induced by the code in 2005, to estimate the effect of board independence on firm outcomes. Given that the code targeted large firms only, the regression discontinuity design makes it possible to compare firms right above and below the cutoff, set at three billion in market capitalisation. This quasi-experimental setting helps mitigate endogeneity issues due to reverse causality.

In order to reduce continuous effects of firm size on the outcome variables, I follow Lee and Lemieux (2014) and include in my estimation linear, cubic and quadratic polynomials of the distance of firm size from the threshold.[15] The main specification is as follow:

$$\Delta \text{Tobin's Q} = \beta_0 + \beta_1 \times Large + \textstyle\sum_{k=1}^{3} \theta_k \times (X-c)^k + \sum_{k=1}^{3} \gamma_k \times Large \times (X-c)^k + \lambda \times Z + \epsilon \quad (1)$$

where $Large$ is equal to one if a firm i is assigned to treatment and zero otherwise, X is the assignment variable, i.e. the logarithm of market capitalisation, c is the cutoff point equal to three billion (ln) in market capitalisation and $(X-c)$ is the distance of a firm's market capitalisation to the threshold (the score). ΔTobin's Q is proxied by the difference in the logarithm of Tobin's Q

[15]Cunat et al. (2012) use a similar specification in identifying the effect of the voting of governance proposals on shareholder value. Black and Kim (2012) also augment their specifications with polynomials up to order six in their study of the effect of board structure on firm value in South Korea. Finally, Iliev (2010) includes polynomials of order three in studying the effect of SOX section 404 on audit fees for firms in the US.

between years 2004 and 2005.

The coefficient β_1 is the average treatment effect, or the intent to treat effect. The use of a regression discontinuity design allows the estimate of β_1 to be consistent, given that in an arbitrarily small interval around the cutoff, the assignment of a firm to treatment is random. The third term in equation (1), $Large \times (X - c)^k$, is an interaction between large firm dummy and the distance from the threshold. k is the order of the polynomial, included to accommodate different functional forms for the outcome variable above and below the threshold. Z is a set of observable covariates, which are assumed to affect the outcome variables but are unaffected by the enactment of the code, i.e. they show no discontinuity at the threshold.

An alternative identification could be the use of a difference-in-differences approach, where the treatment group consists of target firms and the remaining firms are used as controls. Unfortunately, due to the lack of data on most board variables in 2004, including board independence, I cannot conduct such an analysis. In their study, Black and Kim (2012) use an event study to identify the reaction of the South Korean market to the announcement of the new governance reforms. I consider that the use of a regression discontinuity design is more appropriate in the current setting. A priori, there is no reason to believe that the market would react instantly to the announcement of the code in Sweden, especially since discussions about the code started in 2004 and involved all market participants. Information about the code was released gradually, leaving only the definition of the threshold for compliance unknown. The identification strategy in the present paper is more appropriate in identifying the reaction of the market to firms' compliance with the code rather than the announcement of the reform itself.

5.2 Instrumental variable approach

So far, estimates of β_1 in equation (1) identify the intent of treatment, regardless of the compliance status of firms. I consider board independence the main change brought by the code, which makes it the change in governance that the market reacts to in 2005. To further investigate the effect of the code on the market valuation of firms, I use the treatment dummy *Large* in 2005 to instrument for compliance with the independence requirement. This allows me to identify the impact of the code on target firms that actually complied with the independence requirement. I use two-stage least square (2SLS) to estimate the following model:

$$\text{Compliers}= \beta_0 + \beta_1 \times Large + \textstyle\sum_{k=1}^{3} \theta_k \times (X-c)^k + \sum_{k=1}^{3} \gamma_k \times Large \times (X-c)^k + \lambda \times Z + \epsilon \quad (2)$$

$$\Delta\text{Tobin's Q} = \beta_0 + \beta_1 \times \widehat{Compliers} + \textstyle\sum_{k=1}^{3} \theta_k \times (X-c)^k + \sum_{k=1}^{3} \gamma_k \times Large \times (X-c)^k + \lambda \times Z + \epsilon \quad (3)$$

where I define *Compliers* as an indicator variable equal to one if the difference in *pidr* between 2005 and 2004 is larger than zero for firms above the threshold c, and zero otherwise. The use of this measure allows me to capture the gradual compliance of large firms with the independence requirement. In fact, several firms increased the number of independent directors on their boards in 2005, reaching compliance rates as high as 40%. *Large* is equal to one if a firm i is assigned to treatment and zero otherwise, X is the assignment variable, i.e. the logarithm of market capitalisation, c is the cutoff point equal to three billion (ln) in market capitalisation and $(X-c)$ is the distance of a firm's market capitalisation to the threshold (the score).

Equation (2) is the first stage regression, and equation (3) is the second stage regression. In the first stage, β_1 measures the difference in the probability of compliance between target and non-target firms. In the second stage, I use as explanatory variable $\widehat{Compliers}$, which is the predicted probability of complying with the independence requirement in 2005. The estimate of β_1 in the second stage can be interpreted as an intent to treat effect.

5.3 Rule implementation and firm compliance

The code was enacted in July 2005, and firms had until their annual general meeting in 2006 to comply with it. The code defines large firms as firms with a market capitalisation larger than three billion. Firms on the A-list, and large firms on the O-list were expected to comply with the code. The 'comply or explain' nature of the code resulted in some firms deviating from it, yielding a setting of imperfect compliance. Under such circumstances, the probability of treatment at the cutoff point jumps by less than one, which motivates the use of a fuzzy regression discontinuity design (Lee and Lemieux, 2014; Imbens and Lemieux, 2008). In fact, in 2005, 43 firms out of 72 required to comply with the independence requirement had $pidr < 50\%$. However, among the 43 firms that did not fully comply with the code, only 21 firms had $pidr <= 30\%$, which indicates that firms complied with the code in a gradual manner. Figure $1(a)$ shows the density of board independence, i.e. *pidr* for firms grouped according to whether they are targeted by the code or not. From the left panel, we can see that a large number of small firms had close to zero independent directors, whereas a few of them complied with the independence requirement in 2005. In fact, 18 small and medium-sized firms had a $pidr < 0.5$ in 2004 and voluntarily complied with the independence requirement in 2005. I keep those firms in my sample, and dropping them leads to an insignificant decrease in the estimated coefficients, which does not impact inference. Finally, the right panel shows that half of the firms expected to comply with the code did so only partially, with some extreme cases that had $pidr \approx 0$.

5.4 Testing the validity of the design

I use four sub-samples, each at different distances from the cut-off c, and include more firms gradually. Sub-sample 1 includes firms with a market capitalisation ranging from 1.5 billion to 10 billion. Sub-sample 2 includes firms with a market capitalisation ranging from 1.5 billion to 20 billion. In sub-sample 3, the lower tail starts at one billion and the upper tail includes all 53 large firms. The choice of these ranges is because below one billion, firms are too small with an average market capitalisation of 400 million, which complicates the comparison between large and small firms in the context of a regression discontinuity design. Having a lower range starting at one billion in sub-sample 3 restricts the comparison to firms listed as mid cap and large cap on the Stockholm Stock Exchange. Finally, I also use the full sample of firms regardless of their size. Given the small number of firms in the sample, there is a trade-off between efficiency and bias in the estimation. Using a large sample improves efficiency in estimation, whereas focusing on firms around the cut-off with more comparable characteristics reduces bias from unobservable factors. Figure $1(b)$ plots the distribution of market capitalisation based on whether or not firms are targeted by the code. The vertical lines indicate the three sub-samples and illustrate how the inclusion of non-target firms that voluntarily complied with the code in 2005 does not impact the results. Indeed, most of them lie outside the red lines and are thus more relevant to results that are based on the full sample.

In order for the OLS estimate of β_1 to be unbiased and to capture the effect of compliance, the regression discontinuity design assumes that assignment to treatment around the cut-off is randomised. For local randomisation to hold, firms should not be able to manipulate their market capitalisation to avoid compliance. Manipulation around the threshold implies that firms could anticipate the rule and are subsequently able to reduce the size of their market capitalisation prior to July 2005. Indeed, the anticipation effect is relevant in the sense that firms knew about the code since 2004; however, firms did not have information about the level of the threshold prior to the announcement of the code in July 2005. Moreover, given the 'comply or explain' nature of the code, it is unreasonable to expect that a large number of firms manipulate their market capitalisation to influence their treatment status.[16]

[16]From 2004 to 2005 Kinnevik is the only company that changed listing from the A-list to the O-list, but it was still large enough to be part of the target group.

To formally test for the possibility of manipulation of the assignment variable around the cut-off, in Figure 2 I plot the density of market capitalisation in 2004 and 2005.[17] McCrary (2008) points out that a sharp change in the density of the assignment variable around the threshold implies a discontinuity in the probability of being assigned on either side of the threshold, violating the main identification assumption. The upper panel contains histograms for market capitalisation in 2004 and 2005. The rationale is that if some firms manipulated their market capitalisation to avoid compliance, then we should see a larger number of firms right below the cut-off point in 2005 than in 2004. Based on the histograms, it is clear that in 2005 the number of firms immediately below c is lower than in 2004. The McCrary (2008) density plots presented in the lower panel of Figure 2 also indicate that there is a break at c in 2004 and 2005. This implies that some firms could have manipulated their market capitalisation to avoid compliance. However, despite the evidence against local continuity from the density plots, the risk that firms actually manipulated their size to escape compliance is negligible. First, the magnitude of the break in 2005 is small, covering very few firms, which reduces the seriousness of manipulation around c. In fact, only five (three) firms had a market capitalisation lower (larger) than the threshold c in 2004, and their market capitalisation increased (decreased) in 2005 above (below) c. Second, the code is in a comply or explain format, implying that firms unwilling to comply could simply choose to explain instead of explicitly manipulating their market capitalisation.

Local continuity also implies that potential outcomes should be similar for firms just above and below c, and should differ only after the implementation of the rule (Roberts and Whited, 2012). I follow McCall and Bielby (2012) and test for systematic differences in firm characteristics around c. Table 2 presents test of mean differences for firms close to the cut-off point in 2004, 2005 and

[17] According to Lee and Lemieux (2014) and McCall and Bielby (2012), plotting the distribution of the assignment variable can provide insight about possible manipulation of the assignment variable by firms.

2006. I report results for the three sub-samples. In 2005, the difference in the mean of ΔTobin's Q seems to be statistically insignificant for sub-sample 1 but gets larger the wider the sub-sample used. For instance, in sub-sample 3 we see that the t-test for the difference in the mean of ΔTobin's Q is equal to 2.925. Comparing this result for the same sub-sample in 2006, it shows that the difference in the mean of ΔTobin's Q between firms above and below the cut-off is not statistically significant. Though the results are not straightforward, this finding lends support to the idea that in 2005, a change such as the implementation of the code could impact firms' market valuation. If we look at other firm characteristics, there is a significant difference in terms of firm size, i.e. sales (ln) and board size (ln) between firms above and below the cut-off, across all sub-samples.

Finally, I graphically examine the smoothness of firm and board characteristics around the threshold in 2005. In Figure 3, I plot ΔTobin's Q against the score variable $(X - c)$. Following Lee and Lemieux (2014), I also fit a second- and third-order polynomial above and below the cut-off point to see more clearly how the data behaves. As expected, there is a clear discontinuity in ΔTobin's Q at $c = 0$. The intercept of the polynomial above the cut-off is lower than its counterpart below it. The difference in ΔTobin's Q between firms above and below the cut-off is consistent and stable at higher order polynomials and using different sub-samples.[18] In Figure 4, I report plots for the covariates used in the regression. The idea is that as long as the covariates are smooth around the cut-off point, we should be able to include them as controls in our regression. Most of the variables seem to be continuous at c. In the case of ownership concentration, the jump at the cut-off point should not be a problem given that there is no reason to believe that firms right above c differ systematically in ownership structure compared with firms right below it. Additionally, over time, ownership structure is a slow changing variable. It is possible for a shift from a high

[18] I use the procedure developed by Calonico et al. (2014) to produce the regression discontinuity graphs. The results are similar using sub-samples 2 and 3.

to a low ownership concentration to take place, but that should in principle be independent of market capitalisation.

6 Results

6.1 Regression discontinuity design

I present results from the specification in equation (1) in Table 3, where the dependent variable is ΔTobin's Q and the year is 2005. ΔTobin's Q measures the change in Tobin's Q from end of year 2004 to 2005. I report results for sub-samples 1, 2 and 3 in columns $(1-4)$, $(5-8)$ and $(9-12)$, respectively. Results for sub-sample 1 indicate that target firms have a ΔTobin's Q 23% lower than non-target firms. Models (2)–(4) show that the results for sub-sample 1 are not robust to the inclusion of polynomials of order 1–3. However, this does not invalidate findings from Model (1) as sub-sample 1 contains only firms very close to the cut-off, and including higher order polynomials might not be appropriate in this situation.[19] Similar results are obtained using sub-samples 2 and 3. The magnitude of β_1 varies, but it seems to be significant and robust to the inclusion of higher order polynomials. For instance, in model 5 (9), β_1 is equal to -0.310 (-0.271), which corresponds to a ΔTobin's Q that is 26% (23%) lower for target firms than for non-target firms. In Table 4, I report results using the full sample. Similar to the use of sub-samples, the estimates indicate that ΔTobin's Q is indeed lower for target firms than for non-target firms, with a magnitude that varies between -14% and -22%. In terms of firm and board characteristics, employee directors seem to be positively related to the change in Tobin's Q, while firm size is negatively related to it.[20]

[19]See Gelman and Imbens (2014) for a relevant discussion on the danger of using higher order polynomials.

[20]The results reported in Tables 3 and 4 are robust to the use of total asset (ln) as an alternative to sales in controlling for firm size. I test for a non-linear relationship between firm market valuation and board independence and I find no support for it in the data.

6.2 Instrumental variable approach

I use the assignment to treatment dummy *Large* to instrument for compliance with the independence requirement in 2005. In order for *Large* to be a valid instrument, it should be exogenous, it should predict the actual treatment, and it should impact the outcome variable only indirectly through board independence. Two arguments are in favour of the exogeneity of the instrument. First, prior to the introduction of the code in 2005, there is no indication that firms voluntarily aimed for majority-independent boards. For the firms that had a majority-independent board in 2004, it is unlikely that they did so in expectation of the code in 2005. Second, there is little evidence that firms manipulated their market capitalisation around the cut-off to evade compliance. Only one firm from the A-list in 2004 changed status to the O-list in 2005, but it was still part of the target group given its large size. In addition, deviating from the code and explaining seems a more reasonable alternative for firms than manipulating their market capitalisation.

The exclusion assumption requires that the instrument does not affect the outcome variable directly, and affects it only through compliance with board independence. In principle, the cut-off rule set by the code is based on a listing requirement and firm size, both of which should be unrelated to Tobin's Q at year end 2005. There is no reason to believe that belonging to the A-list or the O-list has a direct effect on Tobin's Q, especially since the eligibility criteria to be part of the A-list are not based on performance.[21] Regarding firm size, I control for the sales (Ln) in all specifications to capture the size effect.

Table 5 reports 2SLS estimates from the model in Section 5.2. Models (1)–(3) report results for sub-sample 1, Models (4)–(6) report results for sub-sample 2 and Models (7)–(9) report results for sub-sample 3. Gelman and Imbens (2014) argue that including polynomials of higher orders close to the cut-off can lead to misleading results. They argue in favour of local polynomial regressions rather

[21]See panel A of appendix 1 for information about criteria to be listed as an A-list firm.

than augmenting models with polynomials with higher orders than quadratic. In addition to their argument, the sub-samples I use allow comparison of a relatively small number of firms, and including high-order polynomials can lead to an unbalanced weighting for observations close to the cut-off. Thus, in Models (2)–(3) I include a polynomial of order one only, while I include a quadratic polynomial in Models (4)–(5), and a cubic polynomial in Models (8) and (9), i.e. the larger the sub-sample, the higher the order of the polynomials included. I also report estimates of β_1 from the first stage, the F-test for the excluded instrument and the adjusted R^2.

A common measure of the strength of an instrument is the F-statistic of the excluded instrument. The F-statistic of the excluded instrument for sub-sample 1 ranges from 7 to 10, which can be a warning sign as to the weakness of the instrument. However, the F-statistic of the excluded instrument using sub-samples 2 and 3 ranges from 17 to 47, which indicates that *Large* is a strong instrument.[22] In seven of nine cases, β_1 from the first stage is highly significant and correctly signed, which indicates that the instrument predicts well the actual treatment. In other words, target firms have a higher probability of complying with the independence requirement compared with non-target firms.

Finally, second stage estimates using sub-sample 1 show that an increase in the probability of compliance from 0 to 1 leads to a decrease of -30% to -50% in ΔTobin's Q for complying target firms compared with the rest of the firms. However, the fact that the F-statistic of the excluded instrument is as low as 7, makes results based on sub-sample 1 less reliable. Using sub-samples 2 and 3, the instrument *Large* is strong, with an F-statistic ranging from 17 to 47, and predicts well compliance from the first stage in Models (4), (5), (7) and (8). The

[22]Stock and Yogo (2005) provide a detailed testing procedure that takes into account the number of instruments and endogenous covariates that enter the model. In Table 1, they report a critical value for one endogenous regressor and one instrument to be 13.91. However, they suggest an alternative test to the F-statistic from the first stage, when the number of endogenous regressors is more than one.

associated estimates for β_1 from the second stage indicate that ΔTobin's Q is about 40% to 55% lower when the probability of compliance goes from 0 to 1.[23]

7 Board independence and busy boards

Findings from the previous section suggest that the market reacted negatively to the enactment of the code, and especially to the board independence requirement. One possible explanation for this result is that the imposition of a minimum number of independent directors could lead to an increase in board busyness. In such a situation, firms face a trade-off between board independence and the degree of busyness of board members. This is especially true given that the code does not put any restrictions on the number of directorships board members can hold, making the decision of directors to hold outside directorships exogenous to the firm.

7.1 Busy boards in Sweden

The busyness of the board is relevant to how efficient the board is operating. However, the view concerning busyness in the literature takes two opposing directions. Fama and Jensen (1983) think of multiple directorships as a signal of talent, and thus an improvement of the expertise supplied to the board. Others argue that busyness can shift a director's focus away from the firm. I measure board busyness as the sum of outside directorships held by a board's independent directors in a given year, labelled *Indp Busy*.[24] From Table 1, we can see that in 2005 independent directors in target (non-target) firms held on average

[23]In unreported results, I measure compliance using an indicator variable equal to one if *pidr* $\geq$ 50% and zero otherwise. As expected, due to the fuzzy setting and a low level of full compliance, the results were insignificant (Panel B in Table 1 shows that only 10 [29-19] large firms reached the 50% independence rate in 2005).

[24]This definition of busyness deviates from the traditional definition of busyness used in US based studies, where directors are defined as busy if they hold at least three outside directorships (see Fich and Shivdasani, 2006). I choose a threshold of one directorship given the size of the market of directorships in Sweden, which is relatively small compared with the US market.

3.5 (0.44) outside directorships, indicating that directors in small firms are considerably less busy than directors in larger firms. In 2006, the average number of outside directorships for independent directors increased by 16%, to reach 4.3, compared with 2005. Finally, the overall busyness of the board, measured as the sum of outside directorships held by directors, irrespective of their independence status, seems to increase by roughly 5% from 2005 to 2006. This indicates that post-reform, independent directors became more busy compared with non-independent directors.

Following Ferris et al. (2003) and Cashman et al. (2012), I report the distribution of outside directorships held by directors in my sample in Table 6. The maximum number of directorships held by a director in the sample is 7. Seventy-two per cent of directors in small firms hold no outside directorships, while they are only 57% in large firms. It is also noticeable that the number of directors decreases when the number of directorships increases. This is in line with finding by Ferris et al. (2003) and Cashman et al. (2012) using US data. However, the percentage of directors holding the highest number of directorships, i.e. seven, is 0.25%, which is much higher than the US figure of 0.02% for a maximum seat number of 10 directorships, reported in Cashman et al. (2012). The general pattern is that at least half of directors in large and medium-sized firms are busy directors, while only 28% of directors in small firms are. Figure 5 shows the discontinuity in board and independent directors' busyness around the cut-off in 2006. In general, directors of target firms are busier than their counterparts in non-target firms. Comparing the upper and lower panels, it appears that the discontinuity in busyness at the cut-off is more pronounced for independent directors (lower panel) than for board busyness (upper panel).

7.2 Busy board estimation results

The effect of interest is whether the negative market reaction to the enactment of the code in 2005 could be due to negative expectations by the market regarding the busyness of the board. In order to answer this question, I estimate equation

(1) for 2006 using as dependent variable *Indp Busy*. This allows me to investigate whether there are differences in terms of independent directors' busyness between target and non-target firms. The use of year 2006 in this specification is due to the fact that target firms had until their annual general meeting in 2006 (usually around the month of July) to comply with the code, and thus measuring *Indp Busy* in 2006 gives a better and more accurate picture of the degree of independent directors' busyness. So in 2006, changes made to board composition are observable. In particular, we know that target firms that complied with board independence in 2006 did so in compliance with the code from 2005. Thus, if boards of target firms become busier, it is plausible to assume that this increase is partly due to the busyness of newly appointed independent directors.

Results are reported in Table 7. Using sub-samples 1–3, it seems that independent directors in target firms hold 1.5–3 more outside directorships than independent directors in non-target firms. This indicates that the busyness of independent directors increased after the implementation of the code. Estimation results using the full sample also indicate that independent directors in target firms hold on average 2.5 more outside directorships than those in non-target firms. In terms of controls, a higher voting right concentration i.e. having a controlling shareholder, is associated with less busy independent directors. This finding supports the idea that controlling owners might prefer less independent directors to avoid reducing their ability to expropriate minority shareholders (La Porta et al., 1999; Denis and Sarin, 1999). Table 8 reports results from the instrumental variable approach in equations (2) and (3), where I use the assignment to treatment dummy *Large* to instrument for compliance with the independence requirement in 2005 in the first stage. The dependent variable in the second stage is *Indp Busy* in 2006.[25] The results indicate that independent

[25]The results are robust if the indicator variable *Compliers* is based on differences in *pidr* between years 2006 and 2005. Recall that the variable *Compliers* used so far in Tables 5 and 8 is an indicator variable equal to one if the difference in *pidr* between 2005 and 2004 is larger than zero for firms above the threshold c, and zero otherwise.

directors in target firms that complied with the code have 3–4 more outside directorships compared with directors in firms that did not comply. This result is robust using different sub-samples and indicates that compliance with the independence requirement was accompanied with the recruitment of independent directors who are more busy. This highlights the possibility that the reduced supply of independent directors in Sweden participated in more independent but more busy boards.

8 Conclusion

In this paper I explore the effects of an exogenous change in board independence on the market valuation of Swedish publicly traded firms. In July 2005, the Swedish Corporate Governance Code was enacted, requiring large firms (target) on the Stockholm Stock Exchange to increase their board independence to at least 50%. I find that target firms witnessed a decrease in their market valuation, measured as the change in Tobin's Q, ranging from 14% to 23% compared with non-target firms. This effect is more pronounced for complying target firms than for firms that did not comply with the code.

The use of a regression discontinuity design allows me to mitigate endogeneity problems by exploiting the exogeneity of the regulatory change. Reverse causality in this case could be that changes to board composition is an endogenous response by firms to past bad performance (Hermalin and Weisbach, 1998). By mitigating endogeneity, at least partially, I identify a negative causal relationship between board independence and firm market valuation in Sweden.

The negative effect of board independence on shareholders' wealth in Sweden seems to be in agreement with most conclusions about board independence in the US. Most of the studies that empirically test the implications of board independence on firm outcomes focus on the US market. Despite the absence of a consensus, the general pattern is that board independence has no significant effect (Hermalin and Weisbach, 1991; Bhagat and Black, 2000) or a negative effect (Agrawal and Knoeber, 1996) on firm value or performance. Bhagat and Bolton (2009) find a significant negative (positive) relationship between board independence and operating performance in the US pre (post) the Sarbanes-Oxley Act in 2002.

However, my results differ from findings in Black and Kim (2012), who report large gains in share price and firm value in response to the imposition of majority-independent boards in 1999 in South Korea. Differences in findings can be explained by the economic context preceding the adoption of the codes and the corporate structure and corporate culture prevailing in the two countries. Prior to the enactment of the Swedish code in 2005, there seems to be no market-wide instability and very low incidences of minority shareholder abuse by controlling owners. On the other hand, Korean reforms followed the East Asian crisis in 1997, and the weak corporate governance that prevailed during that period aggravated the negative performance of Korean firms and drastically increased minority expropriation (Joh, 2003; Johnson et al., 2000; Mitton, 2002; Baek et al., 2004).

The reform of the code in Sweden was also a continuity of a process that started in the 1990s and gained momentum in 2001. Despite similarities in ownership structure in the two countries, the rift between controlling owners and minority shareholders is different. As documented by Nenova (2003), private benefits of controlling shareholders are highest in South Korea and are among the lowest in Sweden. The recovery of South Korean firms from the crisis, and the introduction of corporate governance reforms that curbed private benefits of control by large owners, can explain the positive reaction of the market to the new reforms. The negative reaction of investors in Sweden to board independence might be a temporary response to market expectations of an increase in board busyness.

I explore the possibility that an increase in the number of independent directors entails an increase in the busyness of the boards. The motivation for this channel is the fact that the code does not restrict the number of directorships a director can hold. Thus, increasing the number of independent directors on a board might cause the busyness of the board to increase. Besides authors that consider holding multiple directorships as a signal of talent (Fama and Jensen, 1983), a large body of literature argue that busy directors are more time constrained, which may limit their advisory and monitoring roles, and finds that busy directors can harm shareholder value (Lipton and Lorsch, 1992; Cashman et al., 2012; Fich and Shivdasani, 2006).

Using outside directorships held by independent directors in 2006, I find that in target firms, these directors hold 1.5–3 more outside directorships than their counterparts in non-target firms. Finally, using an instrumental variable approach, where I use assignment to treatment as an instrument for compliance, I find that independent directors of target firms that complied with the code hold on average 3–4 outside directorships more than independent directors in firms that did not comply with the code.

My findings have implications for corporate governance policies, as imposing quotas on board independence is associated with higher board busyness. The identification of board busyness as an important factor in determining the relationship between board independence and firm market valuation in Sweden complements findings by previous studies. Randøy and Jenssen (2004) find that board independence reduces firm performance in highly competitive industries, and vice versa for lower competitive industries, and argue that market competitiveness serves as an alternative monitoring tool for the board. Palmberg (2012) finds that independent boards are associated with higher financial performance, whereas inside board members impact firm performance negatively, and argues that ownership structure plays an essential role in explaining her results.

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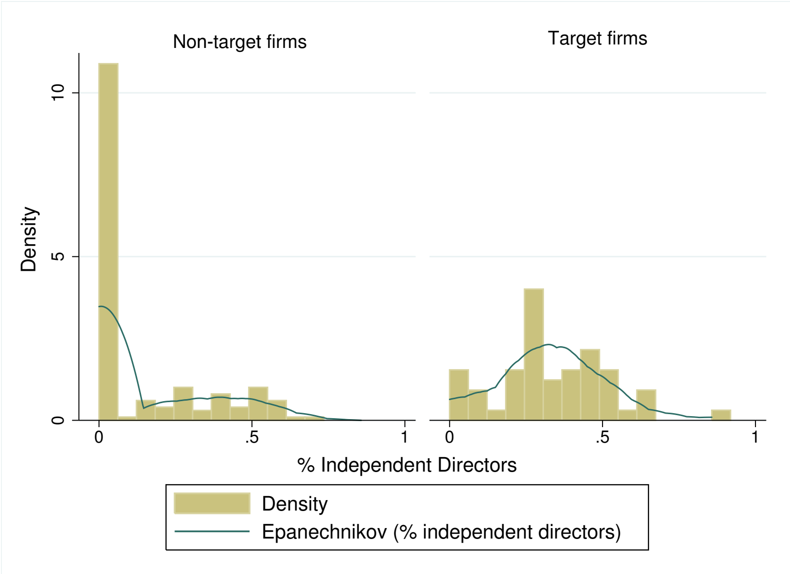
(a) Board independence by intent to treatment



(b) Market capitalisation by intent to treatment

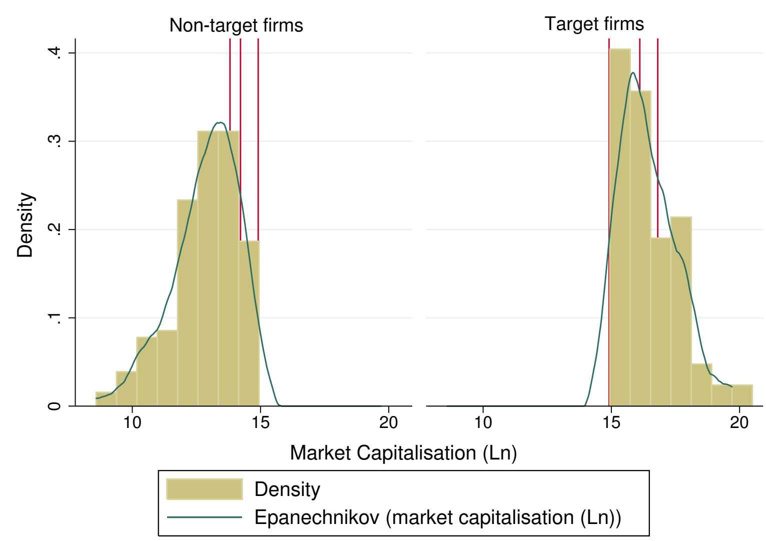


Figure 1: Market capitalisation, board independence and the intent to treatment
Figure (a) shows the density of board independence, i.e. % independent directors $(pidr)$ for firms grouped according to whether they are targeted by the code or not. Figure (b) plots the distribution of market capitalisation (ln) based on whether firms are targeted by the code or not. Market capitalisation is in thousands. The threshold value is $15 \approx ln(3million)$. The vertical line indicates the different ranges used in sub-samples. From left to right, each line refers to 1, 1.5, 3, 10, and 20 million. corresponding to 13.81, 14.22, 14.91, 16.11 and 16.81 in logarithms.

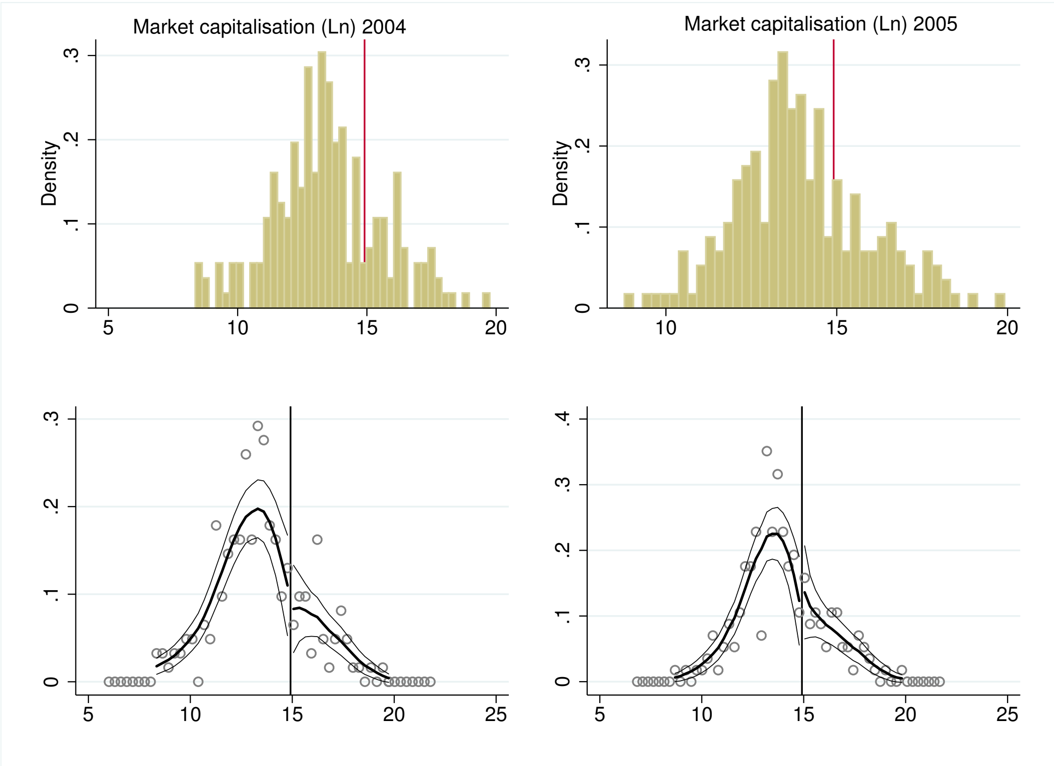


Figure 2: Density plots for market capitalisation in 2004 and 2005
The upper plots are histograms showing the density of market capitalisation. The vertical axis indicates the threshold point. The lower plots show the McCrary density functions for market capitalisation. The left panels are for 2004, and the right panels are for 2005. According to McCrary(2008), sharp changes in the density of the assignment variable around the threshold imply a discontinuity in the probability of being assigned on either side of the threshold, violating the randomisation assumption.

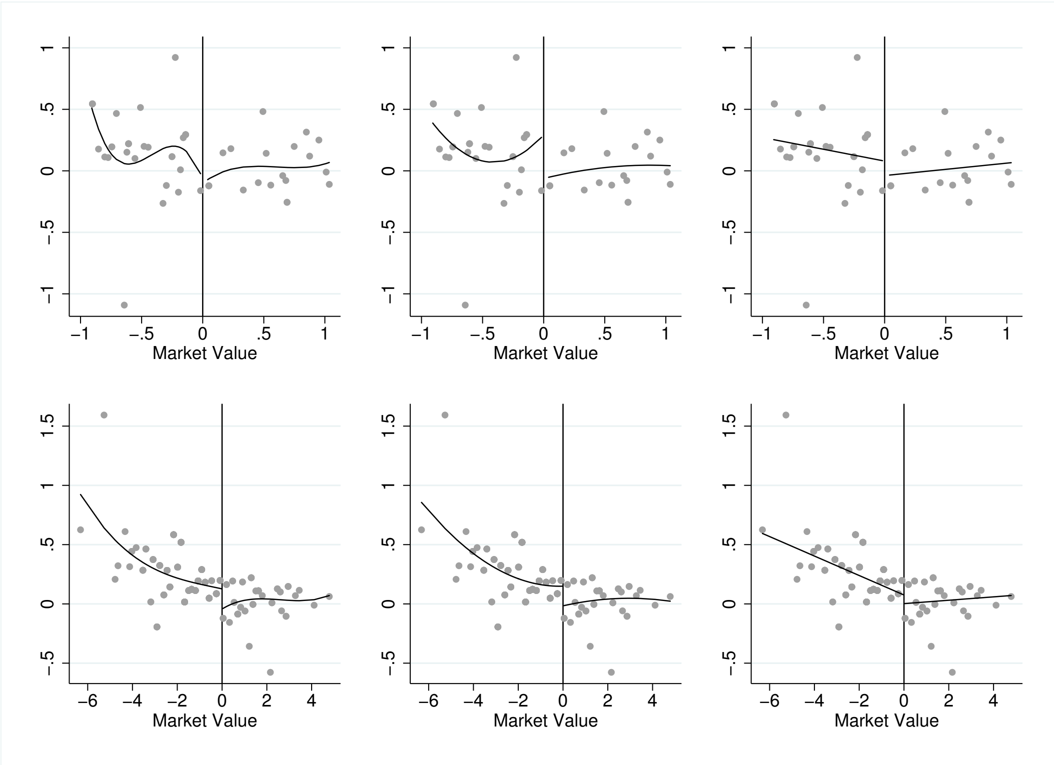


Figure 3: Regression discontinuity plots for ΔTobin's Q in year 2005
The regression discontinuity plots are for ΔTobin's Q in 2005. Market value refers to $(X - c)$, which is the distance of a firm's market capitalisation to the threshold c. The upper panel is for sub-sample 1, with firms closest to the cut-off point c. The lower panel uses the full sample. The number of bins is selected manually to be 40 above and 40 below c. I also fit polynomials of orders 3, 2 and 1, from left to right. I use the procedure developed by Calonico et al. (2014) to produce the figures. Similar results are obtained when I use sub-samples 2 and 3 (see Section 5.1 for more details on the definition of the sub-samples).

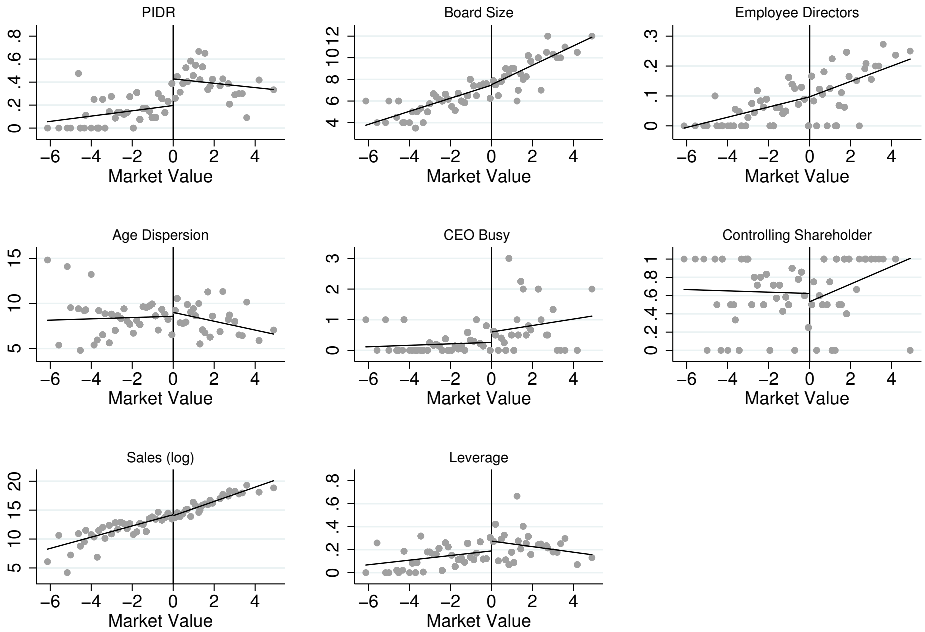


Figure 4: Regression discontinuity plots for covariates in year 2005
The regression discontinuity plots are for covariates used as controls in the regression analysis. Market value refers to $(X - c)$, which is the is the distance of a firm's market capitalisation to the threshold c. PIDR refers to % independent directors on the board, and other variable are as defined in Appendix A. I use full sample data. The number of bins is selected manually to be 40 above and 40 below c. I use the procedure developed by Calonico et al. (2014) to produce the figures. These plots help identify the degree of smoothness for covariates around the cut-off c. The idea is that as long as the covariates are smooth around the cut-off point, we should be able to include them as controls in our regression.

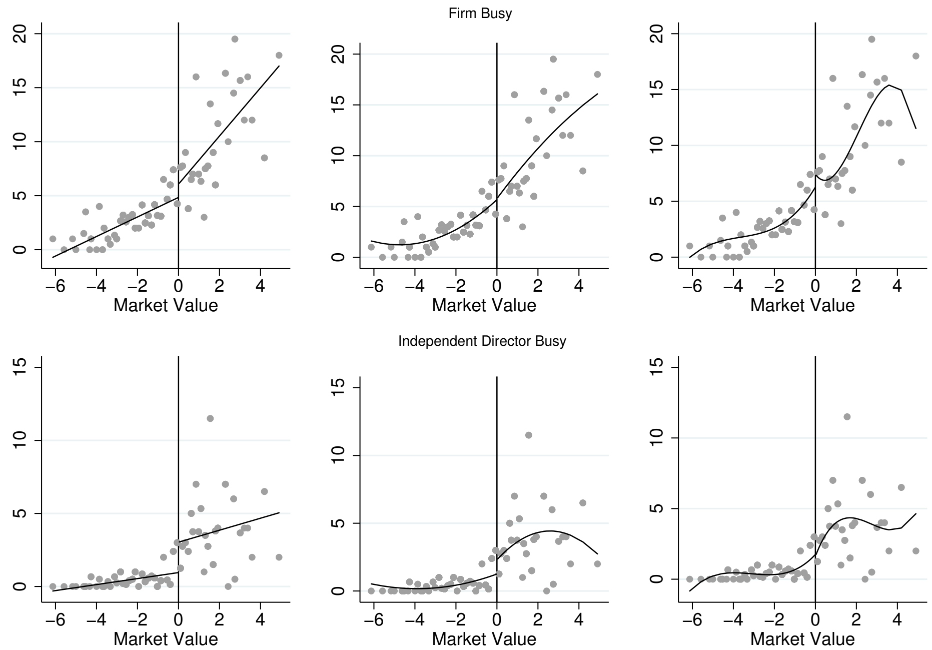


Figure 5: Regression discontinuity plots for firm and independent directors' busyness in year 2006

The regression discontinuity plots are for firm and independent directors' busyness. Market value refers to $(X - c)$, which is the distance of a firm's market capitalisation to the threshold c. The upper panel plots *Firm Busy*, which is the total number of outside directorships held by a firm's board directors, regardless of their independence status. The lower panel plot *Independent Director Busy*, which is the number of outside directorships held by independent directors. I use full sample data. The number of bins is selected manually to be 40 above and 40 below c. I also fit polynomials of orders 1, 2 and 3, from left to right. I use the procedure developed by Calonico et al. (2014) to produce the figures. These plots help identify the degree of smoothness for covariates around the cut-off c. The idea is that as long as the covariates are smooth around the cutoff point, we should be able to include them as controls in our regression.

Table 1: Summary statistics

Panel A

	2004				2005				2006			
	Below cut-off		Above cut-off		Below cut-off		Above cut-off		Below cut-off		Above cut-off	
Variable	Mean	sd	Mean	sd	Mean	sd	Mean	sd	Mean	sd	Mean	sd
Board Size	6.556	1.668	9.679	1.73	6.364	1.737	9.491	1.694	6.475	1.762	9.686	1.794
% Employee Directors	0.075	0.114	0.189	0.111	0.071	0.108	0.172	0.112	0.078	0.111	0.175	0.111
Average Age	52.694	4.281	54.791	3.438	52.694	4.281	54.791	3.438	53.008	4.044	55.005	3.309
Age Dispersion	-	-	8.38	2.547	8.457	2.8	8.38	2.547	8.59	2.481	8.555	2.435
CEO not sitting	0.463	0.5	0.189	0.395	0.481	0.501	0.208	0.409	0.557	0.498	0.216	0.415
CEO Busy	-	-	0.849	1.321	0.198	0.509	0.849	1.321	0.241	0.522	0.843	1.461
# Independent Directors	0.469	0.992	2.358	1.272	0.815	1.301	3.038	1.531	1.184	1.689	3.824	1.786
% Independent Directors (*pidr*)	0.068	0.135	0.243	0.134	0.126	0.2	0.326	0.181	0.18	0.262	0.404	0.212
Firm Busy	-	-	10.566	6.113	3.167	2.915	10.566	6.113	3.557	3.094	11	5.793
Independent Busy	-	-	3.698	3.16	0.444	1.009	3.698	3.16	0.778	1.491	4.294	3.39
Voting Right Concentration	-	-	0.736	0.445	0.63	0.484	0.736	0.445	0.563	0.498	0.706	0.46
Tobin's Q	1.555	1.12	1.412	1.081	2.407	3.201	1.43	1.068	2.223	2.658	1.637	1.184
Total Assets (Million)	719	986	29573	40708	849	1200	36212	49529	1146	2122	3859	51778
Total Sales (Million)	781	1275	28506	40879	777	1237	31773	45560	839	1125	34176	48695
Market Capitalisation (Million)	543	553	25563	49472	868	877	32738	61867	1070	1288	40563	67848
Leverage	0.096	0.148	0.173	0.149	0.146	0.167	0.22	0.146	0.162	0.177	0.216	0.158
R&D	0.296	0.458	0.528	0.504	0.309	0.463	0.528	0.504	0.291	0.456	0.549	0.503
Total Number of Firms	162		53		162		53		158		51	

Panel B

	Total Firms	Below cut-off	Above cut-off	Total Firms	Below cut-off	Above cut-off	Total Firms	Below cut-off	Above cut-off
Full Sample	248	176	72	252	180	72	262	187	75
Firms with data from 2004-2005	-	-	-	248	176	72	239	170	69
firms with pidr ≥ 0.5 at time t	37	18	19	60	31	29	82	44	38
Firms with pidr ≥ 0.5 before the code	-	-	-	33	14	19	30	12	18
Final Sample	-	-	-	215	162	53	209	158	51

Panel A presents firm-level summary statistics for each year separately. Firms above (below) the cut-off point are firms with a market capitalisation larger (smaller) than 3 billion. *Board size* is the number of directors on the board, including employee directors and excluding CEOs that do not have a vote. *% employee directors* is the proportion of employee directors relative to board size. *Age dispersion* is the standard deviation of director's age. *CEO not sitting* is a dummy equal to one if the CEO does not sit on the board, i.e. does not have a vote. *Busy* is the number of outside directorships held by a board member. Independent directors are board members who are independent from the firm, the management and the controlling shareholder. *Voting right concentration* is a dummy variable equal to one if the voting rights of the largest shareholder is larger than the sum of the voting rights of the second and third largest shareholders. *Tobin's Q* is the ratio of the market value of assets divided by its book value. The market value of assets is defined as the sum of total debt and the market capitalisation of the firm. *Leverage* is the ratio of long term debt to total assets. Finally, *R&D* is a dummy variable equal to one if a firm incurs *R&D* costs, and zero otherwise. Panel B presents information about sample construction and firms' compliance rate with board independence.

Table 2: Test of differences in the mean

	Sub-sample 1			Sub-sample 2			Sub-sample 3		
	Mean below c	Mean above c	t-test	Mean below c	Mean above c	t-test	Mean below c	Mean above c	t-test
Year: 2004									
ΔTobin's Q	-	-	-	-	-	-	-	-	-
Sales (ln)	6.617	8.35	-5.600***	6.617	8.708	-7.366***	6.647	9.337	-10.337***
Board size (ln)	2.002	2.229	-4.476***	2.002	2.224	-4.426***	1.981	2.251	-6.190***
Number of firms	30	21		30	21		50	52	
Year: 2005									
ΔTobin's Q	0.173	0.017	1.592	0.173	0.029	1.773*	0.195	0.024	2.925***
Sales(ln)	13.626	15.325	-5.822***	13.626	15.698	-7.743***	13.679	16.38	-10.337***
Board size (ln)	1.979	2.201	-4.314***	1.979	2.19	-4.248***	1.975	2.232	-6.400***
Number of firms	30	21		30	35		50	52	
Year: 2006									
ΔTobin's Q	0.236	-0.043	2.1075***	0.236	0.038	1.848*	0.259	0.132	1.547
Sales(ln)	13.979	15.055	-3.747***	13.979	15.559	-5.649***	13.702	16.448	-10.378***
Board size (ln)	2.005	2.185	-2.973***	2.005	2.201	-3.955***	1.969	2.252	-6.676***
Number of firms	35	15		35	26		56	50	

This table presents tests of differences in means for the dependent variable ΔTobin's Q, firm size (ln) and board size (ln). ΔTobin's Q is the change in Tobin's Q between 2004 and 2005, or 2006 (the difference in ln(Tobin's Q)). I measure firm size with total sales. I use three sub-samples. Sample 1 (2) include firms with a market capitalisation ranging from 1.5 billion to 10 billion (20 billion). For sample 3, the lower tail starts at 1 billion, and the upper tail includes all 53 large firms. Mean above (below) c refers to the mean of the corresponding variable for target (not-target) firms. ***, ** and * correspond to statistical significance at the 1%, 5% and 10% levels respectively.

Table 3: Regression discontinuity design (fuzzy) for Δ *Tobin's Q* (2005)

Dependent variable: Δ *Tobin's Q*	Sub-sample 1				Sub-sample 2				Sub-sample 3			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Large	-0.268**	-0.427	-0.108	-0.764	-0.310***	-0.448**	-0.376	-0.681*	-0.271***	-0.296***	-0.408***	-0.521**
	(0.122)	(0.273)	(0.474)	(0.599)	(0.095)	(0.167)	(0.317)	(0.355)	(0.077)	(0.110)	(0.141)	(0.220)
Total sales (ln)	0.102*	0.090	0.084	0.105*	0.110**	0.080	0.078	0.086*	0.043	0.035	0.033	0.034
	(0.060)	(0.056)	(0.053)	(0.052)	(0.051)	(0.048)	(0.047)	(0.045)	(0.031)	(0.041)	(0.040)	(0.041)
Board size (ln)	-0.528	-0.349	-0.214	-0.371	-0.323	-0.232	-0.210	-0.333	-0.092	-0.085	-0.029	-0.061
	(0.340)	(0.386)	(0.423)	(0.455)	(0.277)	(0.273)	(0.295)	(0.286)	(0.210)	(0.208)	(0.201)	(0.210)
Leverage	-0.053	-0.105	-0.154	-0.255	0.034	0.001	-0.022	-0.039	-0.018	-0.024	-0.061	-0.053
	(0.304)	(0.278)	(0.298)	(0.302)	(0.278)	(0.257)	(0.275)	(0.250)	(0.226)	(0.219)	(0.209)	(0.208)
R&D	0.156	0.161	0.170	0.197	0.154*	0.143	0.138	0.126	0.143**	0.141**	0.142**	0.147**
	(0.098)	(0.101)	(0.109)	(0.119)	(0.080)	(0.085)	(0.093)	(0.099)	(0.066)	(0.069)	(0.069)	(0.071)
Voting right concentration	-0.186	-0.165	-0.147	-0.090	-0.175*	-0.158*	-0.152*	-0.125	-0.122*	-0.122*	-0.123*	-0.101
	(0.113)	(0.121)	(0.124)	(0.143)	(0.089)	(0.089)	(0.087)	(0.097)	(0.068)	(0.068)	(0.071)	(0.072)
% Employee directors	-0.367	-0.542	-0.777	-0.923	0.250	0.225	0.165	0.199	0.483	0.504	0.489	0.481
	(0.668)	(0.712)	(0.726)	(0.674)	(0.535)	(0.583)	(0.608)	(0.574)	(0.358)	(0.381)	(0.402)	(0.411)
% Director's age dispersion	0.050	0.051*	0.049	0.052	0.020	0.025	0.024	0.027	0.024*	0.024*	0.025*	0.027*
	(0.030)	(0.030)	(0.031)	(0.031)	(0.020)	(0.021)	(0.022)	(0.022)	(0.014)	(0.014)	(0.014)	(0.015)
CEO busy	-0.158**	-0.133	-0.173	-0.147	-0.011	-0.013	-0.017	-0.003	-0.024	-0.023	-0.024	-0.023
	(0.067)	(0.100)	(0.117)	(0.104)	(0.033)	(0.032)	(0.040)	(0.040)	(0.029)	(0.029)	(0.029)	(0.028)
CEO not sitting on the board	0.231**	0.248**	0.260**	0.237*	0.200**	0.220**	0.222**	0.208*	0.106	0.110	0.122	0.124
	(0.105)	(0.116)	(0.119)	(0.120)	(0.095)	(0.099)	(0.102)	(0.104)	(0.072)	(0.073)	(0.075)	(0.077)
Polynomial (1)		0.211	0.315	0.600		0.171	0.185	0.626		0.035	0.285	0.278
		(0.228)	(0.289)	(0.675)		(0.275)	(0.354)	(0.692)		(0.124)	(0.326)	(0.291)
Polynomial (1) × Large		-0.082	-1.364	3.007		-0.039	-0.242	0.530		-0.021	-0.129	0.034
		(0.350)	(1.175)	(3.726)		(0.291)	(0.660)	(1.248)		(0.129)	(0.356)	(0.373)
Polynomial (2)			0.177	-0.558			0.004	-0.760			0.290	-0.203
			(1.087)	(1.020)			(1.102)	(0.986)			(0.307)	(0.873)
Polynomial (2) × Large			0.694	-7.271			0.091	-0.623			-0.323	0.083
			(1.096)	(6.194)			(1.041)	(1.276)			(0.306)	(0.856)
Polynomial (3)				-1.833				-2.573				-0.454
				(2.712)				(2.963)				(0.779)
Polynomial (3) × Large				6.334				3.066				0.467
				(4.292)				(3.026)				(0.783)
Constant	-0.278	-0.416	-0.555	-0.410	-0.756	-0.598	-0.626	-0.456	-0.380	-0.277	-0.359	-0.279
	(1.010)	(1.142)	(1.076)	(1.042)	(0.732)	(0.778)	(0.777)	(0.764)	(0.442)	(0.586)	(0.619)	(0.628)
Observations	50	50	50	50	65	65	65	65	102	102	102	102
R-squared	0.481	0.499	0.518	0.547	0.369	0.392	0.394	0.428	0.303	0.304	0.329	0.336

This table shows estimation results for the regression discontinuity model in equation (1). The dependent variable is ΔTobin's Q computed as the change in Tobin's Q from 2004 to 2005 (the difference in ln(Tobin's Q)). The year is 2005. *Large* is equal to one if firm i is assigned to treatment and zero otherwise. All specifications include polynomials of the score variable $(X - c)$, and interaction terms for $(X - c)$ and *Large*. I report results for sub-samples 1, 2 and 3 in columns (1–4), (5–8) and (9–12) respectively. Sub-sample 1 includes firms with a market capitalisation ranging from 1.5 billion to 10 billion. Sub-sample 2 includes firms with a market capitalisation ranging from 1.5 billion to 20 billion. In sub-sample 3 the lower tail starts at 1 billion, and the upper tail includes all 53 large firms. All regressions are estimated by OLS. I control for industry effects using one-digit industry dummy variables in all specifications. I report robust standard errors in parentheses ***, ** and * correspond to statistical significance at the 1%, 5% and 10% levels respectively.

Table 4: Regression discontinuity design (fuzzy) for Δ *Tobin's Q* (2005, full sample)

Dependent variable: Δ *Tobin's Q*	Full Sample			
	(1)	(2)	(3)	(4)
Large	-0.038	-0.158*	-0.242**	-0.259*
	(0.078)	(0.087)	(0.117)	(0.153)
Total sales (ln)	-0.087***	-0.108***	-0.107***	-0.107***
	(0.023)	(0.028)	(0.029)	(0.029)
Board size (ln)	0.237	0.204	0.193	0.197
	(0.147)	(0.152)	(0.156)	(0.156)
Leverage	-0.117	-0.070	-0.076	-0.079
	(0.175)	(0.178)	(0.176)	(0.174)
R&D	0.048	0.027	0.028	0.029
	(0.054)	(0.058)	(0.060)	(0.060)
Voting right concentration	-0.042	-0.051	-0.053	-0.052
	(0.059)	(0.060)	(0.060)	(0.062)
% Employee directors	0.488*	0.606**	0.627**	0.622**
	(0.282)	(0.291)	(0.297)	(0.299)
% Director's age dispersion	-0.010	-0.008	-0.008	-0.008
	(0.012)	(0.012)	(0.013)	(0.013)
CEO busy	0.002	0.000	-0.001	-0.001
	(0.029)	(0.029)	(0.030)	(0.030)
CEO not sitting on the board	0.050	0.068	0.072	0.072
	(0.060)	(0.062)	(0.062)	(0.062)
Polynomial (1)		0.018	0.050	0.063
		(0.043)	(0.088)	(0.168)
Polynomial (1) x Large		0.086*	0.143	0.155
		(0.045)	(0.127)	(0.265)
Polynomial (2)			0.008	0.015
			(0.019)	(0.073)
Polynomial (2) x Large			-0.029	-0.050
			(0.026)	(0.128)
Polynomial (3)				0.001
				(0.009)
Polynomial (3) x Large				0.001
				(0.016)
Constant	0.982**	1.331***	1.355***	1.350***
	(0.392)	(0.486)	(0.495)	(0.499)
Observations	198	198	198	198
R-squared	0.243	0.257	0.260	0.260

This table shows estimation results for the regression discontinuity model in equation (1). The dependent variable is ΔTobin's Q computed as the change in Tobin's Q from 2004 to 2005 (the difference in *ln*(Tobin's Q)). The year is 2005. *Large* is equal to one if firm *i* is assigned to treatment and zero otherwise. All specifications include polynomials of the score variable $(X - c)$, and interaction terms for $(X - c)$ and *Large*. I report results using the full sample. All regressions are estimated by OLS. I control for industry effects using one digit industry dummy variables in all specifications. I report robust standard errors in parentheses ***, ** and * correspond to statistical significance at the 1%, 5% and 10% levels respectively.

Table 5: 2SLS instrumental variable approach for complying firms (2005)

Dependent variable: Δ *Tobin's Q*	Sub-sample 1			Sub-sample 2			Sub-sample 3		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Compliers	-0.361***	-0.743**	-0.978*	-0.518***	-0.801**	-1.327	-0.467***	-0.715**	-1.141*
	(0.132)	(0.312)	(0.521)	(0.160)	(0.352)	(1.480)	(0.138)	(0.290)	(0.609)
Total sales (ln)	0.100**	0.080*	0.079*	0.114***	0.073*	0.100	0.049	0.038	0.058
	(0.044)	(0.043)	(0.046)	(0.038)	(0.042)	(0.062)	(0.032)	(0.041)	(0.048)
Board size (ln))	-0.535**	-0.288	-0.327	-0.232	-0.092	-0.129	0.042	0.129	0.326
	(0.263)	(0.335)	(0.351)	(0.243)	(0.328)	(0.438)	(0.216)	(0.244)	(0.360)
Leverage	-0.156	-0.316	-0.295	-0.103	-0.216	-0.256	-0.144	-0.247	-0.385
	(0.259)	(0.256)	(0.280)	(0.244)	(0.239)	(0.325)	(0.215)	(0.222)	(0.277)
R&D	0.190**	0.235***	0.258**	0.164**	0.144*	0.147	0.141**	0.131*	0.113
	(0.075)	(0.091)	(0.103)	(0.068)	(0.083)	(0.112)	(0.059)	(0.067)	(0.088)
Voting Right Concentration	-0.241**	-0.286**	-0.385*	-0.329***	-0.398***	-0.628	-0.230***	-0.303***	-0.412**
	(0.104)	(0.128)	(0.200)	(0.102)	(0.143)	(0.562)	(0.077)	(0.111)	(0.190)
% Employee Directors	-0.562	-1.008*	-1.071*	0.139	0.099	0.440	0.366	0.410	0.277
	(0.510)	(0.608)	(0.646)	(0.484)	(0.595)	(0.987)	(0.367)	(0.435)	(0.569)
Age Dispersion	0.054**	0.060**	0.065**	0.030	0.045*	0.061	0.037***	0.048**	0.065**
	(0.023)	(0.024)	(0.026)	(0.019)	(0.025)	(0.055)	(0.014)	(0.019)	(0.032)
# Outside Directorships CEO	-0.195***	-0.179***	-0.142	-0.005	-0.007	0.013	-0.026	-0.025	-0.040
	(0.055)	(0.069)	(0.097)	(0.044)	(0.054)	(0.103)	(0.034)	(0.041)	(0.055)
CEO not sitting	0.257***	0.314***	0.353**	0.269***	0.334***	0.391	0.162**	0.204**	0.260*
	(0.089)	(0.111)	(0.139)	(0.088)	(0.118)	(0.253)	(0.073)	(0.092)	(0.133)
Polynomial (1)		0.270	0.118		0.166	0.275		0.111	0.282
		(0.171)	(0.201)		(0.201)	(0.297)		(0.101)	(0.267)
Polynomial (1) x Large			0.443			0.896			0.558
			(0.495)			(2.308)			(0.756)
Polynomial (2)					0.022	1.076		0.006	1.303
					(0.105)	(0.980)		(0.049)	(0.807)
Polynomial (2) x Large						-1.527			-1.657
						(1.833)			(1.014)
Polynomial (3)								-0.007	1.001
								(0.010)	(0.772)
Polynomial (3) x Large									-0.961
									(0.753)
Constant	-0.368	-0.490	-0.462	-1.099	-0.824	-1.297	-0.906*	-0.909	-1.715*
	(0.772)	(0.824)	(0.818)	(0.735)	(0.806)	(1.215)	(0.545)	(0.669)	(0.938)
R-squared	0.522	0.447	0.323	0.253	0.038		0.114		
First Stage									
Excluded Instrument F-Stat	7.23	7.71	9.88	47.95	47.07	44.77	20.76	17.51	13.84
β_1 First Stage	0.742***	0.611**	0.436	0.599***	0.557***	0.283	0.581***	0.493***	0.456***
Adjusted R-Squared	0.497	0.489	0.500	0.418	0.397	0.418	0.477	0.462	0.475
Observations	50	50	50	65	65	65	102	102	102

This table shows estimation results for the instrumental variable approach based on equation (3) (the second stage regression). The dependent variable in the second stage regression is ΔTobin's Q, computed as the change in Tobin's Q from 2004 to 2005 (the difference in *ln*(Tobin's Q)). The year is 2005. In the first stage I use *Large*, which is equal to one if firm i is assigned to treatment and zero otherwise to instrument for the variable *Compliers*. *Compliers* is an indicator variable equal to one if the difference in *pidr* between 2005 and 2004 is larger than zero for firms above the threshold c, and zero otherwise. I report results for sub-samples 1, 2 and 3 in columns (1–2), (3–4) and (5–6) respectively. Sub-sample 1 includes firms with a market capitalisation ranging from 1.5 billion to 10 billion. Sub-sample 2 includes firms with a market capitalisation ranging from 1.5 billion to 20 billion. Polynomials of the score variable $(X - c)$, and interaction terms for $(X - c)$ and *Large* are included in each specification. I include polynomials of order 1 when using sub-sample 1. I include polynomials of order 2, when I use sub-sample 2 and polynomials of order 3 when I use sub-sample 3. I estimate the models using two stage least squares. I report first stage estimate, F-test, and adjusted R-Squared for the excluded instrument. I control for industry effects using one-digit industry dummy variables in all specifications. Robust standard errors in parentheses. ***, ** and * correspond to statistical significance at the 1%, 5% and 10% levels respectively.

Table 6: Director's distribution

Outside Directorships Held	All Firms			Large Cap			Medium Cap			Small Cap & NGM		
	Directorships		Age	Directorships		Age	Directorships		Age	Directorships		Age
0	5544	65.25%	53	1859	57.11%	53	545	59.89%	53	3140	72.48%	53
1	1440	16.95%	55	592	18.19%	56	185	20.33%	54	663	15.30%	54
2	746	8.78%	56	316	9.71%	56	94	10.33%	54	336	7.76%	56
3	393	4.63%	55	237	7.28%	56	44	4.84%	56	112	2.59%	54
4	193	2.27%	55	107	3.29%	57	28	3.08%	51	58	1.34%	52
5	93	1.09%	55	69	2.12%	56	11	1.21%	55	13	0.30%	51
6	67	0.79%	63	54	1.66%	62	3	0.33%	67	10	0.23%	67
7	21	0.25%	56	21	0.65%	56	-		-	-		-

The table reports the distribution of directors based on the number of outside directorships held. I report the number and percentage of directors holding a given number of seats in addition to average age among each group of directors. Seat numbers are categorised by listing status, i.e. large cap, medium cap and small cap. NGM refers to companies belonging to the Nordic Growth Market. The data is presented for all publicly traded firms in the Stockholm Stock Exchange in the period 2005–2008.

Table 7: Regression discontinuity design (fuzzy) for busy independent directors (2006)

Dependent variable: *Indp busy*	Sub-sample 1			Sub-sample 2			Sub-sample 3			Full sample			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Large	3.330***	2.887**	1.441	2.623**	2.362	0.419	2.877***	1.845	-0.156	2.510***	2.538**	0.777	0.245
	(1.095)	(1.414)	(2.659)	(1.194)	(1.471)	(2.614)	(0.943)	(1.246)	(2.002)	(0.668)	(0.993)	(1.395)	(1.793)
Total sales (ln)	-0.131	-0.159	-0.086	0.120	-0.098	-0.047	-0.088	-0.236	-0.228	0.113	0.113	0.099	0.102
	(0.361)	(0.370)	(0.385)	(0.357)	(0.383)	(0.400)	(0.219)	(0.252)	(0.241)	(0.097)	(0.129)	(0.119)	(0.119)
Board size (ln)	2.291	2.460	2.349	1.613	1.866	1.281	0.672	1.108	0.467	0.575	0.563	0.705	0.639
	(2.492)	(2.741)	(2.551)	(3.050)	(2.917)	(2.895)	(1.566)	(1.639)	(1.603)	(0.695)	(0.809)	(0.760)	(0.779)
Leverage	-1.582	-1.678	-1.125	1.700	1.903	1.983	1.092	1.088	1.089	0.270	0.261	0.327	0.389
	(2.089)	(2.032)	(2.010)	(2.337)	(2.276)	(2.193)	(1.726)	(1.679)	(1.683)	(0.942)	(0.987)	(0.916)	(0.910)
R&D	0.152	0.207	0.136	0.003	-0.084	-0.198	0.064	-0.092	-0.222	0.093	0.095	0.039	0.042
	(0.825)	(0.841)	(0.882)	(0.769)	(0.812)	(0.850)	(0.536)	(0.551)	(0.558)	(0.324)	(0.342)	(0.353)	(0.346)
Voting Right Concentration	-0.427	-0.212	-0.490	-1.792**	-1.893**	-2.132**	-1.558***	-1.741***	-2.071***	-0.730**	-0.729**	-0.860***	-0.840**
	(0.675)	(0.836)	(0.812)	(0.785)	(0.881)	(0.866)	(0.575)	(0.569)	(0.606)	(0.325)	(0.330)	(0.318)	(0.325)
% Employee Directors	-0.643	-0.208	0.363	1.209	1.803	2.773	3.427	3.946	4.520	1.168	1.175	1.265	1.319
	(4.240)	(4.216)	(3.838)	(4.917)	(4.570)	(4.549)	(3.151)	(3.210)	(3.086)	(1.797)	(1.882)	(1.838)	(1.820)
Age Dispersion	-0.065	-0.067	-0.047	0.041	0.083	0.092	0.091	0.136	0.162	0.046	0.045	0.077	0.073
	(0.180)	(0.175)	(0.179)	(0.169)	(0.174)	(0.173)	(0.110)	(0.116)	(0.122)	(0.055)	(0.054)	(0.055)	(0.056)
# Outside Directorships CEO	-0.695	-0.652	-0.433	0.631	0.572	0.707*	0.647**	0.671**	0.699**	0.363	0.363	0.394*	0.397*
	(0.413)	(0.423)	(0.593)	(0.452)	(0.405)	(0.408)	(0.325)	(0.292)	(0.278)	(0.267)	(0.267)	(0.230)	(0.232)
CEO not sitting	-0.134	-0.110	-0.113	0.053	0.133	0.095	-0.134	0.037	-0.056	-0.378	-0.383	-0.448	-0.464
	(0.970)	(0.998)	(1.092)	(0.886)	(0.954)	(0.981)	(0.576)	(0.606)	(0.623)	(0.306)	(0.325)	(0.347)	(0.345)
Polynomial (1)		0.651	-0.084		-0.467	-0.862		0.499	-0.969		0.007	-0.377	-0.679**
		(0.977)	(0.945)		(1.066)	(1.018)		(0.512)	(1.426)		(0.150)	(0.293)	(0.336)
Polynomial (1) x Large			2.903			3.599			4.626		-0.028	2.970**	4.788*
			(2.876)			(4.142)			(2.910)		(0.434)	(1.361)	(2.810)
Polynomial (2)					0.905	-1.700		0.523	-1.751***			-0.087	-0.284*
					(0.909)	(1.506)		(0.364)	(0.615)			(0.054)	(0.167)
Polynomial (2) x Large						1.236			0.908			-0.523**	-1.158
						(2.461)			(1.397)			(0.240)	(1.211)
Polynomial (3)								-0.141*	-0.253				-0.028
								(0.076)	(1.413)				(0.023)
Polynomial (3) x Large									0.278				0.147
									(1.457)				(0.157)
Constant	-1.697	-1.816	-3.040	-5.511	-3.704	-1.379	0.604	1.089	2.725	-1.659	-1.612	-2.155	-1.985
	(6.645)	(6.715)	(7.054)	(8.341)	(7.490)	(7.683)	(4.669)	(4.817)	(4.648)	(1.627)	(2.632)	(2.372)	(2.404)
Observations	51	51	51	62	62	62	109	109	109	207	207	207	207
R-squared	0.456	0.462	0.487	0.451	0.474	0.504	0.426	0.459	0.501	0.401	0.401	0.438	0.442

This table shows estimation results for the regression discontinuity model in equation (1). I investigate if there are differences in terms of independent directors busyness between target and non-target firms in 2006. The dependent variable is *Indp busy* which is the total number of outside directorships held by independent directs of board i. *Large* is equal to one if firm i is assigned to treatment and zero otherwise. Sub-sample 1 includes firms with a market capitalisation ranging from 1.5 billion to 10 billion. Sub-sample 2 includes firms with a market capitalisation ranging from 1.5 billion to 20 billion. Polynomials of the score variable $(X - c)$, and interaction terms for $(X - c)$ and *Large* are included in each specification. I include polynomials of order 1 when using sub-sample 1. I include polynomials of order 2, when I use sub-sample 2 and polynomials of order 3 when I use sub-sample 3. I control for industry effects using one-digit industry dummy variables in all specifications. All regressions are estimated by OLS. I report robust standard errors in parentheses. ***, **, * correspond to statistical significance at the 1%, 5% and 10% levels respectively.

Table 8: 2SLS instrumental variable approach for complying firms (2006)

Dependent variable: *Indp Busy*	Sub-sample 1		Sub-sample 2		Sub-sample 3		Full sample			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Compliers	4.504***	4.139	3.492***	0.933	3.667***	-0.355	3.156***	3.747***	1.700	0.545
	(1.196)	(4.879)	(1.274)	(4.610)	(0.990)	(4.062)	(0.750)	(1.289)	(2.693)	(3.656)
Total sales (ln)	-0.133	-0.151	0.154	-0.010	-0.185	-0.229	0.093	0.139	0.113	0.106
	(0.246)	(0.320)	(0.263)	(0.278)	(0.202)	(0.217)	(0.092)	(0.115)	(0.114)	(0.113)
Board size (ln)	1.675	1.831	0.556	0.964	0.499	0.486	0.431	0.408	0.610	0.609
	(2.009)	(2.350)	(2.538)	(3.350)	(1.325)	(1.545)	(0.655)	(0.744)	(0.757)	(0.806)
Leverage	-0.658	-0.796	2.534	2.149	1.536	1.049	0.469	0.358	0.393	0.410
	(1.576)	(1.535)	(1.820)	(1.909)	(1.501)	(1.503)	(0.859)	(0.877)	(0.846)	(0.850)
R&D	0.402	0.417	0.128	-0.143	-0.070	-0.223	0.009	0.060	0.026	0.038
	(0.750)	(0.928)	(0.696)	(0.853)	(0.473)	(0.498)	(0.303)	(0.325)	(0.324)	(0.317)
Voting Right Concentration	0.119	0.211	-1.209*	-1.935*	-1.260**	-2.118***	-0.572**	-0.514*	-0.747**	-0.804**
	(0.599)	(1.048)	(0.660)	(1.088)	(0.499)	(0.678)	(0.290)	(0.295)	(0.319)	(0.335)
% Employee Directors	-0.611	-0.344	2.099	2.874	3.674	4.549*	1.387	1.207	1.270	1.320
	(3.160)	(2.835)	(4.064)	(3.929)	(2.834)	(2.630)	(1.755)	(1.756)	(1.716)	(1.702)
Age Dispersion	-0.003	-0.010	0.077	0.093	0.115	0.163	0.045	0.040	0.069	0.070
	(0.128)	(0.127)	(0.129)	(0.135)	(0.095)	(0.110)	(0.049)	(0.050)	(0.051)	(0.053)
# Outside Directorships CEO	-0.141	-0.160	0.996***	0.799	0.916***	0.675**	0.516**	0.556**	0.480**	0.425*
	(0.227)	(0.231)	(0.377)	(0.493)	(0.268)	(0.342)	(0.237)	(0.242)	(0.234)	(0.258)
CEO not sitting	-0.239	-0.215	-0.100	0.049	-0.085	-0.052	-0.382	-0.464	-0.485	-0.476
	(0.765)	(0.829)	(0.733)	(0.929)	(0.516)	(0.571)	(0.293)	(0.308)	(0.344)	(0.352)
Polynomial (1)		0.412		-0.718		-1.014		-0.001	-0.384	-0.678**
		(1.036)		(1.032)		(1.235)		(0.139)	(0.280)	(0.316)
Polynomial (1) x Large		-0.015		3.004		4.834		-0.357	2.328	4.566
		(5.166)		(5.956)		(4.543)		(0.489)	(2.125)	(3.947)
Polynomial (2)				-1.772		-1.766***			-0.089*	-0.282*
				(1.224)		(0.560)			(0.052)	(0.158)
Polynomial (2) x Large				1.399		0.888			-0.405	-1.116
				(2.488)		(1.395)			(0.389)	(1.362)
Polynomial (3)						-0.219				-0.028
						(1.181)				(0.022)
Polynomial (3) x Large						0.245				0.146
						(1.195)				(0.154)
Constant	0.474	0.491	-2.734	-0.970	0.931	1.861	-1.262	-1.719	-2.120	-2.051
	(4.636)	(6.481)	(6.588)	(6.658)	(3.748)	(4.211)	(1.369)	(2.250)	(2.111)	(2.181)
Observations	51	51	62	62	109	109	207	207	207	207
R-squared	0.465	0.476	0.495	0.517	0.458	0.495	0.414	0.410	0.448	0.448

This table shows estimation results for the instrumental variable approach based on equation (3) (the second stage regression). The dependent variable in the second stage regression is *Indp Busy*, computed as the number of outside directorships held by independent directors. The year is 2006. In the first stage I use *Large*, which is equal to 1 if firm i is assigned to treatment and zero otherwise to instrument for the variable $Compliers$. $Compliers$ as an indicator variable equal to one if the difference in $pidr$ between 2005 and 2004 is larger than zero for firms above the threshold c, and zero otherwise. I report results for sub-samples 1, 2 and 3 in columns (1–2), (3–4) and (5–6) respectively. Sub-sample 1 includes firms with a market capitalisation ranging from 1.5 billion to 10 billion. Sub-sample 2 includes firms with a market capitalisation ranging from 1.5 billion to 20 billion. Columns (7)–(10) report results for the full sample. Polynomials of the score variable $(X - c)$, and interaction terms for $(X - c)$ and *Large* are included in each specification. I include polynomials of order 1 when using sub-sample 1. I include polynomials of order 2, when I use sub-sample 2 and polynomials of order 3 when I use sub-sample 3. I control for industry effects using one-digit industry dummy variables in all specifications.I estimate the models using two stage least squares. I report robust standard errors in parentheses. ***, **, * correspond to statistical significance at the 1%, 5% and 10% levels respectively.

Appendix 1

Panel A	Events Related to Corporate Governance in Sweden
Variable	Description
Year 2004	The first draft of the Swedish Corporate Governance Code (code) was circulated for comments.
July 2005	The amended version of the CGC was released. It was aimed at firms on the A-list and firms on the O-list with an asset value of at least three billion.
May 2007	NASDAQ agreed to acquire OMX (which includes the Stockholm Stock Exchange among other Nordic markets).
Year 2007	Firms on the Stockholm Stock Exchange were classified as large cap, mid cap or small cap. The classification is determined by the company's market capitalisation in euro, in January and July of each year. Large-cap companies have over one billion euros, mid-cap companies have between 150 million and 1 billion euros, and small-cap under 150 million euro.
February 2008	NASDAQ's acquisition of OMX is completed.
July 2008	A new version of the code is released, and its application is generalised to all publicly traded firms on the Stockholm Stock Exchange.
A-list	Consists of the officially listed companies, and is the main market. At least 3 years of audited financial statements, a minimum of 300 million in market capitalisation, and at least 25% of the share capital and no less than 10% of the voting rights held by no fewer than 2000 investors.
O-list	Consists of companies that are smaller in size or have a more concentrated ownership structure. Firms on the O-list can still be very large in size. Firms on the O-list are exempt from wealth taxation (during the period of the study, i.e. 2005-2006).

Panel B	Board Characteristics
Variable	Description
# of independent directors	The number of independent directors sitting on a board
pidr	The percentage of independent directors sitting on the board, computed as the number of independent directors divided by board size.
Board size	The total number of directors sitting on the board. Includes employee directors and excludes the CEO when he/she is not sitting on the board.
CEO not sitting	A dummy variable equal to one if the CEO is not on the board of the firm. A CEO who is not sitting on the board is considered not to have a vote.
% Employees	The proportion of employee directors relative to board size.
Board age	The average age of all board members sitting on the board.
Age dispersion	The standard deviation of the age of directors.
Voting right concentration	Dummy variable equal to one if the voting rights of the largest shareholder are greater than the sum of the voting rights of the second and third largest shareholders.
Busyness measure	# Outside directorships per
CEO busy	The number of outside directorships held by the CEO.
Indp busy	The number of outside directorships held by independent directors.
Firm busy	The total number of outside directorships held by all busy directors sitting on the board, regardless of their independence status

Panel C	**Firm data**
Variable	Description
Firm size	Total sales (ln)
Tobin's Q (proxy)	Market value of assets divided by its book value. The market value of assets is defined as the sum of total debt and the market value of the firm.
ΔTobins' Q	The difference in ln(Tobin's Q) in 2005 and ln(Tobin's Q) in 2004.
Leverage	The ratio of long-term debt to total assets.
R&D	A dummy variable equal to one if a firm has R&D spending (see Bhagat and Bolton, 2008).
Industry	One-digit industry classification, a total of nine industries.
c (threshold)	The threshold set by the CGC for firms to comply, equal to three billion (ln). Given that data on market capitalisation is in thousands, I actually take the natural logarithm of three million.
Score	The difference between the market capitalisation (ln) of a firm and the threshold c.
Large	Large firm dummy equal to one if a firm has a market capitalisation larger than three billion.
Compliers	A dummy variable equal to one if the difference in *pidr* between 2004 and 2005 or 2006 is larger than zero for firms above the threshold c, and zero otherwise.
The assignment variable (X)	The market capitalisation of a firm in logarithms. Can also be referred to as the forcing variable.

PAPER 2

The Value of Directorships in the Eyes of Busy Directors

*Moursli Mohamed Reda**

Abstract

I study the effects of directors' reputation incentives on their commitment to board duties and assess their impact on the market valuation of firms in Sweden. Using social network theory, I measure the reputation of boards and directors based on their centrality in their respective networks. The more central a firm is relative to other firms in the network, the more reputation incentives it supplies to its directors. First, I look at how the relative reputation of firms can affect directors' commitment of time and effort. I find that the probability for outside directors to miss board meetings in firms they consider more prestigious is lower than that for directors who consider those firms less prestigious. Second, I aggregate the reputational incentives of directors to the board level, which allows me to measure how directors value their directorships differently. Accordingly, I find that firms with a higher proportion of independent directors who consider them more prestigious witness a significantly better firm valuation than firms with more directors considering them less prestigious. Third, I study the effect of appointing reputable directors to the board in a given year on shareholders' wealth in subsequent periods. Similar to board network, I measure the talent and reputation of individual directors by relying on their centrality in the overall director network. Directors with high centrality scores are better connected and have better access to information relative to directors who are less central. I find that recruiting reputable directors leads to a better market valuation for firms, and this effect is specific to independent directors. On the other hand, appointing independent directors with low reputation leads to reduced shareholder's wealth. Finally, I find that using network centrality as a measure of reputation generates statistically stronger results compared with the use of relative firm size.

Keywords: Firm reputation, director reputation, social networks, director incentives, independent directors, busy directors, Sweden
JEL classification: G32, G34, L14

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1 Introduction

Reputation is considered to be a determinative incentive for outside directors to carry out their monitoring and advisory roles. Fama and Jensen (1983) posit that one incentive for outside directors to monitor management is the use of their current directorships to signal their expertise to the market. Levit and Malenko (2015) also argue the importance for directors to signal their reputation to the market in the aim of gaining future appointments. They find that directors' choice between shareholder-friendly and management-friendly behaviour is driven by reputational concerns. Within corporate boards, reputational concerns for directors might also materialise through their desire to conform with their peers in terms of decision making to preserve a certain level of reputation (Malenko, 2013). Tirole (1996) argues not only that the reputation of the firm can impact that of its agents, but also that a group's reputation depends mainly on the reputation of its individuals. Considering a board room as a group of connected professionals, one can see the importance of directors' reputational incentives.

Empirical evidence shows that reputational concerns can serve as an incentive for directors to improve their monitoring, as the market penalises underperformance and poor monitoring with future losses of directorships (Fos and Tsoutsoura, 2014; Masulis and Mobbs, 2014a,b). Previous literature also seems to agree that directors' actions are contingent on building and preserving a certain level of reputation. They usually accomplish this by for example leaving firms in distress, signalling their monitoring skills through dissent, or seeking more prestigious appointment and joining reputable firms (Yermack, 2004; Ferris et al., 2003; Fich and Shivdasani, 2006; Adams et al., 2010; Jiang et al., 2014).

To measure reputation, firm size has been used as the main source of prestige to outside directors, particularly those who hold multiple directorships or aim to increase their future board appointments. Shivdasani (1993) and Knyazeva et al. (2013) argue that independent directors are more willing to join boards of larger firms due to their larger reputation benefits, while Fich and Shivdasani (2007) find evidence that firms' reputation can influence future board appointments for outside directors. Masulis and Mobbs (2014a,b) argue that if prestige increases with firm size, then busy directors, i.e. directors with multiple board appointments, have higher incentives to exert more effort in monitoring management in their most valued directorships than in their least preferred ones. They rely on the relative size of firms to proxy firms' prestige and reputation for busy directors.

I follow Masulis and Mobbs (2014a,b) but rely on network centrality to measure reputational incentives of directors and corporate boards in Swedish publicly traded firms. While firm size is a good proxy for a firm's prestige, It does not fully capture the amount of reputation a director can effectively extract from that prestige. Based on Fama and Jensen's (1983) idea of directors signalling their reputation to the market, I conjecture that the strength of the signal depends on the level of visibility the directors have in the market for directorships. Subrahmanyam (2008) contends that, while social networking can reduce the effectiveness of monitoring by outside directors due to the strengthening of ties between monitors and executives, it can also be a valuable source of information regarding the skills of each director. Board rooms are a collection of individual agents, and their connectedness to other firms depends on the number of directors they share (Conyon and Muldoon, 2006). In this respect, social network theory can be applied to map the centrality of a board to the network of firms and, thus, be used as an alternative measure to firm size in measuring reputational incentives to directors. Measuring centrality in a network amounts to capturing the relative importance of a node, which can be an individual or a firm, in terms of information dissemination and connectedness to other nodes in a network (Freeman, 1979; Bonacich, 1987; Borgatti, 2005). As discussed by Conyon and Muldoon (2006), measures of network centrality applied to boards go beyond the traditional concept of first order interlock between boards and better capture the capacity of a board to exchange information.

The main goal of this study is threefold. First, I investigate whether outside busy directors value their directorships differently, using the relative centrality of a firm in the board network to measure directors' reputation incentives. Using data on 13 651 director-firm-year observations over a period of eight years, I map the social network of corporate boards in Swedish publicly traded firms. Boards that are central to the network have better access to information and thus offer their directors more visibility and exposure to the market of directorships. Directors are in turn assumed to value their directorships based on a ranking of the relative centrality of the boards they serve. Similar to Masulis and Mobbs (2014a), I measure directors' commitment to their directorship using their board meeting attendance. For busy outside directors, serving on boards with different centrality provides them with different levels of reputation incentives. Thus, I hypothesise that directors will commit more time and effort to directorships they consider more prestigious. I find that the probability of directors missing board meetings is lower (higher) for firms that are considered more (less) prestigious. I also find that this effect holds for both independent and non-independent directors.

These results are in line with Masulis and Mobbs (2014a), who find a similar behaviour for independent directors in the US. However, the fundamental difference between our two studies is the measure used for reputation. My results are robust to controlling for firm size and relative firm size as a measure of reputation. I associate this finding to the possibility that board centrality might convey relevant information about reputational incentives to directors, compared with firm size alone, in the Swedish context. The Swedish board network is more compact and highly connected, which allows information about an individual's reputation to spread faster compared to a larger and less connected US board network (Sinani et al., 2008).

Second, I aggregate directors' reputation incentives at the board level and identify the proportion of directors who consider a given board more or less prestigious. A busy director considers a firm more prestigious if its centrality score in the board network is above the median of his or her directorships. Using the aggregate board reputation, I test if shareholders' wealth benefits more from the talent and effort of directors in firms viewed as more prestigious than in firms that are considered less prestigious. I find that firms with a higher proportion of directors considering them more prestigious witness a higher market valuation than firms with a lower proportion of directors considering them more prestigious. This result is consistent across various measures of firm centrality and is robust to controlling for firm size, relative firm size and past performance. Third, I use director-level network to evaluate the centrality of individual directors relative to their peers. Based on the centrality score of each director, I can identify directors with high reputation and use their board appointments to assess their impact on the market valuation of firms. I find that appointing directors with a high reputation impacts shareholders' wealth positively, and this effect is specific to independent directors.

This paper contributes to two strands of the literature. I expand on the work of Masulis and Mobbs (2014a,b) and use the centrality of the firm as a measure of reputation. Centrality measures provide insight on the extent to which directors can use the relative importance of a directorship in the board network to improve and signal their reputation. In the existing vast literature on board composition and directors' reputation, most studies implicitly assume that directors value their directorships equally. Among the few exceptions, Masulis and Mobbs (2014a,b) tackle this issue by evaluating directors' reputation incentives using relative firm size as a measure of firms' prestige. I find that for Sweden, where the network of corporate boards is highly connected, measures of network centrality seem to capture some aspects of directors' reputational incentives, even after controlling for firm size.

Second, I bring another perspective on how connections among directors at the individual and board levels could capture reputational incentives for directors. This contribution expands the literature on social network applied to the world of corporate boards. Several studies have investigated the effects of board and director network connections on firms' governance and performance. However, board network is often used to measure interlock, and director network is used to measure busyness. Andres et al. (2013) empirically test the implication of director network in German firms and find evidence that firms with more connected directors witness lower performance and higher levels of executive pay. Similar results are documented by Barnea and Guedj (2007) and Fracassi and Tate (2012) using US data. They find that connections among directors lead to less monitoring of the CEO, higher CEO pay and lower firm performance. Larcker et al. (2013) on the other hand find that US firms with high centrality in the boardroom network earn superior risk-adjusted returns. Houston et al. (2014) study board network for the global banking sector and find that social networks among directors provide a better flow of valuable information between banks, but can also lead to a contagion among banks by facilitating the spread of systemic risk. Finally, Fracassi (2014) finds that firms with more social connections usually engage in similar investment behaviour.

The main findings of this paper point to the importance of board and director networks for the reputation of directors in Sweden. This result is in line with findings by Sinani et al. (2008), Edling et al. (2012) and Stafsudd (2009), which establishes social networks as an important form of informal governance mechanism in Swedish boards. Sinani et al. (2008) propose that a highly connected and ethnically homogeneous network of boards allows more social control through reputation and threats of exclusion from social networks. They argue that in the Scandinavian context, firm underperformance can spill over to the reputation of directors, penalising their eligibility for future appointments in the market for directorships, and can reduce their personal utility. Edling et al. (2012) argue that despite the decrease in the strength of the existing old boys' network among Swedish firms, the connectedness of the country's corporate boards is expected to increase in the future due to more diverse ties between directors, including an increase in the presence of women on boards. Finally, the present paper presents a more comprehensive picture of board and director networks in Sweden over time, and focuses on centrality measures that capture the notion of prestige and the relative importance of firms and directors in their networks.

The rest of the paper is organised as follows. Section 2 outlines the hypothesis development, Section 3 details the sample construction and network centrality measures, Sections 4 and 5 present the director-level and firm-level analyses, respectively, and Section 6 concludes the paper.

2 Hypothesis development

Better connected firms (boards) can offer their directors wider access to information streams and higher visibility. If the centrality of a firm to the network improves directors' reputation incentives, it is plausible that directors value their directorships differently. This is particularly important for board members holding multiple directorships. Busy directors have to decide how to allocate their time and energy across their multiple directorships. Busy directors are expected to spend more (less) time and energy in firms they value more (less), i.e. more (less) connected firms. I measure the extent of directors' commitment based on their level of absenteeism. As documented by Vafeas (1999), board meeting frequency is crucial to the performance of boards, and Lipton and Lorsch (1992) find that time constraints are a major barrier to directors' efficiency in fulfilling their duties. Thus, the degree of absenteeism of directors in a directorship can reveal their commitment to it (Masulis and Mobbs, 2014a). The first hypothesis is:

Hypothesis 1: Directors commit more time to boards of firms they rank as relatively more prestigious.

The performance of a firm depends largely on the talent of its directors, specifically their capacity to monitor and advise the management. Directors holding multiple directorships are often viewed as more talented (Shivdasani, 1993; Shivdasani and Yermack, 1999; Ferris et al., 2003). However, their capacity to effectively direct their talent to their directorships has been largely criticised. Several empirical studies document that firms with more busy directors suffer lower profitability, weaker corporate governance and less effective monitoring (Fich and Shivdasani, 2006; Cashman et al., 2012). Busyness can increase the pressure on directors' time, which in turn reduces their monitoring and advisory capacity. While the arguments against directors' busyness are valid, they implicitly assume that directors value their directorships equally. If busy directors consider one of their directorships more prestigious than others, then they are expected to spend relatively more effort in that firm, and allocate less time to directorships that contribute less to their reputational capital. At the firm level, the higher the proportion of directors who consider a firm more prestigious, the more likely its board will benefit from their talent and expertise. The second hypothesis is:

Hypothesis 2: Firms with more directors considering them more prestigious have a higher market valuation than firms viewed as less prestigious.

Similar to board centrality, individual directors have different levels of importance relative to each other. Board members who are more central in the network for directors benefit from more connections to other directors and access more information. Having a central position in the network does not necessarily imply that a director is busy, but can be a signal of a director's reputation. However, the extent to which the reputation of a director will benefit the firm depends on factors such as his or her independence status and degree of involvement in other directorships. I test for the effect of recruiting highly reputable directors in a given year on the market valuation of firms in the following year. The third hypothesis is:

Hypothesis 3: Firms that appoint directors with a high reputation in a given year experience an increased market valuation in subsequent years.

3 Sample construction and data description

The sample of directors consists of 13 651 director-firm-year observations for 220 publicly traded firms in Sweden from 2006 to 2013. Aggregating director data at the firm level yields 1708 firm-year observations.[1] Table 1 provides summary statistics for director-level data, decomposed according to director's affiliation, and Appendix 1 presents variables definition. Directors are defined as independent if they are independent of the firm, the management and the largest shareholder (Swedish Corporate Governance Code 2010). Non-independent directors are all non-employee, non-CEO directors who are not classified as independent directors.[2] On average, 45% of the directors on Swedish boards are independent, 11% are employee directors and 34% are busy, i.e. they hold more than one directorship in a Swedish listed firm. Comparing board busyness across directors, we find that 38% (32%) of independent (non-independent) directors are busy, whereas only 23% of CEOs hold outside directorships. More than 50% of CEOs are not board members and thus lack voting power. In terms of ownership, 67% of the directors hold shares in the firms they serve. Finally, 82% of CEOs and 68% of independent directors own shares in the firm.

In terms of attendance, 40% of the directors in the sample missed at least one board meeting per year and 10% missed more than 25% of the board meet-

[1]Director data is hand collected from Boards of Directors and Auditors in Sweden's Listed Companies, SIS Ägarservice. Ownership structure data is collected from Owners and Power in Sweden's Listed Companies, SIS Ägarservice. Data on board meetings, director's attendance, ownership and compensation is collected from corporate governance reports (annual reports). Finally, firm data is from Thomson Reuters Datastream.

[2]Non-independent directors can be classified as either insider or outsider directors.

ings. In order to better understand the implications of the frequency of board meetings for directors' time, I report the number of meetings directors have to attend as a function of their busyness. A director holding 5 (3) directorships has to participate in an average of 58 (39) board meetings per year. For directors holding only two directorships the number of board meetings is about 30 per year, whereas for directors with sole directorships the number drops to about 10 meetings.

Table 2 provides summary statistics at the firm level. The average board consists of eight members, roughly half of whom are independent. On average, the number of outside directorships held by a board is six, and 10% of board members are employee-directors. CEOs own more shares and are paid considerably better than the rest of the directors on the board. The difference in share ownership is also more pronounced between independent and non-independent directors. Share holdings are six times as large among non-independent directors than among independent counterparts. I also compare firm characteristics across two sub-samples of firms. *High-ranked* refers to firms with at least one director who considers them more prestigious. *Low-ranked* are firms where none of their directors consider them more prestigious, i.e. all directors consider the firm to be less prestigious.[3] About half of the firms in the sample are ranked as more prestigious and the other half as less prestigious. *High-ranked* and *low-ranked* firms have a similar board composition. The main difference can be found in the busyness of directors, where those in *high-ranked* firms hold more outside directorships than their peers in *low-ranked* firms. In terms of firm size, *low-ranked* firms seem to have a lower market capitalisation than *high-ranked* ones, whereas the difference in total assets is small. *High-ranked* firms are also more indebted. CEOs in *low-ranked* firms hold a considerably larger proportion of shares compared with CEOs in *high-ranked* firms, while directors in *high-ranked* firms have a higher pay compared with the rest of the sample. The

[3]The ranking is based on *eigenvector* centrality. A formal definition of *high-ranked*, *low-ranked* and *eigenvector* centrality is provided in Sections 3.1 and 3.2.

difference in director pay seems to be consistent across different director categories.

3.1 Social network construction

Using director-level data and constructing a first network, I map the relationship of each individual director to the rest of the board members in the sample. Two directors are considered to be connected if they simultaneously sit on at least one board. The individual connections at the director level are then aggregated to form a second network, which maps the connectedness of each board of directors to other boards in the sample. Two boards are considered to be connected if they share at least one board member. Following the literature on social networks, each director (board) in the network is considered to be a node and each connection between two directors (boards) is a tie.[4] This results in an adjacency matrix, where each connected pair of nodes is assigned a value of one, and zero otherwise.[5] Table 3 reports information on the composition of the two networks. The director's network is an $(N \times N)$ matrix whith $N = 13\,651$ and has 101 900 ties, whereas the board network is a $(K \times K)$ matrix with $K = 1708$ and a total of 8006 ties.

The upper (lower) section of Figure 1 presents director (board) networks for the years 2006, 2009 and 2013. For director networks, I restrict the number of connections to only one connection per director in order to have a clearer exposition. From the graph, we can see that some directors are relatively more central than others, and some are not connected to the network. We can also see that there are two main sub-networks, one much larger than the other. Over time, there seems to be more variation in the smaller sub-network than in the larger

[4]The director-board dimensions make the network a bipartite type, where directors (boards) are nodes (ties) or vice versa. For a discussion on bipartite networks in corporate boards see Conyon and Muldoon (2006).

[5]For the board network, values on the diagonal are set to zero. For the director network, the values on the diagonal are equal to zero by definition.

one. Regarding the board network, I include the full set of connections between boards and exclude firms that are not connected. The network of boards seems to be highly connected, with few firms outside the core network. Over time, these firms connect with the remaining boards by sharing directors.

3.2 Connectedness measures

In order to assess the relative importance of a director (board) in the global network of directors (boards), I use two measures of centrality that are common in the social network literature.[6] Each measure captures a different aspect of the importance of a node in the network. The first measure is *eigenvector* centrality and captures the importance of a node relative to the centrality of its neighbouring nodes. In the board network, for example, the *eigenvector* centrality measure will assign more weight to boards with more links to other boards that are central to the network, taking into account both first- and multiple-degree links. As shown in Bonacich (1972) and Bonacich (1987), for an adjacency matrix A of board connections, the centrality of board i is:

$$\lambda \text{ eigenvalue}_i = \sum_j A_{i,j} \text{ eigenvalue}_j \tag{1}$$

where i and j are interlocked, i.e. $a_{i,j} = 1$. The equation in (1) can be written in vector form as:

$$\lambda \text{ eigenvector} = A \text{ Eigenvector} \tag{2}$$

where the *eigenvector* is that of A and λ is its associated eigenvalue. I use *eigenvector* centrality as the primary measure for reputation of a firm in the network, given that it is ideally suited to measure influence (Borgatti, 2005). In a board network, *eigenvector* captures the notion of prestige or power of a firm as it evaluates more precisely the importance of a board by taking into account the centrality of adjacent boards in the network (Larcker et al., 2013). At the director

[6] For a more detailed explanation of the centrality measures in social networks, see Carrington et al. (2005). All the centrality measures are computed using Hirotaka Mirua's network command in Stata, and all reported network formulas are as described in Miura (2012).

level, the *eigenvector* centrality captures the quality of a director's connections in the network by considering his or her ties to other well-connected directors (Andres et al., 2013; Bøhren and Strøm, 2010).

The second measure of centrality is *betweenness*, which concerns how well a node connects other nodes in the network. For a given board i, *betweenness* measures the number of shortest paths connecting any two boards in the network that pass through board i. The intuition is that the higher the frequency at which board i lies on the shortest path of other boards, the higher the informational and relational importance of board i (Larcker et al., 2013; Houston et al., 2014). Thus, *betweenness* measures in a sense the overall importance of a board in the whole network. Define $P_{j,k}$ as the shortest path connecting boards j and k, and define $P_{j,k}(i)$ as the number of shortest paths that pass through board i. *Betweenness* is defined as [7]:

$$betweenness_i = \sum_{j,k:j\neq k,i\notin j,k} \frac{P_{j,k}(i)}{P_{j,k}}$$

3.3 Firm reputation and directors' reputational incentives

For a busy director, I measure the relative importance of his or her directorships by comparing their centrality in the board network. The more central a firm is in the board network, the higher the reputation benefits to its directors. Using each centrality measure individually, I rank above (below) median directorships as more (less) prestigious. I define the indicator variable for more prestigious directorships as:

[7] Two other centrality measures are commonly used in Social-Network theory. *Degree* is closer in principle to *eigenvector* centrality as it is a measure of first-order (immediate) influence, while *eigenvector* captures higher orders, direct and indirect influence (Borgatti, 2005). *Closeness* measures the speed at which a node reaches other nodes in a network and it is closer in principle to the concept of *betweenness*. The correlation coefficient between *degree* and *eigenvector* is 0.83 and between *closeness* and *betweenness* is 0.82.

$$High - ranked = \begin{cases} 1 & \text{if } centrality_i > \text{median} \\ 0 & \text{Otherwise} \end{cases}$$

For directors holding a sole directorship, I use an indicator variable. It is referred to as *sole-directorship* and is equal to one if a director holds one directorship only and zero otherwise. The objective is to capture the effect of a sole directorship being, intuitively, ranked as most important by a director. For example, in 2006, Ulla Litzén was a board member in Atlas Copco (0.055), SKF (0.027), Karo Bio (0.019), Boliden (0.050) and Alfa-Laval (0.051), where values in parentheses are board-level *eigenvector*. Based on the *high-ranked* variable, Atlas Copco and Alfa-Laval provide more reputation incentives to Ulla Litzén than SKF, Karo Bio and Boliden. For the same director and the same firms the *betweenness* scores are Atlas Copco (0.025), SKF (0.0019), Karo Bio (0.037), Boliden (0.041) and Alfa-Laval (0.031), which implies that Boliden and Karo Bio are ranked above the median value of 0.031. This illustrates how different centrality measures rank firms differently.

Following Masulis and Mobbs (2014a), I also use the relative size of market capitalisation as a measure of reputation. For busy directors, they define the indicator variable *high-value* (*low-value*) equal to one if the market capitalisation of a firm is 10% larger (smaller) than the smallest (largest) firm they serve at. This measure allows more variability in the sense that it captures the effect of holding more than two directorships. Using firm size to rank Ulla Litzén's directorships in 2006, Karo Bio is ranked as *low-value* while the rest of the firms are ranked as *high-value*, given that the market capitalisation of the latter firms are all 10% larger than that of Karo Bio. This illustrates the difference between network measures and relative firm size in identifying prestigious firms.

Panel A in Table 4 presents director-level summary statistics for the centrality measures. Fifteen per cent of the directors consider their firms to be more prestigious when ranking directorships based on *eigenvector* or *betweenness* separately. Using firm size as a measure of reputation, 20% of the directors rank their directorship as *high-value*, and an equal fraction consider their directorship to be *low-value*. The use of firm size as a measure of reputation leads to a 33% increase in the number of directors who rank their firms as *high-value*, compared with other network centrality measures. As expected, the average market capitalisation for *high-value* firms is also larger than that of any centrality measure used.

Panel B of Table 4 presents the mean of *eigenvector* and *betweenness* scores across different rankings. The average *betweenness* score for high-ranked firms based on *eigenvector* (*betweenness*) is 0.033 (0.037), whereas the average *eigenvector* score for high-ranked firms based on *eigenvector* (*betweenness*) is 0.088 (0.080), indicating a slight difference between the two centrality measures. However, the difference in centrality scores becomes more apparent when comparing centrality rankings with relative market capitalisation rankings. *High-value* firms seem to have lower measures of centrality, which indicates that large firms are not always the most central in the board network. Indeed, the *eigenvector* of *high-value* (*low-value*) firms is 17% (49%) lower than that of *high-ranked* firms.

Panel C of Table 4 presents correlation coefficients between different rankings. Rankings based on *eigenvector* and *betweenness* have a high correlation, while their correlation with relative market capitalisation rankings i.e. *low-value* and *high-value*, is low.

4 Director-level analysis: Board centrality as a measure of reputation

In this section, I examine how directors allocated their time and energy across their directorships based on their board meeting attendance. As reported in Table 1, the typical yearly work load for a director increases on average by 10 board meetings for each extra directorship. For a director serving on two (three) boards, the number of annual board meetings is 29 (38). This illustrates the time pressure associated with board meeting attendance, which is considered one of the main challenges faced by directors in fulfilling their duties (Lipton and Lorsch, 1992; Vafeas, 1999).

Following Masulis and Mobbs (2014a), I treat board meeting attendance as a measure of directors' commitment to their firms. Directors are thus expected to allocate more time to directorships they consider more important, i.e. directorships that increase their reputational capital. Most publicly traded Swedish firms report information on board meeting frequency and director attendance in their corporate governance reports.[8] I measure director *absence* with an indicator variable equal to one if a director missed more than 25% of the board meetings in a firm during a year, and zero otherwise. I also use *attendance rate*, which is the number of board meetings attended by a director relative to the total number of board meetings for a firm in a given year.

The centrality of a firm in the board network depends on the type of centrality measure used. The main reputation variable, *high-ranked*, is based on either *eigenvector* or *betweenness* measures of centrality. *Eigenvector* is chosen as the main measure of director reputation because it better captures the importance (prestige) of a firm in the board network by comparing it to the centrality of neighbouring firms. On the other hand, given that *betweenness* measures the capacity of a firm to connect other firms, firms with higher betweenness scores can be more valuable to a director, in the sense that they allow the latter to better signal his or her reputation to the market.

Tables 5 and 6 present results for a director-level probit model, where the dependent variable is *absence*. In Table 5, the main explanatory variable *high-*

[8] Some firms do not report board meeting attendance for some or all years. The results remain unchanged when excluding them from the analysis.

ranked is based on *eigenvector* scores, whereas in Table 6 it is based on *betweenness* scores.[9] Models (1)–(4) present results for all directors regardless of their independence status, while Models (5)–(8) restrict attention to independent directors only.[10] In all models reported in Table 5, the indicator variable for highly ranked directorships is negative and significant, indicating that the probability of missing board meetings is lower in firms ranked as more prestigious, and vice versa. In Model 1, the marginal effects associated with *high-ranked* (*eigenvector*) equal -0.026 and imply that the predicted probability of missing more than 25% of the board meetings is 2.6 percentage points lower for a director who ranks a directorship as more prestigious relative to a director that ranks that directorship as less prestigious. This effect is similar in Model 5, when restricting attention to independent directors, as the *absence* probability is 2.6 percentage points lower there as well. Similar results are found when using *betweenness* as a centrality measure. Marginal effects associated with *high-ranked* (*betweenness*) are reported for Models 1 and 5 in Table 6. As can be seen, the probability of missing more than 25% of board meetings is 2.9 to 3.2 percentage points lower for a director who ranks a directorship as more prestigious relative to a director who ranks that directorship as less prestigious.

It is important to distinguish between firm size and relative firm size. In all specifications, I control for firm size measured as the logarithm of market capitalisation. In Models 2 and 6, in addition to firm size I control for relative firm size as a measure of reputation following Masulis and Mobbs (2014a,b). *High-value* is equal to one if for a busy director the market capitalisation of a firm is 10% larger than the smallest firm he or she serves at, and vice versa for *low-value*. The coefficients on *high-value* and *low-value* are insignificant in both specifications, which indicates that relative firm size per se is not related to board meeting attendance in Sweden. These results lend support to the hypothesis that firm centrality, measured using the *eigenvector* or *betweenness* score,

[9]The reported results use robust standard errors. The results are essentially the same when clustering standard errors by directors.

[10]All directors include all non-employee non-CEO directors.

seems to capture some notion of firm reputation that might drive directors' efforts to attend corporate board meetings in Sweden. One possible explanation for this result is that the Swedish market for directorships is relatively small compared with the US market, which increases the importance of social networking. As described by Sinani et al. (2008), the board network is an informal governance mechanism that is central to the Swedish model of corporate governance. In a corporate board network that is highly connected and small in size, information about the individual directors' reputation can be more accessible and credible. Another characteristic of Swedish corporate boards is the strong presence of large owners in boardrooms. Large owners also enjoy a highly connected network (Stafsudd, 2009). The importance of large owners for directors' future careers is better understood when looking at the nomination procedure in Swedish corporate boards. The typical nomination committee is mainly composed of large shareholder representatives, and typically the chairman of the board (Sinani et al., 2008).[11] The close connection between board and owner networks highlights the importance of social networking for directors to signal their reputation in Sweden.

Several directors hold only one directorship, and controlling for those directors is an additional robustness check for earlier findings. In Models (3) and (7) I control for *sole directorship*, which is a dummy variable equal to one if a board is the sole directorship for a director and zero otherwise. The coefficients associated with *high-ranked* have the expected sign and their magnitude is essentially unchanged. However, their significance is less robust when we restrict the sample to independent directors only. In Models (4) and (8) I control for *director's remuneration*, which is the sum of a director's pay, board fees and committee membership fees. In addition to controlling for financial rewards, I control for the number of board meetings (# *of board meetings*) [12]. I find that

[11]The new Swedish Corporate Governance code introduced a new requirement, where one of the members of the nomination committee should be independent of the largest shareholder.

[12]Unfortunately, not all firms report the number of board meeting, which leads to a decrease in the sample size from 10 399 observations to 9510 observations.

a higher financial reward is associated with a lower probability of a director missing board meetings, which is in line withAdams and Ferreira (2008) and Masulis and Mobbs (2014a). However, the number of board meetings seems to be positively related with *absence*, which lends more support to the idea that more meetings make directors more busy, thus increasing their risk of missing board meetings.

In addition to reputation incentives, the commitment of a director to a directorship can be influenced by other factors. For directors holding multiple appointments the notion of busyness is important, since the busier the director, the less time allocated to each directorship (Ferris et al., 2003; Fich and Shivdasani, 2006). I control for directors' busyness measured as the number of outside directorships held. In Models (1)–(4), the coefficient on *# outside directorships* is negative and significant, which implies that busier boards are less inclined to miss board meetings. However, this result does not hold when we restrict attention to independent directors, which implies that the effect is specific to non-independent busy directors. The work of audit and remuneration committees is an important part of a board's duties and constitutes as such a good measure of the degree of director involvement (Masulis and Mobbs, 2014a). I control for *committee membership*, which is equal to one if a director serves in the audit committee, the remuneration committee or both. The results indicate that the risk of missing board meetings is lower when a director participates in one or both committees.

Board size, firm performance and a director's age can affect attendance negatively (Masulis and Mobbs, 2014a). The expected negative effect of board size is due to an increased free riding in larger boards, and directors are more likely to miss meetings when firm performance is strong and when they get older. I also find that larger boards and better performing firms are associated with lower board meeting attendance. However, older directors seem to have a lower probability of missing board meetings. Share of ownership can also play a role in incentivising directors to exert more effort, as suggested by Bhagat and Bolton (2013). Intuitively, the higher a director's ownership stake in a firm, the more effort he or she will allocate to it. I measure *director ownership* as the ratio of a director's shareholdings to the total number of shares outstanding. The coefficients associated with *director ownership* are negative and significant in Models (1)–(4), and only marginally significant in Models (5)–(8) when restricting attention to independent directors. This indicates that the share ownership effect is specific to non-independent busy directors, who typically own more equity in the firm. Finally, I control for the post-2008 period to capture the effects of the release of new corporate governance regulation in Sweden (CGC). $Post\ CGC(2008)$ is equal to one for periods after 2008, and zero otherwise. The results indicate that absenteeism increased in the post-reform period. One explanation for this can be that the majority-independent boards required by the CGC led to a rise in the demand for independent directors, from a limited supply of directors, making directors busier.

Tables 7 and 8 report results for a director-level pooled regression where the dependent variable is *attendance rate*. In Table 7, centrality is measured using *eigenvector*, and in Table 8 it is measured using *betweenness*.[13] All the coefficients on *high-ranked* are positive and significant, indicating that firms ranked as more prestigious by their directors have a higher rate of board meeting attendance than less prestigious firms. Models 1 and 5 in Table 7 report coefficients for *high-ranked* (*eigenvector*) equal to 0.012 and 0.015, respectively. This implies that *attendance rate* is 1.2 and 1.5 percentage points higher for a director who considers a directorship more prestigious than for a director who considers the directorship less prestigious. From Table 8, we see that the estimated coefficients associated with *high-ranked* (*eigenvector*) are similar in magnitude to coefficients based on *eigenvector*. All the results remain robust after controlling for

[13] All explanatory variables are as defined for probit model in Tables 5 and 6. I exclude firms that do not have full data on attendance, which reduces the sample to 9481 director-firm-year observations.

firm size, relative firm size, *sole directorship*, *director's remuneration*, the # *of board meetings* and other board characteristics.

5 Firm-level analysis

The evidence discussed so far unveils one aspect of the relationship between directors' reputational concerns and their effort supply across different directorships. Board meeting attendance does not capture all aspects of directors' commitment to a directorship, but it allows us to proxy directors' effort. As argued by Adams et al. (2010), the actual behaviour of directors is often unobservable and is hard to quantify. If directors allocate more time and effort to more prestigious firms, then it is reasonable to hypothesise that the aggregate effort of those directors impacts these firms' market valuation.

5.1 Directors' reputation and firm market valuation

In this section, I test the second hypothesis by looking at the aggregate effect of independent directors' reputation incentives on the market valuation of firms. The market valuation of the firm is measured as the difference in the logarithm of Tobin's Q between two periods, labeled ΔTobin's Q. I compare firms based on the number of independent directors who regard them as more prestigious, using board network centrality to measure reputation. By firm, the variable *director-high*is the percentage of independent directors who consider that firm more prestigious relative to board size. *Director-high* is similar to the measure used by Masulis and Mobbs (2014a).[14]

Table 9 presents results for fixed effects estimation, where the dependent variable is ΔTobin's Q. Controls for board composition, ownership structure and firm characteristics are as commonly used in the literature (Masulis and

[14]To compute *director-high*, I exclude employee directors from the board size measure. Including employee directors in the board size measure will distort the comparability of this ratio across firms that have different numbers of employee directors.

Mobbs, 2014a; Fich and Shivdasani, 2006; Bøhren and Strøm, 2010).[15] In Models 1–4, *director-high* is based on *eigenvector* as a measure of board centrality, whereas in Models 5–8 I use *betweenness* as a measure of board centrality. The results indicate that firms with a higher proportion of independent directors who consider them more prestigious see a significantly higher firm valuation. This result is similar regardless of the centrality measure used in assessing board centrality. In order to get a more sensible economic interpretation of the results, consider the estimate from Model 1 for *director-high*, i.e. 0.006. For an average-sized board with eight members, the switch in ranking for one director leads to a 12.5% $(\frac{1}{8})$ increase in the measure of directors' reputation incentive. Thus, an increase of one director who considers the firm to be more prestigious leads to a 7.5% increase in ΔTobin's Q (0.005×12.5). In Model 5, similar results are obtained using *betweenness* as a measure of reputation, where the effect of *director-high* is positive and significant.

In addition to controlling for firm size using the one period lagged total assets, I control for relative firm size to see if the results from Models 1 and 5 are driven by network centrality effects.[16] In Models 2 and 6, I include the percentage of independent directors who consider a firm as more or less prestigious based on Masulis and Mobbs's (2014a) relative firm size measure of reputation. The estimated coefficient associated with *director-high, market capitalisation* and *director-low, market capitalisation* have the right signs, but do not seem to be significantly related to ΔTobin's Q. These results confirm our previous finding that network centrality might capture the effects of directors' reputational incentives

[15] I exclude financial firms from the sample and use robust standard errors clustered by firm. In unreported results, I look at all directors regardless of their independence status. These results become marginally significant, indicating that the effect is mainly driven by independent directors. The results are robust to the use of right hand side variables in differences instead of levels. Only three firms in the sample do not have independent directors, and excluding them from the sample does not affect the results.

[16] Results remain qualitatively unchanged when I use the one period lagged market capitalisation as a measure of firm size. Model estimates are also robust to controlling for contemporaneous effects of firm size in addition to their lagged effects.

in Sweden. Direct compensation of directors can also impact the effort they supply to the board (Yermack, 2004; Fich and Shivdasani, 2007). In Models 3 and 7, I control for CEO and director remuneration, measured as the sum of a director's pay, board fees and committee membership fees received in a year. The results indicate that neither director nor CEO remuneration is significantly related to firm market valuation.[17]

I control for board independence, i.e. an indicator variable equal to one if the board of a firm has a majority of independent directors. The coefficient on board independence is positive and significant, which can be attributed to better expertise and improved monitoring brought by independent directors. In terms of board busyness, Cashman et al. (2012) and Fich and Shivdasani (2006) argue that more busy directors can impact firm performance negatively. I use the sum of outside directorships held by all directors serving on a board as a proxy for board busyness. Consistent with their predictions, the estimate for busy boards is negatively related to firms' market valuation and significant.

The presence of endogeneity complicates the task of establishing causal effects of board-level characteristics on firm-level outcomes (Hermalin and Weisbach, 1998). Hypothesis 2 implies that causality is due to directors putting more effort into directorships they regard as more prestigious, which leads to a higher market valuation for those firms. However, there is a risk of endogeneity as causality can run in the reverse direction. In the current setting, the channel for reverse causality can be that directors exert more effort in firms that are already performing well. In the previous section, I find that directors have a higher probability of missing board meetings when the firm is performing well. Consistent with the argument and findings by Masulis and Mobbs (2014a), directors are more likely to miss meetings when firm performance is good and less likely to miss meetings when the firm is performing poorly. Although board meeting

[17]Unfortunately, remuneration information is missing for some directors in some years, which explains the drop in the number of observations in Models 3 and 7.

attendance represents only one aspect of the effort directors commit to a directorship, the inverse relationship between firm performance and attendance provides more support for the direction of causality in hypothesis 2. Finally, in order to partially control for potential endogenous effects due to reverse causality, I include past performance using the one period lagged return on assets (ROA). Models 4 and 8 in Table 9 show that the coefficient associated with *director-high* is positive and significant, both using *eigenvector* and *betweenness* as a measure of board centrality.

5.2 Reputable directors' appointment and firm market valuation

I study the impact of recruiting well connected directors on firms' market valuation, using director-level network to evaluate individual directors' centrality and reputation. One can use the connections of directors to identify their importance in the director-level network. Similar to board reputation, the quality of directors will depend on their centrality in the director network, i.e. their ability to connect with other board members. The reputation of a director can be beneficial to boards as more connected directors can improve the centrality of the firms they serve, attract more skilled directors and improve a firm's access to information.

For each firm-year, I identify reputable directors who have been appointed one year earlier. In a boardroom, directors are considered to have *high-reputation* if their *eigenvector* score in the director network is higher than the median of the board they are newly appointed to, and vice versa for directors with *low-reputation*. Table 10 presents summary data on the distribution of director appointments. Panel A provides information about independent directors and Panel B provides information on non-independent directors (excluding employee directors and the CEO). I divide each sub-category of appointed directors based on whether they are above or below director's sample median age, which is 55 years. In total, firms appointed 1342 directors, 415 of whom had high reputation and 927 low reputation. Most of the new directors, regardless of their independence status, seem to hold few outside directorships and are younger than the median age in the sample.

Table 11 reports estimation results from a fixed effects model, where the dependent variable is ΔTobin's Q. The main explanatory variable *#connected-high* refers to the number of newly appointed directors with an above median centrality score. *#connected-low* refers to the number of newly appointed directors with a below median centrality score. I distinguish between independent and non-independent directors under each measure. I use *eigenvector* as the main measure of directors' centrality in the network.[18] Model 1 focuses on the appointment of independent directors only. Estimates indicate that firms that recruited highly (low) reputable independent directors in a given year witnessed an improvement (worsening) of their market valuation in the year that followed the appointment. In Model 2, I focus on the appointment of non-independent directors. The results indicate that appointing a non-independent director, regardless of his or her reputation, is unrelated to the firm's market valuation. In Model 3 (4), I report estimation results for the appointment of reputable (non-reputable) directors only, regardless of their independence status. The results are consistent with findings from Models 1 and 2, and indicate that recruiting reputable independent directors benefits the firm the most, whereas adding to the board independent directors with low levels of centrality to the board can harm shareholders' wealth.

The relationship between the recruitment of directors and firm performance can also be endogenously determined. Firms can decide to recruit independent directors, or directors with good reputation, in response to previous bad firm performance. One way to partially mitigate this source of endogeneity is to control for past firm performance. In Table 12, I estimate Models 1–4 from Table 11

[18]The results are qualitatively similar using *betweenness* as a measure of directors' centrality.

and control for past firm performance using the one period lagged return on assets (ROA). The estimated coefficients have the same sign and in most cases the same significant relationship with firms' market valuation as findings from Table 11. Thus, the conclusion that recruiting independent directors with high (low) reputation benefits (harms) shareholders' wealth is to some extent robust to potential endogenous effects due to the reaction of firms to past bad performance. Another form of endogeneity can be related to directors self-selecting into well performing firms, and avoiding troubled ones. However, under the premise that directors seek more appointments, it is possible that those with fewer directorships are less inclined to refuse additional ones. The same argument can be extended to directors' age, where younger directors should be less able to choose between board appointments compared with older more experienced directors. From Table 10, we can see that the majority of the newly appointed directors hold few directorships. For example, 122 of the 214 independent directors with high reputation hold only one other directorship, and 52 directors hold two outside directorships. In terms of directors' age, 62% of the appointed directors are below the median age in the sample.[19]

Finally, one can also argue that the estimates from Tables 11 are driven by the independence status of appointed directors. In order to show that the effect is indeed due to directors' reputation, I look at the stability of the coefficients associated with #*connected-high*(*low*) for independent directors, after controlling for board independence. In Table 13, Models 1–3, I control for board independence using an indicator variable for majority independent boards. In Models 4–6, I control for the total number of independent directors recruited in a given year. Similar to findings from Table 10, the results indicate that hiring reputable (non-reputable) independent directors benefits (harms) the firm in subsequent periods. The robustness of the results, after controlling for different aspects of

[19] The number of outside directorships includes only Swedish publicly traded firms and does not take into account the possibility that directors might be serving other boards in privately owned firms.

board independence, lends more support to directors' reputation driving the estimated effects.[20]

6 Conclusion

In this study I investigate how the reputation of firms impacts the commitment of directors to their board duties. I build on predictions by Fama and Jensen (1983), Levit and Malenko (2015) and Malenko (2013), where reputational incentives impact the monitoring and advisory efforts of directors. In an attempt to secure future directorships, directors can signal their reputation to the market, and their capacity to do so can depend on the level of visibility offered by the boards they already serve. This motivates the use of social network metrics to measure reputation. I map the network of connections between boardrooms, where two boards are connected if they share one or more directors. Based on the position of the firm in the network, I can evaluate its relative centrality in the board network, and use this centrality as a measure of firm reputation. This departs from previous literature, such as the recent work by Masulis and Mobbs (2014a,b), where firm size is used to proxy for firm reputation. In fact, the centrality of the firm captures not only firm size but also the firm's access to information and its capacity to connect and exchange information with other boards (Larcker et al., 2013; Conyon and Muldoon, 2006). From the perspective of directors, a more connected firm allows them to benefit from more exposure and serves as a relay to signal their talent to the market. In the case of directors serving multiple boards, the time and effort they allocate to each directorship is assumed to be a function of the relative reputational incentives they extract from their directorship.

I use directors' board meeting attendance rate to measure their degree of

[20]Results are robust to the use of the lag of board independence and the lag of the number of independent directors recruited, instead of their contemporaneous counterparts.

commitment to each directorship. Specifically, directors will rank their directorships based on their centrality in the board network. They are expected to commit more time to firms they considers more prestigious and have weaker attendance in firms that provide them with less reputational incentives. Consistent with predictions, I find that the probability that busy directors miss more than 25% of board meetings in firms they rank as more prestigious is lower compared with directors who consider the firms less prestigious. Despite the fact that board meeting attendance captures only one aspect of directors' commitment to board duties, the result above implies a significant relationship between the effort supplied by directors and their reputational incentives. This is in line with findings by Masulis and Mobbs (2014a) for US corporate boards. The main difference rests in measuring firms' prestige using centrality scores, which seem to capture more directors' reputational incentives in the Swedish context compared with relative firm size measures. This result sheds more light on the importance of networks in Sweden, and lends support to previous studies that consider corporate boards and directors' networks in Sweden to be an important form of informal governance mechanism (Sinani et al., 2008; Edling et al., 2012; Stafsudd, 2009).

The second main finding of the paper is that the aggregate reputational incentives of directors serving on a board have implications for shareholders' wealth. Directors' commitment to board duties is a positive signal to the firm. However, their efficiency carrying out their advisory and monitoring roles depends on several attributes. Connected directors are busier, which is rarely viewed as a positive director characteristic (Lipton and Lorsch, 1992; Ferris et al., 2003; Fich and Shivdasani, 2006). The effectiveness of directors can also depend on their independence status, where independent directors are expected to play mainly a monitoring role and to some extent benefit the firm with their expertise. I aggregate reputational incentives of directors at the board level to obtain a measure of how board members value a particular directorship. The premise is that directors will direct more of their talent and effort to firms that contribute more to their reputational capital (Masulis and Mobbs, 2014a). Accordingly, I show that firms with a higher proportion of independent directors who consider them more prestigious display a significantly better firm market valuation. This result is consistent using different measures of centrality in board network and is robust to firm fixed effects, controls of firm size, relative firm size and firms' past performance. Similar to Masulis and Mobbs' (masulis14a) conclusions for the US market, this result shows that connected (busy) directors in Sweden allocate their effort differently across their directorships, and having a higher proportion of directors considering a firm to be more prestigious benefits the firm's market valuation.

Finally, I study the impact of recruiting well-connected directors on firms' market valuation using director-level network to evaluate individual directors' centrality and reputation. Similar to board network, directors with high centrality scores have better access to information, more opportunities to exchange information, and can enjoy a richer network of connections when connected to other well-connected directors. I find that appointing better connected independent directors benefits the future market valuation of the firm, whereas recruiting independent directors with low reputation can cause harm to shareholders' wealth. This finding highlights the importance of taking into account reputational incentives in evaluating the contribution of independent directors to corporate boards.

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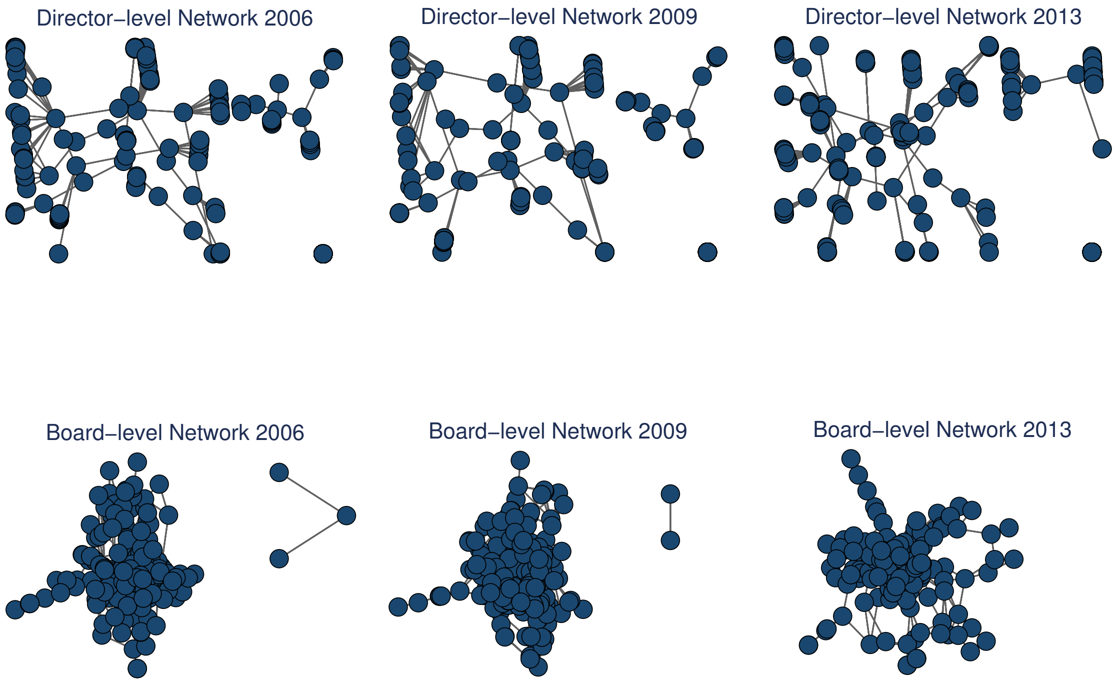

Figure 1: Director-level and board-level networks for years 2006, 2009 and 2013. The upper section of the figure, maps the network of connected Swedish directors. In order to ease the readability of the plot, I show only one connection per director. Each node refers to a director, and there are 1253, 1367 and 1293 directors in each year, respectively. The lower section of the figure maps the full network of Swedish boardrooms. Each node is a boardroom, and there are 177, 189 and 178 boardrooms in each year, respectively. I use the procedure by Grund (2014).

Table 1: Director-level descriptive statistics

Variable	N	Mean	Count
Age	13651	54.782	
Independent directors	13651	0.45	6149
Non-independent directors	13651	0.439	5986
CEO	13651	0.125	1708
Employee directors	13651	0.111	1516
Busy directors ($>$ 1 directorship)	13651	0.341	4657
Independent busy ($>$ 1 directorship)	6149	0.385	2367
Non-independent busy ($>$ 1 directorship)	5794	0.326	1891
CEO busy ($>$ 1 directorship)	1708	0.234	399
CEO not sitting in the board	1708	0.536	915
Ownership	13651	0.671	9155
Busy director ownership	4657	0.778	3622
Independent director ownership	6149	0.688	4232
Non-independent ownership	5986	0.735	4397
CEO ownership	1708	0.827	1413
Attendance $<$ 100% of meetings	13651	0.405	5526
Attendance $<$ 75% of meetings	13651	0.101	1385
# of outside directorships	N	Mean	Median
0	8994	9.957	9
1	2306	19.814	19
2	1146	29.586	29
3	572	38.545	38
4	310	47.355	47
5	186	57.903	55
6	105	63.000	61
7	32	52.750	52.5
Total	13651	16.47835	12

This table presents director-level summary statistics for 13651 director-firm-year, from year 2006 to 2013. N is the sample size, Mean refers to the average or the frequency of a variable, and Count measures the occurrences of a variable. A director is considered independent if he is independent from the firm, the management and the largest shareholders (as defined by the Swedish Corporate Governance Code (2010)). Non-independent directors refer to all non-employee, non-CEO directors that are not classified as. A director is considered to be busy if he holds more than one directorship. CEO not sitting in the board is an indicator variable equal to 1 if the CEO does not sit in the board and thus does not have a vote, and zero otherwise. Ownership is an indicator variable equal to 1 if board members own shares in the firm and zero otherwise. Attendance is the fraction of total board meetings attended by a director. Finally, I also report the distribution of the number of board meetings to be attended by directors depending on their degree of busyness.

Table 2: Firm-level data

	All firms			*High-ranked*			*Low-ranked*		
Variables	N	Mean	Median	N	Mean	Median	N	Mean	Median
Board size	1708	7.993	8.000	855	8.770	9.000	853	7.215	7.000
Total outside directorships	1708	5.977	4.000	855	9.133	8.000	853	2.812	2.000
Fraction of employee directors	1708	0.096	0.000	855	0.118	0.125	853	0.073	0.000
% Independent directors	1708	0.494	0.500	855	0.492	0.500	853	0.496	0.500
Majority owner	1708	0.648	1.000	855	0.646	1.000	853	0.651	1.000
Market capitalisation (millions)	1708	14433	1475	855	21659	3431	853	7191	758
Total assets (millions)	1707	66509	1700	855	71443	3470	852	61557	870
Total debt (millions)	1703	25167	252	854	28993	795	849	21318	105
Tobin's Q	1703	1.477	0.957	854	1.379	0.989	849	1.576	0.928
CEO ownership	1708	0.028	0.001	855	0.016	0.000	853	0.040	0.002
CEO compensation	1553	5242000	3512000	789	6742000	4800000	764	3693000	2735000
Directors' ownership	1708	0.018	0.003	855	0.016	0.002	853	0.020	0.003
Directors' compensation	1558	302700	228600	792	353800	275000	766	249800	190200
Independent directors' ownership	1708	0.003	0.000	855	0.002	0.000	853	0.004	0.000
Independent directors' compensation	1406	282600	211700	740	335800	266700	666	223400	175000

This table presents summary statistics for firm and board characteristics for a panel of 1708 firm-year observations, over the period 2006–2013. I report results for the full sample, and for three subsamples. *High-ranked* refers to firms where at least one director considered a firm as more prestigious. *Low-ranked* refers to firms where none of their directors considered them as more prestigious, i.e. all the directors considered the firm to be less prestigious (The ranking is based on *eigenvector* centrality score as defined in sections 3.1 and 3.2). For example, in 855 occurrences, firms have been ranked as more prestigious by an individual director. Majority owner is a dummy variable equal to 1 if the voting power of the controlling shareholder is higher than the sum of the voting power of the second and third largest share holders. Directors' share ownership is the average number of shares held by board members, proportional to the end-of-year total shares outstanding. Compensation refers to board fees, committee membership fees and annual remuneration. The rest of board and firm characteristics are as defined in Appendix 1.

Table 3: Director and board networks

	2006	2007	2008	2009	2010	2011	2012	2013	Total
# Directors	1580	1731	1763	1733	1759	1749	1732	1604	13651
# Links	11776	12920	13164	12760	13194	13018	12946	12122	101900
# Connected directors	1253	1342	1389	1367	1381	1385	1374	1293	10784
# Unconnected directors	327	389	374	366	378	364	358	311	2867
# Boards	198	216	221	220	220	219	216	198	1708
# Links	842	1088	1102	1094	1080	1000	972	828	8006
# Connected firms	177	196	199	189	193	200	192	178	1524
# Unconnected firms	21	20	22	31	27	19	24	20	184

This table summarises information about the number of nodes and ties for directors and board networks. #*Directors* (*Boards*) is the number of directors (boards) during a year, corresponding to the number of nodes in the director (board) network. #*Links* is the number of ties between each director (board) and the rest of individual directors (boards) in the sample. # *Unconnected* directors (boards) counts the number of directors (boards) that are not connected to the rest of the network during a given year.

Table 4: Board centrality distribution at the director-level

Panel A	N	Mean	Market Capitalisation		Count
			Mean	Median	
Eigen Vector (High-ranked)	13651	0.152	30503	7800	2071
Betweenness (High-ranked)	13651	0.152	30784	6914	2073
High-value (Market capitalisation)	13651	0.203	35263	9354	2770
Low-value (Market capitalisation)	13651	0.202	11608	2062	2761
Sole directorship	13651	0.659	17932	1556	8994

Panel B	High Ranked		Market Cap		
	Eigen vector	Betweenness	Low-value	High-value	Sole directorship
Eigen Vector Score	0.088	0.08	0.059	0.075	0.038
Betweenness Score	0.033	0.037	0.021	0.026	0.013

Panel C	Correlation Matrix				
	Eigen Vector	Betweenness	Low-value	High-value	Sole directorship
Eigen Vector	1				
Betweenness	0.7389	1			
Low-value (Market capitalisation)	0.2438	0.2688	1		
High-value (Market capitalisation)	0.548	0.5237	0.2	1	
Sole directorship	-0.591	-0.5926	-0.69	-0.7121	1

This table presents director-level summary statistics for centrality measures and market capitalisation. Panel A presents the mean (frequency) of directors that rank their directorships as *high-ranked* based on a given centrality measure, as well as the corresponding mean and median market capitalisation. 15% of directors in the sample consider their directorships as high-ranked based on *eigenvector* centrality measure, and the average market capitalisation of those firms is SEK 30503 (Millions). *High-value* (*Low-value*) refers to when the ranking of directorships is based on relative firm size, measured using market capitalisation. *Sole-directorship* refers to directors that hold a sole directorship. In panel B, I present average *eigenvector* and *betweenness* scores across different rankings. For example, *high-ranked* firms based on *eigenvector* have an average *betweenness* score of 0.033, whereas firms ranked as more prestigious based on *high-value* i.e. based on relative market capitalisation, have an average *eigenvector* score of 0.075. Panel C provides correlation matrix between different measures of reputation.

Table 5: Probit model for director's attendance, using *eigenvector*

Dependent Variable: *absence, director's attendance* $< 75\%$								
	All directors				Independent directors			
Explanatory Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High-ranked (eigenvector)	-0.151***	-0.148***	-0.127**	-0.122**	-0.150**	-0.149**	-0.136*	-0.127*
	(0.052)	(0.056)	(0.058)	(0.054)	(0.067)	(0.072)	(0.074)	(0.069)
High-value (mkt cap)		-0.008				0.008		
		(0.064)				(0.086)		
Low-value (mkt cap)		0.022				0.078		
		(0.057)				(0.077)		
Sole directorship			0.061				0.034	
			(0.060)				(0.079)	
# of board meetings				0.052***				0.053***
				(0.004)				(0.005)
Director's remuneration				-0.046***				-0.089***
				(0.007)				(0.013)
# Outside directorships	-0.058***	-0.062**	-0.042*	-0.037**	-0.028	-0.049	-0.018	-0.021
	(0.016)	(0.025)	(0.021)	(0.016)	(0.022)	(0.037)	(0.031)	(0.023)
Committee membership	-0.295***	-0.296***	-0.294***	-0.393***	-0.324***	-0.327***	-0.325***	-0.430***
	(0.071)	(0.071)	(0.071)	(0.071)	(0.082)	(0.082)	(0.082)	(0.082)
Board size (ln)	0.931***	0.930***	0.925***	0.907***	0.921***	0.921***	0.917***	0.970***
	(0.095)	(0.095)	(0.095)	(0.098)	(0.122)	(0.122)	(0.122)	(0.126)
Director age (ln)	-0.782***	-0.782***	-0.782***	-0.776***	-0.958***	-0.961***	-0.957***	-0.941***
	(0.093)	(0.093)	(0.093)	(0.099)	(0.133)	(0.134)	(0.133)	(0.141)
Director ownership	-0.018***	-0.018***	-0.018***	-0.018***	-0.050*	-0.050*	-0.050*	-0.056*
	(0.005)	(0.005)	(0.005)	(0.005)	(0.028)	(0.028)	(0.028)	(0.032)
Post CGC (2008)	0.207***	0.207***	0.207***	0.114***	0.178***	0.178***	0.178***	0.098*
	(0.036)	(0.036)	(0.036)	(0.038)	(0.049)	(0.049)	(0.049)	(0.052)
Market capitalisation (ln)	-0.052***	-0.051***	-0.052***	-0.067***	-0.042***	-0.039***	-0.042***	-0.051***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.014)	(0.015)	(0.014)	(0.015)
Tobin's Q (ln)	0.068***	0.068***	0.068***	0.097***	0.047	0.048	0.047	0.086***
	(0.024)	(0.024)	(0.024)	(0.025)	(0.030)	(0.030)	(0.030)	(0.031)
Constant	0.640	0.625	0.598	0.938**	1.253**	1.220**	1.227**	1.780***
	(0.391)	(0.391)	(0.393)	(0.418)	(0.551)	(0.551)	(0.555)	(0.595)
Observations	10,399	10,399	10,399	9,510	6,132	6,132	6,132	5,689
Marginal Effects of *High-ranked* (*eigenvector*)								
Marginal effect	-0.026	-0.025	-0.022	-0.022	-0.026	-0.026	-0.024	-0.023
p-value	0.004	0.009	0.031	0.023	0.031	0.045	0.076	0.065

This table presents estimation results for a Probit model, where the dependent variable is *absence*, a dummy variable equal to one if a director attended less than 75% of board meetings in a firm during a given year, and zero otherwise. The main explanatory variable is *High-ranked*, which is a dummy variable equal to one if for a director, the network-centrality score of a directorship is higher than the median of all boards the director simultaneously serves at. *High-ranked* is based on the *eigenvector* measure of firms' centrality. *High-value* (*low-value*) is an indicator variable equal to one if the market capitalisation of a firm is 10% larger (smaller) than the smallest (largest) firm he serves at (this measure is the Masulis and Mobbs (2014a) measure of relative firm size). *Sole directorship* is an indicator variable equal to one if a board is the sole directorship for a director, and zero otherwise. # of board is the number of board meetings. Directors' remuneration is the sum of a director's pay, board fees and committee membership fees. The sample used in columns (1)–(4) includes all outside directors, regardless of their independence status. In columns (5)–(8) I use a sample of independent directors only. The rest of the variables are as defined in Appendix 1. Marginal effects for *High-ranked* are reported at the bottom of the table, and are computed using the margin command in Stata (Williams, 2012). I report robust standard errors in parenthesis. ***, ** and * correspond to statistical significance at the 1%, 5% and 10% levels respectively.

Table 6: Probit model for director's attendance, using *betweenness*

Dependent Variable: *absence, director's attendance* < 75%								
	All directors				Independent directors			
Explanatory Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High-ranked (betweenness)	-0.186***	-0.187***	-0.170***	-0.174***	-0.160**	-0.162**	-0.149**	-0.159**
	(0.054)	(0.056)	(0.059)	(0.055)	(0.068)	(0.071)	(0.075)	(0.070)
High-value (mkt cap)		0.001				0.007		
		(0.062)				(0.084)		
Low-value (mkt cap)		0.032				0.085		
		(0.057)				(0.076)		
Sole directorship			0.043				0.029	
			(0.059)				(0.079)	
# of board meetings				0.052***				0.053***
				(0.004)				(0.005)
Director's remuneration				-0.046***				-0.089***
				(0.007)				(0.013)
# Outside directorships	-0.054***	-0.061**	-0.042**	-0.031*	-0.026	-0.048	-0.017	-0.015
	(0.016)	(0.025)	(0.021)	(0.016)	(0.022)	(0.036)	(0.031)	(0.023)
Committee membership	-0.297***	-0.298***	-0.296***	-0.394***	-0.329***	-0.332***	-0.329***	-0.434***
	(0.070)	(0.070)	(0.070)	(0.071)	(0.081)	(0.081)	(0.081)	(0.082)
Board size (ln)	0.936***	0.936***	0.932***	0.909***	0.922***	0.923***	0.919***	0.971***
	(0.096)	(0.096)	(0.096)	(0.098)	(0.122)	(0.122)	(0.122)	(0.126)
Director age (ln)	-0.783***	-0.783***	-0.782***	-0.777***	-0.955***	-0.958***	-0.954***	-0.939***
	(0.093)	(0.093)	(0.093)	(0.099)	(0.133)	(0.134)	(0.133)	(0.141)
Director ownership	-0.017***	-0.017***	-0.017***	-0.018***	-0.051*	-0.051*	-0.051*	-0.057*
	(0.005)	(0.005)	(0.005)	(0.005)	(0.028)	(0.028)	(0.028)	(0.032)
Post CGC (2008)	0.207***	0.207***	0.207***	0.115***	0.177***	0.177***	0.177***	0.097*
	(0.036)	(0.036)	(0.036)	(0.038)	(0.049)	(0.049)	(0.049)	(0.052)
Market capitalisation (ln)	-0.052***	-0.051***	-0.052***	-0.067***	-0.043***	-0.040***	-0.043***	-0.051***
	(0.011)	(0.012)	(0.011)	(0.012)	(0.014)	(0.015)	(0.014)	(0.015)
Tobin's Q (ln)	0.068***	0.069***	0.069***	0.097***	0.046	0.047	0.045	0.085***
	(0.024)	(0.024)	(0.024)	(0.025)	(0.030)	(0.030)	(0.030)	(0.031)
Constant	0.639	0.621	0.610	0.937**	1.248**	1.210**	1.226**	1.777***
	(0.391)	(0.392)	(0.393)	(0.418)	(0.551)	(0.551)	(0.554)	(0.596)
Observations	10,399	10,399	10,399	9,510	6,132	6,132	6,132	5,689
Marginal Effects of *High-ranked* (*betweenness*)								
Marginal effect	-0.032	-0.032	-0.029	-0.031	-0.029	-0.029	-0.027	-0.029
p-value	0.000	0.001	0.004	0.002	0.020	0.024	0.048	0.023

This table presents estimation results for a probit model, where the dependent variable is *absence*, a dummy variable equal to one if a director attended less than 75% of board meetings in a firm during a given year, and zero otherwise. The main explanatory variable is *High-ranked*, which is a dummy variable equal to one if for a director, the network-centrality score of a directorship is higher than the median of all boards the director simultaneously serves at. *High-ranked* is based on the *betweenness* measure of firms' centrality. *High-value* (*low-value*) is an indicator variable equal to one if the market capitalisation of a firm is 10% larger (smaller) than the smallest (largest) firm he serves at (this measure is the Masulis and Mobbs' (2014a) measure of relative firm size). *Sole directorship* is an indicator variable equal to one if a board is the sole directorship for a director, and zero otherwise. # of board is the number of board meetings. Directors' remuneration is the sum of a director's pay, board fees and committee membership fees. The sample used in columns (1)–(4) consists of all outside directors, regardless of their independence status. In columns (5)–(8) I use a sample of independent directors only. The rest of the variables are as defined in Appendix 1. Marginal effects for *High-ranked* are reported at the bottom of the table, and are computed using the margin command in Stata. I report robust standard errors in parenthesis. ***, ** and * correspond to statistical significance at the 1%, 5% and 10% levels respectively.

Table 7: OLS model for director's attendance, using *eigenvector*

Dependent Variable: Attendance rate of directors								
	All directors				Independent directors			
Explanatory Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High-ranked (eigenvector)	0.012***	0.011***	0.009**	0.009**	0.015***	0.014**	0.013**	0.011**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.006)	(0.006)	(0.005)
High-value (mkt cap)		0.002				0.002		
		(0.005)				(0.007)		
Low-value (mkt cap)		-0.001				-0.004		
		(0.004)				(0.006)		
Sole directorship			-0.008*				-0.005	
			(0.005)				(0.007)	
# of board meetings				-0.006***				-0.006***
				(0.000)				(0.000)
Director's remuneration				0.007***				0.014***
				(0.001)				(0.003)
# Outside directorships	0.006***	0.005***	0.004***	0.003***	0.002	0.003	0.001	0.001
	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.003)	(0.002)	(0.002)
Committee membership	0.022***	0.022***	0.022***	0.030***	0.025***	0.026***	0.025***	0.034***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)
Board size (ln)	-0.084***	-0.084***	-0.083***	-0.085***	-0.085***	-0.085***	-0.085***	-0.094***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.010)	(0.010)	(0.010)	(0.010)
Director age (ln)	0.085***	0.085***	0.085***	0.071***	0.124***	0.124***	0.124***	0.106***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.013)	(0.013)	(0.013)	(0.013)
Director ownership	0.001***	0.001***	0.001***	0.001***	0.002**	0.002**	0.002**	0.001*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Post CGC (2008)	-0.016***	-0.015***	-0.015***	-0.013***	-0.011***	-0.011***	-0.011***	-0.011**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
Market capitalisation (ln)	0.006***	0.005***	0.006***	0.005***	0.005***	0.005***	0.005***	0.004**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Tobin's Q (ln)	-0.008***	-0.008***	-0.008***	-0.011***	-0.010***	-0.010***	-0.010***	-0.012***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
Constant	0.673***	0.674***	0.678***	0.718***	0.522***	0.525***	0.526***	0.533***
	(0.038)	(0.038)	(0.038)	(0.038)	(0.055)	(0.055)	(0.055)	(0.057)
Observations	9,481	9,481	9,481	9,481	5,675	5,675	5,675	5,675
R-squared	0.035	0.035	0.035	0.074	0.036	0.036	0.036	0.081

This table presents OLS estimation results for a model, where the dependent variable is *attendance rate*, which is the number of board meetings attended by a director in a firm relative to the total number of board meetings for a firm during a given year. The main explanatory variable is *High-ranked*, which is a dummy variable equal to one if for a director, the network-centrality score of a directorship is higher than the median of all boards the director simultaneously serves at. *High-ranked* is based on the *eigenvector* measure of firms' centrality. *High-value* (*low-value*) is an indicator variable equal to one if the market capitalisation of a firm is 10% larger (smaller) than the smallest (largest) firm he serves at (this measure is the Masulis and Mobbs' (2014a) measure of relative firm size). *Sole directorship* is an indicator variable equal to one if a board is the sole directorship for a director, and zero otherwise. # of board is the number of board meetings. Directors' remuneration is the sum of a director's pay, board fees and committee membership fees. The sample used in columns (1)–(4) consists of all outside directors, regardless of their independence status. In columns (5)–(8) I use a sample of independent directors only. The rest of the variables are as defined in Appendix 1. I report robust standard errors in parenthesis. ***, ** and * correspond to statistical significance at the 1%, 5% and 10% levels respectively.

Table 8: OLS model for director's attendance, using *betweenness*

Dependent Variable: Attendance rate of directors								
	All directors				Independent directors			
Explanatory Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High-ranked (betweenness)	0.014***	0.013***	0.011***	0.012***	0.014***	0.013**	0.012**	0.013**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.006)	(0.006)	(0.005)
High-value (mkt cap)		0.002				0.003		
		(0.005)				(0.007)		
Low-value (mkt cap)		-0.001				-0.004		
		(0.004)				(0.006)		
Sole directorship			-0.007				-0.005	
			(0.005)				(0.007)	
# of board meetings				-0.006***				-0.006***
				(0.000)				(0.000)
Director's remuneration				0.007***				0.014***
				(0.001)				(0.003)
# Outside directorships	0.005***	0.005***	0.004***	0.003***	0.002	0.003	0.001	0.001
	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.003)	(0.002)	(0.002)
Committee membership	0.022***	0.022***	0.022***	0.030***	0.026***	0.026***	0.026***	0.035***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)
Board size (ln)	-0.085***	-0.084***	-0.084***	-0.085***	-0.086***	-0.085***	-0.085***	-0.094***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.010)	(0.010)	(0.010)	(0.010)
Director age (ln)	0.085***	0.085***	0.085***	0.071***	0.124***	0.124***	0.124***	0.105***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.013)	(0.013)	(0.013)	(0.013)
Director ownership	0.001***	0.001***	0.001***	0.001***	0.002**	0.002**	0.002**	0.001*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Post CGC (2008)	-0.016***	-0.016***	-0.015***	-0.013***	-0.011***	-0.011***	-0.011***	-0.010**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
Market capitalisation (ln)	0.006***	0.005***	0.006***	0.005***	0.005***	0.005***	0.005***	0.004**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Tobin's Q (ln)	-0.008***	-0.008***	-0.008***	-0.011***	-0.010***	-0.010***	-0.009***	-0.012***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
Constant	0.673***	0.675***	0.678***	0.719***	0.523***	0.526***	0.527***	0.534***
	(0.038)	(0.038)	(0.038)	(0.038)	(0.055)	(0.055)	(0.055)	(0.057)
Observations	9,481	9,481	9,481	9,481	5,675	5,675	5,675	5,675
R-squared	0.035	0.035	0.035	0.074	0.036	0.036	0.036	0.081

This table presents OLS estimation results for a model, where the dependent variable is *attendance rate*, which is the number of board meetings attended by a director in a firm relative to the total number of board meetings for a firm during a given year. The main explanatory variable is *High-ranked*, which is a dummy variable equal to one if for a director, the network-centrality score of a directorship is higher than the median of all boards the director simultaneously serves at. *High-ranked* is based on the *betweenness* measure of firms' centrality. *High-value* (*low-value*) is an indicator variable equal to one if the market capitalisation of a firm is 10% larger (smaller) than the smallest (largest) firm he serves at (this measure is the Masulis and Mobbs' (2014a) measure of relative firm size). *Sole directorship* is an indicator variable equal to one if a board is the sole directorship for a director, and zero otherwise. # of board is the number of board meetings. Directors' remuneration is the sum of a director's pay, board fees and committee membership fees. The sample used in columns (1)–(4) consists of all outside directors, regardless of their independence status. In columns (5)–(8) I use a sample of independent directors only. The rest of the variables are as defined in Appendix. I report robust standard errors in parenthesis. ***, ** and * correspond to statistical significance at the 1%, 5% and 10% levels respectively.

Table 9: Firm fixed effects model

Dependent Variable: $\Delta Tobin'sQ$								
	Eigenvector Centrality				*Betweenness Centrality*			
Explanatory Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Director-high (eigenvector)	0.006***	0.006***	0.005**	0.006***				
	(0.002)	(0.002)	(0.002)	(0.002)				
Director-high (betweenness)					0.004**	0.003*	0.003*	0.004**
					(0.002)	(0.002)	(0.002)	(0.002)
Director-high (mkt cap)		0.001				0.001		
		(0.001)				(0.002)		
Director-Low (mkt cap)		-0.000				-0.000		
		(0.001)				(0.002)		
CEO Remuneration (Ln)			0.003				0.006	
			(0.025)				(0.025)	
Directors' Remuneration (Ln)			0.035				0.045	
			(0.058)				(0.058)	
Board independence	0.198***	0.196***	0.192***	0.194***	0.205***	0.201***	0.198***	0.201***
	(0.045)	(0.045)	(0.046)	(0.044)	(0.045)	(0.045)	(0.046)	(0.044)
# Outside directorships	-0.037***	-0.037***	-0.032***	-0.036***	-0.035***	-0.035***	-0.030***	-0.034***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Director ownership (Independent)	0.392	0.401	0.405	0.365	0.425	0.438	0.433	0.398
	(0.819)	(0.825)	(0.856)	(0.792)	(0.822)	(0.829)	(0.856)	(0.796)
CEO ownership	-0.221	-0.220	-0.220	-0.125	-0.229	-0.229	-0.224	-0.135
	(0.296)	(0.300)	(0.373)	(0.296)	(0.292)	(0.296)	(0.365)	(0.293)
Majority owner	0.007	0.008	0.042	0.008	0.005	0.006	0.040	0.006
	(0.062)	(0.062)	(0.064)	(0.063)	(0.063)	(0.063)	(0.065)	(0.063)
Board size (ln)	0.102	0.106	0.172	0.098	0.094	0.101	0.169	0.090
	(0.154)	(0.155)	(0.168)	(0.153)	(0.153)	(0.155)	(0.167)	(0.153)
Director age (ln)	0.053	0.055	0.035	0.061	0.065	0.067	0.047	0.073
	(0.097)	(0.096)	(0.096)	(0.098)	(0.097)	(0.096)	(0.096)	(0.098)
Fraction of employee directors	0.288	0.293	0.567	0.237	0.320	0.325	0.588	0.269
	(0.426)	(0.426)	(0.427)	(0.429)	(0.426)	(0.427)	(0.427)	(0.428)
Leverage (ln)	-0.002	-0.002	0.000	-0.001	-0.001	-0.002	0.000	-0.001
	(0.015)	(0.015)	(0.017)	(0.014)	(0.015)	(0.015)	(0.017)	(0.015)
R&D	-0.107**	-0.107**	-0.109**	-0.102**	-0.110**	-0.111**	-0.114**	-0.105**
	(0.050)	(0.050)	(0.050)	(0.051)	(0.050)	(0.050)	(0.049)	(0.051)
ROA (at *t-1*)				-0.237*				-0.233*
				(0.134)				(0.133)
Total assets (ln, at *t-1*)	0.126**	0.124**	0.125**	0.147***	0.129**	0.126**	0.124**	0.150***
	(0.052)	(0.053)	(0.056)	(0.055)	(0.053)	(0.053)	(0.057)	(0.055)
Constant	-2.146***	-2.133***	-2.749***	-2.471***	-2.228***	-2.208***	-2.944***	-2.548***
	(0.789)	(0.792)	(1.044)	(0.834)	(0.788)	(0.792)	(1.033)	(0.833)
Observations	1,229	1,229	1,137	1,227	1,229	1,229	1,137	1,227
R-squared	0.068	0.068	0.069	0.072	0.065	0.065	0.066	0.069
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of firms	218	218	191	217	218	218	191	217

This table presents fixed effects estimation, where the dependent variable is Δ Tobin's Q, which is the difference in the natural logarithm of Tobin's Q between two years. Tobin's Q is measured as the market value of assets divided by its book value. The market value of assets is defined as the sum of total debt and the market capitalisation of the firm. The main explanatory variable is $director - high$ which is the percentage of independent directors that consider a firm as more prestigious relative to board size. Columns (1)–(4) presents $director - high$ based on *eigenvector* centrality, while in columns (5)–(8) *betweenness* is used. *Director-high (Market capitalisation)* is the percentage of independent directors that consider a firm as more or less prestigious based on Masulis and Mobbs' (2014a) relative firm size measure of reputation. I measure firm size using total assets (ln) lagged one period, and I include the one period lagged return on assets (ROA) to control for past firm performance. All the remaining explanatory variables are contemporaneous. I exclude financial firms from the sample, and use robust standard errors clustered by firm. Yearly and firm fixed effects are included in all regressions. I report robust standard errors in parenthesis. ***, ** and * correspond to statistical significance at the 1%, 5% and 10% levels respectively.

Table 10: Distribution of directors' appointments based on age and outside directorships held

Number of outside directorships	0	1	2	3	4	5	6	7	Total
Panel A: Independent Directors									
High-ranked (appointed)									
Age $>$ sample median	-	48	18	8	7	5	1	-	87
Age $\leq$ sample median	-	74	34	13	1	4	1	-	127
Total	-	122	52	21	8	9	2	-	214
Low-ranked (appointed)									
Age $>$ sample median	180	5	3	0	-	-	-	-	188
Age $\leq$ sample median	321	7	3	1	-	-	-	-	332
Total	501	12	6	1	-	-	-	-	520
Panel B: Non-Independent Directors									
High-ranked (appointed)									
Age $>$ sample median	-	34	29	14	6	1	2	0	86
Age $\leq$ sample median	-	56	33	17	5	2	1	1	115
Total	-	90	62	31	11	3	3	1	201
Low-ranked (appointed)									
Age $>$ sample median	129	7	0	1	0	-	-	-	137
Age $\leq$ sample median	257	10	2	0	1	-	-	-	270
Total	386	17	2	1	1	-	-	-	407

This table presents a summary of characteristics for newly appointed directors to corporate boards. Panel A provides information about independent directors, and Panel B provides information on Non-independent directors (excluding employee directors and the CEO). In each category, I provide the information about *high-reputation* and *low-reputation* directors, where reputation is measure suing directors' *eigenvector* score on the directors-network. The median of age in the sample is 55 years.

Table 11: Firm fixed effects model for reputable director recruitment

Dependent Variable: $\Delta Tobin'sQ$				
Explanatory Variables	(1)	(2)	(3)	(4)
# Connected High *t-1* (independent)	0.047**		0.045*	
	(0.023)		(0.023)	
# Connected Low *t-1* (independent)	-0.091**			-0.086*
	(0.045)			(0.045)
# Connected High *t-1* (non-independent)		-0.009	-0.002	
		(0.028)	(0.029)	
# Connected Low *t-1* (non-independent)		0.013		0.009
		(0.038)		(0.038)
# Outside directorships	-0.029***	-0.030***	-0.029***	-0.030***
	(0.007)	(0.007)	(0.007)	(0.007)
Director ownership (independent)	0.499	0.954	0.530	0.943
	(1.006)	(0.945)	(1.011)	(0.941)
CEO ownership	-0.173	-0.176	-0.176	-0.168
	(0.346)	(0.346)	(0.347)	(0.346)
Majority owner	0.003	0.007	0.007	0.003
	(0.062)	(0.063)	(0.063)	(0.062)
Board size (ln)	0.022	0.049	0.026	0.043
	(0.167)	(0.168)	(0.166)	(0.169)
Director age (ln)	0.109	0.109	0.106	0.111
	(0.096)	(0.096)	(0.097)	(0.096)
Fraction of employee directors	-0.099	0.025	-0.070	0.005
	(0.468)	(0.475)	(0.468)	(0.479)
Leverage (ln)	-0.007	-0.004	-0.006	-0.004
	(0.015)	(0.015)	(0.015)	(0.015)
R&D	-0.132***	-0.132***	-0.134***	-0.132***
	(0.050)	(0.051)	(0.051)	(0.050)
Total assets (ln, at *t-1*)	0.161***	0.164***	0.161***	0.164***
	(0.056)	(0.056)	(0.056)	(0.056)
Constant	-2.572***	-2.663***	-2.587***	-2.664***
	(0.843)	(0.858)	(0.846)	(0.855)
Observations	1,229	1,229	1,229	1,229
R-squared	0.042	0.035	0.039	0.037
Firm fixed effects	Yes	Yes	Yes	Yes
Number of firms	218	218	218	218

Panel A presents the distribution of directors' appointment based on their independence status and centrality in the director network. Panel B presents fixed effects estimation, where the dependent variable is Δ Tobin's Q, which is the difference in the natural logarithm of Tobin's Q between two years. Tobin's Q is measured as the market value of assets divided by its book value. The market value of assets is defined as the sum of total debt and the market capitalisation of the firm. The main explanatory variable is #*Connected high* (low), which is the number of highly (low) reputable directors appointed by a firm during a year. I distinguish between the appointment of independent and non-independent directors. The reputation of the director is measured based on their score of *eigenvector* centrality. All measures of appointment are lagged one period. I control for firm size using the one period lagged total assets (ln). The rest of the explanatory variables are contemporaneous. Control variables are as defined in Appendix 1. I exclude financial firms from the sample, and use robust standard errors clustered by firm. I report robust standard errors in parenthesis. ***, ** and * correspond to statistical significance at the 1%, 5% and 10% levels respectively.

Table 12: Firm fixed effects model for reputable director recruitment, controlling for past performance

Dependent Variable: $\Delta Tobin'sQ$				
Explanatory Variables	(1)	(2)	(3)	(4)
# Connected High *t-1* (independent)	0.044*		0.042*	
	(0.023)		(0.024)	
# Connected Low *t-1* (independent)	-0.090**			-0.085*
	(0.045)			(0.045)
# Connected High *t-1* (non-independent)		-0.007	-0.001	
		(0.028)	(0.029)	
# Connected Low *t-1* (non-independent)		0.012		0.009
		(0.038)		(0.038)
ROA (at *t-1*)	-0.260*	-0.272*	-0.262*	-0.272*
	(0.138)	(0.139)	(0.139)	(0.138)
# Outside directorships	-0.029***	-0.029***	-0.029***	-0.030***
	(0.007)	(0.007)	(0.007)	(0.007)
Director ownership (independent)	0.483	0.913	0.513	0.901
	(0.968)	(0.906)	(0.973)	(0.902)
CEO ownership	-0.068	-0.065	-0.070	-0.059
	(0.340)	(0.340)	(0.342)	(0.339)
Majority owner	0.004	0.008	0.008	0.004
	(0.063)	(0.063)	(0.063)	(0.062)
Board size (ln)	0.020	0.046	0.024	0.040
	(0.166)	(0.168)	(0.166)	(0.168)
Director age (ln)	0.115	0.114	0.112	0.117
	(0.097)	(0.097)	(0.097)	(0.097)
Fraction of employee directors	-0.142	-0.025	-0.113	-0.045
	(0.463)	(0.473)	(0.465)	(0.475)
Leverage (ln)	-0.006	-0.003	-0.005	-0.004
	(0.015)	(0.015)	(0.015)	(0.015)
R&D	-0.127**	-0.127**	-0.128**	-0.127**
	(0.051)	(0.052)	(0.052)	(0.051)
Total assets (ln, at *t-1*)	0.185***	0.189***	0.186***	0.190***
	(0.060)	(0.060)	(0.060)	(0.060)
Constant	-2.932***	-3.041***	-2.952***	-3.038***
	(0.907)	(0.917)	(0.910)	(0.913)
Observations	1,227	1,227	1,227	1,227
R-squared	0.046	0.040	0.044	0.043
Firm fixed effects	Yes	Yes	Yes	Yes
Number of firms	217	217	217	217

Panel A presents the distribution of directors' appointment based on their independence status and their centrality in the director network. Panel B presents fixed effects estimation, where the dependent variable is Δ Tobin's Q, which is the difference in the natural logarithm of Tobin's Q between two years. Tobin's Q is measured as the market value of assets divided by its book value. The market value of assets is defined as the sum of total debt and the market capitalisation of the firm. The main explanatory variable is *#Connected high* (low), which is the number of highly (low) reputed directors appointed by a firm during a year.I distinguish between the appointment of independent and non-independent directors. The reputation of the director is measured based on their score of *eigenvector* centrality. All measures of appointment are lagged one period. I control for past performance of firms using the one period lagged return on assets (ROA). I control for firm size using the one period lagged total assets (ln). The rest of the explanatory variables are contemporaneous. Control variables are as defined in Appendix 1. I exclude financial firms from the sample, and use robust standard errors clustered by firm. I report robust standard errors in parenthesis. ***, ** and * correspond to statistical significance at the 1%, 5% and 10% levels respectively.

Table 13: Firm fixed effects model for reputable director recruitment, controlling for board independence

Controlling for:	Board independence			#independent directors appointed		
Dependent Variable: $\Delta Tobin's Q$	(1)	(2)	(3)	(4)	(5)	(6)
# Connected High *t-1* (independent)	0.041*	0.040*		0.054**	0.053**	
	(0.024)	(0.024)		(0.022)	(0.023)	
# Connected Low *t-1* (independent)	-0.094**		-0.090*	-0.090**		-0.084*
	(0.047)		(0.047)	(0.045)		(0.045)
# Connected High *t-1* (non-independent)		0.012			0.001	
		(0.028)			(0.029)	
# Connected Low *t-1* (non-independent)			0.021			0.008
			(0.037)			(0.038)
Board independence	0.218***	0.220***	0.224***			
	(0.045)	(0.045)	(0.045)			
# Independent directors appointed				0.035*	0.036*	0.026
				(0.021)	(0.021)	(0.022)
# Outside directorships	-0.027***	-0.026***	-0.027***	-0.028***	-0.028***	-0.029***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Director ownership (independent)	0.091	0.116	0.478	0.557	0.587	1.037
	(0.887)	(0.893)	(0.822)	(1.016)	(1.022)	(0.948)
CEO ownership	-0.248	-0.245	-0.249	-0.199	-0.201	-0.187
	(0.294)	(0.296)	(0.293)	(0.349)	(0.351)	(0.349)
Majority owner	0.003	0.005	0.003	0.005	0.009	0.004
	(0.062)	(0.063)	(0.062)	(0.062)	(0.063)	(0.062)
Board size(ln)	0.028	0.025	0.045	-0.019	-0.017	0.015
	(0.157)	(0.156)	(0.158)	(0.170)	(0.169)	(0.173)
Director age (ln)	0.071	0.067	0.073	0.108	0.104	0.111
	(0.096)	(0.097)	(0.096)	(0.096)	(0.097)	(0.096)
Fraction of employee directors	0.170	0.211	0.274	-0.067	-0.035	0.041
	(0.430)	(0.436)	(0.436)	(0.452)	(0.454)	(0.466)
Leverage (ln)	-0.006	-0.005	-0.004	-0.005	-0.004	-0.003
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
R&D	-0.117**	-0.120**	-0.117**	-0.135***	-0.136***	-0.134***
	(0.049)	(0.050)	(0.049)	(0.050)	(0.051)	(0.050)
Total assets (ln, at *t-1*)	0.138**	0.141**	0.141**	0.156***	0.158***	0.161***
	(0.055)	(0.054)	(0.055)	(0.056)	(0.056)	(0.056)
Constant	-2.251***	-2.289***	-2.327***	-2.448***	-2.467***	-2.580***
	(0.809)	(0.806)	(0.819)	(0.846)	(0.847)	(0.859)
Observations	1,229	1,229	1,229	1,229	1,229	1,229
R-squared	0.066	0.063	0.063	0.045	0.042	0.039
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of firms	218	218	218	218	218	218

This table presents fixed effects estimation, where the dependent variable is Δ Tobin's Q, which is the difference in the natural logarithm of Tobin's Q between two years. Tobin's Q is measured as the market value of assets divided by its book value. The market value of assets is defined as the sum of total debt and the market capitalisation of the firm. The main explanatory variable is #*Connected high* (low), which is the number of highly (low) reputable directors appointed by a firm in a year. I distinguish between the appointment of independent and non-independent directors. The reputation of the director is measured based on their score of *eigenvector* centrality. All measures of appointment are lagged one period. The rest of the explanatory variables are contemporaneous. The difference compared with the models in Table12 is that I control for board independence. In Models (1)–(3) I use the variable *board independence*, which is a dummy variable equal to one if the proportion of independent directors in the board is larger than 50%, and zero otherwise. In Models (4)–(6) I use the number of independent directors appointed by a firm in a given year. All measures of appointment are lagged one period. I control for firm size using the one period lagged total assets (ln). The rest of the explanatory variables are contemporaneous. Control variables are as defined in Appendix 1. I exclude financial firms from the sample, and use robust standard errors clustered by firm. I report robust standard errors in parenthesis. ***, ** and * correspond to statistical significance at the 1%, 5% and 10% levels respectively.

Appendix 1

Panel A	Reputation Measures
Variable	Description
High-ranked	Dummy variable equal to one if for a director, the network-centrality score of a directorship is higher than the median of all boards where that director simultaneously serves at.
Sole directorship	Dummy variable equal to one if a board is a director's sole directorship, and zero otherwise.
High (low) value	A dummy variable equal to one if the market capitalisation of a firm is 10% larger (smaller) than the smallest (largest) firm a director serves at.
Director high	The percentage of independent directors that consider a firm as more prestigious relative to board size (I exclude employee directors from the measure of board size).
# Connected	The number of high-ranked directors appointed during a year.
Panel B	**Board Meeting Attendance Measures**
Variable	Description
# Board meetings	The total number of board meetings held by a firm during a year.
Absence	A dummy variable equal to one if a directors attended less than 75% of board meetings in a firm during a given year.
Attendance rate	The number of board meetings attended by a director in a firm relative to the total number of board meetings for a firm during a given year.
Committee membership	A dummy variable equal to one if a director is a member of the audit committee, the remuneration committee or both.

Panel C	Board Data
Variable	Description
# Outside directorships	The sum of outside directorships held by all board members sitting in a board (an aggregate measure of busyness for firms).
CEO busy	A dummy variable equal to one of the CEO holds an outside directorship and zero otherwise.
Director busy	A dummy variable equal to one if a directors holds an outside directorship and zero otherwise.
Director's remuneration	The sum of a directors' pay, board fees and committee membership fees. At the firm level, it is the average of all director's remuneration, excluding the CEO.
CEO remuneration	Yearly salary paid to the CEO, including any board fees.
Board size	The total number of directors sitting in a board, including employee directors and excluding the CEO when he is not sitting in the board.
Director ownership	The ratio of the number of shares held by a director (A- and B-shares) to the total number of shares outstanding.
CEO ownership	The ratio of the number of shares held by the CEO (A- and B-shares) to the total number of shares outstanding.
Board independence	A dummy variable equal to one if the percentage of independent directors in a board is larger than 50%.
% independent directors	The ratio of the number of independent directors in a board relative to board size.
CEO not sitting	Dummy variable equal to one if the CEO is not sitting in the board.

Panel D	Firm and Ownership Data
Variable	Description
Majority owner	A dummy variable equal to one if the voting rights of the largest owner is larger than the sum of voting rights of the second and third largest owners.

Leverage	The ratio of long-term debt to total assets.
R&D	A dummy variable equal to one if a firm has R&D spending (see Bhagat and Bolton, 2008).
Return on Assets (ROA)	The ratio of net income to total assets
Tobin's Q (proxy)	Market value of assets divided by its book value. The market value of assets is defined as the sum of total debt and the market value of the firm.
ΔTobins' Q	The difference in ln(Tobin's Q) between times t and $t-1$.
Post CGC (2008)	Dummy variable equal to one after 2008. It captures the effects of regulatory changes to corporate governance brought by the Swedish corporate governance code in 2008.

PAPER 3

Investor Protection and the Predictability of Dividends and Returns: A Cross Country Comparison

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Abstract

I study return and dividend growth predictability in 59 countries and find that dividend growth predictability is dominant in small and medium-sized countries, whereas return predictability is more present in large markets such as the US, the UK and Japan. In order to explain this finding, I investigate whether shared corporate governance characteristics across countries can explain this pattern. I measure governance quality using eight indices, each capturing different aspects of investor protection, the quality of legal systems and the importance of capital markets (Djankov et al., 2008). Using mean clustering, I classify countries into three portfolios with varying degrees of governance quality. I find that expectations about dividend growth explain most of the variation in dividend yields in countries with low investor protection, whereas return predictability is more dominant in countries with large capital markets and high levels of investor protection. Finally, the quality of the legal system does not seem to be related to one particular form of predictability.

Keywords: Dividend yield, predictability, corporate governance quality, investor protection, dividend smoothing, clustering, international stock markets
JEL classification: G12, G15, G34, G38

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1 Introduction

I investigate whether shared governance quality characteristics across 59 countries can explain whether movements in stock prices are driven by expectations about returns or dividend growth rates. The view that most of the variation in US dividend yields is driven by expectations about future returns, as supported by Cochrane (2008, 2011), has been challenged in recent studies. Chen (2009) and Chen et al. (2012) find evidence of dividend growth predictability using dividend yield in the US in the pre-World War II period, while Rangvid et al. (2014) find that dividend growth predictability is the dominant form of predictability in international equity markets. Chen et al. (2012) argue that dividend smoothing severs the connection between dividend payments and dividend yield fluctuations, which explains the absence of dividend growth predictability in the US. Rangvid et al. (2014) contend that the prevalence of dividend growth predictability by dividend yield in world markets is due to differences in terms of dividend smoothing. They find that dividend growth predictability is higher in countries with less dividend smoothing and in countries with higher return volatility.

I hypothesise that if countries with high investor protection display higher dividend smoothing than countries with low investor protection, dividend growth predictability should be more common in countries with poor investor protection and weak institutions. I use a portfolio approach to investigate the relationship between the quality of governance and the type of predictability that dominates in a market. Following Leuz et al. (2003) and Boonlert-U-Thai et al. (2006), I use mean clustering to classify countries into three groups, according to their shared governance quality characteristics.[1] For each cluster, I form equally weighted and value-weighted portfolios, for which I estimate predictive regressions. I find evidence that predictability in countries with low governance quality is driven by expectations about dividend growth, and vice versa

[1]Leuz et al. (2003) and Boonlert-U-Thai et al. (2006) use mean clustering to study the relationship between investor protection and earnings quality.

for countries with high governance quality. This result contributes to the existing literature by identifying the quality of investor protection as a factor influencing the type of predictability in a country. I expand on the argument by Rangvid et al. (2014) regarding the role of dividend smoothing for the presence of dividend growth predictability, and find that dividend growth predictability is linked more to lower levels of shareholders' rights protection than to law enforcement and capital market development.

First, I compare return and dividend growth predictability across countries, within the classical Campbell and Shiller (1988) estimation framework, using the Campbell and Yogo (2006) Bonferroni test of predictability for inference. This test is more robust to the bias inherent to predictive regression where the predictor variable is persistent.[2] I use monthly series for return, dividend growth and dividend yield in individual country regressions for the period 1973–2013 and find that dividend growth predictability is dominant in countries with small and medium-sized equity markets, while return predictability is mainly present in larger economies such as the US, Japan and the UK. These findings confirm the evidence reported in multi-country studies by Hjalmarsson (2010) and Rangvid et al. (2014). Second, I follow Cochrane (2008) and compute long-run coefficients, which measure the proportion of variation in the dividend yield that is due to variation in expectations about returns and dividend growth.[3] Consistent with findings from individual country predictive regressions, I find that in most countries, expectations about dividend growth explain most of the variation in dividend yields.

After documenting the presence of dividend growth predictability in most countries, I investigate whether shared governance quality characteristics across

[2]As argued by Stambaugh (1999, 1986) and Campbell and Yogo (2006), the use of conventional tests for stock return predictability could lead to invalid inference.

[3]Long-run coefficients for return and dividend growth solve an identity, which implies that comparing the two coefficients indicates whether expectations about return or dividend growth dominate in a market.

countries can explain this predictive pattern. I measure governance quality using eight different indices that are widely used in cross-country comparisons.[4] To measure the level of minority shareholders' rights, I use the anti-self-dealing and the anti-director rights indices from Djankov et al. (2008).[5] The anti-self-dealing index measures the degree of private enforcement in a country and the risks of expropriation faced by minority shareholders. The anti-director rights index aggregates six different components, each measuring different dimensions of shareholders' rights. The second aspect of governance quality is the strength of the legal system, which I measure using the rule of law index and corruption index from Kaufmann et al. (2009). Broadly, the rule of law index captures the agents' confidence in the judiciary system, while the corruption index measures the degree of corruption in a country. The third measure of legal quality is the public enforcement index from Djankov et al. (2008), which measures the effectiveness of the judiciary system and the extent of public law enforcement. The last aspect of governance quality is the importance of capital markets to the economy. As argued by Shleifer and Wolfenzon (2002), firms in countries with better investor protection are expected to be larger and more valuable. I use the ratio of market capitalisation to GDP, the ratio of listed companies to the population, and the ratio of the value of shares traded to GDP to capture the importance of capital markets (La Porta et al., 2006; Djankov et al., 2008).

Using mean clustering, I assign countries with similar investor protection quality, law enforcement levels and capital markets development to three clusters. The first cluster contains 31 countries with low investor protection rights, weak legal systems and undeveloped capital markets. The second cluster contains 18 countries, mainly Scandinavian and Western European countries, with low investor protection, strong legal systems and medium-sized capital mar-

[4]These measures are commonly used in studies of corporate governance, see La Porta et al. (2000), La Porta et al. (2006), Djankov et al. (2008), Doidge et al. (2007), Klapper and Love (2004), Leuz et al. (2003), Boonlert-U-Thai et al. (2006) and Low et al. (2011).

[5]The anti-director rights index is an updated version of the index in La Porta et al. (2006).

kets. The third cluster consists of countries with high investor protection, average legal systems and large capital markets. Major markets such as the US, the UK and Japan are part of the third cluster. The three clusters identified are similar in composition to findings by Leuz et al. (2003) and Boonlert-U-Thai et al. (2006). The main differences rest in that the current study covers 59 countries compared with 31 countries in their sample, and in the use of updated versions of governance quality indices.

I estimate predictive regressions for equally weighted and value-weighted portfolios and compute the corresponding Cochrane (2008) long-run coefficients. I find evidence of dividend growth predictability in cluster 1, i.e. countries with undeveloped capital markets, weak investor protection and low law enforcement. There is also strong evidence of dividend growth predictability for countries in cluster 2, i.e. countries with low investor protection levels, medium-sized capital markets and strong law enforcement. The shared characteristic in clusters 1 and 2 is weak investor protection, which suggests that dividend growth predictability is more linked to lower levels of shareholders' rights protection than to law enforcement and capital markets' development. For countries with large capital markets and high levels of investor protection in cluster 3, return predictability is the dominant form of predictability. The results are concordant using Campbell and Yogo's (2006) Bonferroni test of predictability. I find support for dividend growth predictability in cluster 2 countries, using equal and value-weighted portfolios, whereas in countries with the highest scores for investor protection, i.e. cluster 3, there is evidence of return predictability but not dividend growth predictability. The fact that the main difference between clusters 2 and 3 is the level of investor protection lends more support to the hypothesis that dividend growth predictability is more dominant in countries with weak investor protection levels, and vice versa for returns.

The rest of the paper is structured as follows: Section 2 discusses the relationship between investor protection and dividend smoothing. Section 3 presents the data and sample construction. Section 4 details the estimation framework and presents results for country-level predictive regressions. Section 5 presents results for the relationship between governance quality and predictability. Finally, Section 6 concludes the paper. Appendix 1 contains details about the Campbell and Yogo (2006) Bonferroni test of predictability.

2 Dividend smoothing and investor protection

The link between dividend smoothing and quality of corporate governance has been analysed in the context where dividend smoothing is a response to agency conflicts or asymmetric information. From an agency point of view, dividends are expected to be regular and stable over time. The higher the dividends, the lower the risk of insiders squandering free cash on hand (Easterbrook, 1984; Jensen, 1986; Allen et al., 2000). Thus, dividend smoothing is expected to be positively related with the severity of the free cash flow problem. In the context of asymmetric information (Guttman et al., 2010), dividends are perceived as a signal about managers' private information regarding current and future cash flows, which implies that higher smoothing is expected to be observed in firms facing more information asymmetry.[6]

However, over the past 60 years firms in the US market, which is one of the markets with the highest levels of investor protection in the world, have witnessed an increasing tendency of dividend smoothing. As observed by Lintner (1956), managers are reluctant to reduce dividend payment and prefer stable dividends. He finds that managers are convinced that firms with stable dividend streams enjoy a market premium. Brav et al. (2005) survey a larger sample of US executives and report that managers prefer stable dividend payouts and avoid cuts even at the cost of good investment opportunities. Fama and French (2001) document a consistently decreasing propensity for dividend pay-

[6]Leary and Michaely (2011) provide a detailed discussion of dividend smoothing implications under asymmetric information and agency-based models.

ments in the US from 1978 to 1999. They suggest that one possible explanation for this is that the improvement in corporate governance mechanisms in the 1990s lowered the benefits of dividends in controlling agency problems between stockholders and managers. Pinkowitz et al. (2006) find support for Fama and French's (2001) argument in an international setting, and report that the relation between dividends and firm value is weaker in countries with stronger investor protection. Similarly, Bauer et al. (2004) compare the UK with other European countries, and find support for the idea that lower quality of corporate governance strengthens the relationship between governance and firm value.

More recently, Leary and Michaely (2011) test whether US firms that smooth dividends do so in line with the agency view or the asymmetric information view. They find that smoothing is lower in firms with high asymmetric information, i.e. younger, smaller firms with high earnings and return volatility. They also report that firms facing agency conflicts tend to display higher level of dividend smoothing. Similar findings are reported by Rangvid et al. (2014) for international equity markets, where they find less dividend smoothing in smaller firms and firms with higher dividend and earnings volatility. These firm characteristics are typically found in countries with low quality of corporate governance. As argued by Harvey (1995), emerging markets have higher equity risk and weaker governance systems compared with developed markets. His argument is that due to their lack of integration in the world market, emerging economies are more influenced by local information, and thus the effects of weak governance on market volatility transfer more to equity markets.

Findings that dividend smoothing is lower in the presence of information asymmetry and higher in markets where the typical firm is large and more stable lend support to the idea that the quality of corporate governance can impact predictability through differences in market risk across countries. As suggested by Rangvid et al. (2011), one channel could be that in countries with lower quality of corporate governance, firms face more uncertainty. Based on their finding that dividend predictability is higher in countries with high volatility, they expect to find more pronounced dividend predictability in countries with poor corporate governance.[7]

Finally, La Porta et al. (2000) suggest an 'outcome model' where minority shareholders use their power to force insiders to pay dividends, and contend that this mechanism is more relevant in countries with weak shareholder protection. Using firm-level data in 33 countries, they find that dividend payouts are higher in countries with strong minority shareholder rights. They also show that in the presence of growth opportunities, legally protected shareholders are willing to defer their receipt of dividend payments, in contrast to countries with poor shareholder protection. This lends more support to the idea that dividend payments matter more to investors in countries with weak investor protection, where they might be more susceptible to reductions in dividends payments, and thus to dividend smoothing.

3 Data description

The data used in this study covers 59 countries, representing both developed and developing economies. I use monthly data from January 1973 to December 2013. Several countries have data starting at later dates. Data on returns, prices and dividend yield is retrieved from Datastream. I use country market indices as defined by Datastream, where the composition of each market index represents at least 75–80% of total market capitalisation in each country.[8] The dividend yield is computed as the sum of dividends paid out by the constituent equities of a given country as a percentage of their market value.

$$DY_t = \frac{\sum_1^n (D_t \times N_t)}{\sum_1^n (P_t \times N_t)} \times 100, \quad (1)$$

[7]Rangvid et al. (2011) is an earlier version of Rangvid et al. (2014). In Rangvid et al. (2011), the authors included a discussion on the relationship between the quality of corporate governance and institutions and the predictability of dividends.

[8]The market indices are dividend adjusted.

where DY_t is the aggregate dividend yield at time t, D_t is the dividend per share on day t, P_t is the unadjusted share price at day t , and N_t is the number of constituents of the index. I use data in local currency for individual country regressions, and USD-denominated series in forming portfolios.

Table 1 presents summary statistics for the annualised total log-returns, dividend growth rates (ln) and dividend yields. The last column of Table 1 shows the number of observations for each country. The results show large differences in returns and dividend growth across countries. Emerging markets usually have higher returns and dividend growth rates than larger, more developed economies. For instance, the rate of return is 17.7% in South Africa and 21.5% in Mexico, and their dividend growth rates are 14% and 16.15%, respectively. For larger economies, the rate of return varies from 4.77% in Japan to 10.22% in the US, while their dividend growth rates are as low as 3.32% and 7%, respectively. There are also differences across countries that can be attributed to variation in sample length. Countries entering the sample much later than 1973 usually display more variation in average returns and dividend growth rates.

4 Return and dividend predictability across countries

4.1 Estimation framework

In this section, I lay out the testing procedure used to investigate predictability of return and dividend growth using dividend yield as predictor. Following Campbell and Shiller (1988), the log-linearisation of the definition of returns yields the following approximate identity:

$$d_t - p_t = \alpha + E_t[\sum_{j=1}^{\infty} \rho^i r_{t+j}] - E_t[\sum_{j=1}^{\infty} \rho^i \Delta d_{t+j}] \tag{2}$$

where α is a constant, $(d_t - p_t)$ is the log of the dividend price ratio at time t, r_{t+j} is the log of return at time $t + j$, and Δd_{t+j} is the log dividend growth at time $t + j$. Equation (2) indicates that the dividend price ratio today depends on the expectations about future returns and growth rates of dividends. Thus, a change in the dividend yield today entails changes in market expectations regarding future returns, future dividend growth or both. It follows that an increase in dividend yield suggests a decrease in expected dividend growth rate or an increase in expected return. Since the idea behind equation (2) is to use variation in the dividend-price ratio to infer news about future cash flows, the degree of persistence in dividends plays a central role in identifying whether dividend yield today predicts better future returns or future dividends growth. As reported by Chen et al. (2012), a lack of variation in dividends complicates predictability tests in finite samples.

4.2 Country-level predictive regressions

4.2.1 VAR representation and Stambaugh bias

In order to test the implications of equation (2), I run individual predictive regressions for each country. Following the VAR representation as in Cochrane (2008) and Chen et al. (2012), I estimate equations (3)–(5) :

$$\begin{aligned} r_{i,t+1} &= \alpha_{i,r} + \beta_{i,r}(d_t - p_t) + u_{i,t+1} &(3)\\ \Delta d_{i,t+1} &= \alpha_{i,dg} + \beta_{i,dg}(d_t - p_t) + v_{i,t+1} &(4)\\ d_{i,t+1} - p_{i,t+1} &= \alpha_{i,dy} + \beta_{i,dy}(d_t - p_t) + e_{i,t+1} &(5)\end{aligned}$$

where i refers to a country and t is time. In a first stage, each equation in the system of equations (3)–(5) is estimated individually using OLS.[9] Due to potential heteroskedasticity and serial correlation issues, statistical inference is based

[9] All the equations in (3)–(5) have the same right hand side variable and thus can be efficiently estimated separately using OLS due to Kruskal's theorem.

on Newey and West (1987) standard errors. I include three lags, which is a reasonable lag length for data at a monthly frequency[10].

Using the VAR representation in equations (3)–(5) with the Campbell and Shiller (1988) framework, Cochrane (2008) infers the following identity based on coefficients estimated from equations (3)–(5). I drop the i subscript for ease of exposition:

$$\beta_r = 1 - \rho\beta_{dy} + \beta_{dg} \tag{6}$$

where ρ is the log-linearisation parameter. Dividing both sides of (6) by $(1 - \rho\beta_{dy})$, gives the long-run coefficients for return and dividend growth, $\beta^{\mathrm{l}}{}_r$ and $\beta^{\mathrm{l}}{}_{dg}$, as:

$$\frac{\hat{\beta}_r}{1 - \rho\hat{\beta}_{dy}} - \frac{\hat{\beta}_{dg}}{1 - \rho\hat{\beta}_{dy}} = \beta^l_r - \beta^l_{dg} = 1 \tag{7}$$

The long-run coefficient $\beta^{\mathrm{l}}{}_r$ measures the proportion of variation in the dividend yield due to variation in expected returns, and $\beta^{\mathrm{l}}{}_{dg}$ measures the proportion of variation in the dividend yield due to variation in expected dividend growth. Given that the long-run coefficients are linked by the identity in (6), dividend yield should predict either returns or dividend growth. In fact, we will see later in the analysis that countries differ largely in whether their predictability is driven more by expectations about returns or expectations about dividend growth.

A recurrent issue in predictive regressions using dividend yield as a predictor variable is the estimation bias under OLS finite sample properties. The source of the bias in regressing returns on the lag of dividend yield is due to the correlation between the regression errors with the regressor's innovations and the persistence of the regressor (Stambaugh, 1986, 1999). In equation (5), the

[10]The results are qualitatively the same using longer lags.

dividend yield is modelled as an $AR(1)$, where $d_{t+1} - p_{t+1}$ is highly persistent and depends on prices in previous periods. While the bias in $\hat{\beta}_{dy}$ is usually negative, the direction of the bias in $\hat{\beta}_r$ and $\hat{\beta}_{dg}$ will depend on the sign and strength of the correlation between e_{t+1}, u_{t+1} and v_{t+1}.[11] As reported by Campbell and Yogo (2006), it has been shown in both analytical and simulation studies that in the presence of a persistent predictor variable with innovations that are highly correlated with those of returns, asymptotic theory provides a poor approximation to the actual finite sample distribution of test statistics.

4.2.2 Bonferroni Q-test

In order to circumvent invalid inference based on estimating predictive regressions using OLS standard errors, I use the Campbell and Yogo (2006) Bonferroni test of predictability, herein referred to as the Q-test.[12] Their test is based on the idea that if the power of a test of predictability of return onto a financial variable is low due to noise on the return series, partly removing the noise can increase the power of the test. The inference in Campbell and Yogo (2006) is based on local-to-unity asymptotics, where the autoregressive coefficient is not exactly equal to one but is assumed to be arbitrarily close to one.[13] The use of local-to-unity asymptotics allows the Bonferroni Q-statistic to be asymptotically valid under general assumptions about the persistence of the predictor variable, and robust to heteroskedastic innovations.[14]

Table 2 presents estimates of model parameters used in computing Q-test

[11]The relevance of the sign of the correlation between the innovations from (3), (4) and (5) will be discussed in more details in a later section.

[12]Appendix 1 provides the detailed steps for implementing this procedure. See also Campbell and Yogo's (2005) online appendix for more details.

[13]Lewellen (2004) used a similar approach to test for return predictability using several valuation ratios, where the coefficient from the $AR(1)$ specification in (5), β_{dy}, is assumed to be equal to one, which makes it a special case of the more general test proposed by Campbell and Yogo (2006).

[14]See Campbell and Yogo (2006) for more details on the efficiency and power gains of their procedure. In Appendix 1, I provide details of the implementation of their test.

confidence intervals. The first column contains estimation results for β_{dy} in model (5), and column 2 presents the DF-GLS statistic based on a test of unit root for dividend yield. The coefficient of the $AR(1)$ model indicates the degree of persistence of dividend yields in each country considered in the sample, with a minimum coefficient of 0.849 in Latvia and a maximum coefficient of 0.995 in the US.[15] In general, most of the estimates of $\hat{\beta}_{dy}$ are close to one, indicating strong persistence of dividend yields across countries. Using the DF-GLS statistic and the estimated correlation coefficient $\hat{\delta}_r$ or $\hat{\delta}_{dg}$, I estimate lower and upper bounds for β_{dy}. Columns 3–5 (6–8) provide estimates for residual correlation $\hat{\delta}_r$ ($\hat{\delta}_{dg}$) and confidence intervals for $\beta_{dy,r}$ ($\beta_{dy,dg}$). As expected, the correlation coefficients $\hat{\delta}_r$, between the residuals from equations (3) and (5), are negative for all countries except Ecuador and Ghana, while the correlation coefficients $\hat{\delta}_{dg}$, between the residuals from equations (4) and (5), are positive in 47 of the 59 countries.

4.2.3 Robust test of return and dividend growth predictability

Table 3 reports predictive regression results for returns from the model in (3) and dividend growth from (4). Columns 1–3 and 6–8 provide Newey-West estimates and their associated t-statistics and R-squares. Columns 4–5 and 9–10 show the Bonferroni confidence intervals (intervals in bold refer to 5% significance level).

Based on Q-confidence intervals in columns 4 and 5, we see that developed economies, such as the US, the UK and Japan, all show evidence of return predictability. There is also a pronounced return predictability in large economies such as China and India. These results are in line with findings by Hjalmarsson (2010), who uses Campbell and Yogo's (2006) procedure and reports evidence of return predictability by dividend price ratio in large markets, with the exception of India. On the other hand, Campbell and Yogo (2006) find that for the US, β_r is 0.009 with a t-statistic of 1.706 and a Q-confidence interval of $[-0.005 \ \ 0.010]$.

[15]Cochrane (2008) find that for the US annual CRSP data 1927-2004, the persistence of dividend yield is equal to 0.941.

Though we have similar estimates for β_r and the t-statistic, their Q-confidence interval indicates no return predictability at a monthly frequency. However, differences in results can be explained by differences in the time period studied.[16] I also find that a second group of countries that can be classified as small and medium-sized developed markets show evidence of return predictability. France, the Netherlands, Spain and most of the Scandinavian countries fall into this category. The signs of the coefficients are mostly positive and thus in line with predictions by Campbell and Shiller's definition of returns. R^2 values are low and higher than 4% only in Chile, Turkey and Indonesia. The results in columns 4 and 5 indicate that most of the countries showing evidence of return predictability based on conventional t-statistics have Q-confidence intervals that fail to reject the null of no return predictability ($\beta_r = 0$), which indicates that results based on OLS should be interpreted with caution.

Columns 9 and 10 of Table 3 show that dividend growth predictability is dominant in international equity markets. Using Q-confidence intervals, 24 markets show evidence of dividend growth predictability. For large economies such as the US and Japan, I find no evidence of dividend growth predictability, while dividend yield can be used to predict dividend growth in the UK, Germany and Canada. It also seems that dividend yield is more useful in predicting dividend growth in Europe and South America. For the case of Europe, dividend growth predictability is present in both western more developed and eastern less developed financial markets. Columns 6–8 of Table 3 show that most of the coefficients have the predicted negative sign based on the Campbell-Shiller identity. The general pattern is that both small and medium-sized developed and developing markets show signs of dividend growth predictability. R^2 values are higher than for return predictability. Egypt, Portugal and Romania have the highest R^2 with 11%, 9% and 5% respectively. Finally, inference based on conventional t-statistics shows that 31 countries have significant dividend

[16]Their sample is from 1926 to 2002, while mine is from 1973 to 2013. Using dividend yield as a predictor, they find evidence of predictability in the US at a yearly frequency only.

growth predictability. This result is in line with Rangvid et al. (2014), who report that dividend growth predictability in world markets is the rule rather than the exception.

To get a better idea about what drives the predictability in each country, I compute long-run coefficients from the estimated parameters based on equation (7). An estimate of ρ can be inferred from the identity in equation (6), labeled ρ_{imp}. Columns 2–4 of Table 4 show country-level long-run coefficients using ρ_{imp}. The β^l_{dg} values are high for most European, South American and African countries. In markets such as Germany, Argentina and Italy, most of the variation in dividend yield is explained by long-term changes in expected dividend growth. The main notable exception in Europe is France, where variation in dividend yield is driven mainly by long-run changes in expected returns. The β^l_r values indicate that the long-run changes in expected returns is the main driver of variation in dividend yield in large economies such as the US, the UK, and Japan. Smaller countries with large financial markets such as Hong Kong and Singapore as well as most Asian countries in the sample, show a similar pattern.[17] Finally, results from long-term coefficients largely coincide with results from country-level regressions. Countries where expectations about returns are more relevant to dividend yields tend to have either large economies or large financial markets relative to their GDP. However, this pattern is less pronounced for expectation about dividend growth as countries with medium-sized and smaller economies and financial markets seem to be dominant in the later category.

Following Cochrane (2008), a second approach to compute long-run coefficients is to rely on the knowledge that ρ is the log-linearisation parameter in equation (2) and use the mean of dividend yield from the data in the following

[17]The results above are in line with findings by Rangvid et al. (2014), with the exception of China, Ireland, Pakistan and Poland.

formula:

$$\rho = \frac{e^{E(p-d)}}{1 + e^{E(p-d)}} \tag{8}$$

where $E(p-d)$ is the mean of the natural logarithm of dividend yield. Columns 5–7 of Table 4 present country-level long-run coefficients based on ρ from equation (8). The results from the two approaches differ given that the identity in (6) is highly sensitive to small changes in ρ. An interesting result is that ρ is always smaller than ρ_{imp} for all countries. The difference is large in some cases, and the magnitude of the long-run coefficients differs considerably. However, despite differences in the magnitude of the long-run coefficients between the two methods, the conclusions about what drives predictability across markets remains unchanged.

5 Governance quality and predictability

In this section, I analyse the relationship between the quality of governance and observed patterns in return and dividend growth predictability documented across countries.

5.1 Governance quality measures

I use eight indices that measure different aspects of investor protection in a country. To measure the degree of protection for minority shareholders, I use the anti-self-dealing and anti-director rights indices from Djankov et al. (2008). To capture the degree of law enforcement, I use the corruption and rule of law indices from Kaufmann et al. (2009) and public enforcement index from Djankov et al. (2008). Finally, I measure the importance of the stock market per country using the ratio of market capitalisation to GDP, the ratio of listed companies in a country to its population and the ratio of the value of shares traded to GDP (La Porta et al., 2006; Djankov et al., 2008; Leuz et al., 2003).

5.1.1 Minority shareholders' protection

According to Djankov et al. (2008), the anti-self-dealing index is an aggregate measure of minority shareholders' level of protection from expropriation by corporate insiders. The index is based on laws in force across 72 countries in 2003 and compares the level of disclosure and approvals required by the law for insider transactions and minority shareholders' ease of obtaining redress in case of expropriation. The measure ranges from zero to one, with higher scores implying better investor protection. The second measure of minority shareholder protection is the anti-director rights index based on La Porta et al. (2000) and La Porta et al. (2006) and updated in Djankov et al. (2008). The index aggregates six measures of shareholder rights and adds one point for each measure. The components of anti director rights are: (1) a possibility for shareholders to mail their proxy vote, (2) if firms are not allowed to require their shareholders to deposit their shares prior to general shareholders' meetings, (3) cumulative voting is allowed, (4) a possibility for minority shareholders to challenge resolutions that benefit controlling shareholders, (5) priority for shareholders to buy new issues of stock and (6) a minimum level of voting power that entitles a shareholder to call a shareholders' meeting. Similar to the anti-self-dealing index, higher scores on the anti-director right index indicate better investor protection.

5.1.2 Law enforcement

In order to measure law enforcement, I use the public enforcement index from Djankov et al. (2008). This index measures the extent to which the law sanctions wrongdoing by controlling shareholders and third parties involved, based on the level of fines and jail sentences. Similar to the anti-self-dealing index, this measure relies on laws in force in each country in 2003. The second and third measures of law enforcement are the rule of law index and the corruption index as measured by Kaufmann et al. (2009). The rule of law index reflects the extent to which agents have confidence in and abide by the rules of society. It focuses mainly on perceived contract enforcement, the potential for violence and crime, and the effectiveness of the judiciary system. The corruption index measures the extent of power abuse for private gains. Both rule of law and corruption indices are for year 2003 and range from -2.5 to 2.5, with higher scores indicating better legal enforcement and higher investor protection.

5.1.3 The importance of capital markets

Following La Porta et al. (2006) and Djankov et al. (2008), I use three different measures to account for the development of the stock market in each country. The first measure is the proportion of the market capitalisation in a country relative to its GDP, averaged over the period 1999–2003. As argued by Shleifer and Wolfenzon (2002), firms in countries with better investor protection are expected to be larger and more valuable. The second measure is the average number of domestic publicly traded firms relative to the population of a country from 1999 to 2003. Finally, the third measure is the ratio of value of traded shares in a country relative to GDP, which captures the liquidity of the stock market.

5.2 Country-level analysis

First, I investigate the relationship between investor protection, return and dividend predictability at the country level. I estimate a model where the dependent variable is one of the measures of predictability, and the explanatory variables are measures of investor protection. To measure predictability I use R^2 from the predictive regressions in equations (3) and (4), which are commonly used to assess the strength of predictability in a country (see e.g. Rangvid et al., 2014). The first two explanatory variables are the anti-self-dealing index and the anti-director rights index, which I include in separate models given that they capture different aspects of shareholders rights but are correlated ($corr = 0.541$). To account for law enforcement, I include a public enforcement index and a corruption index. I exclude rule of law as it is highly correlated with the corruption index ($corr = 0.960$), even though they measure two different, yet related, aspects of legal quality. Finally, I control for the importance of the stock market to a country as defined in Section 4.1.3.

Table 5 shows results for a pooled country regression, where the dependent variables are R^2 in columns 1–4. As expected, the results indicate that higher levels of investor protection are associated with higher levels of return predictability and lower levels of dividend growth predictability. Using R_r^2 (R_{dg}^2) as dependent variable, the estimates associated with anti-self-dealing and anti-director rights are positive (negative) and significant. In terms of law enforcement, it seems that better enforcement, i.e. low levels of corruption, is negatively related to predictability. Finally, measures of the importance of capital markets display opposite relationships to return and dividend growth predictability. Countries with large stock markets have higher (lower) return (dividend growth) predictability, whereas a higher ratio of listed companies to the population is negatively (positively) related to return (dividend growth) predictability.

In columns 5 and 6, I use long-run coefficients for returns as a measure of predictability. Given that long-run coefficients for return and dividend growth are linked with an exact identity, having long-run coefficients for dividend growth as the dependent variable gives a similar result.[18] $\beta^l_{r,imp}$ is computed using the implied value of ρ from equation (6). I find that higher scores of the anti-self-dealing and anti-director rights indices are associated with higher return predictability. This implies that countries with better investor protection have lower dividend growth predictability. The results are robust to the use of β^l_r in columns 7 and 8, which is computed based on ρ from equation (8) and does not always satisfy the identity in (7).[19]

[18]The difference is that the identity in equation (7) implies that long-run dividend growth coefficients are negative, and vice versa for returns.

[19]R^2 are from Table 3, $\beta^l_{r,imp}$ and β^l_r are from Table 4.

5.3 Portfolio analysis

The results from country-level regressions show that higher levels of investor protection are associated with higher return predictability and lower dividend growth predictability. In order to gain a deeper understanding of these patterns I resort to a portfolio approach. I classify countries into three portfolios based on their levels of investor protection, law enforcement and the importance of their equity markets, and test for the relationship between the quality of governance and the direction of predictability. If the relationship between governance quality and predictability documented so far is more than a mere correlation, then it is expected that portfolios of countries with better (worse) governance have a predictability driven by expectations about return (dividend growth).

5.3.1 Clustering and portfolio selection

I group countries in three clusters based on their governance quality. The idea is to assign countries with similar investor protection quality, law enforcement levels and capital markets development to the same cluster. First, following Leuz et al. (2003) and Boonlert-U-Thai et al. (2006), I use mean clustering based on the eight governance quality indices defined in s Section 4 to identify systematic patterns in governance quality across countries. Prior to clustering, each governance index is standardised to z-scores in order to allow more balanced comparability of the indices as they enter the clustering simultaneously.[20]

Table 6 presents information about the composition of each cluster. Panel A presents means of governance indices by cluster. Panel A shows that cluster 1 is

[20] K-means is a clustering algorithm that helps classify objects (countries) into K groups, based on a number of attributes. The algorithm starts by placing user-defined K points as initial centres (means) for the K groups. In a second step, each object is assigned to the group with the nearest mean, after which new means are computed. The procedure is repeated until the means within each cluster no longer move; see MacQueen et al. (1967) for more details. I use the command K-means in Stata with a random selection for the starting observations used to centre the three clusters.

composed of 31 relatively small countries with small undeveloped capital markets and weak law enforcement and shareholder rights protection. The only large western economy in cluster 1 is Italy. The second cluster consists of 18 countries with very strong law enforcement, relatively more developed capital markets compared with cluster 1, but poor investor protection. Scandinavian and Western European countries are typically part of cluster 2. Finally, cluster 3 is composed of 10 countries with well developed capital markets, very high levels of shareholder rights and average law enforcement. Major markets such as the US, the UK and Japan are part of the third cluster. The three clusters are similar in composition to findings by Leuz et al. (2003) and Boonlert-U-Thai et al. (2006). The main differences between the clusters in the current study and theirs is that I use 59 countries while they use 31. In addition, I use updated versions of governance quality indices.

In order to test for differences in governance quality patterns across the three clusters, Panel B of Table 6 shows p-values for a test of differences in means, for every index, between clusters. The anti-self-dealing and anti-director rights in cluster 3 are significantly different from clusters 1 and 2. In terms of public enforcement, cluster 1 is significantly different from clusters 2 and 3 in the three measures of legal quality. However, clusters 2 and 3 have similar corruption and rule of law indices, while they differ significantly in terms of law enforcement. In terms of capital markets development, the countries in cluster 3 have levels of capital market development differing from countries in the first cluster. Panel C lists the countries within each cluster, and the initials (CD) and (CM) refer to code law (common law) legal systems. The main pattern is that clusters 1 and 2 consist mainly of countries with civil law systems (French, German and Scandinavian systems), whereas cluster 1 comprises mainly countries with common law tradition such as the UK and Hong-Kong.

5.3.2 Portfolio predictive regressions

Based on the clusters from the previous section, I form three portfolios of returns, dividend growth and dividend yield in US dollars. For each portfolio I use equal weights and value weights, where value weights are computed based on a country's market capitalisation relative to the portfolio's total market capitalisation. For value-weighted portfolios, I rebalance the weights each month to capture changes in countries' market capitalisation. I also rebalance equal weight portfolios monthly, given that data availability differs across countries, which implies that some countries enter early in the sample and others join the portfolio in later periods. Findings based on equal weight portfolios are more reliable than their value-weighted counterparts, given that results based on value-weighted portfolios can be driven by a handful of countries in a portfolio washing away interesting evidence. For each portfolio, I estimate predictive regressions in equations (3)–(5) using both Newey-West regression and Bonferroni confidence intervals. Given that all measures of governance quality are for 2003, in addition to the full sample I use a sub-sample starting from 2003. Despite the fact that governance quality is inherently slow changing over time, measures of governance quality in 2003 are less representative of conditions in countries in the 1970's or 1980's periods, which motivates the use of a sub-sample.

Table 7 presents predictive regression results using Newey-West. Estimates of β_r, β_{dg} and their associated t-statistics and R^2 are reported in the first six columns. The seventh column presents the autoregressive coefficient β_{dy} from equation (5). Finally, the last three columns present long-run coefficients based on equation (7), using the ρ_{imp}, i.e the difference between β_r^l and β_{dg}^l is exactly one. The results in Panel A are based on the full sample and in Panel B I use the period 2003–2013 as a sub-sample.

Based on the estimates of β_r, β_{dg} and R^2 in Panel A of Table 7, the results show evidence of dividend growth predictability in the equally weighted cluster 1 portfolio, i.e. countries with low investor protection, low law enforcement and undeveloped capital markets. There is also strong evidence of dividend growth predictability for countries in cluster 2, where countries have low investor protection levels, medium-sized capital markets and very strong law enforcement. The shared characteristic between clusters 1 and 2 is low levels of investor protection, which suggests that dividend growth predictability is more linked to lower levels of shareholder rights protection than to law enforcement and capital markets development. The results are consistent using long-run coefficients. Considering β_r^l and β_{dg}^l in absolute terms, we see that β_{dg}^l dominates β_r^l for equally weighted clusters 1 and 2 portfolios, and value-weighted cluster 2 portfolio. For countries with large capital markets and high levels of investor protection in cluster 3, return predictability is the dominant form of predictability. These results are robust to the use of the sub-sample period in Panel B. Surprisingly, it seems that for cluster 3 there is more evidence of dividend growth predictability in the sub-period 2003–2013 regardless of the weighting used.

I check the robustness of these findings using the Bonferroni Q-confidence intervals, which are more robust to bias in estimation. Table 8 reports portfolio estimates of $\hat{\delta}_{r,dy}$, DF-GLS statistics and Q-confidence interval $[\underline{\beta}_r, \overline{\beta}_r]$ in the first four columns, and equivalent estimates for dividend growth in the last four columns. Panel A shows results for the full sample and Panel B shows results for the sub-sample period 2003–2013. Results based on equally weighted portfolios indicate that in countries with weak investor protection, i.e. clusters 1 and 2, dividend growth predictability is strong. For value-weighted portfolios, there is no evidence of predictability for cluster 1 countries, whereas cluster 2 countries show evidence of both return and dividend growth predictability. Finally, for countries with high investor protection (cluster 3 portfolio), there is evidence of return predictability, but no evidence of dividend growth predictability. The main difference in terms of governance quality between clusters 2 and 3 are in terms of investor protection. Countries in cluster 3 portfolio have higher investor protection levels than countries in cluster 2 portfolio. This lends more support to the idea that dividend growth predictability is more dominant in countries with low investor protection levels, and vice versa for returns.

6 Conclusion

Identifying whether predictability in a market is driven more by expectations about returns or expectations about dividend growth rates is a classical dilemma in the finance literature. Studying the US market, Cochrane (2008, 2011) find that most of the variation in the US dividend yield is driven by expectations about future returns, while Chen (2009) and Chen et al. (2012) find evidence of dividend growth predictability in the pre-World War II period in the US. Rangvid et al. (2014) investigate dividend predictability around the world and show that dividend growth predictability is prevalent. To explain their findings, Chen et al. (2012) argue that dividend smoothing deters the effect of dividend growth predictability in the post-war sample, while Rangvid et al. (2014) contend that differences in the level of dividend smoothing and market return volatility across countries explain the dominance of dividend growth predictability by dividend yield in world markets.

Based on the arguments by Chen et al. (2012) and Rangvid et al. (2014), I conjecture that if countries with high quality of corporate governance display higher dividend smoothing than countries with lower corporate governance quality, dividend growth predictability should be more common in countries with poor investor protection and weak institutions. I measure the quality of corporate governance based on level of investor protection, quality of the judiciary system and importance of capital markets, factors identified to impact stock market performance and dividend policies around the world (La Porta et al., 1997; Core et al., 2006; La Porta et al., 2000; Klapper and Love, 2004).

Using country-level robust predictive regressions, I find evidence that dividend growth predictability is dominant in most small and medium-sized economies, while return predictability dominates in countries with large capital markets. I reach a similar conclusion using Cochrane (2008) long-run coefficients, as I find that variation in dividend yields is explained more by long-run changes in expected returns in large economies such as the US and Japan, or in small countries with large financial markets such as Hong Kong and Singapore.

Following Leuz et al. (2003) and Boonlert-U-Thai et al. (2006), I use mean clustering to classify countries into three clusters according to their shared governance quality characteristics. The first cluster consists of countries with weak investor protection, weak judiciary systems and small capital markets. The second cluster consists of countries with weak investor protection, strong judiciary systems and medium-sized capital markets. The third cluster consists of countries with strong investor protection, average judiciary systems and large capital markets. I estimate predictive regressions for each portfolio and find that dividend growth predictability is more present in small and medium-sized economies with weak investor protection, whereas in countries with large capital markets and high levels of investor protection, return predictability is the dominant form of predictability. Finally, it seems that the quality of the judiciary system is not more related to one form of predictability than the other.

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Table 1: Descriptive statistics

	Return		Dividend Growth		Dividend Yield		
Country	MEAN	STD.DEV	MEAN	STD.DEV	MEAN	STD.DEV	OBS
Argentina	13.278	32.505	8.676	39.788	4.539	2.431	244
Australia	11.042	19.904	7.844	7.713	5.070	0.912	491
Austria	7.378	19.798	6.146	13.556	3.009	0.677	491
Belgium	9.567	17.293	6.300	15.375	4.755	1.753	491
Brazil	14.840	25.557	16.290	30.232	4.361	1.604	233
Bulgaria	3.244	31.856	11.413	84.230	1.967	1.272	204
Canada	9.697	15.678	6.150	7.818	4.033	1.015	491
Chile	17.546	18.991	9.592	20.161	4.544	2.033	293
China	8.582	37.550	9.134	21.225	2.507	0.620	235
Colombia	16.505	21.977	14.686	30.658	3.790	1.035	261
Croatia	4.921	24.938	5.327	98.581	3.138	2.464	181
Czech Rep	5.314	23.326	5.300	41.672	5.051	2.082	239
Denmark	11.436	18.343	9.481	14.350	2.957	0.819	491
Ecuador	14.740	32.067	7.427	114.989	5.059	4.253	204
Egypt	13.261	30.463	8.824	28.718	5.740	1.694	207
Finland	9.437	28.241	7.490	21.034	3.938	1.322	309
France	11.159	20.435	7.444	9.834	4.748	1.319	491
Germany	8.003	18.018	5.000	8.603	3.673	0.896	491
Ghana	17.877	19.086	14.145	70.561	4.432	2.797	204
Greece	6.596	33.140	2.542	24.895	3.826	1.227	287
Hong Kong	11.973	32.767	9.505	11.378	4.616	1.260	491
Hungary	12.343	30.393	7.891	34.679	4.035	1.440	270
India	15.079	33.475	14.821	20.438	2.410	0.483	287
Indonesia	9.357	30.803	12.032	25.651	3.140	0.933	284
Ireland	11.447	22.443	6.464	12.727	4.822	2.250	491
Israel	8.531	20.802	8.898	17.702	4.085	1.412	251
Italy	9.943	23.812	7.463	14.422	3.942	1.219	491
Jamaica	14.789	25.481	6.982	45.675	6.129	2.379	204
Japan	4.778	18.012	3.329	9.533	2.341	0.662	491
Kenya	18.894	23.867	7.002	42.388	7.291	4.252	204
Latvia	10.753	28.017	-0.918	100.099	2.542	1.715	181
Lithuania	3.455	26.769	6.470	76.726	2.863	1.725	204
Luxembourg	11.198	18.512	8.535	20.694	3.609	1.034	263
Malaysia	11.917	25.748	6.437	11.479	3.858	1.121	335
Mexico	21.515	23.674	16.152	25.492	2.972	0.845	295
Morocco	11.679	15.531	9.091	18.886	4.380	0.939	237

Table 1: (continued)

Country	MEAN	STD.DEV	MEAN	STD.DEV	MEAN	STD.DEV	OBS
Netherlands	9.779	17.648	4.540	8.392	5.158	1.540	491
Norway	11.663	24.812	9.776	19.150	3.713	0.982	407
Pakistan	13.941	33.045	12.418	26.159	5.834	2.394	257
Peru	11.907	21.864	14.288	40.400	4.325	2.429	239
Philippines	13.505	26.345	16.046	26.013	2.504	0.872	315
Poland	6.459	30.753	10.853	26.864	3.215	1.356	237
Portugal	5.232	18.293	-2.351	40.068	4.373	1.504	287
Romania	13.719	40.076	4.362	58.437	5.411	3.427	192
Russia	23.471	40.023	30.594	51.523	2.890	1.190	191
Singapore	6.413	26.704	5.155	12.526	3.646	0.829	491
Slovakia	8.708	24.200	1.699	119.322	6.014	8.074	203
South Africa	17.702	22.849	13.922	17.420	4.992	1.806	491
South Korea	8.217	29.776	4.946	17.649	2.725	0.508	315
Spain	9.435	21.105	6.818	10.781	4.496	1.383	321
Sri Lanka	15.467	27.971	15.461	35.004	4.208	2.220	318
Sweden	13.941	22.773	11.960	15.084	3.697	0.894	383
Switzerland	7.918	15.470	6.417	9.219	3.235	0.704	491
Thailand	12.233	33.352	7.274	22.640	4.106	1.269	323
Tunisia	6.109	16.049	4.274	37.419	4.271	1.485	204
Turkey	39.713	48.290	30.499	28.842	4.544	2.679	294
UK	11.862	19.152	7.428	6.334	5.205	1.214	491
US	10.228	15.719	7.039	5.349	3.956	1.321	491
Venezuela	38.469	42.017	35.219	38.440	6.080	4.233	287

This table presents means and standard deviations for return, dividend growth and dividend yields for 59 countries included in the sample. The second and third columns show total annualised returns (ln), and the next two columns information on annualised dividend growth (ln). The sixth and seventh columns present dividend yield, and the last column shows the number of observations (monthly frequency). Values are in local currency.

Table 2: Estimates of model parameters (Bonferroni Q-confidence intervals)

	Dividend Yield		Return			Dividend Growth		
	β_{dy}	DF-GLS	δ_r	$\underline{\beta}_{dy,r}$	$\overline{\beta}_{dy,r}$	δ_{dg}	$\underline{\beta}_{dy,dg}$	$\overline{\beta}_{dy,dg}$
Country	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Argentina	0.975	-1.765	-0.529	[0.953	0.986]	0.710	[0.952	0.990]
Australia	0.952	-1.826	-0.922	[0.974	0.997]	-0.135	[0.979	0.989]
Austria	0.974	-3.128	-0.747	[0.941	0.973]	0.159	[0.948	0.965]
Belgium	0.981	-1.233	-0.693	[0.985	1.000]	0.575	[0.986	0.999]
Brazil	0.976	-0.713	-0.423	[0.985	1.002]	0.641	[0.983	1.005]
Bulgaria	0.904	-2.350	-0.076	[0.927	0.954]	0.924	[0.908	0.978]
Canada	0.987	-1.343	-0.868	[0.983	1.001]	-0.006	[0.989	0.995]
Chile	0.954	-0.375	-0.558	[0.992	1.005]	0.653	[0.991	1.006]
China	0.958	-1.977	-0.831	[0.940	0.987]	-0.210	[0.948	0.974]
Colombia	0.945	-2.577	-0.445	[0.922	0.963]	0.767	[0.919	0.970]
Croatia	0.935	-1.877	-0.020	[0.948	0.968]	0.967	[0.926	0.996]
Czech Rep	0.960	-1.244	-0.319	[0.973	0.994]	0.851	[0.969	1.002]
Denmark	0.981	-2.339	-0.669	[0.964	0.987]	0.304	[0.966	0.983]
Ecuador	0.914	-2.335	0.011	[0.933	0.954]	0.961	[0.909	0.981]
Egypt	0.951	-1.972	-0.641	[0.934	0.981]	0.512	[0.935	0.977]
Finland	0.980	-1.936	-0.706	[0.957	0.989]	0.238	[0.961	0.982]
France	0.979	-2.089	-0.876	[0.969	0.993]	0.033	[0.977	0.985]
Germany	0.985	-1.778	-0.886	[0.975	0.997]	-0.188	[0.979	0.990]
Ghana	0.959	-2.061	0.002	[0.946	0.965]	0.965	[0.925	0.992]
Greece	0.974	-1.521	-0.697	[0.967	0.996]	0.257	[0.971	0.990]
Hong Kong	0.946	-1.005	-0.946	[0.988	1.004]	-0.394	[0.990	0.999]
Hungary	0.929	-2.384	-0.541	[0.933	0.972]	0.676	[0.932	0.975]
India	0.958	-2.281	-0.816	[0.939	0.983]	-0.337	[0.944	0.972]
Indonesia	0.951	-0.431	-0.610	[0.990	1.005]	0.360	[0.992	1.003]
Ireland	0.992	-1.460	-0.834	[0.981	0.999]	0.237	[0.984	0.994]
Israel	0.975	-0.730	-0.690	[0.984	1.005]	0.508	[0.985	1.003]
Italy	0.977	-2.264	-0.810	[0.965	0.990]	0.130	[0.970	0.983]
Jamaica	0.910	-1.630	-0.295	[0.953	0.983]	0.856	[0.947	0.995]
Japan	0.994	-1.089	-0.925	[0.987	1.003]	-0.695	[0.988	1.001]
Kenya	0.970	-1.116	-0.372	[0.972	0.996]	0.849	[0.968	1.005]
Latvia	0.849	-1.286	-0.035	[0.973	0.987]	0.957	[0.956	1.006]
Lithuania	0.947	-2.139	-0.050	[0.940	0.962]	0.936	[0.921	0.985]
Luxembourg	0.968	-1.299	-0.509	[0.972	0.996]	0.634	[0.972	0.998]
Malaysia	0.961	-0.659	-0.895	[0.988	1.006]	-0.122	[0.992	1.000]

Table 2: (continued)

Country	β_{dy}	DF-GLS	δ_r	$\underline{\beta}_{dy,r}$	$\overline{\beta}_{dy,r}$	δ_{dg}	$\underline{\beta}_{dy,dg}$	$\overline{\beta}_{dy,dg}$
Mexico	0.930	-0.796	-0.458	[0.986	1.002]	0.577	[0.986	1.003]
Morocco	0.951	-2.533	-0.621	[0.915	0.965]	0.754	[0.913	0.968]
Netherlands	0.990	-1.730	-0.881	[0.976	0.997]	0.049	[0.983	0.990]
Norway	0.955	-3.448	-0.723	[0.917	0.959]	0.451	[0.919	0.953]
Pakistan	0.967	-1.031	-0.741	[0.977	1.003]	0.539	[0.979	1.000]
Peru	0.967	-0.808	-0.312	[0.984	1.000]	0.854	[0.981	1.007]
Philippine	0.970	-0.646	-0.498	[0.989	1.003]	0.463	[0.989	1.003]
Poland	0.976	-0.247	-0.576	[0.991	1.007]	0.363	[0.992	1.005]
Portugal	0.889	-1.164	-0.316	[0.979	0.996]	0.891	[0.976	1.004]
Romania	0.932	-1.321	-0.547	[0.961	0.995]	0.806	[0.959	1.000]
Russia	0.948	-0.530	-0.317	[0.986	1.003]	0.660	[0.984	1.007]
Singapore	0.953	-1.628	-0.883	[0.978	0.998]	-0.123	[0.983	0.992]
Slovakia	0.905	-3.413	-0.021	[0.866	0.896]	0.979	[0.833	0.938]
South Africa	0.973	-1.786	-0.747	[0.975	0.995]	0.490	[0.976	0.993]
South Korea	0.910	-3.434	-0.817	[0.892	0.950]	0.169	[0.904	0.934]
Spain	0.983	-1.775	-0.863	[0.962	0.995]	0.061	[0.972	0.984]
Sri Lanka	0.970	-0.957	-0.490	[0.984	1.000]	0.714	[0.983	1.003]
Sweden	0.964	-3.350	-0.772	[0.916	0.960]	0.259	[0.922	0.949]
Switzerland	0.987	-1.684	-0.807	[0.977	0.997]	-0.046	[0.983	0.991]
Thailand	0.959	-1.268	-0.751	[0.977	1.000]	0.271	[0.980	0.995]
Tunisia	0.941	-2.400	-0.246	[0.916	0.955]	0.908	[0.906	0.975]
Turkey	0.952	-0.747	-0.803	[0.986	1.005]	0.205	[0.989	1.000]
UK	0.975	-2.486	-0.944	[0.958	0.990]	-0.147	[0.965	0.979]
US	0.995	-1.134	-0.967	[0.986	1.004]	-0.659	[0.987	1.000]
Venezuela	0.988	-1.248	-0.591	[0.975	0.998]	0.474	[0.976	0.997]

This table presents estimates of model parameters used in computing Q-test confidence intervals. The first column contains estimation results for β_{dy} from the AR(1) in model (5). Column 2 presents DF-GLS statistic based on a test of unit root for dividend yield. Columns 3 and 6 show estimates of $\hat{\delta}_r$ and $\hat{\delta}_{dg}$, which measure the correlation between residuals in models (3) and (5) and models (4) and (5), respectively. Finally, columns 4–5 and 7–8 show confidence intervals for $\beta_{dy,r}$ and $\beta_{dy,dg}$. See step 1 of Appendix 1 for columns 3 and 6, and step 2 for the rest of the table.

Table 3: Country predictive regressions

	Return					Dividend Growth				
	β_r	R^2	$t-stat$	$\underline{\beta}_r$	$\overline{\beta}_r$	β_{dg}	R^2	$t-stat$	$\underline{\beta}_{dg}$	$\overline{\beta}_{dg}$
Country	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Argentina	-0.009	0.0032	-0.760	[-0.032	0.019]	-0.037**	0.0348	-2.539	**[-0.074**	**-0.029]**
Australia	0.042**	0.0161	2.170	[-0.035	0.021]	-0.010	0.0053	-1.332	[-0.056	0.000]
Austria	-0.006	0.0005	-0.317	[0.007	0.029]	-0.034***	0.0334	-3.721	**[-0.068**	**-0.029]**
Belgium	0.003	0.0005	0.365	[-0.024	0.009]	-0.020	0.0215	-1.848	**[-0.036**	**-0.001]**
Brazil	0.010	0.0039	0.813	[-0.025	0.028]	-0.017	0.0079	-1.061	[-0.027	0.025]
Bulgaria	0.007	0.0016	0.595	[-0.050	0.079]	-0.088**	0.0339	-2.086	[-0.091	0.011]
Canada	0.008	0.0017	0.747	[-0.009	0.013]	-0.009	0.0096	-1.411	**[-0.029**	**-0.002]**
Chile	0.044***	0.0611	2.661	[-0.013	0.054]	-0.007	0.0011	-0.494	[0.002	0.070]
China	0.057	0.0162	1.471	**[0.008**	**0.068]**	0.012	0.0024	0.557	[-0.026	0.056]
Colombia	0.025*	0.0135	1.939	**[0.0051**	**0.0824]**	-0.032	0.0104	-1.562	**[-0.071**	**-0.009]**
Croatia	0.002	0.0005	0.293	[-0.046	0.061]	-0.063**	0.0284	-2.425	[-0.074	0.003]
Czech Rep	0.025**	0.0276	2.080	[-0.001	0.076]	-0.018	0.0042	-0.931	[-0.021	0.043]
Denmark	0.006	0.0008	0.591	**[0.001**	**0.027]**	-0.015**	0.0086	-2.000	**[-0.038**	**-0.006]**
Ecuador	0.010	0.0068	1.312	[-0.022	0.089]	-0.077**	0.0341	-2.448	**[-0.084**	**-0.000]**
Egypt	-0.038	0.0186	-1.673	**[-0.083**	**-0.007]**	-0.092***	0.1195	-4.433	**[-0.153**	**-0.072]**
Finland	-0.013	0.0034	-0.810	[-0.017	0.016]	-0.035***	0.0449	-3.079	**[-0.069**	**-0.026]**
France	0.018	0.0061	1.596	**[0.003**	**0.029]**	-0.008	0.0047	-1.481	[-0.032	0.004]
Germany	0.004	0.0003	0.363	[-0.007	0.015]	-0.014**	0.0200	-2.553	**[-0.040**	**-0.009]**
Ghana	0.004	0.0023	0.434	[-0.025	0.053]	-0.037	0.0166	-1.321	**[-0.072**	**-0.028]**
Greece	-0.004	0.0002	-0.155	[-0.034	0.016]	-0.033	0.0240	-1.716	**[-0.067**	**-0.008]**
Hong Kong	0.06**	0.0248	2.424	[-0.054	0.012]	0.002	0.0002	0.233	[-0.058	0.010]
Hungary	0.034*	0.0153	1.694	[-0.017	0.074]	-0.039**	0.0155	-2.132	[-0.068	0.019]
India	0.060*	0.0162	1.742	**[0.013**	**0.063]**	0.016	0.0031	0.680	[-0.015	0.050]
Indonesia	0.056***	0.0399	2.788	[-0.029	0.047]	0.005	0.0005	0.213	[-0.006	0.067]
Ireland	0.008	0.0033	1.013	**[0.005**	**0.021]**	-0.003	0.0017	-0.845	[-0.020	0.005]
Israel	0.006	0.0013	0.481	[-0.037	0.012]	-0.022**	0.0250	-2.497	[-0.042	0.010]
Italy	-0.005	0.0004	-0.371	[-0.017	0.011]	-0.031***	0.0475	-3.732	**[-0.068**	**-0.029]**
Jamaica	0.022	0.0104	1.278	[-0.046	0.078]	-0.069**	0.0319	-1.976	[-0.055	0.062]
Japan	0.010	0.0030	1.052	**[0.001**	**0.014]**	0.003	0.0007	0.503	[-0.004	0.012]
Kenya	0.006	0.0023	0.572	[-0.030	0.039]	-0.028	0.0150	-1.553	[-0.040	0.016]
Latvia	0.011	0.0057	0.998	[-0.043	0.103]	-0.138***	0.0720	-2.757	[-0.039	0.138]
Lithuania	0.007	0.0034	0.732	[-0.027	0.066]	-0.046**	0.0174	-2.287	**[-0.075**	**-0.018]**
Luxembourg	0.012	0.0031	0.846	[-0.029	0.034]	-0.024*	0.0110	-1.647	[-0.042	0.019]
Malaysia	0.035**	0.0171	2.119	[-0.046	0.011]	-0.006	0.0026	-1.009	[-0.045	0.009]
Mexico	0.046***	0.0274	2.890	[-0.039	0.053]	-0.025*	0.0072	-1.879	[-0.017	0.077]
Morocco	0.004	0.0004	0.282	[-0.011	0.053]	-0.048**	0.0370	-2.213	**[-0.107**	**-0.051]**
Netherlands	0.006	0.0013	0.714	**[0.004**	**0.021]**	-0.008*	0.0102	-1.721	**[-0.030**	**-0.002]**
Norway	0.017	0.0036	1.135	**[0.023**	**0.060]**	-0.0298**	0.0185	-2.317	**[-0.081**	**-0.032]**
Pakistan	0.026**	0.0180	2.443	[-0.021	0.037]	-0.010	0.0037	-0.737	[-0.029	0.034]
Peru	0.002	0.0004	0.298	[-0.039	0.025]	-0.034***	0.0234	-2.638	[-0.031	0.025]
Philippine	0.003	0.0002	0.216	[-0.042	0.010]	-0.028*	0.0189	-1.697	[-0.037	0.015]
Poland	0.021	0.0095	1.327	[-0.027	0.027]	-0.005	0.0008	-0.404	[-0.021	0.033]
Portugal	-0.009	0.0023	-0.625	**[-0.124**	**-0.006]**	-0.122*	0.0968	-1.742	[-0.061	0.071]
Romania	0.002	0.0001	0.142	[-0.088	0.021]	-0.070**	0.0582	-2.513	[-0.080	0.021]
Russia	-0.010	0.0014	-0.300	[-0.080	0.014]	-0.063*	0.0387	-1.910	[-0.058	0.036]

Table 3: (continued)

Country	β_r	R^2	$t-stat$	$\underline{\beta}_r$	$\overline{\beta}_r$	β_{dg}	R^2	$t-stat$	$\underline{\beta}_{dg}$	$\overline{\beta}_{dg}$
Singapore	0.047**	0.0181	1.972	[-0.036	0.022]	-0.003	0.0004	-0.374	[-0.039	0.016]
Slovakia	0.003	0.0011	0.524	[-0.044	0.074]	-0.091**	0.0444	-2.293	**[-0.165**	**-0.118]**
South Africa	0.017	0.0069	1.328	[-0.013	0.026]	-0.015	0.0087	-2.920	[-0.035	0.008]
South Korea	0.041	0.0083	1.543	[-0.007	0.068]	-0.050***	0.0347	-1.508	**[-0.125**	**-0.031]**
Spain	0.008	0.0014	0.594	**[0.005**	**0.030]**	-0.013	0.0149	-1.617	**[-0.043**	**-0.003]**
Sri Lanka	0.011	0.0046	1.090	[-0.028	0.027]	-0.023	0.0123	-1.461	[-0.028	0.025]
Sweden	0.017	0.0035	0.863	**[0.039**	**0.064]**	-0.022*	0.0142	-1.754	**[-0.068**	**-0.021]**
Switzerland	0.000	0.0000	-0.030	[-0.008	0.013]	-0.015***	0.0167	-2.721	**[-0.035**	**-0.007]**
Thailand	0.04**	0.0207	2.496	[-0.024	0.038]	-0.003	0.0002	-0.239	[-0.025	0.039]
Tunisia	0.010	0.0053	1.019	[-0.017	0.074]	-0.049*	0.0234	-1.691	**[-0.091**	**-0.034]**
Turkey	0.059***	0.0432	3.338	[-0.032	0.039]	0.007	0.0018	0.738	[-0.010	0.057]
UK	0.039*	0.0246	1.920	**[0.0310**	**0.0535]**	0.010***	0.0152	2.758	**[0.009**	**0.049]**
US	0.010	0.0048	1.601	**[0.005**	**0.016]**	0.001	0.0008	0.591	[-0.002	0.013]
Venezuela	0.008	0.0031	0.780	[-0.004	0.027]	-0.008	0.0034	-0.972	[-0.028	0.005]

This table presents estimates for return and dividend growth predictability in models (3) and (4). Columns 1–3 and 6–8 show Newey-West (3 lags) estimates with their associated t-statistics and R-squares. Columns 4–5 and 9–10 show the Bonferroni Q-confidence intervals, where bold refers to statistical significance at 5%. $\underline{\beta}_r$ and $\underline{\beta}_{dg}$ correspond to $\underline{\beta}_r(\overline{\beta}_{dy})$ and $\underline{\beta}_{dg}(\overline{\beta}_{dy})$ in step 3 of Appendix 1 ($\overline{\beta}_r$ and $\overline{\beta}_{dg}$ are the upper bound of the confidence interval). ***, ** and * correspond to statistical significance at the 1%, 5% and 10% levels, respectively.

Table 4: Country-level long-run coefficients

	Implied ρ_{imp}			Computed ρ		
Country	ρ_{imp}	β_r^l	β_{dg}^l	ρ	β_r^l	β_{dg}^l
Argentina	0.997	-0.330	-1.330	0.972	-0.178	-0.717
Australia	0.996	0.815	-0.185	0.983	0.656	-0.149
Austria	0.997	-0.216	-1.216	0.882	-0.043	-0.244
Belgium	0.996	0.142	-0.858	0.977	0.080	-0.484
Brazil	0.997	0.372	-0.628	0.966	0.175	-0.296
Bulgaria	1.000	0.077	-0.923	0.725	0.021	-0.258
Canada	0.997	0.461	-0.539	0.954	0.129	-0.151
Chile	0.995	0.871	-0.129	0.972	0.605	-0.089
China	0.998	1.276	0.276	0.819	0.263	0.057
Colombia	0.998	0.441	-0.559	0.942	0.229	-0.290
Croatia	1.000	0.031	-0.969	0.895	0.012	-0.386
Czech Rep	0.997	0.583	-0.417	0.983	0.446	-0.319
Denmark	0.997	0.285	-0.715	0.876	0.044	-0.111
Ecuador	0.999	0.111	-0.889	0.983	0.095	-0.764
Egypt	0.995	-0.701	-1.701	0.991	-0.661	-1.604
Finland	0.997	-0.591	-1.591	0.950	-0.193	-0.521
France	0.996	0.702	-0.298	0.977	0.408	-0.173
Germany	0.997	0.211	-0.789	0.935	0.049	-0.185
Ghana	1.000	0.092	-0.908	0.969	0.053	-0.526
Greece	0.997	-0.133	-1.133	0.944	-0.048	-0.406
Hong Kong	0.996	1.035	0.035	0.974	0.762	0.026
Hungary	0.997	0.460	-0.540	0.954	0.300	-0.351
India	0.998	1.366	0.366	0.804	0.262	0.070
Indonesia	0.998	1.104	0.104	0.895	0.376	0.035
Ireland	0.996	0.712	-0.288	0.979	0.292	-0.118
Israel	0.997	0.212	-0.788	0.956	0.089	-0.331
Italy	0.996	-0.187	-1.187	0.950	-0.069	-0.441
Jamaica	0.998	0.242	-0.758	0.994	0.232	-0.727
Japan	0.998	1.345	0.345	0.793	0.049	0.012
Kenya	0.996	0.179	-0.821	0.998	0.188	-0.862
Latvia	1.001	0.073	-0.927	0.824	0.036	-0.462
Lithuania	1.000	0.133	-0.867	0.866	0.039	-0.256
Luxembourg	0.997	0.322	-0.678	0.931	0.116	-0.245
Malaysia	0.998	0.847	-0.153	0.946	0.384	-0.069
Mexico	0.998	0.639	-0.361	0.878	0.250	-0.141

Table 4: (continued)

Country	ρ_{imp}	β_r^l	β_{dg}^l	ρ	β_r^l	β_{dg}^l
Morocco	0.996	0.075	-0.925	0.967	0.049	-0.603
Netherlands	0.996	0.431	-0.569	0.985	0.246	-0.325
Norway	0.998	0.365	-0.635	0.938	0.164	-0.286
Pakistan	0.997	0.730	-0.270	0.992	0.646	-0.239
Peru	0.996	0.063	-0.937	0.965	0.035	-0.515
Philippine	0.998	0.083	-0.917	0.818	0.013	-0.140
Poland	0.997	0.794	-0.206	0.902	0.175	-0.045
Portugal	0.996	-0.076	-1.076	0.967	-0.062	-0.877
Romania	0.995	0.025	-0.975	0.988	0.022	-0.893
Russia	0.998	-0.176	-1.176	0.869	-0.054	-0.360
Singapore	0.997	0.937	-0.063	0.934	0.426	-0.028
Slovakia	1.000	0.031	-0.969	0.993	0.029	-0.908
South Africa	0.995	0.538	-0.462	0.982	0.380	-0.327
South Korea	0.998	0.451	-0.549	0.849	0.182	-0.222
Spain	0.996	0.373	-0.627	0.971	0.167	-0.281
Sri Lanka	0.996	0.329	-0.671	0.961	0.163	-0.333
Sweden	0.997	0.427	-0.573	0.937	0.173	-0.232
Switzerland	0.997	-0.021	-1.021	0.903	-0.003	-0.146
Thailand	0.998	0.935	-0.065	0.957	0.490	-0.034
Tunisia	0.998	0.170	-0.830	0.963	0.110	-0.536
Turkey	0.996	1.137	0.137	0.972	0.792	0.096
UK	0.996	1.359	0.359	0.985	0.995	0.263
US	0.997	1.158	0.158	0.951	0.178	0.024
Venezuela	0.996	0.512	-0.488	0.994	0.452	-0.432

This table presents country-level long-run coefficients based on equations (6) and (7). In columns 2–4 I use ρ_{imp}, which is the value implied from the identity in (6). Columns 5–7 I present long-run coefficients using ρ from equation (10).

Table 5: Country level predictability and investor protection regression

	R^2_r	R^2_r	R^2_{dg}	R^2_{dg}	$\beta^l_{r,imp}$	$\beta^l_{r,imp}$	β^l_r	β^l_r
Governance Quality Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Anti-self-dealing	0.019***		-0.028**		1.163***		0.514***	
	(0.007)		(0.013)		(0.254)		(0.165)	
Anti-director rights		0.002*		-0.004*		0.125*		0.062**
		(0.001)		(0.002)		(0.070)		(0.030)
Public enforcement	0.003	0.001	0.001	0.004	0.015	-0.086	0.029	-0.016
	(0.004)	(0.004)	(0.008)	(0.007)	(0.154)	(0.154)	(0.086)	(0.085)
Corruption Index	-0.003**	-0.003**	-0.002	-0.002	-0.033	-0.028	-0.034	-0.031
	(0.001)	(0.002)	(0.003)	(0.003)	(0.071)	(0.077)	(0.039)	(0.041)
Market capitalisation to GDP	0.003	0.006**	-0.006*	-0.009***	-0.010	0.126	0.063	0.122**
	(0.002)	(0.003)	(0.004)	(0.003)	(0.092)	(0.097)	(0.056)	(0.052)
Listed to population	-0.006**	-0.005*	0.013**	0.013***	-0.211**	-0.161*	-0.083*	-0.065
	(0.003)	(0.003)	(0.005)	(0.005)	(0.095)	(0.095)	(0.049)	(0.053)
Turnover to GDP	-0.000	-0.001	0.004	0.006	0.179	0.111	0.063	0.031
	(0.004)	(0.004)	(0.008)	(0.008)	(0.131)	(0.159)	(0.071)	(0.078)
Constant	0.001	0.001	0.033***	0.035***	-0.118	-0.056	-0.079	-0.070
	(0.003)	(0.004)	(0.009)	(0.011)	(0.147)	(0.254)	(0.102)	(0.119)
Observations	59	59	59	59	59	59	59	59
R-squared	0.180	0.117	0.161	0.131	0.324	0.152	0.255	0.158

This table presents pooled country level regression, where the dependent variables measure predictability for each country over the sample period. In columns 1 and 2, the dependent variable is R^2_r based on equation (3). In columns 3 and 4, the dependent variable is R^2_{dg} based on equation (4). $\beta^l_{r,imp}$ is the dependent variable in columns 5 and 6 and is computed using the implied value of ρ from equation (7). β^l_r is the dependent variable in the last two columns and is computed using ρ based on equation (8). The explanatory variables are various measures of investor protection as defined in Section 3. The variables market capitalisation to GDP, listed to population and turnover to GDP are scaled by 100 for ease of readability. Estimation is done using white standard errors. ***, ** and * correspond to statistical significance at the 1%, 5% and 10%, respectively.

Table 6: Institutional clusters

Panel A: Institutional Variables	Cluster 1	Cluster 2	Cluster 3
Anti-Self-Dealing	0.38	0.41	0.78
Anti-director rights	3.13	3.50	4.50
Public Enforcement	0.31	0.83	0.25
Rule of Law	-0.20	1.44	1.34
Corruption	-0.22	1.52	1.58
Market capitalization to GDP	27.42	78.97	154.57
Number of listed firms to population	17.95	35.22	46.87
Value of stock traded to GDP	18.06	49.93	68.44
Panel B: Test of Differences in mean	**C1 Vs C2**	**C2 Vs C3**	**C3 Vs C1**
Anti-Self-Dealing	0.688	0.000	0.000
Anti-director right	0.233	0.003	0.001
Public Enforcement	0.000	0.000	0.708
Rule of Law	0.000	0.639	0.000
Corruption	0.000	0.831	0.000
Mkt cap to GDP	0.000	0.008	0.000
Number listed firms to GDP	0.147	0.393	0.071
Stock traded to GDP	0.004	0.365	0.000
Panel C: Cluster membership of countries	**Cluster 1**	**Cluster 2**	**Cluster 3**
Countries per cluster	Argentina (CM) Brazil (CD) Bulgaria (CD) China (CD) Colombia (CD) Croatia (CD) Ecuador (CD) Egypt (CD) Ghana (CM) Greece (CD) Hungary (CD) India (CM) Indonesia (CD) Italy (CD) Jamaica (CM) Kenya (CM) Lithuania (CD) Mexico (CD) Morocco (CD) Pakistan (CM) Peru (CD) Philippines (CD) Poland (CD) Romania (CD) Russia (CD) Slovak Rep. (CD) Sri Lanka (CM) Thailand (CM) Tunisia (CD) Turkey (CD) Venezuela (CD)	Austria (CD) Belgium (CM) Canada (CM) Chile (CD) Czech Rep. (CD) Denmark (CD) France (CD) Germany (CD) Israel (CM) Latvia (CD) Luxembourg (CD) Netherlands (CD) Norway (CD) Portugal (CD) Korea (Rep.) (CD) Spain (CD) Sweden (CD) Switzerland (CD)	Australia (CM) Finland (CD) Hong Kong (CM) Ireland (CM) Japan (CD) Malaysia (CM) Singapore (CM) South Africa (CM) United Kingdom (CM) United States (CM)

This table presents information on cluster composition. Each cluster represents a group of countries with similar governance quality. I use measures of investor protection, legal system quality and financial market importance simultaneously to cluster the countries. Panel A presents means of governance indices by cluster. Panel B provides p-values for test of differences in means, for every index, between clusters. Panel C lists the countries within each cluster, and the initials (CD) and (CM) refer to code law (common law) legal systems. All the governance quality measures are standardised to their z-scores. All the measures of governance quality used are as of year 2003.

Table 7: Portfolio predictive regression (Newey-West)

	Return			Dividend Growth			Dividend Yield	Long-run Coefficients		
Panel A: Full Sample	β_r	$t-stat$	R^2	β_{dg}	$t-stat$	R^2	β_{dy}	β_r^l	β_{dg}^l	ρ_{imp}
Cluster 1										
Equal Weight	0.016	0.615	0.001	**-0.074****	-2.486	0.010	0.957	0.179	-0.821	0.951
Value Weight	0.026	0.965	0.001	0.009	0.417	0.000	0.966	1.498	0.498	1.018
Cluster 2										
Equal Weight	-0.002	-0.251	0.000	**-0.024*****	-3.133	0.021	0.981	-0.111	-1.111	0.997
Value Weight	0.000	0.036	0.000	**-0.014****	-2.508	0.013	0.988	0.023	-0.977	0.997
Cluster 3										
Equal Weight	0.013	1.248	0.005	-0.008	-1.471	0.005	0.983	0.631	-0.369	0.996
Value Weight	0.008	0.804	0.002	-0.003	-0.507	0.001	0.992	0.699	-0.301	0.997
Panel B: 2003-2013	β_r	$t-stat$	R^2	β_{dg}	$t-stat$	R^2	β_{dy}	β_r^l	β_{dg}^l	ρ_{imp}
Cluster 1										
Equal Weight	0.026	0.409	0.001	**-0.101*****	-2.649	0.055	0.939	0.205	-0.795	0.931
Value Weight	0.088	1.112	0.010	-0.035	-0.537	0.004	0.956	0.715	-0.285	0.918
Cluster 2										
Equal Weight	-0.021	-0.647	0.005	**-0.053*****	-3.870	0.088	0.971	-0.658	-1.658	0.997
Value Weight	-0.028	-0.709	0.008	**-0.062*****	-4.445	0.094	0.969	-0.827	-1.827	0.997
Cluster 3										
Equal Weight	-0.022	-0.339	0.004	**-0.062*****	-4.542	0.139	0.962	-0.530	-1.530	0.997
Value Weight	-0.025	-0.400	0.004	**-0.054****	-2.332	0.086	0.969	-0.845	-1.845	1.002

This table presents portfolio predictive regression results using Newey-West (3 lags). Panel A shows results based on the full sample, and Panel B shows results using the period 2003-2013 as a sub-sample. I report estimates of β_r, β_{dg} and their associated t-statistics and R^2 are reported in the first six columns. The seventh column presents the autoregressive coefficient β_{dy} from equation (5). The last three columns present long-run coefficients using ρ_{imp}. ***, ** and * correspond to statistical significance at the 1%, 5% and 10%, respectively.

Table 8: Portfolio predictive regression Bonferroni Q-confidence intervals

	Return				Dividend Growth			
	$\delta_{r,dy}$	DF-GLS	$\underline{\beta}_r$	$\overline{\beta}_r$	$\delta_{dg,dy}$	DF-GLS	$\underline{\beta}_{dg}$	$\overline{\beta}_{dg}$
Panel A: Full Sample								
Cluster 1								
Equal Weight	-0.351	-3.110	[-0.017	0.034]	**-0.155**	-3.110	**[-0.056**	**-0.004]**
Value Weight	-0.367	-3.288	[-0.002	0.040]	**-0.116**	-3.288	[-0.022	0.023]
Cluster 2								
Equal Weight	-0.632	-2.162	[-0.012	0.016]	**-0.418**	-2.162	**[-0.055**	**-0.010]**
Value Weight	-0.742	-2.007	**[0.001**	**0.019]**	**-0.131**	-2.007	**[-0.032**	**-0.006]**
Cluster 3								
Equal Weight	-0.808	-1.524	[-0.007	0.020]	**-0.252**	-1.524	[-0.028	0.005]
Value Weight	-0.573	-1.530	**[0.000**	**0.019]**	**-0.086**	-1.530	[-0.014	0.007]
Panel B: 2003-2013								
Cluster 1								
Equal Weight	-0.548	-2.256	[-0.007	0.089]	**-0.129**	-2.256	**[-0.146**	**-0.030]**
Value Weight	-0.537	-2.024	**[0.017**	**0.098]**	**-0.035**	-2.024	[-0.070	0.030]
Cluster 2								
Equal Weight	-0.800	-1.702	[-0.009	0.043]	**-0.062**	-1.702	**[-0.116**	**-0.035]**
Value Weight	-0.786	-1.805	[-0.009	0.044]	-0.010	-1.805	**[-0.122**	**-0.037]**
Cluster 3								
Equal Weight	-0.884	-2.197	[0.032	0.071]	-0.141	-2.197	**[-0.145**	**-0.054]**
Value Weight	-0.839	-1.836	[0.004	0.052]	-0.308	-1.836	**[-0.096**	**-0.019]**

This table presents portfolio estimates of the Bonferroni Q-confidence intervals. The first four columns report estimates of the correlation coefficient between residuals from equations (3) and (5) $\hat{\delta}_{r,dy}$, DF-GLS statistics and Q-confidence interval $[\underline{\beta}_r, \overline{\beta}_r]$ for portfolio returns. The last four columns report estimates of the correlation coefficient between residuals from equations (4) and (5) $\hat{\delta}_{dg,dy}$, DF-GLS statistics and Q-confidence interval $[\underline{\beta}_{dg}, \overline{\beta}_{dg}]$ for portfolio dividend growth. Confidence intervals in bold indicate statistical significance at 5%. Panel A shows results for the full sample and Panel B show results for the sub-sample period 2003–2013.

Appendix 1

1 The Bonferroni Q-test

1.1 Step 1: Innovation Correlation

In general, the local-to-unity framework assumes that the largest autoregressive root in (5) is modelled as:

$$\beta_{dy} = 1 + \frac{c}{T}$$

where c is a fixed constant and β_{dy} is close to one when $c < 0$.

The estimated β from (3) and (4) is defined as:

$$\beta(\beta_{dy}) = \frac{\sum_{t=0}^{T-1} dy_t^{\mu}[y_{t+1} - \hat{\sigma}_{ue}(dy_{t+1} - \beta_{dy} dy_t)]}{\sum_{t=0}^{T-1} dy_t^{\mu 2}}$$

where y is either return or dividend growth, dy is dividend yield, and the superscript μ refers to demeaned series of the predictor variable. $\hat{\sigma}_{ue}$ is the covariance of the residuals from either return or dividend growth and dividend yield regressions.

Assume we use the system of equations (3)–(5), where the regressor, dividend yield, is modelled as an $AR(1)$ process. After running each regression in the system separately using OLS, we can extract the residuals and compute their variances and covariances as follow:

$$\hat{\sigma}_u^2 = \frac{1}{T-2} \sum_{t=1}^{T} \hat{u}_t^2$$

$$\hat{\sigma}_v^2 = \frac{1}{T-2} \sum_{t=1}^{T} \hat{v}_t^2$$

$$\hat{\sigma}_e^2 = \frac{1}{T-2} \sum_{t=1}^{T} \hat{e}_t^2$$

$$\hat{\sigma}_{ue} = \frac{1}{T-2} \sum_{t=1}^{T} \hat{u}_t \hat{e}_t$$

$$\hat{\sigma}_{ve} = \frac{1}{T-2}\sum_{t=1}^{T}\hat{v}_t\hat{e}_t$$

The correlation coefficient between the residuals from (3) and (5) is:

$$\hat{\delta}_r = \frac{\hat{\sigma}_{ue}}{\hat{\sigma}_u\hat{\sigma}_e}$$

The correlation coefficient between the residuals from (4) and (5) is:

$$\hat{\delta}_{dg} = \frac{\hat{\sigma}_{ve}}{\hat{\sigma}_v\hat{\sigma}_e}$$

The correlation coefficient is assumed to be negative. In case the correlation between the innovations is positive, following Campbell and Yogo (2006) I redefine the predictor variable as $-(d_t - p_t)$, which flips the signs on both the β and δ. After getting the appropriate confidence intervals, I flip back the signs of β and δ and the ensuing confidence intervals.

1.2 Step 2: Confidence intervals for c and β_{dy}

In order to compute the confidence intervals for β_{dy}, which will be used later to define confidence intervals for β_r and β_{dg}, we first compute the confidence interval for c. As mentioned in Campbell and Yogo (2006), the idea is to test the data for unit root and use the distribution of that unit root test statistic under the alternative to construct confidence intervals for c. The test used is DF-GLS, where $c = 7$ and $\beta_{dy,gls} = 1 - \frac{7}{T}$ [1]

The DF-GLS procedure is carried as follow:

Define $x = d_{t+1} - p_{t+1}$ from (5):

$A = [x_0, x_1 - \beta_{dy,gls}x_0, ..., x_T - \beta_{dy,gls}x_{T-1}]'$ and $B = [1, 1 - \beta_{dy,gls}, ..., 1 - \beta_{dy,gls}]'$

Regress A onto B in order to get the coefficient μ_{gls}, which will be used to demean the original series x.

Define $\overline{x}_t = x_t - \mu_{gls}$. Run the following regression without a constant:

$$\Delta\overline{x}_t = \theta\overline{x}_{t-1} + \epsilon_t$$

[1] Recall that the local-to-unity framework assumes that the largest autoregressive root in (**??**) is modelled as $\beta_{dy} = 1 + \frac{c}{T}$

The t-statistic associated with θ is the DF-GLS statistic.

Using the DF-GLS statistic and the estimated correlation coefficient $\hat{\delta}_r$ or $\hat{\delta}_{dg}$, I use Tables 2–11 in Campbell and Yogo (2005) to find the appropriate confidence interval for c, i.e. $[\underline{c}, \overline{c}]$ from which I can compute the confidence interval for β_{dy} as:

$$[\underline{\beta}_{dy}, \overline{\beta}_{dy}] = [1 + \frac{\underline{c}}{T}, 1 + \frac{\overline{c}}{T}]$$

When searching the grid in Tables 2–11, I use a linear interpolation in order to get more accurate results. In the text I distinguish between confidence intervals for returns and dividend growth using $\beta_{dy,r}$ and $\beta_{dy,dg}$, respectively.

1.3 Step 3: Confidence intervals for β_r and β_d

In order to compute the confidence intervals for β_r and β_d, I proceed as follows.

Define the new return series as:

$$\overline{r}_{t+1} = r_{t+1} - (\frac{\hat{\sigma}_{ue}}{\hat{\sigma}_e^2}) \times (x_t - \underline{\beta}_{dy} x_{t-1})$$

Regress $\overline{r}_{t+1}$ onto x_{t-1} using OLS. The confidence intervals for $\hat{\beta}_r$ conditional on $\underline{\beta}_{dy}$ are:

$$\underline{\beta}_r(\underline{\beta}_{dy}) = \sqrt{\frac{\hat{\sigma}_e^2}{\hat{\sigma}_u^2}} \times (\hat{\beta}_r + \gamma - 1.96 \times ((1 - (\hat{\delta}_r^2)^{0.5}) \times SE(\hat{\beta}_r))$$

$$\overline{\beta}_r(\underline{\beta}_{dy}) = \sqrt{\frac{\hat{\sigma}_e^2}{\hat{\sigma}_u^2}} \times (\hat{\beta}_r + \gamma + 1.96 \times ((1 - (\hat{\delta}_r^2)^{0.5}) \times SE(\hat{\beta}_r))$$

where:

$$\gamma = (\frac{T-2}{2}) \times (\frac{\hat{\sigma}_{ue}}{\hat{\sigma}_e^2}) \times (\frac{\hat{\sigma}_e^2}{MSE_e} - 1) \times (SE(\hat{\beta}_r))^2$$

MSE_e is the mean standard error for residuals in equation (5). Similarly, the confidence intervals for $\hat{\beta}_r$ conditional on $\overline{\beta}_{dy}$ are computed by using the upper bound of the confidence interval for β_{dy}. The same procedure is used when dividend growth is the dependent variable. The 90% Bonferroni confidence interval goes from the upper bound of β_{dy} to the lower bound of β_{dy}, i.e. $[\underline{\beta}(\overline{\beta}_{dy}), \overline{\beta}(\underline{\beta}_{dy})]$ and corresponds to a two-sided 5% test of the null hypothesis that $\beta_r = 0$.

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