Say on Pay Design, Executive Pay, and Board Dependence*

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Abstract:

I study the impact of "say on pay" (SoP) on the compensation decisions and the structure of the board of directors (BoD) in a setting where the CEO has the real authority over the composition of the BoD. The CEO's authority arises endogenously from an informational advantage about individual board members' contribution to firm value and allows her to establish a dependent BoD. Shareholders approve the CEO's director slate because they can only control the level of board dependence but not the board's contribution to firm value. In this setting, SoP has two effects. On the one hand, it prompts a BoD with a given dependence level to reduce the CEO's bonus. On the other hand, it allows the CEO to extract the rent generated by the improved compensation policy and to establish a more dependent BoD. In equilibrium the board becomes more dependent from the CEO and pays her a higher bonus for the same performance. This outcome can only be avoided if the CEO is restricted in her ability to adjust the board composition. Motivated by existing differences in SoP design, I also analyze the consequences of a binding and a pre-contractual vote. I find that a binding vote creates a moral hazard problem on the part of the firm's shareholders if the vote takes place after the agent has supplied her effort. Its consequences critically depend on the legal protection standard of the CEO. Whenever the shareholders can enforce a retroactive bonus cut, the allowable amount of the bonus reduction determines whether or not SoP improves the efficiency of the pay process or diminishes firm value. I show that the moral hazard problem can be avoided by a pre-contractual vote. If the vote is binding, SoP can improve the efficiency of the compensation arrangement and effectively reduce the equilibrium level of board dependence without impairing the CEO's effort incentives.

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JEL Classification: G34, G38, K22, M12, M48.

1 Introduction

1.1 Motivation and overview of main results

In an attempt to improve the compensation practice in publicly listed firms, the U.S. as well as several European countries have recently introduced shareholder votes on the compensation of executives, also referred to as “say on pay” (henceforth SoP). According to its proponents, SoP is thought to facilitate the communication between shareholders and the board of directors (henceforth BoD) on compensation issues and to strengthen the BoD’s responsibility towards its shareholders.[1] By this means SoP should ideally make the compensation policy of public firms less dependent from the interests of their executives and discourage the use of pay practices that are not in the best interest of shareholders.

Since inefficient compensation arrangements such as a poor link between pay and performance and excessive compensation levels seem to be more pronounced in firms with weak governance structures, SoP can be expected to be most effective in firms where the CEO has some power over the board of directors.[2] In this paper, I show that this view might be wrong and that SoP can have exactly the opposite consequences. Namely, SoP can reduce the efficiency of compensation contracts, aggravate existing governance problems, and diminish shareholder value. I demonstrate these problems in the context of an agency model with three risk neutral players: the CEO, the BoD, and the firm’s shareholders. The CEO must be motivated to exert productive effort in order to increase the firm’s profit. An agency problem arises because she is protected by limited liability.

The decision on the agent’s compensation contract is in the hands of the BoD. Its composition is determined as the equilibrium of a non-cooperative game between the CEO and the firm’s shareholders. The CEO can use her influence to propose a director slate that must be approved by the firm’s shareholders. Potential board members differ in their ability to contribute to firm value and their dependence from the CEO. The degree of independence is common knowledge but only the CEO can evaluate the potential contributions of individual board members. This informational advantage is the source of the CEO’s power over

1 See e.g. European Commission (2004) or Gordon (2009, p.337) who defines the role of SoP as ”*to buttress boards independence-in-fact by making them more accountable.*”

2 See e.g. Bebchuk and Fried (2003, 2004), or Bertrand and Mullainathan (2000, 2001). A critical discusssion of executive compensation pratices in the U.S. can be found in Kaplan (2008) and Bogle (2008).

the BoD. It allows her to combine the two qualities of board members in a manner that makes a dependent BoD attractive to shareholders. Due to the lack of information on the contribution of individual board members, shareholders cannot implement an efficient board structure but only threaten to establish an independent BoD with an expected contribution of zero.

The key variable in the model is the level of board dependence. The CEO is interested in a more dependent BoD because it partly considers her utility in designing the compensation contract and offers her a higher bonus for a given performance. To make a dependent BoD acceptable to shareholders, the CEO composes the BoD so that its contribution to firm value is positively related to the level of board dependence. Faced with the trade-off between an increasing contribution to firm value and higher compensation cost, shareholders accept a dependent board. The equilibrium level of board dependence is determined by the point where the shareholders attain the same utility as with their outside option of replacing the CEO's director slate with an independent BoD.

In this setting, the introduction of a vote on the CEO's compensation has a direct and an indirect effect. First, a BoD with a given dependence level reduces the CEO's bonus for a given firm performance. It does so because the board members derive a disutility from a negative shareholder vote and the shareholders' voting dissent is increasing in the agent's compensation. Second, since the CEO has the real authority over the composition of the BoD and the shareholders face the same outside option, she can extract the rent generated by the improved compensation policy and establish a more dependent BoD. As a matter of fact the board becomes more dependent from the CEO and pays her a higher compensation for the same level of performance. This outcome can only be avoided if the CEO is restricted in her ability to adjust the board composition.

The standard SoP model used in the U.S. and the U.K. gives shareholders an advisory vote on the CEO's compensation after the firm's result are realized. As explained in more detail in section 1.2, there are important international differences in SoP design, especially regarding its enforceability and its timing. To analyze how changes of the basic SoP model affect the compensation decisions of the BoD and the level of board dependence, I provide two extensions of my basic model. First, I examine the consequences of a binding SoP and second, I analyze the impact of a pre-contractual vote.

I find that a binding vote creates a moral hazard problem on the part of the firm's shareholders if the timing of the standard model is maintained. Since the vote takes place after the agent has supplied her effort, shareholders have an incentive to refuse the CEO's bonus payment. A rational CEO anticipates the threat of an expropriation by the firm's shareholders and adjusts her effort accordingly. As a matter of fact the consequences of a binding SoP critically depend on the legal protection standard of the CEO. If shareholders cannot impair existing contractual arrangement between the BoD and the CEO, a binding SoP offers no advantage over an advisory vote. If the shareholders can only enforce moderate bonus cuts, a binding SoP can improve the efficiency of the pay setting process and limit the equilibrium level of board dependence. However, if all bonus payments are subject to shareholder approval, the threat of a retroactive pay cut completely destroys the agent's effort incentives and diminishes firm value.

The moral hazard problem can be avoided if the vote on the compensation takes place before the BoD signs the compensation contract with the agent. If the pre-contractual vote is advisory, the change of the timing has not much impact on the equilibrium of the game except for a weakly higher voting dissent. If the pre-contractual vote is binding, shareholders can force the BoD to improve the efficiency of the compensation arrangement and effectively reduce the equilibrium level of board dependence. Since the vote takes place before the contract is signed, these effects are not caused by a moral hazard problem but by the requirement to find the shareholders' majority support for the SoP proposal.

These findings suggest that SoP design can have a significant impact not only on the equilibrium degree of board dependence and the level of executive compensation but also on the utilities of the players. On these grounds the enforceability and the timing of SoP are also critical for its ability to improve the pay setting process in weakly governed firms and to contribute to shareholder value. The standard approach of an advisory SoP usually leaves the shareholders' utility unaffected and can only add to shareholder value if the CEO is restricted in her ability to extract the surplus. By contrast, the consequences of a post-contractual binding SoP critically depend on the legal protection standard of the CEO. There are conditions under which shareholders strictly benefit from a binding SoP but there is also a minimum protection standard below which a binding SoP diminishes firm value. This risk is usually excluded with a pre-contractual vote but it is not guaranteed that shareholders strictly benefit from such a step. If the vote is advisory, the shareholders typically attain the same utility as with a post-contractual SoP. If the vote is binding, shareholders attain a higher utility whenever the compensation paid with an advisory vote is not supported by the majority of shareholders.

The rest of the paper is organized as follows. The next subsection provides an overview of the institutional background and a review of the related literature. Section 2 explains the model assumptions and the structure of the multi-stage game. Section 3 derives the optimal contract and the equilibrium board structure in the absence of SoP. Section 4 analyzes the impact of the standard advisory SoP model on the equilibrium of the multi-stage-game. Section 5 extends the analysis and examines first the consequences of a binding SoP, second the impact of a pre-contractual vote, and third the implications of SoP design for regulatory policy. Section 6 concludes the analysis with a summary of the main results and some suggestions for further research.

1.2 Institutional background and related literature

The first SoP legislation was introduced in 2002 in the U.K. where listed firms are required to submit an annual remuneration report to an advisory vote at the annual shareholder meeting.[3] The U.S. introduced a similar regulation with the Dodd-Franck Act in 2010. Starting with the 2011 reporting season, it asks public firms in the U.S. to provide shareholders at least every three years with the opportunity to give a non-binding vote on the compensation of the executives for which the compensation must be disclosed in the firm's proxy statements.[4]

In recent years, several European countries adopted similar rules. According to a report of the European Commission (2010), a total of 19 out of the 27 member states of the European Union have either introduced mandatory legal provisions or at least recommendations in their local corporate governance codes requiring shareholder votes on the remuneration of executives. The report shows important disparities not only concerning the legal basis but also with respect to the practical implementation of SoP, most importantly with regard to the enforceability, the subject and the timing of the shareholder vote.

Different from the Anglo-Saxon model of an advisory SoP, the majority of European SoP adopters has actually introduced binding shareholder votes.[5] Moreover, a substantial

3 See The Directors Remuneration Report Regulations (2002) for details.

4 See Larcker et al (2012) for a detailed record of the SoP legislation in the U.S. and Glass, Lewis & Co. (2011) for a report on the voting results in the first proxy season.

5 In fact, 13 out of the 19 SoP adopters within Europe require a binding shareholder vote. Only 4 countries

fraction of the newly introduced voting rights do not refer to the annual compensation report but to the firm's compensation policy or to the actual remuneration of executives. For example, countries such as the Netherlands and Sweden have adopted a binding SoP vote on the firms' compensation systems, whereas Switzerland is confronted with a public voting initiative proposing a binding vote on the actual compensation of executives.[6] Since votes on the compensation policy apply to future compensation arrangements and not to the compensation paid out during the current reporting period, the different subject of the vote also implies a different timing. These observations suggest that there is no unique approach to SoP and underscore the relevance of a better understanding of the economic incentives generated by different SoP designs.[7]

Due to the fact that SoP is a relatively recent phenomenon, the economic literature on the topic is limited. There are a couple of empirical studies that analyze the relation between advisory SoP and executive pay using data from the U.K.[8] These analyses suggest that higher compensation levels trigger a higher voting dissent on the part of shareholders, but they provide mixed results on the consequences of a negative shareholder vote. Alissa (2009) finds that a high voting dissent seems to curb extreme cases of excess compensation. Both, Carter and Zamora (2009) and Ferri and Maber (2012) find a positive relation between voting dissent and the pay-for-performance-sensitivity in later periods, particularly in the case of poor performance.

Ferri and Maber (2012) also find that a high voting dissent seems to motivate boards to remove controversial provisions from compensation contracts. They report further that firms often adjust contracts before the advisory SoP is conducted in order to avoid a disapproval of questionable compensation arrangements by shareholders. Larcker et al. (2012) make similar observations for the U.S. but they attribute the changes in firms' compensation programs to the threat of receiving a negative voting recommendation from one of the major proxy

rely on a pure advisory vote and 2 countries allow for both types of votes, see European Commission (2010) for details.

6 See European Commission (2010). Wagner and Wenk (2011) as well as Economist (2007) provide a detailed account of the legislative process in Switzerland.

7 Gordon (2009, p. 337) classsifies the available design options along *"....four binary choices: (1) 'before' versus 'after', (2) 'binding' versus 'advisory', (3) 'general' versus 'specific' compensation plans, and (4) 'mandatory' versus 'firm-optional'."*

8 See Alissa (2009), Carter and Zamora (2009), Conyon and Sadler (2010) as well as Ferri and Maber (2012). A recent survey of the the SoP literature is provided by Göx and Kunz (2012).

advisor firms. Moreover, the study of Larcker et al. (2012) suggests that the changes in firms' compensation programs induced by SoP are associated with a negative stock market reaction and conclude that the voting recommendations of proxy advisors can trigger compensation policies that diminish firm value.

Unlike other empirical studies, Conyon and Sadler (2010) do not find any evidence for the hypotheses that a negative shareholder vote affects the compensation structure or reduces the overall level of executive pay. Moreover, consistent with the results of the theoretical analysis in section 4, they even find a weak positive relation between voting dissent and total CEO compensation. This observation is confirmed in a laboratory experiment conducted by Göx et al. (2010). In this study, shareholders face the problem of motivating a risky investment decision of a CEO who has partial control over the terms of her own incentive compensation. The experiment analyzes the effectiveness of post-contractual SoP in solving the resulting trade-off between rent extraction and goal congruent project selection. As long as SoP is advisory, it motivates higher rent extraction by the CEO but does not affect the CEO's investment incentives as compared to a world without SoP.

Göx et al. (2010) also show that a post-contractual binding SoP provides shareholders with an effective instrument to control the agent's compensation but that it destroys the agent's investment incentives and thereby significantly reduces the firm's profit. These findings are consistent with the predictions regarding the impact of a post-contractual binding SoP in the absence of legal protection standards for the CEO. Empirical support for the potential risks associated with this SoP method is provided by Wagner and Wenk (2011). These authors analyze the reaction of capital market participants to the announcement of a public voting initiative proposing a post-contractual binding SoP for listed firms in Switzerland. They find abnormal negative price reactions for two thirds of the firms in their sample suggesting that shareholders understand the fundamental problems associated with a post-contractual binding SoP.[9]

This paper contributes to the literature by providing the first theoretical analysis of the relation between SoP design, executive compensation and board dependence. Earlier theoretical studies such as Drymiotes (2007), Kumar and Sivaramakrishnan (2008), and Laux

9 See Cai and Walkling (2011) for a similar study regarding the announcement effect of an advisory SoP bill in the U.S where they find positive market reactions for firms with inefficient compensation practices. They also analyze the market reaction to company-specific SoP-proposals and find a negative impact of labor union-sponsored proposals.

and Mittendorf (2011) have analyzed the cost and benefits of delegating the compensation decision to a partially dependent boards in settings where the BoD also monitors the CEO's activities or where it must provide incentives to identify profitable investment incentives. In all these studies, a partially dependent BoD offers some net contribution to firm value, albeit for different economic reasons.[10] However, none of these studies has so far analyzed the relation between shareholder votes on the remuneration of executives and the equilibrium composition of the board of directors.

The study is also related to Levit and Malenko (2011). These authors analyze the role of non-binding votes on shareholder proposals as a mechanism to convey the expectation of shareholders to the CEO and find that non-binding votes are generally less effective in this respect than binding votes. Levit and Malenko (2011) neither consider an incentive contracting problem nor a BoD. They also assume a different information structure. In their model the shareholders are better informed about the prospects of their proposal than the CEO. Since the vote takes place before the CEO decides on the proposal, she can update her beliefs after observing the voting outcome and make a better informed project decision.

In a broader sense, both models are related to Aghion and Tirole (1997) who identify the information structure as the critical factor determining the formal and the real authority in organizations. In my model, the shareholders have the formal authority over the composition of the BoD but the CEO has the real authority because of her superior information about the contribution of individual board members. In Levit and Malenko (2011) the CEO has the formal authority to decide over the shareholder proposal but shareholders can obtain the real authority by conveying decision relevant information to the CEO in a pre-contractual shareholder vote.

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10 From a broader perspective, this paper also contributes to the literature on endogenously determined boards of directors. See Hermalin and Weisbach (1998, 2003), Adams and Ferreira (2007), as well as Adams et al. (2010) for a recent survey.

2 Model assumptions

2.1 Firm setup, technology, and compensation system

I consider an agency-relation between three risk neutral parties: a group of shareholders (the "principal"), a board of directors ("BoD"), and a CEO (the "agent"). The agent's personal effort a, $a \in [0,1]$, affects the distribution of the firm's results. There are two possible outcomes, x_H and x_L. The probabilities of the high and the low result depend on the agent's effort and are given by $p(x_H|a) = a$ and $p(x_L|a) = 1 - a$, respectively. That is, the higher the agent's effort, the higher the likelihood of a high outcome and the higher the expected result, $E[x] = x_L + a \cdot \Delta_x$, where $\Delta_x = x_H - x_L > 0$. The amount of effort spent on improving the distribution of the firm's results is the agent's private information and not contractible. Effort is personally costly to the agent. The cost equals $C(a)$, where I assume that $C(a)$ satisfies the Inada conditions ($C(0) = C'(0) = 0, C'(1) = +\infty$) and is monotonically increasing and strictly convex in a to assure that the incentive problem has a non-trivial solution.

For some exogenous reasons shareholders are not in a position to design the agent's compensation contract and delegate this task to the BoD. To focus on the role of SoP on the CEO's compensation, I let the BoD receive a salary w_B but no performance-based compensation for its services. I subsequently normalize w_B to zero. To motivate the agent, the BoD offers her a contract $s(x)$ that comprises a salary w and a bonus b in case of good performance. From these assumptions, the agent's expected remuneration equals $E[s(x)] = w + a \cdot b$ and her expected utility is

$$E[U_A] = w + a \cdot b - C(a). \tag{1}$$

An agency problem arises from the agent's limited liability. Particularly, I assume that the agent's compensation cannot fall below the amount of $\underline{w}$, where $x_L > \underline{w} \geq 0$. The income level $\underline{w}$ can be interpreted as the minimum income that the agent can attain without exerting a positive effort level.[11] The minimum income must be distinguished from the reservation

11 See e.g. Poblete and Spulber (2012) for a corresponding asumption. Other limited liabilty models assume that the agent's pay can become negative but cannot fall below an exogenously given wealth level $-L < 0$. See e.g. Laffont and Martimort (2002), pp. 155. Letting $\underline{w} < 0$ would not change results. I choose $\underline{w} \geq 0$ because negative executive compensation is uncommon and since the minimum pay interpretation is more convenient in terms of the research question.

utility $\underline{U} \geq 0$ that the agent receives from her next best employment alternative. While $\underline{w}$ puts a lower bound on the agent's pay, $\underline{U}$ restricts the agent's expected utility from below. In what follows, $\underline{U}$ is normalized to zero so that $\underline{w} \geq \underline{U}$.

2.2 Governance structure

A necessary condition for a non-trivial economic analysis of SoP is the presence of inefficiencies in the pay-setting process, otherwise the regulation cannot provide any benefits to shareholders. Inspired by the managerial power approach, I consider a firm in which the CEO has some control over the nomination of individual directors and thereby over the composition of the BoD. Since the BoD is responsible for designing the agent's compensation contract, the CEO's power over the BoD allows her to (indirectly) influence her own pay.[12] In line with recent literature I model a potentially dependent BoD that balances the interests of shareholders and the CEO in setting the agent's compensation according to the following objective function[13]

$$V_B = (1 - \lambda) \cdot U_P + \lambda \cdot U_A, \tag{2}$$

where U_P is the utility of the principal and λ measures the degree of board dependence. The level of board dependence represents the aggregate preferences of a given mix of independent and dependent directors sitting on the firm's board. Let the BoD have a fixed size of n members and let $\lambda_i, \lambda_i \in [0, 1/2]$, denote the dependence level of the ith director, then the average dependence level of the BoD is $\lambda = 1/n \cdot \sum \lambda_i$. That is, the higher the fraction of dependent board members, the higher is λ and the more the board considers the agent's utility in designing the compensation contract. Limiting λ_i and thereby λ to take values from the interval $[0, 1/2]$ avoids scenarios in which the CEO's interest dominates shareholder interest.[14]

12 In fact, Bebchuk and Fried (2004) identify the CEO's influence on the nomination of directors as the main source of inefficiency in the pay-setting process.

13 See e.g. Drymiotes (2007), Kumar und Sivaramakrishnan (2008), and Laux and Mittendorf (2011).

14 See Laux and Mittendorf (2011) for a corresponding assumption. Essentially, this restriction assures that the agent's compensation enters with a negative sign into the board's objective function. In fact, since $s(x)$ enters negatively into the principal's utility function and positively into the agent's utility function the net weight on the agent's compensation in (2) equals $\psi(\lambda) = -(1 - 2\lambda)$.

The equilibrium degree of board dependence is determined by the CEO and the firm's shareholders as the outcome of a multi-stage game. The full time line of this game is given in figure 1 (see section 2.4). At stage one, the CEO proposes a director slate to the firm's shareholders. The candidates on the slate can be characterized along two dimensions: First, their dependence on the CEO, and second, their potential to contribute to firm value.

The two qualities of potential directors can be related in many ways. For example, the board can be mainly composed of outside directors that contribute to firm value but are largely independent. A typical example are bankers who provide valuable financial expertise but are usually not considered as being dependent from the CEO. Likewise, the presence of venture capitalists on the BoD facilitates the firm's financing opportunities but reportedly reduces the CEO' power over the board of directors. The CEO can also propose directors that contribute to firm value but also increase the dependence level of the BoD. Examples are insiders, such as former CEOs, or managers of peer firms on the BoD. On the one hand, these directors typically possess industry-specific human capital and are capable of providing valuable strategic advice. On the other hand they tend to be more supportive to the CEO and to tolerate higher compensation levels.[15]

Apart from the joint occurrence of director qualities at the individual level, the contribution of particular types of directors can also depend on the aggregate level of board dependence. For example, the presence of compliance and audit experts is certainly most effective in firms with insufficient internal control systems and weak governance structures. Also, it has been found that the presence of labor representatives on the boards of public firms negatively affects firms' investment decisions and productivity. Moreover, the resulting valuation discounts seem to be more pronounced in firms with a significant level of employee representation.[16] These observations suggests that the impact of stakeholders on firm value varies in a nontrivial way with the overall level of board dependence.

To capture these considerations in the model, let $y_i(\lambda) = (v_i + \rho_i \cdot \lambda)/n$ denote the contribution of the ith board member. The parameter $v_i \in [-\overline{v}, \overline{v}]$, $\overline{v} > 0$, denotes the basic contribution of the ith board candidate, whereas $\rho_i \in [-\overline{\rho}, \overline{\rho}], \overline{\rho} > 0$, is a measure for potential synergies (dysergies) that arise from appointing candidate i to a board with a given

15 See Adams et al. (2010) for a detailed discussion of the potential impact of different type of directors and an overview of the existing empirical evidence on the subject.

16 See Adams et al. (2010) for details and further references.

dependence level λ.[17] With this structure, the aggregate contribution of the BoD becomes

$$y(\lambda) = v + \rho \cdot \lambda, \tag{3}$$

where $v = 1/n \cdot \sum v_i$ and $\rho = 1/n \cdot \sum \rho_i$. Since v and ρ can take any sign, the linear specification in (3) is suitable for capturing a wide array of possible relations between the board's contribution to firm value and its dependence from the CEO.

Without loss of generality, I assume that λ_i is publicly observable so that λ is common knowledge among all players. By contrast, the parameters determining the individual contribution of candidates for the BoD, v_i and ρ_i, are ex ante unknown with an expected value of $E[v_i] = E[\rho_i] = 0$. Unlike shareholders, the CEO can infer the potential contributions of candidates for the BoD before putting them on the slate. Being responsible for the firm's strategy and overall performance, the CEO is in the best position to identify the firm's requirements and to compose a BoD that provides a maximum contribution to firm value. In addition, the CEO can employ the firm's resources to examine the qualities of potential board members before proposing their names to shareholders. In fact, the search and evaluation of new board members is routinely performed by professional executive search consultants acting on behalf of the companies that seek to fill board positions. Since the CEO controls the firm's financial resources, she can also claim priority access to the information generated by the consultant or other advisors. By contrast, shareholders of large public firms are typically not in a position to micro-manage the board structure. Identifying and evaluating the qualities of potential directors is a demanding and time consuming task that is too costly to carry out for individual shareholders and can hardly be coordinated among different (groups of) shareholders.[18]

Following these considerations, I subsequently assume that the CEO observes a costless signal over the type of each candidate before composing the candidate list. For the ease of exposition, the signal is supposed to perfectly reveal the actual values of v_i and ρ_i.[19] Based

17 The board's contribution represents the net benefits that shareholders derive from its advice and its monitoring efforts. Since the focus of the model is the impact of SoP on executive pay and shareholder value, I do not explicitly model the value creating activities of the BoD but take the contribution as given. See e.g. Hermalin (2005), Adams and Ferreira (2007), or Kumar and Sivaramakrishnan (2008) for more detailed models of board activities.

18 Consistent with these arguments Bebchuk and Fried (2004, p.25) report that there is virtually no evidence of shareholders proposing their own list of candidates for the BoD.

19 The assumption that the signal is perfect serves to simplify the notation. All results would equivalently

on this information, the CEO composes the director slate and truthfully communicates its aggregate production function $y(\lambda)$ to shareholders. Thus, since λ is common knowledge, there is symmetric information about the properties of the BoD at the time the CEO makes the slate public.

The exclusive access to the information about v_i and ρ_i prior to composing the director slate allows the CEO to aggregate her information on the contribution of individual board members and to combine it with an appropriate level of λ in a manner that makes a dependent BoD attractive to shareholders. Since the proposal reveals no information on the qualities of individual directors or other candidates that have been considered for a board position, the CEO has the power to make a take-it-or-leave-it offer to the firm's shareholders.

After the CEO has composed the director slate, the board proposal must be approved by the firm's shareholders. The shareholders aim to maximize the net value of the firm, given by the difference between the contributions of the BoD and the agent and the expected compensation. From the above assumptions, the shareholders' expected utility equals

$$E[U_P] = y(\lambda) + x_L - w + a \cdot (\Delta_x - b). \tag{4}$$

The expression in (4) is increasing in the board's contribution to firm value, $y(\lambda)$, and the agent's effort (a) but it is decreasing in the parameters of the compensation scheme, i.e. the salary (w) and the bonus (b). Since the agent's effort depends on the size of the bonus and the BoD determines the agent's compensation by maximizing (2), the equilibrium levels of a and b are functions of λ. That is, the critical variable determining the utility of shareholders is the level of board dependence.

In the absence of SoP, the requirement of a shareholder approval for the director slate is the only constraint imposed on the CEO's power over the BoD. However, the efficacy of this instrument is limited because the shareholders are unable to solve the bundling task performed by the CEO due to the lack of information on the individual contributions of board members. That is, if the shareholders were to compose their own director slate, the expected contribution of individual candidates would equal $E[y_i(\lambda)] = 0$. However, since λ is common knowledge, shareholders can credibly threaten to disapprove the CEO's board proposal and to nominate a BoD with the desired dependence level and an expected contribution of zero. Doing so incurs a transaction cost of $k \geq 0$.

go through if the CEO would observe a noisy but informative signals about v_i and ρ_i.

2.3 SoP votes and BoD concerns

Disapproving the director slate is an extreme measure and not well adapted for the shareholders' objective of signalling their dissatisfaction with the BoD's compensation policy. The introduction of SoP permits shareholders to address potential compensation issues more directly and to eventually resolve them without putting the current BoD into question. For the main part of the analysis I consider an advisory vote on the CEO's realized compensation as it is mandatory for firms listed at major stock exchanges in the U.S. and in the U.K. In a model extension, I also analyze the consequences of a binding vote as it is practiced in a number of European countries.

There is a conceptual problem with an advisory vote on executive compensation. Even if the majority of shareholders disagrees with its compensation policy, the BoD can simply ignore the vote because it is not enforceable. Moreover, anticipating that their vote cannot force the BoD to change its compensation policy, rational shareholders should not vote against the compensation proposal in the first place. Even though these arguments are theoretically appealing, they are inconsistent with recent empirical evidence.

Particularly, the data from the U.K. as well as those from the last two proxy seasons in the U.S. convey two facts: First, although the vast majority of SoP proposals is supported by a majority of shareholders, virtually no SoP proposal receives full shareholder support. That is, despite the fact that their vote is seemingly irrelevant, a substantial fraction of shareholders rejects SoP proposals.[20] Moreover, the voting dissent is more pronounced for firms with high compensation levels (Conyon and Sadler 2010), a poor link between pay and performance (Ferri and Maber 2012), and for firms having received negative voting recommendations from proxy advisors (Larcker et al. 2012). Second, boards actually seem to consider the threat of a negative SoP vote in their compensation decisions despite the fact that they are not forced to do so. Actually, Ferri and Maber (2012) as well as Larcker et al. (2012) find that a number of firms has made important changes to their compensation contracts before submitting the SoP proposal to shareholders.

These findings suggest that the advisory SoP mechanism works more subtly than standard

20 For example, Conyon and Sadler (2010) find a mean voting dissent of 7.61 % in a sample of 3,640 SoP votes in the U.K. Likewise, Glass Lewis & Co (2011) report average support rates of 87.5 % for the S&P 500 companies and 90.1 % for the full sample of Russel 3000 firms in 2011. However, only 6 out of the 2658 firms in the sample provided 100 % support to the SoP proposal.

theory predicts. SoP seems to motivate a certain fraction of shareholders to signal their concerns about problematic compensation practices and at the same time it prompts boards to propose less controversial compensation arrangements. To capture these considerations in the context of my model, I subsequently assume that shareholders base their voting decision on an individual evaluation of the BoD's compensation policy and that the BoD derives disutility from a negative shareholder vote.

More precisely, shareholders are supposed to compare the proposed compensation $s(x)$ with a benchmark pay level t and to disagree with any compensation $s(x)$ exceeding t. The benchmark pay can represent the average compensation paid by a sample of peer firms with comparable performance or the shareholders' individual perception of an appropriate compensation level given the realized result. In fact, in the binary outcome model an increasing pay level is equivalent to an inferior pay-for-performance relation.[21] For firms relying on the voting recommendations of proxy advisors, t can also represent the maximum pay level that the proxy advisor would accept in order to provide a positive recommendation for the firm's SoP proposal.[22] To allow for heterogeneity in shareholders' reference points, I assume that t is uniformly distributed over the interval $[\underline{s}, \overline{s}]$, where $\overline{s} > \underline{s}$ so that t has a strictly positive density function. That is, all shareholders accept compensation levels less or equal to $\underline{s}$ and refuse compensation levels above $\overline{s}$. The upper bound $\overline{s}$ can take arbitrary values. To assure that no shareholder rejects the minimum compensation that the firm must offer the agent in order to satisfy her limited liability constraint, I assume that $\underline{s} \geq \underline{w}$.

The board's disutility function takes the simple multiplicative form $D_B = \theta \cdot \alpha$, where $\alpha \in [0, 1]$ denotes the percentage level of shareholder voting dissent realized in the SoP vote. θ is a nonnegative parameter representing the BoD's responsiveness to shareholder concerns as well as the strictness of the regulatory environment. A strictly positive disutility can arise from several risk factors faced by the BoD ranging from concerns about a negative press coverage to an eventual shareholder litigation.[23] Most importantly, boards failing to react appropriately to a significant voting dissent in an SoP proposal face a significant risk

21 In the model, inefficient compensation arrangements can only arise in the form of inflated bonus awards. Since the bonus is paid in case of a good performance ($x = x_H$) and the performance is fxed, an increase of the pay level implies an inferior pay-for-performance ratio.

22 As Larcker et al. (2012) point out, many instutional investors such as mutual funds follow the voting recommendations of proxy advisors instead of making their own evaluation of compensation policies in their investment portfolio.

23 See Levit and Malenko (2011) for a detailed discussion and further examples of factors triggering the

of not being reelected. In fact, proxy advisors routinely recommend to vote against the reappointment of the compensation committee or even the full BoD if the firm has failed to change its compensation policy after a substantially negative SoP vote.[24]

The higher the BoD's responsiveness to shareholder concerns, the stricter the regulatory environment, the higher the anticipated voting dissent, and the higher is the disutility of the BoD. It can also be seen that the BoD incurs no disutility if either θ or α are zero. That is, whenever the shareholders unanimously agree with the BoD's compensation proposal, or the BoD disregards the shareholders' concerns about its pay policy, or if there is no SoP, no disutility arises on the part of the BoD.

2.4 Order of moves

The board composition and the level of board dependence is determined as the equilibrium of the multistage game exhibited in figure 1.

[please insert figure 1 about here]

At date 1, the CEO proposes a BoD with a given level of board dependence λ and an aggregate contribution to firm value of $y(\lambda)$ to shareholders. At date 2, the firm's shareholders approve the CEO's board proposal or replace it with their own director slate incurring transaction cost k whenever it is profitable to do so. At date 3, the approved BoD designs the CEO's compensation contract and at date 4, the agent decides on the contract offer and makes her effort decision. At date 5, the firm realizes its actual profit and at date 6, it pays out the corresponding compensation to the agent.

The vote on the agent's compensation takes place between dates 5 and 6, after the results are realized but before the agent's compensation is paid out. Since the vote is advisory, it has no impact on the enforceability of the compensation contract signed at date 4 so that the agent's compensation is paid out according to the contractual terms specified at date 3. It follows that the potential consequences of the advisory vote on the firm's compensation policy must already be reflected in the BoD' contract proposal made at date 3.

effectiveness of non-binding shareholder votes. A detailed analysis and discussion of the relation between negative press coverage and executive pay is provided by Core et al. (2008).

24 ISS (2012) defines a voting dissent of more than 30 % as substantial, and, according to Larcker et al (2012), Glass Lewis & Co fixes the hurdle at a voting dissent of 25 %.

3 Optimal contract and BoD composition without SoP

3.1 First-best solution

As a benchmark case for the subsequent analysis of the multi-stage game I consider the first-best solution of the agency problem. If effort were contractible and the individual contribution of board candidates were publicly observable, the principal could compose the board without an efficiency loss and write a contract specifying the effort level that maximizes the joint surplus of the agency[25]

$$E[W] = E[U_P] + E[U_A] = y(\lambda) + E[x] - C(a). \tag{5}$$

The surplus comprises the contribution of the BoD, the expected result and the agent's personal cost. The surplus maximizing effort level is implicitly defined by the following first order condition

$$\Delta_x = C'(a^{FB}). \tag{6}$$

According to (6) the first-best effort is found by equating the agent's marginal contribution to the firm's result with its marginal cost of effort. Since effort is contractible, the agent's compensation contract contains a salary but no bonus. Assuming that $C(a^{FB}) \geq \underline{w}$, the optimal contract satisfies the agent's participation and her limited liability constraint,

$$\begin{aligned} E[s(x)] - C(a) &\geq 0 && (7)\\ s(x) &\geq \underline{w} \quad \forall \quad x. && (8) \end{aligned}$$

Since $C(a^{FB}) \geq \underline{w}$, the participation constraint is binding and stricter than the limited liability constraint. It follows that the agent receives just her reservation utility.

The first-best composition of the BoD maximizes the contribution of all board members in (3). Since v is the intercept and ρ the slope of (3), the BoD's contribution function takes its maximum value for a given value of λ if $v_i = v = \overline{v}$, and $\rho_i = \rho = \overline{\rho}$. Since $\overline{\rho} > 0$, the resulting first-best contribution function, $y^{FB}(\lambda) = \overline{v} + \overline{\rho} \cdot \lambda$, is monotonically increasing in λ so that $\lambda^{FB} = 1/2$.[26]

25 The surplus definition in (5) is standard in agency theory. Adding the BoD's utility would imply double counting because the BoD already maximizes a weighted average of the principal's and the agent's utility.

26 If effort were contraticble, the shareholders could delegate the contracting task to the BoD without any efficiency loss. Since $V_B(1/2) = W/2$, the first best effort level is also obtained if $\lambda = 1/2$ and the BoD writes the contract on a.

3.2 Second-best solution

3.2.1 Optimal contract for a given board structure

Since the agent's effort is not contractible, the compensation must not only assure a sufficient pay level but also provide incentives to exert productive effort. At date 3, the BoD designs the optimal bonus contract by maximizing its objective function in (2) subject to the limited liability constraint in (8), the agent's participation constraint (7) and the incentive constraint:

$$b = C'(a). \tag{9}$$

The incentive constraint in (9) stems from maximizing the agent's expected utility in (1) with respect to a and implicitly defines the agent's optimal effort choice as the effort level that equates the bonus with the marginal cost of effort provision. Since $C(a)$ is strictly convex, the agent's equilibrium effort is monotonically increasing in the bonus. Solving the BoD's optimal contracting problem at date 3 yields the following result.

Lemma 1: *The agent's equilibrium effort is monotonically increasing in the level of board dependence. For $\lambda < 1/2$ the equilibrium effort is implicitly defined by the following expression*

$$a^*(\lambda) = h(\lambda) \cdot \frac{\Delta_x - C'(a)}{C''(a)}, \quad h(\lambda) = \frac{1-\lambda}{1-2\cdot\lambda}, \tag{10}$$

where the term $h(\lambda)$ is monotonically increasing in λ. For $\lambda = 1/2$, $a^* = a^{FB}$. **Proof**: see appendix.

Lemma 1 suggests that an increasing level of board dependence alleviates the agency problem. The higher the level of board dependence, the closer is the agent's equilibrium effort to the first-best effort level. The optimal compensation contract is obtained by solving (8) for the salary and (9) and (10) for the optimal bonus. As an immediate consequence of lemma 1, we can make the following statement about the agent's compensation without giving a formal proof:

Corollary 1: *The optimal compensation comprises a salary equal to the minimum pay level and a bonus that is monotonically increasing in the level of board dependence:*

$$w^* = \underline{w}, \quad b^*(\lambda) = \Delta_x - \frac{a \cdot C''(a)}{h(\lambda)}. \tag{11}$$

That is, an increasing level of board dependence affects the agent's bonus but not her salary so that in equilibrium, the performance-based part of the agent's compensation is distorted whenever $\lambda > 0$.

In the limited liability setting, the agency problem arises because the bonus determines not only the agent's effort incentives but also the sharing of the surplus between the agent and the principal. The total surplus generated by the agent's effort equals $\Pi(a) = a \cdot \Delta_x - C(a)$ whereof the agent receives the share $G(a)$ and the principal retains the share $H(a)$. In equilibrium, these shares are defined as follows

$$G(a) = a \cdot C'(a) - C(a), \quad H(a) = a \cdot (\Delta_x - C'(a)), \tag{12}$$

where I use the fact that $b = C'(a)$ from the agent's incentive constraint. From the assumptions about the cost function, $G(a)$ is monotonically increasing whereas $H(a)$ is strictly concave in a.

To implement the first-best effort, the principal must set the bonus equal to $b = \Delta_x$. This solution cannot be optimal because it transfers the entire surplus to the agent. At the other extreme, a bonus of zero would attribute the maximum share to the principal but provide no effort incentives. An independent BoD solves this trade-off in the best interest of the principal by setting a bonus rate of $b^*(0) = \Delta_x - a \cdot C''(a)$ and thereby implements an equilibrium effort level of $a^*(0) = [\Delta_x - C'(a)]/C''(a)$, the effort level that maximizes $H(a)$. An increasing level of board dependence puts more weight on the agent's share and thereby mitigates the conflict between surplus sharing and incentive provision. For $\lambda = 1/2$, the BoD puts equal weight on both parties' shares so that the BoD essentially maximizes the agent's contribution to the joint surplus.[27]

3.2.2 Equilibrium board composition

I determine next the equilibrium composition of the BoD. At date 1 the CEO proposes a BoD with a given dependence level λ and a contribution function $y(\lambda)$. This proposal is subject to shareholder approval at date 2. If the shareholders accept the CEO's proposal, their utility equals

$$E[U_P(y(\lambda), a^*(\lambda))] = y(\lambda) + H(a^*(\lambda)) + x_L - \underline{w} \tag{13}$$

27 In fact, $[G(a) + H(a)]/2 = [a \cdot \Delta_x - C(a)]/2 = \Pi(a)/2$.

The CEO's proposal has two countervailing effects on the utility of shareholders. As long as $y(\lambda) > 0$, the shareholders' utility is increasing in the BoD's contribution to firm value. Further, if the CEO composes the BoD so that $\rho > 0$, $y(\lambda)$ is increasing in λ so that shareholders partly benefit from an increasing level of board dependence. This positive effect is offset by a reduction of the principals' share in the surplus generated by the agent because $H(a)$ is monotonically decreasing in a for $\lambda > 0$. The optimal level of board dependence from the principal's perspective balances the two effects and can be found by maximizing (13) with respect to λ.

Lemma 2: *Let λ^* denote the optimal level of board dependence from the shareholders' perspective. It holds that $\lambda^* < 1/2$ if $\overline{\rho} < \rho^+$, where $\rho^+ > 0$.* **Proof**: see appendix.

Intuitively, lemma 2 requires that the BoD's marginal contribution to firm value is not always larger than the marginal loss resulting from the decline of the shareholders' surplus share generated by the agent's effort. In fact, if $\rho > \rho^+$ there is no conflict of interest between the CEO and the firm's shareholders because both player prefer a dependence level of $\lambda = 1/2$. To focus on non-trivial equilibria, the subsequent analysis considers the case where $\overline{\rho} < \rho^+$ so that $\lambda^* < 1/2$.

Since shareholders cannot control the optimal BoD composition, they are not interested in implementing a BoD with a dependence level of λ^*. While the shareholders can control the level of board dependence, they can only compose a BoD with an expected contribution of zero. However, for $y(\lambda)$, the shareholders' best alternative consists of implementing an independent BoD in order to maximize the agent's contribution to firm value, $H(a)$. In this case, the shareholders' utility equals $E[U_P(0, a^*(0))] - k$. A rational CEO anticipates the shareholders' decision problem and proposes a BoD so that it maximizes her utility and is accepted by shareholders at date 2. The solution is summarized in Proposition 1:

Proposition 1: *In the absence of SoP, the equilibrium composition of the BoD comprises the first-best contribution function $y^{FB}(\lambda)$ and a strictly positive level of board dependence $\lambda = \lambda^N$. If the board's contribution is sufficiently large, $\lambda^N = \lambda^{FB}$. Otherwise, the equilibrium level of board dependence solves*

$$y^{FB}(\lambda^N) + H(a^*(\lambda^N)) = H(a^*(0)) - k, \tag{14}$$

the solution $\lambda^N \in (0, 1/2)$ is unique. **Proof**: see appendix.

As in the first-best solution, the CEO proposes a BoD with a maximum contribution function $y^{FB}(\lambda)$. This strategy is optimal because the CEO's utility does not directly depend on the parameters of $y(\lambda)$ but a higher board contribution prompts shareholders to approve a higher dependence level. Since the CEO's utility is monotonically increasing in λ, she uses her ability to bundle the two essential director qualities in a manner that the firm's shareholders accept the highest possible level of board dependence.

The equilibrium level of board dependence is strictly positive. It holds that $\lambda^N \leq 1/2$ because the principal must solve the trade-off between incentive provision and surplus sharing. Since $H(a^*(1/2)) = 0$, it is only optimal for the principal to allow for the first-best level of board dependence if the BoD's contribution to firm profit is relatively more important than the net contribution of the agent. Particularly, the shareholders approve the first-best level of board dependence if and only if $y^{FB}(\lambda^{FB}) \geq H(a^*(0)) - k$. That is, the net contribution of a BoD with $\lambda = 1/2$ must not be lower than the difference between the surplus share attainable with an independent board and the transaction cost, otherwise $\lambda^N < 1/2$. Ceteris paribus, the shareholders are willing to accept a more dependent board, the higher the intercept (v) and the slope (ρ) of the BoD's contribution function. Likewise, the equilibrium level of board dependence is decreasing in the benchmark contribution of an independent board, $H(a^*(0))$, and increasing in the transaction cost (k).

4 Optimal contract and BoD composition with SoP

4.1 Optimal contract with SoP

In this section, I consider the consequences of an advisory shareholder vote on the agent's compensation. As shown in figure 1, the vote takes place between date 5 and date 6, after the firm's results are realized but before the compensation is paid out to the agent. Before submitting their vote, shareholders observe the firm's profit and the resulting compensation and evaluate the prospective total compensation against the benchmark level t. As long as $s(x) \leq t$, the shareholders accept the BoD's compensation proposal, otherwise they reject it. Since t is uniformly distributed over the interval $[\underline{s}, \overline{s}]$ with density $\phi(t) = 1/(\overline{s} - \underline{s})$, the fraction of shareholders refusing to approve a given compensation of $s(x)$ equals

$$\alpha(x) = \Phi[s(x)] = \phi(t) \cdot [s(x) - \underline{s}]. \tag{15}$$

The expression in (15) reflects the well documented empirical observation that the shareholder voting dissent is positively related to the level of CEO compensation. The higher the

CEO's compensation level, the higher the fraction of shareholders that disapprove the BoD's compensation policy.

The optimal voting strategy of shareholders depends on the realized result. According to corollary 1, the level of board dependence does not affect the agent's salary so that the firm sets $w = \underline{w}$ for all types of boards. The presence of SoP cannot alter this result because a higher salary merely increases the likelihood of a shareholder disapproval without providing any benefits to the BoD. It follows that $\alpha(x_L) = 0$ because $\underline{s} \geq \underline{w}$ regardless of the firm's result. Accordingly, shareholders can only have an incentive to disapprove the agent's compensation in case of a good result. They do so if $\underline{w} + b > t$ so that $\alpha(x_H) = \phi(t) \cdot (s(x_H) - \underline{s}) > 0$. Considering the optimal voting strategy of shareholders, the expected equilibrium level of voting dissent equals $\widehat{\alpha} = a \cdot \alpha(x_H)$.

Anticipating the shareholders' equilibrium vote, the BoD maximizes its objective function in (2) net of the disutility arising from a negative shareholder vote to determine the optimal contract. Lemma 3 characterizes the equilibrium effort induced by the optimal contract.

Lemma 3: *The agent's equilibrium effort in the presence of SoP is implicitly given by the following expression*

$$a^{\circ}(\lambda) = \frac{(1-\lambda) \cdot [(\Delta_x - C'(a)] - \theta \cdot \alpha(x_H)}{(1 - 2 \cdot \lambda + \theta \cdot \phi(t)) \cdot C''(a)}. \tag{16}$$

For a given value of λ, it holds that $a^{\circ}(\lambda) \leq a^*(\lambda)$ and $b^{\circ}(\lambda) \leq b^*(\lambda)$. The inequalities are strict whenever θ is positive. **Proof**: see appendix.

According to lemma 3, SoP prompts a BoD with a given dependence level λ to offer the agent a contract that provides lower effort incentives. It does so by reducing the bonus, whereas the equilibrium salary is not affected by the shareholder vote and equal to $\underline{w}$. That is, with an identical salary and a lower bonus, advisory SoP can be expected to reduce the total compensation granted by a BoD with a given dependence level λ.

Setting the CEO's compensation requires the BoD to trade off its interest in balancing the principal's and the agent's utilities against the disutility arising from the prospects of a negative shareholder vote. Since the BoD's utility is decreasing in α but α is increasing in the agent's compensation, the anticipation of a negative advisory vote leads the BoD to reduce the agent's compensation even though the vote is not directly enforceable. In equilibrium, the downward adjustment of the bonus partly corrects for the positive impact of board dependence on the agent's compensation. The higher the BoD's responsiveness to shareholder concerns (θ) and the equilibrium voting dissent in case of a good result, $\alpha(x_H)$, the lower is the bonus and the lower is the equilibrium effort motivated by the optimal contract.

The same effect is induced by a higher value of the uniform density function $\phi(t)$. Fixing the lower bound of the support at $\underline{s}$, a higher value of the density function is equivalent to a lower value of $\overline{s}$, the highest acceptable compensation to shareholders. That is, a lower tolerance of shareholders towards high compensation levels prompts the BoD to reduce the agent's pay. However, advisory SoP can only impact the compensation policy if the BoD is actually responsive to shareholders' concerns. If $\theta = 0$, the compensation contract is the same as without SoP even if the BoD anticipates a strictly positive voting dissent. Likewise, it is essential for the effectiveness of advisory SoP that some shareholders openly disagree with the firm's compensation policy even if doing so does not add to their utility once the compensation contract has been signed. Only the interplay of a responsive BoD with shareholders willing to evaluate the firm's compensation levels against a benchmark, such as the pay level of peer firms with similar performance, makes SoP an effective governance instrument despite the fact that it is not binding.

4.2 Equilibrium BoD composition with SoP

The equilibrium level of board dependence is determined as in section 3.2. At date 1, the CEO anticipates the shareholders' decision problem and proposes a board with the maximum acceptable level of board dependence at date 2. The result is summarized in proposition 2:

Proposition 2: *The equilibrium composition of the BoD with advisory SoP combines the first-best contribution function $y^{FB}(\lambda)$ with a strictly positive level of board dependence $\lambda = \lambda^A$. The equilibrium level of board dependence solves*

$$y^{FB}(\lambda^A) + H(a^{\circ}(\lambda^A)) = H(a^*(0)) - k, \tag{17}$$

whenever an interior solution $\lambda^A \in (0, 1/2)$ exists. Otherwise, $\lambda^A = 1/2$. It holds that $\lambda^A \geq \lambda^N$. The inequality is strict whenever $\lambda^N < 1/2$. **Proof**: see appendix.

According to proposition 2, the presence of SoP does not affect the shape of the BoD's contribution function, $y^{FB}(\lambda)$, but it leads to a weakly higher level of board dependence as compared to the equilibrium level in the absence of SoP. Intuitively, $\lambda^A \geq \lambda^N$ because shareholders attain a higher utility for a given value of λ so that they are willing to accept a higher level of board dependence before eventually replacing the BoD at date 2. Particularly, since the contribution function is the same as in the absence of SoP, the marginal benefit of board dependence is unaffected by its introduction. By contrast, the marginal cost of board dependence is reduced because the BoD anticipates that a fraction of shareholders disagrees with the CEO's compensation and reduces the agent's bonus for a given value of λ. This direct effect on the agent's compensation increases the shareholders utility for a given level of board dependence so that

$$E[U_P(y(\lambda), a^{\circ}(\lambda))] > E[U_P(y(\lambda), a^{*}(\lambda))] \quad \forall \quad \lambda. \tag{18}$$

Shareholders can only benefit from the reduction in compensation cost if the CEO proposes the same level of board dependence as without SoP. However, since the utility derived from the outside option of replacing the current BoD with a board that makes no contribution to firm value, rational shareholders cannot credibly refuse to accept a more dependent board than in the absence of SoP. A rational CEO anticipates the shareholders' willingness to accept a higher level of board dependence and proposes λ^A so that the shareholders are indifferent between approval and disapproval. Essentially, the constant outside option of shareholders puts the CEO in the position of the residual claimant.

Thus, whenever (17) has an interior solution, $\lambda^A > \lambda^N$ and shareholders attain the utility level associated with their outside option, $H(a^*(0)) - k$. Shareholders can only benefit from SoP if the CEO is constrained in her ability to extract the surplus. For example, if $\lambda^N = 1/2$, the CEO cannot further increase the level of board dependence so that $\lambda^A = \lambda^N$. It follows directly from (18) that shareholders benefit from SoP under these conditions.[28] Proposition 3 summarizes the impact of advisory SoP on the CEO's compensation:

Proposition 3: *Whenever* (17) *has an interior solution so that* $\lambda^A < 1/2$, *advisory SoP increases the CEO's compensation, that is* $a^{\circ}(\lambda^A) > a^*(\lambda^N)$, *and* $b^{\circ}(\lambda^A) > b^*(\lambda^N)$. *If* $\lambda^A = 1/2$, *the impact of SoP on the CEO's compensation is ambiguous.* **Proof**: see appendix.

If $\lambda^N < \lambda^A < 1/2$, the increased level of board dependence directly translates into a higher effort despite the fact that SoP reduces $a^{\circ}(\lambda) < a^*(\lambda)$ for a given value of λ, so that $a^{\circ}(\lambda^A) > a^*(\lambda^N)$. That is, in equilibrium the difference between the two levels of board dependence λ^A and λ^N outweighs the marginal reduction of the agent's effort level caused

28 The same holds if $\lambda^N < 1/2$ but $\lambda^A = 1/2$ because the CEO can extract the full surplus in the absence of SoP but not with SoP.

by SoP. To induce the increased equilibrium effort, the firm must raise the agent's bonus so that the agent's compensation is higher than without SoP. That is, whenever SoP has a non-trivial impact on the firm's board structure, it can be expected to increase the level of executive compensation.

As for the utility of shareholders, advisory SoP only unambiguously increases the agent's compensation if the CEO is constrained in her ability to extract the surplus. If λ^A is not determined by (17) but limited to its boundary value of $\lambda^A = 1/2$, the agent's compensation can also decrease. A clear prediction can be made for the case where $\lambda^A = \lambda^N = 1/2$. For this case it follows directly from lemma 3 that $a^{\circ}(\lambda^A) < a^*(\lambda^N)$ so that the agent's equilibrium effort and the corresponding compensation are reduced by the introduction of SoP. For intermediate cases, where λ^N is interior but λ^A is bounded, the impact of SoP on the agent's effort and her compensation is ambiguous.

5 Extensions and regulatory implications

5.1 Binding SoP

As mentioned in the introduction, a number of European countries did not follow the Anglo-Saxon approach of an advisory vote but have introduced a binding shareholder vote on the remuneration of executives. In this section, I briefly discuss whether and how this change of the SoP design affects the predictions of my model. As in section 4, I assume that the vote takes place after the firm's results are realized and the size of the agent's bonus has been determined but before the agent's compensation is paid out so that the time line of the game in figure 1 remains unchanged.[29]

With a binding vote, the BoD can only pay out the prospective compensation to the agent if the firm's shareholders approve the payment, otherwise the agent's compensation needs to be adjusted. As a practical matter, this type of regulation requires that the BoD closes all compensation contracts subject to later shareholder approval in order to avoid the payment of damages in case of a negative shareholder vote. Otherwise, the CEO may

29 Apart from Switzerland, where a post-contractual binding vote is currently included in a law proposal put forward in a public voting initiative, a binding vote on the actual remuneration amount is already law in Czechia and in Latvia, see European Commission (2010).

successfully sue the firm for the payment of her contractual claims.

To address these legal issues within my model framework, I subsequently assume that the shareholders can effectively refuse the payout of any compensation exceeding an exogenously given amount of m, provided that the SoP proposal finds majority support. The amount m defines the legal protection standard of the CEO. On the one hand it determines the extent to which the SoP vote can overrule existing compensation arrangements, and on the other hand it limits the amount of compensation that can be granted without shareholder approval. For example, if $m = \underline{w}$, all bonus payments are subject to prior shareholder approval, whereas if $m > \underline{w}$, the CEO is essentially in a position to enforce a part of her bonus awards by legal action. To assure that the agent accepts the compensation contract at date 4, I subsequently assume that $m \geq \underline{w}$.

The analysis of the players' equilibrium strategies starts with the shareholders' voting decision between dates 5 and 6. Since the vote takes place after the agent has supplied her effort, the shareholders face a moral hazard problem. As before, shareholders compare the prospective compensation with their individual benchmark pay level t and refuse it if $t < s(x)$. However, even shareholders that do not vote against the CEO's compensation in an advisory vote because $t \geq s(x)$, have an incentive to disapprove the BoD' compensation proposal whenever $s(x) > m$. If they approve the CEO's compensation, they must pay $s(x)$. If they refuse it, they must only pay a compensation of m. It follows that rational shareholders are strictly better off if they refuse any compensation exceeding m.

Since $m \geq \underline{w}$, the agent's salary cannot be reduced so that a negative SoP vote can only affect the agent's bonus in case of a good result ($x = x_H$). Particularly, whenever $b > \underline{b} := m - \underline{w}$, all shareholders vote against the agent's compensation and force the BoD to cut the bonus to $\underline{b}$. Thus, the equilibrium voting dissent is $\alpha = 1$ as long as the BoD proposes a bonus exceeding $\underline{b}$. Otherwise $\alpha(x_L) = 0$ and $\alpha(x_H) = \Phi[s(x_H)]$ as with advisory SoP. The consequences of the shareholder vote on the agent's compensation and the equilibrium composition of the BoD are summarized in Proposition 4

Proposition 4: *With a binding SoP, the equilibrium composition of the BoD comprises the first-best contribution function $y^{FB}(\lambda)$ and a board dependence level of λ^B. The equilibrium degree of board dependence is determined by the legal protection standard of the CEO. If $m < s(x_H)$ it holds that $\lambda^B \in [0, \lambda^A)$ and the agent's bonus equals $\underline{b} = m - \underline{w} < b^{\circ}(\lambda^A)$. If $m \geq s(x_H)$ the enforceability of the SoP vote has no impact on the equilibrium strategies,* *i.e.* $\lambda^B = \lambda^A$ *and* $b = b^\circ(\lambda^A)$. **Proof**: see appendix.

According to proposition 4, the enforceability of the shareholder vote on the SoP proposal can only affect the player's equilibrium strategies if the legal protection standards are low. Particularly, if shareholders can effectively preclude any compensation payment above m, the shareholders can effectively cut the agent's bonus to $\underline{b}$ whenever $s(x) > m$, otherwise the BoD implements the same contract as with advisory SoP. A rational board of directors anticipates this threat and reduces the contractually specified bonus to $\underline{b}$. This strategy is optimal for the BoD because it minimizes the equilibrium voting dissent. As a consequence, the threat of a retroactive bonus cut by the firm's shareholders is never carried out in equilibrium.

Faced with a contractual bonus of $\underline{b}$, the CEO reduces her level to $\underline{a} = C'^{-1}(\underline{b})$. This effort level is lower than $a^\circ(\lambda^A)$, the equilibrium effort with advisory SoP. Further, since $\underline{b}$ is increasing in m, the agent's effort is increasing in the legal protection standard. The higher (lower) the amount of the agent's compensation that can be granted without shareholder approval, the higher (lower) her equilibrium effort. To assure that the BoD pays no bonus below $\underline{b}$, the CEO composes the BoD so that $\lambda^B \geq 0$ and $a^\circ(\lambda^B) = \underline{a}$. Both conditions,can only be met if $\underline{a} > a^\circ(0)$, otherwise the shareholders disapprove the optimal bonus proposed by an independent BoD. In this case, the CEO does not benefit from proposing a dependent BoD and composes the board so that $\lambda^B = 0$. Shareholders accept the CEO's board proposal at date 2 because they attain a higher utility than in case of a rejection.

The analysis shows that a binding SoP can be more effective than an advisory vote for controlling the level of board dependence and thereby the CEO's compensation. The consequences of a binding SoP crucially depend on the legal protection standard of the CEO. If m is high so that shareholders cannot impair existing contractual arrangement between the BoD and the CEO, a binding SoP offers no advantage over an advisory vote. For lower values of m, a binding SoP becomes an effective control mechanism for shareholders. However, this mechanism can also become too rigid and impair the agent's effort incentives. In the worst case, when $m = \underline{w}$, the agent exerts no effort because the perspective of a retroactive bonus cut prompts the BoD to remove any bonus payment from the agent's compensation contract.

5.2 Pre-contractual SoP

The moral hazard problem caused by a binding SoP can basically be avoided if the vote on the compensation takes place before the BoD signs the compensation contract with the agent.[30] This simple change of the decision sequence avoids that shareholders are tempted to adjust the agent's prospective compensation after she has taken her effort decision and thereby secures the agent's contractual claims. Subsequently, I briefly discuss the impact of this change in the order of moves on the equilibrium of the SoP game. The sequence of events for a pre-contractual vote is given in figure 2.

[please insert figure 2 about here]

Different from the previous analysis, the firm's shareholders vote on the BoD's contract proposal immediately after date 3 but before the agent receives the final contract offer. Based on the voting outcome, the BoD decides on the revision of the contract offer and proposes a potentially revised compensation contract to the CEO. As before, the vote can be advisory or binding. Provided that shareholders can only accept or reject the BoD's compensation proposal but not determine the details of the contract, it is necessary to define the BoD' fallback position for a shareholder disapproval in a binding vote.[31] To keep the analysis simple, I assume that the BoD revises the contract in a manner that the agent receives only her salary but no bonus whenever the vote is binding and the majority of shareholders rejects the initial contract proposal.

Since the agent's effort choice for a given bonus contract is not affected by the pre-contractual SoP vote, it suffices to begin the analysis with the shareholders' voting decision after date 3. Suppose that the BoD proposes a contract specifying a salary of $\underline{w}$ and an arbitrary bonus b to the firm's shareholders. Different from a post-contractual SoP, shareholders must vote on the contract offer before they know the firm's result and the agent's final compensation. The most natural way to deal with this informational disadvantage is to evaluate the agent's expected compensation against the benchmark level t. Following this approach, shareholders disapprove the contract proposal whenever $E[s(x)] > t$ so that the equilibrium voting dissent equals $\alpha = \Phi(E[s(x)])$.

Given that the vote is pre-contractual, the shareholders' optimal voting strategy is independent of whether or not the SoP is binding. Different from a post-contractual vote,

30 In fact, some European countries such as the Netherlands or Sweden have recently adopted a pre-contractual binding SoP, see European Commission (2010) for details.

31 Clearly, if shareholders were allowed to make their own bonus proposals, they could force the BoD to set the bonus that maximizes their utility. However, assuming that shareholders are able to determine the details of the CEO's compensation contract would lead the idea of SoP to the point of absurdity.

shareholders for which $t > E[s(x)]$ do not have an incentive to remove the agent's bonus from the compensation contract even if they are in a position to enforce such a drastic contract adjustment. The reason is that a bonus of $b = 0$ eliminates the agent's effort incentives and therefore her contribution to firm value.[32] Thus, even if shareholders possess significant veto power, they must not necessarily have an incentive to execute it.

If the pre-contractual vote is advisory, the BoD is not forced to alter the compensation contract after a negative shareholder vote but it anticipates the shareholders' voting dissent and considers it in its compensation decision. Proposition 5 compares the resulting equilibrium efforts and bonus payments with those attainable under a post-contractual voting regime.

Proposition 5: *Let $a^+(\lambda)$ denote the equilibrium effort level and $b^+(\lambda)$ the bonus with a pre-contractual advisory vote. It holds that $a^+(\lambda) \leq a^\circ(\lambda)$ and $b^+(\lambda) \leq b^\circ(\lambda)$. The inequalities are strict whenever $\underline{s} > \underline{w}$ and θ is positive.* **Proof**: see appendix.

According to proposition 5, a BoD with a given dependence level implements a lower equilibrium effort and grants a lower bonus to the agent. It does so because a pre-contractual advisory vote increases the marginal voting dissent and thereby the BoD's disutility arising from a negative shareholder vote.[33] As already argued in section 4 the bonus reduction induced by an advisory SoP increases the shareholders' utility for a given level of board dependence. Because shareholders do not control the BoD's contribution to firm value, they face the same outside option as with a post-contractual SoP. As a matter of fact, the CEO can extract the additional surplus generated by the pre-contractual vote and implement a higher level of board dependence as with a post-contractual SoP. Corollary 2 summarizes the result.

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32 Suppose that the BoD proposes a contract implementing an equilibrium effort of $a' < a^*(1/2)$ so that $\alpha < 1/2$ if only shareholders for which $E[s(x)] > t$ reject the contract. If the contract is implemented, the shareholders' utility equals $E[U_P(y, a')] = y + H(a') + x_L - \underline{w}$. If all shareholders refuse the contract proposal and the BoD cuts the bonus to $b = 0$, the shareholders' utility equals $E[U_p(y, 0)] = y + x_L - \underline{w}$ so that shareholders suffer a loss of $H(a') > 0$.

33 In fact, for a given contract with a salary of $\underline{w}$ and an arbitary bonus b, the shareholder voting dissent aniticipated by the BoD at date 3 equals $\widehat{\alpha}^\circ = a \cdot \phi(t) \cdot [\underline{w} + b - \underline{s}]$ for a post-contractual vote and $\widehat{\alpha}^+ = \phi(t) \cdot [\underline{w} + a \cdot b - \underline{s}]$ for a pre-contractual vote. The difference in the shareholder voting dissent is $\widehat{\alpha}^+ - \widehat{\alpha}^\circ = (1 - a) \cdot \phi(t) \cdot (w - \underline{s})$. Since $\underline{s} \geq \underline{w}$, this expression is weakly increasing in a and makes a lower effort desirable for the BoD.

Corollary 2: *Let λ^{A+} denote the equilibrium level of board dependence with a pre-contractual advisory SoP. It holds that $\lambda^{A+} \geq \lambda^{A}$. The inequality is strict whenever $a^{+}(\lambda) < a^{\circ}(\lambda)$ and* $\lambda^{A} < 1/2$. **Proof**: follows analogously from the proof of proposition 2.

Suppose now that the pre-contractual vote is binding. As long as the majority of shareholders supports the BoD's contract proposal, there is no need to adjust the contract after the shareholder vote. As a consequence, the BoD implements the same contract as with an advisory vote and the CEO establishes a BoD with a dependence level of λ^{A+} as defined in corollary 2. Whenever the initial contract proposal is not supported by the majority of shareholders, the BoD must implement the fallback alternative. A rational board of directors anticipates this scenario and designs the initial contract so that the proposal finds majority support.

Corollary 3: *Let λ^{B+} denote the equilibrium level of board dependence with a pre-contractual binding SoP. It holds that $\lambda^{B+} \leq \lambda^{A+}$. The inequality is strict whenever $b^{+}(\lambda^{A+}) > \underline{b}^{+}$, where $b^{+}(\lambda^{A+})$ is the equilibrium bonus with advisiory SoP and $\underline{b}^{+}$ is the bonus that implements an equilibrium effort $\underline{a}^{+}$ so that $\underline{a}^{+} \cdot C'(\underline{a}^{+}) = E[t] - \underline{w}$. It holds that* $\underline{a}^{+} > 0$. **Proof**: see appendix

Pursuant to corollary 3, a binding SoP imposes weakly tighter limits on board dependence than an advisory vote so that the shareholder control over the agent's compensation becomes more effective. Whenever the threat of rejecting the initial contract proposal after date 3 imposes tighter limits on the agent's bonus than the threat of replacing the BoD at date 2, the equilibrium level of board dependence with a binding SoP is strictly lower than with an advisory SoP. That is, a binding vote can only be more effective if the majority of shareholders fails to support the optimal contract implemented with an advisory vote. Otherwise, both voting regimes yield equivalent board structures.

5.3 Regulatory implications

The analysis in section 4 shows that SoP can have a significant impact on the level of executive compensation and on the equilibrium composition of the BoD. In addition, the analysis of the model extensions in sections 5.1 and 5.2 suggests that an appropriate SoP design can be important for its effectiveness, especially as it concerns the enforceability and the timing of the shareholder vote. A rational regulatory authority must consider these consequences and adopt measures that satisfy the objectives of the regulation. The natural purpose of SoP is to improve shareholder rights in order to maximize the expected shareholder value. In the context of the model, this objective is equivalent to maximizing the principal's expected utility. Proposition 6 asserts how the basic advisory SoP complies with this objective.

Proposition 6: *Shareholders weakly benefit form an advisory SoP. Whenever $\lambda^A < 1/2$, shareholders attain the same utility level as in the absence of SoP. They are strictly better off if SoP cannot affect the equilibrium level of board dependence, that is if $\lambda^A = \lambda^N = 1/2$.* **Proof**: see appendix.

According to proposition 6, advisory SoP leaves the utility of shareholders largely unaffected. As shown in section 4, an advisory vote lowers the compensation cost for a given level of board dependence because the BoD derives a disutility from a negative shareholder vote and adjusts the agent's compensation accordingly. Since the CEO has the real authority over the composition of the board, she can extract the rent generated by the improved compensation policy and establish a more dependent BoD. As long as there are no restrictions on the level of board dependence, the CEO implements a board with a dependence level of $\lambda^A < 1/2$ and captures the full surplus in form of a higher compensation.

Shareholders can only benefit from the advisory vote if the CEO is restricted in her ability to extract the surplus. Particularly, whenever $\lambda^N = 1/2$, so that the level of board dependence can not be adjusted, the shareholders unambiguously benefit from an advisory vote on the CEO's compensation. It follows that an advisory shareholder vote can only be beneficial for firms with extreme levels of board dependence. As an alternative, the regulator might consider the introduction of a binding shareholder vote. Proposition 7 summarizes the potential consequences of this measure.

Proposition 7: *The consequences of a stricter enforceability of the SoP depend on the legal protection standards of the CEO. If $m > \overline{m}$, shareholders attain the same utility level as with an advisory SoP. If SoP becomes binding, the shareholders' utility is increasing whenever $\underline{m} < m < \overline{m}$ and decreasing if $m < \underline{m}$.* **Proof**: see appendix.

As already argued in section 5.1, the consequences of a binding SoP critically depend on the legal protection standard of the CEO. Since the vote is post-contractual and binding, the shareholders face a moral hazard problem because the SoP design allows them to refuse the payment of the bonus after the CEO has spent her personal effort for the firm. A rational CEO anticipates this problem and adjusts her effort accordingly. The protection standard

m defines to what extent the shareholder vote can actually reverse existing compensation arrangements and thereby limits the consequences of the moral hazard problem. If $m > \overline{m}$, there is no moral hazard problem because the shareholders are not in a position to refuse the compensation granted by the BoD under an advisory voting regime.

By contrast, if $m < \overline{m}$ the shareholders can at least partly refuse the payment of the CEO's bonus. This threat effectively limits the CEO's compensation to a bonus of $\underline{b} := m - \underline{w}$ and thereby prompts the CEO to limit the level of board dependence to λ^B. Since $\lambda^B < \lambda^A$ and λ^A is larger than λ^*, the optimal level of board dependence from the shareholders' perspective, the firm's shareholders are strictly better of if SoP becomes binding, provided the protection standard is not too low. Particularly, whenever $m < \underline{m}$, the consequences of the moral hazard problem are so severe that the shareholders' utility is lower than with an advisory vote.

In extreme cases where the legal protection standard is so low that the shareholders can refuse any bonus payment ex post ($m = \underline{w}$), a binding SoP completely destroys the agent's effort incentives. Because the principal cannot credibly commit to refrain from a retroactive pay cut, the binding SoP not only reduces the agent's compensation but also minimizes her contribution to firm profit. Moreover, because the CEO does not benefit from establishing a dependent BoD, the BoD's contribution is reduced to $\overline{v}$. These results show that a binding CEO is a double-edged sword that should only be used if the legal environment provides sufficient protection against the moral hazard problem on the part of shareholders. One way to avoid this problem is a change in the order of moves so that the vote takes place before the agent signs the contract. Corollary 4 summarizes the consequences of a pre-contractual vote.

Corollary 4: *The consequences of a pre-contractual SoP depend on its enforceability.*
A) If SoP is advisory, shareholders (weakly) benefit relative to a post-contractual vote if $\lambda^{A+} = \lambda^A = 1/2$. *If* $\lambda^{A+} < 1/2$, *both alternatives yield identical utility levels.*
B) The expected compensation with an advisory vote equals $E[s^{A+}]$. *A binding vote can only affect the utility of shareholder if* $E[s^{A+}] > E[t]$. *If this condition is met, there exists a range of equilibrium effort levels* $\underline{a}^+$ *for which shareholders attain a strictly higher utility with a binding vote.*

If the precontractual vote is advisory, the change of the timing has not much impact on the utility of shareholders. As before, they can only benefit if the CEO is restricted in her ability to adjust the level of board dependence. Whenever $\lambda^A = 1/2$ so that the CEO cannot increase λ, the shareholders' utility (weakly) increases because a pre-contractual vote invokes a (weakly) higher level of board dependence. As shown in proposition 5, the voting dissent is higher with a pre-contractual vote whenever $\underline{s} > \underline{w}$. Thus, if all shareholders accept at least a small but positive bonus payment, the firm pays less compensation for the same level of board dependence and implements an effort level that is closer to the effort level that maximizes the agents' contribution to firm profit without reducing the board's contribution to firm value.

If the precontractual vote is binding, shareholders can attain a higher utility whenever the compensation paid with an advisory vote is not supported by the majority of shareholders. In this case, the BoD adjusts the bonus so that a majority of shareholders accepts the compensation proposal. The CEO anticipates the pay cut and limits the level of board dependence to λ^{B+} at date 1. As with a post-contractual vote the firm's shareholders benefit from this step because $\lambda^{B+} < \lambda^{A+}$ and λ^{A+} is larger than λ^*. However, since the vote takes place before the contract is signed, this limitation does not arise from a moral hazard problem but from the requirement to find the shareholders' majority support for the SoP proposal. Since it is always possible to propose a contract with a strictly positive bonus payment that is accepted by a majority of shareholders, the CEO's effort incentives are only reduced but cannot be completely destroyed with a pre-contractual vote. If the agent's incentives are not reduced too much, shareholders unambiguously benefit from a pre-contractual binding SoP.

The shareholders' utility can only be negatively affected if the expected value of the benchmark pay level t is relatively low so that the average shareholder accepts only small bonus payments. Though theoretically possible without imposing further restrictions on $\overline{s}$, this scenario is not very realistic because it requires that a majority of shareholders refuses a compensation policy that strictly increases their utility. For realistic scenarios, a pre-contractual binding can therefore be expected to contribute to shareholder value.

6 Summary and conclusions

In this paper I examine the impact of SoP on the compensation decisions and the structure of the board of directors. I propose a three-layer agency model with a CEO, a BoD, and the firm's shareholders. Although all parties are risk neutral an agency problem arises because the CEO is protected by limited liability. Since SoP can only provide room for improvement if there are inefficiencies in the pay-setting process, I consider a firm in which the CEO has the real authority over the BoD. Since the BoD is responsible for designing the agent's compensation contract, the CEO's power over the BoD allows her to influence her own pay.

The composition of the board of directors is determined as the equilibrium of a multi-stage game. At the first stage of the game the CEO proposes a director slate that must be approved by the firm's shareholders at stage two. The board members differ in their ability to contribute to firm value and their dependence from the CEO. The dependence level of each candidate is common knowledge but only the CEO can evaluate the potential contributions of individual board members. This informational advantage allows the CEO to combine the two qualities of board members in a manner that makes a dependent BoD attractive to shareholders. Since shareholders cannot evaluate the contribution of individual board members, they are unable to establish an efficient board structure. As an outside alternative they can refuse the CEO's director slate and replace it with an independent BoD that provides an expected contribution of zero.

The key variable in the model is the level of board dependence. The CEO is interested in a more dependent BoD because it offers her a higher bonus for a given firm performance. To obtain the shareholder approval for a dependent BoD, the CEO composes the BoD so that its contribution to firm value is positively related to the level of board dependence. Shareholders solve the resulting trade-off between an increasing contribution to firm value and higher compensation cost by accepting a dependent board. The equilibrium level of board dependence is determined by the point where shareholders attain the same utility as with their outside option.

Under these conditions, the introduction of a shareholder vote on the CEO's compensation has a direct and an indirect consequence. The direct effect prompts a BoD with a given dependence level to reduce the CEO's bonus for a given firm performance. A BoD with a given structure cuts the CEO's bonus because the board members derive a disutility from a negative shareholder vote and because they anticipate that the voting dissent is increasing in the agent's compensation. However, since the CEO has the real authority over the composition of the BoD and the shareholders face the same outside option, the CEO can extract the rent generated by the improved compensation policy and establish a more dependent BoD. As an indirect consequence of SoP the board becomes more dependent from the CEO and pays her a higher compensation for the same level of performance. As a matter of fact, SoP reduces the efficiency of the CEO's compensation contract and aggravates the firm's governance problem. This outcome can only be avoided if the CEO is restricted in her ability to adjust the board composition.

Motivated by existing international differences in SoP design, I also analyze the consequences of a binding SoP and the impact of a pre-contractual vote. I first maintain the timing of the standard SoP model and demonstrate that a binding vote creates a moral hazard problem on the part of the firm's shareholders. In fact, since the vote takes place after the agent has supplied her effort, shareholders have an incentive to expropriate the CEO by refusing the payment of the bonus. A rational CEO anticipates this threat and reduces her effort accordingly. The consequences of the moral hazard problem critically depend on the legal protection standard of the CEO. If existing contractual arrangements between the BoD and the CEO cannot be overruled by the SoP vote, a binding SoP yields the same outcome as an advisory vote. If the shareholders can only enforce small bonus cuts, a binding SoP can even improve the efficiency of the compensation contract and limit the level of board dependence. In the worst case, where all bonus payments must be approved by the firm's shareholders, the threat of a retroactive pay cut completely destroys the agent's effort incentives and thereby diminishes shareholder value.

A pre-contractual vote can avoid the moral hazard problem because the vote on the compensation takes place before the agent supplies her effort. If the pre-contractual vote is binding, shareholders can force the BoD to improve the efficiency of the compensation arrangement and effectively reduce the equilibrium level of board dependence. However, these effects are not caused by a moral hazard problem but by the requirement to find the shareholders' majority support for the SoP proposal. If the pre-contractual vote is advisory, the change of the timing has only little impact on the equilibrium of the game except for a weakly higher voting dissent.

Overall, my findings suggest that a shareholder vote on the remuneration of executives as well as its enforceability and its timing can have a significant impact on the equilibrium degree of board dependence, the level of executive compensation, and on the utilities of the players. The standard approach of an advisory SoP usually leaves the shareholders' utility unaffected and can only add to shareholder value if the CEO is restricted in her ability to adjust the board structure. The impact of a post-contractual binding SoP critically depends on the legal protection standard of the CEO. I identify conditions under which shareholders strictly benefit from a binding SoP but there is also a minimum protection standard below which a binding SoP diminishes firm value. Since the critical values determining the efficacy of the legal standard are firm specific, it is hardly possible for a regulator to release legal protections that unambiguously benefit all firms with weak governance structures. This problem does not apply to a pre-contractual vote but it is not guaranteed that shareholders strictly benefit from such a step. If the vote is binding, shareholders attain a higher utility whenever the compensation paid with an advisory vote is not supported by the majority of shareholders. If the vote is advisory, the shareholders typically attain the same utility as with a post-contractual SoP.

Appendix

Proof of Lemma 1

For a given value of λ, the BoD maximizes

$$E[V_B] = (1-\lambda)\cdot(y(\lambda)+x_L+a\cdot\Delta_x) - \lambda\cdot C(a) - (1-2\lambda)\cdot(w+a\cdot b) \tag{19}$$

subject to the limited liability constraint in (8), the participation constraint in (7) and the incentive constraint in (9).

I first show that the participation constraint is not binding. Substituting for b from the incentive constraint into the participation constraint yields

$$w + a\cdot C'(a) - C(a) \geq 0 \tag{20}$$

Since $C(a)$ is strictly convex, $G(a) = a\cdot C'(a) - C(a)$ is positive and monotonically increasing in a, i.e. $G'(a) = a\cdot C''(a) > 0$. Thus, it must be that $w < 0$ if the participation constraint should be binding. However, a negative salary violates the limited liability constraint, a contradiction. It follows that (8) must be binding and that the optimal salary equals $w^* = \underline{w}$. Substituting for b and w from (8) and (9) into (19) and rearranging terms yields the first order condition

$$\partial E[V_B]/\partial a = (1-\lambda)\cdot[\Delta_x - C'(a)] - (1-2\lambda)\cdot a\cdot C''(a) = 0, \tag{21}$$

solving for a yields the expression in (10). Since $h(\lambda) = (1-\lambda)/(1-2\lambda) \geq 1$ and $h(\lambda)$ is monotonically increasing in λ, $a^*(\lambda) = h(\lambda)\cdot[(\Delta_x - C'(a))/C''(a)]$ is monotonically increasing in λ. For $\lambda = 1/2$, the ratio $h(\lambda)$ is not defined but (21) becomes

$$\partial E[V_B]/\partial a = \frac{1}{2}\cdot[\Delta_x - C'(a)] = 0. \tag{22}$$

This condition is only satisfied by the first-best effort level in (6)

Proof of Lemma 2

Since $H(a)$ is strictly concave and monotonically decreasing in a for $\lambda > 0$, (13) has a unique maximum implicitly defined by the first order condition

$$\frac{\partial E[U_P(y(\lambda), a^*(\lambda))]}{\partial\lambda} = \rho + H'(a^*(\lambda))\cdot\frac{da^*(\lambda)}{d\lambda} \geq 0. \tag{23}$$

Since $H'(a^*(\lambda)) < 0$ for $\lambda > 0$ and $a^*(\lambda)$ is monotonically increasing in lambda, the second term in (23) is negative, it follows that $\lambda^* > 0$ whenever $\rho > 0$. An interior solution is obtained if

$$\frac{\partial E[U_P(y(1/2), a^*(1/2))]}{\partial \lambda} < 0, \tag{24}$$

otherwise $\lambda = 1/2$. Since (23) is monotonically increasing in ρ, there exists a critical value $\rho = \rho^+$ for which (24) holds with equality. Since $\rho \leq \overline{\rho}$, it follows that $\lambda^* < 1/2$ whenever $\rho^+ < \overline{\rho}$.

Proof of Proposition 1

At date 1 the CEO composes a BoD with a dependence level λ and a contribution $y(\lambda)$ and proposes it to the firm's shareholders. If the shareholders accept the proposal at date 2, their utility equals

$$E[U_P(y(\lambda), a^*(\lambda))] = y(\lambda) + x_L - \underline{w} + H(a^*(\lambda)) \tag{25}$$

if they refuse the proposal, their net utility after transaction cost equals

$$E[U_P(0, a^*(0))] - k = x_L - \underline{w} + H(a^*(0)) - k. \tag{26}$$

It follows that the shareholders accept the CEO's proposal whenever

$$y(\lambda) + H(a^*(\lambda)) \geq H(a^*(0)) - k. \tag{27}$$

To determine the optimal board composition, the CEO maximizes her expected utility subject to the shareholders' participation constraint (27). Substituting from (10), (12), and (11) into the agents's utility function (1) yields an equilibrium utility of:

$$E[U_A^*] = \underline{w} + G(a^*(\lambda)) \tag{28}$$

Since $G(a)$ is monotonically increasing in a and a is increasing in λ from lemma 1, the expression in (28) is monotonically increasing λ. That is, the agent implements the maximum level of board dependence satisfying (27).

The parameters of the board's contribution function do not directly affect the agent's utility but a positive contribution relaxes the shareholders' participating constraint. The higher $y(\lambda)$, the larger the left hand side of (27). It follows that the CEO composes the BoD so that $v = \overline{v}$ and $\rho = \overline{\rho}$. As in the first-best case, the contribution function becomes

$y^{FB}(\lambda) = \overline{v} + \overline{\rho} \cdot \lambda$. Using the fact that $H(a^*(1/2)) = 0$ and evaluating the shareholders' participation constraint in (27) shows that the optimal solution falls into two cases:

Case 1: If $y^{FB}(\lambda^{FB}) \geq H(a^*(0)) - k$, $\lambda^N = 1/2$.

Case 2: If $y^{FB}(\lambda^{FB}) < H(a^*(0)) - k$, $\lambda^N \in (0, 1/2)$.

In the second case, the equilibrium level of board dependence is found by solving (14) for λ. Since the left hand side of (14) is strictly concave in λ and $y^{FB}(0) > 0$, the solution is unique.

Proof of Lemma 3

With SoP the BoD considers the disutility arising from a negative shareholder vote and maximizes

$$Z = E[V_B] - E[D_B], \tag{29}$$

where $E[D_B] = \theta \cdot \widehat{\alpha}$ and $\widehat{\alpha} = a \cdot \alpha(x_H) = a \cdot \phi(t) \cdot [w + b - \underline{s}]$. Maximizing Z under the limited liability constraint in (8), the participation constraint in (7) and the incentive constraint in (9) yields the following first order condition

$$\partial Z/\partial a = \partial E[V_B]/\partial a - \theta \cdot \phi(t) \cdot [a \cdot C''(a) + C'(a) + \underline{w} - \underline{s}] = 0, \tag{30}$$

where $\partial E[V_B]/\partial a$ is given by (21). Using the fact that $\alpha(x_H) = \phi(t) \cdot [\underline{w} + C'(a) - \underline{s}]$ and solving for a yields the expression in (16). Let λ denote an arbitrary level of board dependence and $a^*(\lambda)$ the optimal effort level in the absence of SoP, it holds that

$$\partial Z/\partial a|_{a=a^*(\lambda)} = -\theta \cdot \phi(t) \cdot [a \cdot C''(a) + C'(a) + \underline{w} - \underline{s}] < 0. \tag{31}$$

The expression must be positive because it must hold that $\underline{w} + C'(a) > \underline{s}$. Otherwise, all shareholders would support the optimal contract offered by the dependent BoD. This is a contradiction to the initial condition that $\widehat{\alpha} > 0$. It follows that $a^\circ(\lambda) \leq a^*(\lambda)$. The inequality is strict whenever θ is positive.

Proof of Proposition 2

At date 1 the CEO proposes a BoD with a dependence level λ and a contribution function $y^{FB}(\lambda)$ to shareholders. As in the absence of SoP shareholders compare the expected utility arising from the CEO's proposal with the expected utility derived from a (potentially less dependent) replacement alternative that provides no contribution to firm value. Considering the transaction cost, the outside alternative provides a utility of

$$H(a^{\circ}(\lambda)) - k \tag{32}$$

However, since $H(a)$ is strictly concave and maximized by $a = a^{*}(0) > a^{\circ}(0)$ it cannot be optimal for the firm's shareholders to implement an independent BoD as an outside alternative. In fact, maximizing (34) requires to set $\lambda' > 0$ so that $a^{\circ}(\lambda') = a^{*}(0)$. It follows that

$$H(a^{\circ}(\lambda')) - k = H(a^{*}(\lambda)) - k, \tag{33}$$

that is, the shareholders' outside option yields the same utility as in the absence of SoP. Using this result the shareholders' participation constraint can be written as

$$y^{FB}(\lambda) + H(a^{\circ}(\lambda)) \geq H(a^{*}(0)) - k, \tag{34}$$

where $a^{\circ}(\lambda)$ denotes the agent's equilibrium effort for a given level of board dependence as defined in (16). The condition in (34) is identical to (27) except for the fact that the equilibrium effort on the left hand side of (34) is $a^{\circ}(\lambda)$ and not $a^{*}(\lambda)$. As in the absence of SoP, the optimal solution falls into two cases:

case 1: If $y^{FB}(\lambda^{FB}) + H(a^{\circ}(\lambda^{FB})) \geq H(a^{*}(0)) - k$, $\lambda^{A} = 1/2$.

case 2: If $y^{FB}(\lambda^{FB}) + H(a^{\circ}(\lambda^{FB})) < H(a^{*}(0)) - k$, $\lambda^{A} \in (0, 1/2)$.

In the second case, the equilibrium level of board dependence is found by solving (17) for λ.

To verify that $\lambda^{N} \leq \lambda^{A}$, I consider first an arbitrary interior solution $\lambda^{N} < 1/2, \lambda^{A} < 1/2$ so that (14) and (17) are satisfied in equilibrium and it must hold that

$$y^{FB}(\lambda^{N}) + H(a^{*}(\lambda^{N})) = y^{FB}(\lambda^{A}) + H(a^{\circ}(\lambda^{A})). \tag{35}$$

Assume now that $\lambda^{A} = \lambda^{N}$ so that $a^{\circ}(\lambda^{N}) \leq a^{*}(\lambda^{N})$ from Lemma 3. Since $H(a)$ is monotonically decreasing in a for $a > a^{*}(0)$ it must hold that $H(a^{\circ}(\lambda^{N})) > H(a^{*}(\lambda^{N}))$ so that the right hand side of equation (35) is larger than the left hand side. It follows that the CEO can increase λ^{A} up to the point where equation (35) holds with equality.

I consider next a boundary solution for λ^{A} : Let $y^{FB}(\lambda^{FB}) + H(a^{\circ}(\lambda^{FB})) = H(a^{*}(0)) - k$ so that $\lambda^{A} = 1/2$. Since $H(a^{\circ}(\lambda^{FB})) > 0$, the boundary condition implies that $y^{FB}(\lambda^{FB}) < H(a^{*}(0)) - k$ so that $\lambda^{N} < 1/2$. It follows that $1/2 \geq \lambda^{A} > \lambda^{N}$ as long as $\lambda^{N} < 1/2$.

Proof of Proposition 3

Let (14) and (17) hold so that $\lambda^N < \lambda^A < 1/2$. To rank the resulting equilibrium efforts under both regimes fix λ^N and suppose that the shareholders accept board proposals up to $\lambda^A > \lambda^N$ so that $a^\circ(\lambda^A) = a^*(\lambda^N)$ and $H(a^\circ(\lambda^A)) = H(a^*(\lambda^N))$. With this policy (35) becomes

$$y^{FB}(\lambda^N) < y^{FB}(\lambda^A) \tag{36}$$

so that the firm must further increase λ^A to satisfy (35). It follows that in equilibrium $H(a^\circ(\lambda^A)) < H(a^*(\lambda^N))$ and since $H'(a) < 0$ for $a > a^*(0)$ it must hold that $a^\circ(\lambda^A) > a^*(\lambda^N)$. Moreover, since $\lambda^A > \lambda^N$ and $a^\circ(\lambda^A) > a^*(\lambda^N)$ the incentive constraint in (9) implies that $b^\circ(\lambda^A) > b^*(\lambda^N)$.

Now let $\lambda^N = \lambda^A = 1/2$. It follows directly from lemma 3 that $a^\circ(\lambda^A) < a^*(\lambda^N)$ from (9) that $b^\circ(\lambda^A) < b^*(\lambda^N)$ so that the agent's total compensation is reduced. Given the opposite consequences of the two extreme cases it must be that for $\lambda^N < 1/2$ and $\lambda^A = 1/2$ the agent's compensation and her equilibrium effort can increase or decrease depending on the difference between $\lambda^N$and λ^A.

Proof of Proposition 4

The equilibrium voting strategy of shareholders depends on the amount of the agent's compensation, $s(x)$, relative to the size of the legally enforceable compensation level m. There are two solutions.

Case 1: If $s(x_H) > m$, $\alpha(x_H) = 1$.

Case 2: If $s(x_H) \leq m, \alpha(x_H) = \Phi[s(x_H)]$, as in the case of an advisory vote.

Consider first case 2. Since the shareholders' cannot force the BoD to cut the agent's compensation below m, shareholders cannot alter the compensation contract even if the majority rejects the SoP proposal, i.e. $\Phi[s(x_H)] > 1/2$. It follows that the optimal compensation contract and the equilibrium composition of the BoD are the same as with advisory SoP.

Consider next case 1. Here, the BoD is forced to cut the agent's compensation to $\underline{b} = m - \underline{w}$ ex post. A rational CEO anticipates the pay cut and reduces her optimal effort level to $\underline{a} = C'^{-1}(\underline{b})$. That is, regardless of whether or not the BoD proposes a bonus $b > \underline{b}$ at date 3, the agent will not provide more effort than $a = \underline{a}$ because she anticipates the consequences of the binding SoP vote. Accordingly, the BoD's expected utility at the contracting stage equals

$$E[V_B - D_B | a = \underline{a}] = E[V_B(\underline{a}, \underline{b}, \underline{w})] - \theta \cdot \widehat{\alpha}, \tag{37}$$

where $E[V_B(a, b, w)]$ is given in (19) and $\widehat{\alpha}$ is the anticipated voting dissent. Since the first term of the BoD's objective function is constant but the second term is monotonically decreasing in $\widehat{\alpha}$, the BoD has a strict incentive to minimize the anticipated voting dissent. It does so by proposing a bonus of $\underline{b}$ in the first place because this pay level induces an equilibrium voting dissent of $\Phi[\underline{w} + \underline{b}] < 1$ instead of a voting dissent of $\alpha(x_H) = 1$ if $b > \underline{b}$.

At date 1, the CEO composes the BoD in order to maximize her utility, $w + G(a)$. As before, she proposes a BoD with a dependence level λ to maximize $G(a)$ and the first-best contribution function $y^{FB}(\lambda)$ to meet the shareholders' participation constraint. Anticipating that the bonus cannot exceed $\underline{b}$, the agent realizes that her equilibrium effort will not be larger than $\underline{a}$. Therefore, the CEO must simply assure that the BoD does not aim to implement an equilibrium effort lower than $\underline{a}$.

As long as $\underline{a} > a^\circ(0)$, the CEO proposes a BoD with a positive dependence level λ^B so that $a^\circ(\lambda^B) = \underline{a}$.[34] It must be that $\lambda^B < \lambda^A$ because otherwise $b^\circ(\lambda^A) < \underline{b}$, or equivalently, $s(x) \leq m$, a contradiction. If $\underline{a} \leq a^\circ(0)$ and $\underline{b} \leq b^\circ(0)$ so that the shareholders even disapprove the optimal bonus proposed by an independent BoD, the CEO does not benefit from a dependent BoD and proposes a BoD with a dependence level of $\lambda^B = 0$.

Since $\lambda^B < \lambda^A$, shareholders accept the CEO's board proposal at date 2. In fact, following the same arguments as in the proof of proposition 2, it must hold that any solution $\lambda^A > \lambda^B \geq 0$ satisfies the shareholders' participation constraint in (34). However, if $\underline{a} < a^\circ(0)$, the shareholders' participation constraint becomes

$$y^{FB}(0) + H(\underline{a}) \geq H(\underline{a}) - k, \tag{38}$$

where the expression on the right hand side of (38) reflects the fact that rational shareholders must adopt the same voting strategy for the SoP proposal after date 5 regardless of whether or not they approve the BoD at date 2.

34 Note that for $0 \leq \lambda \leq \lambda^B$ the BoD faces identical objective functions with a binding and an advisory SoP because for $\lambda \leq \lambda^B$ it holds that $s(x) \leq m$. Therefore $a^\circ(\lambda)$ is the optimal effort level with both forms of SoP as long as $0 \leq \lambda \leq \lambda^B$.

Proof of Proposition 5

The proof is similar to the proof of lemma 3. The BoD maximizes its objective function Z in (29) considering the limited liability constraint in (8), the participation constraint in (7) the incentive constraint in (9), and the disutility arising from the anticipated voting dissent, $\widehat{\alpha} = \phi(t) \cdot [w + a \cdot b - \underline{s}]$. The first order condition for this problem is

$$\partial Z/\partial a = \partial E[V_B]/\partial a - \theta \cdot \phi(t) \cdot [a \cdot C''(a) + C'(a)] = 0, \tag{39}$$

where $\partial E[V_B]/\partial a$ is given in (21). Evaluating the first order condition at the optimal effort level with a post-contractual advisory SoP in (16) yields

$$\partial Z/\partial a\big|_{a=a^{\circ}(\lambda)} = \theta \cdot \phi(t) \cdot [\underline{w} - \underline{s}] \leq 0 \tag{40}$$

Because $\underline{s} \geq \underline{w}$, it must be that $a^{+}(\lambda) \leq a^{\circ}(\lambda)$. The inequality is strict whenever $\underline{s} > \underline{w}$ and θ is positive.

Proof of Corollary 3

Suppose that the BoD proposes a contract specifying the minimum salary $\underline{w}$ and an arbitrary bonus b at date 3. After date 3 but before the final contract is signed and the agent's takes her effort decision, the shareholders evaluate the expected compensation against the benchmark t. Since only the fraction of voters for which $E[s(x)] > t$ rejects the contract proposal, the equilibrium voting dissent equals $\alpha = \phi(t) \cdot [w + a \cdot b - \underline{s}]$. As long as $0 < \alpha \leq 1/2$, the BoD considers the disutility arising from the shareholder vote in its compensation decision and sets $b = b^{+}(\lambda)$ to implement an effort of $a = a^{+}(\lambda)$ as defined in proposition 5. At date 1 the CEO proposes a dependence level of λ^{A+} as defined in corollary 2. The solution is equivalent to the equilibrium with a pre-contractual advisory SoP.

Suppose now that $\phi(t) \cdot [w + a^{+}(\lambda^{A+}) \cdot b^{+}(\lambda^{A+}) - \underline{s}] > 1/2$ so that the majority of shareholders rejects the contract proposal of the board. Since the BoD cannot enforce a contract that does not find majority support and a rejection of the bonus would reduce the BoD's utility, it anticipates the shareholder vote and proposes a contract so that $\alpha \leq 1/2$. Considering the agent's incentive constraint (9) and rearranging this inequality results in the following constraint on the agent's equilibrium effort:

$$a \cdot C'(a) \leq E[t] - \underline{w}, \tag{41}$$

where $E[t]$ is the expected value of the benchmark pay. That is, all contracts implementing an equilibrium effort so that (41) is satisfied are (weakly) supported by the majority of shareholders. The equilibrium effort $\underline{a}^+$ solves (41) with equality and $\underline{b}^+$ is the bonus implementing $\underline{a}^+$. Since $E[t] > \underline{w}$, it must be that $\underline{a}^+ > 0$.

Following the same arguments given in the proof of Proposition 4, it can be shown that CEO proposes a BoD with a dependence level $\lambda^{B+} \leq \lambda^{A+}$ so that $a^{\circ}(\lambda^{B+}) = \underline{a}^+$. As long as $\underline{a}^+ > a^{\circ}(0)$, λ^{B+} is positive, otherwise $\lambda^{B+} = 0$. At date 2, shareholders accept the CEO's director slate (see the proof of proposition 4 for details).

Proof of Proposition 6

For a given level of board dependence and a given effort level of the agent, the shareholders' utility equals

$$E[U_P(y(\lambda), a)] = y(\lambda) + H(a) + x_L - \underline{w}. \tag{42}$$

From (14) and (17) it holds in equilibrium that

$$E[U_P(y^{FB}(\lambda^N), a^*(\lambda^N))] = E[U_P(y^{FB}(\lambda^A), a^{\circ}(\lambda^A))] = H(a^*(0)) - k, \tag{43}$$

for $\lambda^N < \lambda^A < 1/2$, so that the shareholders receive the same expected utility with and without an advisory SoP. If $y^{FB}(\lambda^{FB}) + H(a^*(\lambda^{FB})) > H(a^*(0)) - k$, so that $\lambda^A = \lambda^N = \lambda^{FB} = 1/2$, the CEO cannot extract the full surplus and it holds that

$$\begin{aligned} & E[U_P(y^{FB}(\lambda^{FB}), a^{\circ}(\lambda^{FB}))] - E[U_P(y^{FB}(\lambda^{FB}), a^*(\lambda^{FB}))] \\ = \; & H(a^{\circ}(\lambda^{FB})) - H(a^*(\lambda^{FB})) > 0 \end{aligned} \tag{44}$$

The expression is positive because $H(a)$ is decreasing in λ for $a > a^*(0)$, and $a^*(0) > a^{\circ}(\lambda^{FB}) > a^*(\lambda^{FB})$.

Proof of Proposition 7

From proposition 4, a binding SoP has different consequences than an advisory vote if it holds that

$$m < \overline{m} := b^{\circ}(\lambda^A) - \underline{w}, \tag{45}$$

otherwise shareholders attain the same utility level under both forms of SoP. If condition (45) holds, the shareholders' utility equals

$$E[U_P(y^{FB}(\lambda^B), \underline{a})] = y^{FB}(\lambda^B) + H(\underline{a}) + x_L - \underline{w}.$$

where $\underline{a} < a^{\circ}(\lambda^A)$ and $\lambda^B < \lambda^A$. Suppose now that $\underline{a} > a^{\circ}(0)$ so that $a^{\circ}(\lambda^B) = \underline{a}$. Since the shareholders' utility function is strictly concave in λ and maximized for $0 < \lambda^* < \lambda^A$, there exists a range of values for λ^B for which the shareholders attain a higher utility level if the SoP vote becomes binding. The lower bound of this range is given by the point where the equation

$$E[U_P(y^{FB}(\lambda^B), \underline{a})] \geq E[U_P(y^{FB}(\lambda^N), a^{\circ}(\lambda^A))]. \tag{46}$$

holds with equality. Assuming that (46) holds as a strict inequality for $\underline{a} = a^{\circ}(0)$ and using the definitions of y^{FB} and $E[U_P(\cdot)]$, this condition becomes

$$H(\underline{a}) \leq \overline{\rho} \cdot \lambda^A + H(a^{\circ}(\lambda^A)). \tag{47}$$

Since the right hand side of (47) is strictly positive and $\underline{a} = 0$ for $m = \underline{w}$ from the proof of proposition 4, there must exist a critical level $\underline{m} > \underline{w}$ below which the shareholders' utility is strictly lower if the SoP becomes binding. Because $\underline{a} = C'^{-1}(\underline{b}) = C'^{-1}(m - \underline{w})$, the critical protection standard $\underline{m}$ is implicitly defined by the effort level $\underline{a}$ that solves (47) with equality.[35]

Proof of Corollary 4

A) Suppose first that the vote is advisory. To verify that a pre-contractual SoP yields a higher utility than a post-contractual vote, suppose that $\lambda^{A+} = \lambda^A = \lambda^{FB}$, so that shareholders are better off with SoP. Since $a^+(\lambda^{FB}) \leq a^{\circ}(\lambda^{FB})$ from proposition 5, it must hold that

$$E[U_P(y^{FB}(\lambda), a^+(\lambda))] \geq E[U_P(y^{FB}(\lambda), a^{\circ}(\lambda))]. \tag{48}$$

As shown in proposition 5, the inequality is strict whenever $\underline{s} > \underline{w}$ and θ is positive.

B) Suppose now that the vote becomes binding. As shown in the proof of corollary 3, the enforceability of a pre-contractual vote does only affect the players' equilibrium strategies if

$$E[s^{A+}] = a^+(\lambda^{A+}) \cdot C'(a^+(\lambda^{A+})) - \underline{w} > E[t]$$

so that the majority of shareholders rejects the contract proposal of the board. Otherwise, the shareholders' utility is the same as with an advisory vote. Following the arguments in corollary 3 and proposition 4, there must exist a range of effort levels $a^{\circ}(\lambda^{B+}) = \underline{a}^+$

35 The solution assumes that $\underline{a} = C'^{-1}(\underline{m} - \underline{w}) < a^{\circ}(0)$. If this condition is not met, $\underline{a}$ solves $H(\underline{a}) = \overline{\rho} \cdot (\lambda^A - \lambda^{B+}) + H(a^{\circ}(\lambda^A))$, the rest of the argumant is identical to the case where $\underline{a} = C'^{-1}(\underline{m} - \underline{w}) < a^{\circ}(0)$.

and corresponding board dependence levels λ^{B+} for which the shareholders derive a higher utility if the SoP becomes binding. The lower bound of this range is implicitly defined by the condition

$$H(\underline{a}^{+}) \geq \overline{\rho} \cdot (\lambda^{A+} - \lambda^{B+}) + H(a^{+}(\lambda^{A+})), \tag{49}$$

whenever there exists an effort level $\underline{a}^{+}$ for which (49) holds with equality. Otherwise, the shareholders always benefit if the pre-contractual SoP becomes binding. In fact, different from a post-contractual vote, the agents' equilibrium effort cannot become zero. That is, since $\underline{a}^{+}$solves (41) and $E[t] > \underline{w}$, it holds that $\underline{a}^{+} > 0$ so that it is possible that (49) always holds as a strict inequality.

References

Adams, Renee B., Hermalin, Benjamin E. and Michael S. Weisbach (2010): The Role of Boards of Directors in Corporate Governance: A Conceptual Framework and Survey, Journal of Economic Literature, 48(1), 58-107.

Adams, Renee B., and Ferreira, Daniel (2007): A Theory of Friendly Boards, Journal of Finance, Vol. 62, No. 1, S. 217-250.

Aghion, Philippe and Jean Tirole (1997): Formal and real authority in organizations, Journal of Political Economy 105, 1-29.

Alissa, Walid (2009): Boards Response to Shareholders Dissatisfaction: The Case of Shareholders Say on Pay in the UK, available at http://ssrn.com/abstract=1412880.

Bebchuk, Lucien A. and Jesse M. Fried (2003): Executive Compensation as an Agency-Problem, Journal of Economic Perspectives Vol. 17, 71-92.

Bebchuk, Lucien A. and Jesse M. Fried (2004): Pay without Performance - The unfulfilled Promise of Executive Compensation, Cambridge and London: Harvard University Press.

Bertrand, Marianne amd Mullainathan, Sendhil (2000): Agents With and Without Principals, American Economic Review, Vol 90, 203–208.

Bertrand, Marianne and Mullainathan, Sendhil (2001): Are CEOS rewarded for Luck? The Ones without Principals are, The Quarterly Journal of Economics, 901-932.

Bogle, John C. (2008): Reflections on CEO Compensation, Academy of Management Perspectives, 22(2), 21-25.

Cai, Jie and Ralph A. Walkling (2011): Shareholders' Say on Pay: Does it Create Value?, Journal of Financial and Quantitative Analysis, Vol. 46, No. 2, 299-339.

Carter, Mary Ellen and Valentina Zamora (2009): Valentina, Shareholder Remuneration Votes and CEO Compensation Design. Available at http://ssrn.com/abstract=1004061

Conyon, Martin J. and Graham V. Sadler (2010): Shareholder Voting and Directors Remuneration Report Legislation: Say on Pay in the UK, Corporate Governance: An International Review, Vol. 18, 296-312.

Core, John, Guay, Wayne and David Larcker (2008): The Power of the Pen and Executive Compensation, Journal of Financial Economics 88, 1-25.

Drymiotes, George (2007): The monitoring role of insiders, Journal of Accounting and Economics, Volume 44, Issue 3, S. 359-377

Economist (2007): Executive Pay in Europe: Minder's Mission, June 21, 80-81.

European Commission (2004): Commission Recommendation of 14 December 2004 fostering an appropriate regime for the remuneration of directors of listed companies (2004/913/EC), Official Journal of the European Union, L385, 55-59, available at: eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:385:0055:0059:EN:PDF

European Commission (2010): Commission Staff Working Document. Report on the Application by Member States of the EU of the Commission 2009/385/EC Recommendation (2009 Recommendation on directors' remuneration) complementing Recommendations 2004/913/EC and 2005/162/EC as regards the regime for the remuneration of directors of listed companies, available at: http://ec.europa.eu/internal_market/company/docs/-directors-remun/sec-2010-670-2_en.pdf

Ferri, Fabrizio and Maber, David A. (2012): Say on Pay Votes and CEO Compensation: Evidence from the UK, Review of Finance, forthcoming.

Göx, Robert F., Imhof, Frédéric and Kunz, Alexis (2010): Say on Pay and its Repercussion on CEO Investment Incentives, Compensation, and Firm Profit, available at http://ssrn.com/abstract=1588682.

Göx, Robert F.and Kunz, Alexis (2010): Say on Pay: Ein Überblick über Gestaltungsoptionen, ökonomische Konsequenzen und Erkenntnisse aus Empirie und Laborexperimenten, Zeitschrift für Betriebswirtschaft, special issue 5.

Glass, Lewis & Co. (2011): Say on Pay 2011: A Season in Review.

Gordon, Jeffrey N. (2009): Say on Pay; Cautionary Notes on the U.K. Experience and the case for shareholder opt-in, Harvard Journal on Legislation, Vol. 46, 323-367.

Hermalin, B.E. (2005): Trends in Corporate Governance, Journal of Finance, Vol. 60, S. 2351-2384.

Hermalin, B.E. and M.S. Weisbach (1998): Endogenously Chosen Boards of Directors and Their Monitoring of the CEO, American Economic Review, Vol. 88, S. 96-118.

Hermalin, B.E. and M.S. Weisbach (2003): Boards of Directors as an Endogenously Determined Institution: a Survey of the Economic Literature. Federal Reserve Bank of New York Economic Policy Review, 9(1), 7-26.

Institutional Shareholder Services (ISS) (2012): 2012 U.S. Proxy Voting Guidelines Summary. January 31, 2012. Available at http://www.issgovernance.com/files/2012USSummaryGuidelines1312012.pdf

Kaplan, Steven N. (2008): Are U.S. CEOs overpaid? Academy of Management Perspectives, 22(2), 5-20.

Kumar, Praveen and K. Sivaramakrishnan, (2008): Who Monitors the Monitor? The Effect of Board Independence on Executive Compensation and Firm Value Review of Financial Studies Vol. 21, No 3., S. 1371-1401

Laffont, Jean-Jaques and David Martimort (2002): The Theory of Incentives, Princeton University Press, Princeton and Oxford.

Larcker, David F., McCall, Allan L. and Gaizka Ormazabal (2012): The Economic Consequences of Proxy Advisor Say-on-Pay Voting Policies, working paper, Stanford University.

Laux, Volker and Brian Mittendorf (2011): Board Independence, Executive Pay, and the Adoption of Pet Projects, Contemporary Accounting Research, Vol. 28, 1467-1483.

Levit, Doron and Nadya Malanko (2011) Nonbinding Voting for Shareholder Proposals, Journal of Finance, Vol. 66, 1579-1614.

Poblete, Joaquin and Daniel Spulber (2012): The form of incentive contracts: Agency with moral hazard, risk neutrality and limited liability, Rand Journal of Economics, 43, 215-234.

The Directors' Remuneration Report Regulations 2002. Available at http://www.opsi.gov.uk/-si/si2002/20021986.htm.

Wagner, Alexander F. and Wenk, Christoph (2011), Are Shareholders Stupid? On The Surprising Impact of Binding Say-On-Pay On Stock Prices. Swiss Finance Institute Research Paper No. 11-12. Available at SSRN: http://ssrn.com/abstract=1793089.

Figure 1: Sequence of events

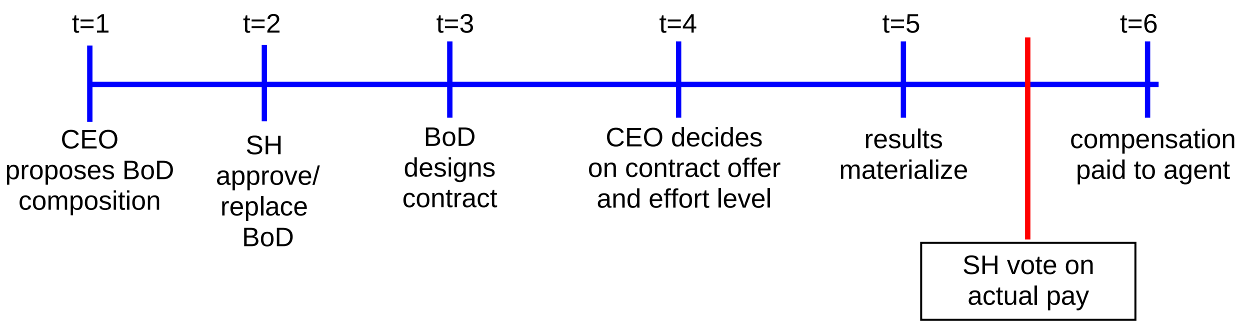

Figure 2: Sequence of events with pre-contractual vote