Codetermination and CEO compensation: Evidence from Germany

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Abstract

In the German two-tier system, the board of executives and board of (independent) directors are two distinct bodies; directors may not simultaneously be executives. German regulatory provisions on codetermination require employee representatives to hold at least one-third, and sometimes even half, of the board seats in companies with more than 500 employees. This gives employees some power to influence executive compensation. Given that employees invest specifically in a firm and suffer psychological and financial costs in the event of financial distress, they may be interested in the firm's long-term performance, low firm risk, and favourable working conditions. Analysing the CEO compensation characteristics of German publicly listed firms for 2015–2022, we find that higher levels of codetermination are associated with more variable CEO pay. Furthermore, under stronger codetermination, CEO compensation is more likely to use deferred bonus compensation. We also find weak evidence that stock option plans are less likely in this scenario. Finally, firms with higher levels of codetermination are more likely to use employee-related performance criteria for variable CEO pay. These results tend to be robust to alternative measures of codetermination and controlling for endogeneity. Overall, our results suggest that codetermination creates long-term incentives for CEO pay.

Keywords: Codetermination, employee board representation, executive compensation, deferred bonus compensation, stock option plans, Societas Europaea.

JEL codes: G34, M12, K31

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1. Introduction

Previous studies investigated the role of different financiers in executive compensation, such as minority and institutional shareholders, family owners, and banks (Clifford & Lindsey, 2016; Core et al., 1999; van Essen et al., 2015). However, research on whether and how the interests of *non*-financial stakeholders are associated with executive compensation patterns is lacking. This study focuses on employees, who are an important stakeholder group.

Employees frequently make firm-specific investments to align with the organisation's requirements, procedures, and culture (Feils et al., 2018). These investments contribute to increasing firm value but cannot be fully protected by contracts ex ante. When a company faces financial distress and terminates employees, the value of those investments is forfeited. In addition, job dismissals can cause psychological distress and salary losses (Britto et al., 2022; Couch, 2021). Employees generally cannot protect their investments *ex post* because they often do not enjoy substantial control rights. This is in contrast to shareholders or creditors, who benefit from (conditional) control rights granted by corporate law, corporate statutes, or debt contracts (Aghion & Bolton, 1992). If employees possess significant control rights, would they attempt to shape executive compensation patterns to serve their own interests?

To the best of our knowledge, this is the first study to investigate thoroughly whether employee control rights are associated with CEO compensation. We expect that employees aim to incentivise executives to improve the firm's long-term performance while mitigating their risk appetite, as this reduces the probability of financial distress and lowers the likelihood of psychological costs, salary losses, and impairment of the value of employees' firm-specific investments. Therefore, we conjecture that employee representatives favour deferred bonus compensation, but are not interested in executive stock option plans. We do not necessarily expect more (long-term) variable executive pay. On the one hand, performance-based compensation offers more compelling incentives to enhance firm value, thereby helping to prevent financial distress. On the other hand, variable pay may incentivise executives to take on greater risks, thereby increasing the likelihood of financial distress for the firm. We also anticipate employee representatives to seek to include employee-related performance criteria in executive compensation (e.g. with respect to working conditions). A more favourable working environment may increase employees' willingness to invest.

In our empirical analysis, we leverage the fact that German corporations with more than 500 employees are subject to mandatory legal provisions for codetermination. These provisions mandate that employee representatives occupy at least one-third, and under specific conditions, up to half of the seats on the board of (independent) directors.[1] Codetermination provisions provide employee representatives with substantial power to influence executive compensation.

We target German firms listed in one of three key market segments (DAX, MDAX, or SDAX), representing the 160 largest publicly listed firms as measured by market capitalisation and trading volume.[2] We analyse CEO compensation data for 2015–2022 and measure codetermination using an index comprising three characteristics: (1) the proportion of employee seats on the board of directors, (2) the proportion of employees on the compensation committee, and (3) whether the deputy chair of the board is an employee representative.

We find that higher levels of codetermination are associated with more variable CEO pay and a higher incidence of deferred bonus compensation. The latter result is in line with employees' long-term interests. The former indicates that employees' interest in creating firm value as the basis for long-term firm survival outweighs the concern that variable pay creates risk-increasing incentives. Furthermore, we report weaker evidence that codetermination is

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[1] Note that under the German two-tier system, the board of executives and the board of (independent) directors are two distinct bodies; directors may not simultaneously be executives.

[2] In total, Germany has approximately 400 listed firms, but those listed on the DAX, MDAX, and SDAX must comply with the strictest (Prime Standard) disclosure standards.

negatively associated with the use of stock option plans, which is consistent with employees' interest in limiting risk-taking incentives. Finally, firms with higher levels of codetermination are more likely to use employee-related performance criteria for CEO pay. These results are generally robust to alternative codetermination measures and when controlling for endogeneity.

We contribute to the literature on the determinants of executive pay characteristics by thoroughly investigating how non-financial stakeholders' interests are associated with CEO compensation. We contribute to the literature on the role of shareholders and debtholders in executive compensation (Clifford & Lindsey, 2016; Core et al., 1999; van Essen et al., 2015) by showing that employees, in addition to institutional investors, blockholders, or banks, affect executive compensation. Our findings indicate that employees use their control rights to influence executive compensation by, for example, incentivising long-term performance (variable pay and deferred bonus compensation), moderating business risk (no stock option plans), and addressing employees' non-financial interests (employee-related performance criteria). Moreover, our findings indicate that employees may pursue different interests in executive compensation than investors, especially those with short-term horizons (Cremers et al., 2020).

The small body of literature that addresses the effect of codetermination on pay-for-performance sensitivity for executive compensation reports contradictory evidence (Gorton & Schmid, 2004; Edwards et al., 2009; Dyballa & Kraft, 2020). We complement this literature by investigating whether codetermination is related to the use of stock option plans, deferred bonus compensation, and employee-related performance targets. Moreover, we examined a more recent period (2015–2022).[3]

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[3] The literature on how employee board representation relates to *firm value* (Gorton & Schmid, 2004, Fauver & Fuerst, 2006, Feils et al., 2022), *employee dismissals under financial distres*s (Kim et al. 2018), *agency problems of debt* (Lin et al., 2018), *earnings quality* (Overland & Samani, 2022),

The remainder of this paper is organised as follows. Section 2 describes the German codetermination provisions in detail and presents the hypotheses. Section 3 presents the data and empirical design. Section 4 discusses the results. Section 5 concludes.

2. The legal framework and hypothesis development

2.1 Legal provisions on codetermination in Germany

The Stock Corporation Code (*Aktiengesetz,* CC) and the German Corporate Governance Code (*Deutscher Corporate Governance Kodex*, GCGC) determine governance in German corporations. Although not legally binding, firms usually apply the GCGC partly because they must disclose why they do not follow certain rules of the GCGC ('comply or explain'). The Stock Corporation Code is the relevant legal reference for codetermination in conjunction with the provisions mentioned below.

In contrast to the single-tier system in Anglo-Saxon countries, German law requires the board of executives (*Vorstand*) and board of (independent) directors (*Aufsichtsrat*) to be two distinct bodies. Executives may not be directors, and directors may not be executives. The main tasks of the executive board include managing and steering the firm, as well as providing regular reporting to the board of directors, shareholders, and government agencies (Sections 77, 90, and 131 CC).

The board of directors monitors the executive board's decisions (Sec. 111, 171 CC), provides advice on strategic decisions, hires executives, and provides incentives via a detailed compensation arrangement (Sec. 84, 87 CC) based on a general compensation system approved at the annual meeting of the shareholders (Sec. 87a CC).

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and *corporate social responsibility* (Scholz & Vitols, 2019) do not address executive compensation issues.

Section 100 determines who selects the board of directors. Shareholders have input, but so do employees, at least in the case of larger firms and firms in the coal and steel industry. Section 100 also refers to specific laws. According to Section 1-4 of the *Drittelbeteiligungsgesetz*, employee representatives must be allocated one-third of the seats on the board of directors if the corporation has between 500 and 2,000 employees. Section 7 of the *Mitbestimmungsgesetz* assigns half of the seats on the board of directors to employee representatives if the corporation employs more than 2,000 employees. In the absence of a voting majority, the chair of the board of directors has two votes, and the chair must represent the shareholders (quasi-parity codetermination).[4] Employees may not hold *more* than 50% of the board seats. Table 1 provides an overview.

--Insert Table 1 about here--

The Stock Corporation Code is valid for German corporations, but not for Societas Europaea (SE). Societas Europea is a publicly listed company registered in accordance with European Union corporate law (European Council, 2001). For SE, shareholders and employees should agree on the terms of codetermination. If they cannot agree, the terms are determined by the company with the highest level of codetermination in the group (Sections 22ff, 34ff, *SE-Beteiligungsgesetz*).

Since the 1970s, an increasing number of European countries have introduced codetermination. By 2015, 19 of 31 countries in the European Economic Area had provisions

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[4] Special rules apply to firms in the coal and steel industries. Section 4 of the *Montan-Mitbestimmungsgesetz* requires an equal share of employee and shareholder representatives and one neutral member on the board of directors for firms with more than 1,000 employees. Codetermination was later extended to entities that control firms in the coal and steel industry (*Montan-Mitbestimmungsergänzungsgesetz*).

for codetermination (Conchon, 2015). Although the scope of employee board-level participation varies widely across countries, Germany appears to have the highest level.[5]

2.2 Hypothesis development

2.2.1 Theoretical framework

Agency theory cannot explain mandatory codetermination (Jensen & Meckling, 1976), and stakeholder theory (Donaldson & Preston, 1995) lacks a conceptual specification for managing the tradeoffs between conflicting stakeholder interests (Zattoni, 2011). Therefore, we focus on the Coasian perspective on stakeholder theory developed by Feils et al. (2018). This informal conceptual framework explicitly includes human capital investments based on a wider concept of residual control rights. The basic premise of Feils et al.'s (2018) perspective is that different stakeholders provide firm-specific investments that contribute to increasing the cooperation surplus and firm value but cannot be fully protected by contracts ex ante. To protect against ex-post expropriation, stakeholders must have ex-post control rights in scenarios that are not governed by contracts. A stakeholder group's control rights should increase with the importance of its specific investment in the firm's surplus (Feils et al., 2018). They explicitly argue that residual control rights need not be tied to ownership and are, therefore, not restricted to shareholders, but may stem from other rights, such as membership in the board of directors. Furthermore, Feils et al. (2018) find that residual control rights should not be allocated to one

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[5] *Board systems* vary as well. Similar to Germany, some other European countries mandate a two-tier board system (e.g. Austria, Estonia, Latvia, Poland, Slovakia), some allow a choice between a single- or two-tier board of directors (e.g. Denmark, Finland, France, Italy, Netherlands, Portugal), and some countries mandate a single-tier board of directors (e.g. Belgium, Norway, Spain, Sweden, United Kingdom), see Conchon (2015). Davies and Hopt (2013) argue that the two models are functionally less different than they appear at first glance.

stakeholder (agent) *only* when at least two stakeholders provide specific investments.[6]

The idea that employees make firm-specific human capital investments has existed for a long time (Hashimoto, 1981). Feils et al. (2018) explains why employees should be given control rights. Even when employees make firm-specific investments, firms may still decline to voluntarily grant them control rights, for example by withholding board representation. The reasons might include high transaction costs, such as coordination and negotiation costs, and concerns that firms that voluntarily allow employee participation may attract low-quality workers and deter high-quality managers (Fauver & Fuerst, 2006). Therefore*, mandatory* employee board representation may reduce transaction and adverse selection costs and encourage firm-specific investments by employees (Fauver & Fuerst, 2006). In the German setting, codetermination levels vary, and, thus, the level of employee control rights. Stronger control rights give employees more power to influence executive compensation patterns in their own interests.

However, tensions between employee representatives and shareholders may arise. Both groups can be seen as principals of executives, which implies a common agency problem (Bernheim & Whinston, 1986; Khalil et al., 2007). The common agency problem is particularly problematic when the principals pursue diverging objectives.

Employees and shareholders with a long-term perspective may both be interested in the firm's long-term financial performance to incentivise employees to make specific investments

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[6] Note that Feils et al.'s (2018) approach is not compatible with the property rights model proposed by Grossman and Hart (1986) and Hart and Moore (1990). According to Grossman and Hart (1986), hold-up problems result from bargaining between different parties in the presence of incomplete contracts. To mitigate this issue, decision-making authority should not be dispersed but rather concentrated. Residual control rights, therefore, are to be assigned exclusively to the party making the largest investment—namely, the shareholders. Feils et al. (2018) deviate from this argumentation by allowing for distributed residual control rights. We are thankful to an anonymous reviewer for this insight.

and enjoy sustainable dividend payouts and value growth. However, employees and short-term investors are likely to have different time horizons. Therefore, their goals are generally incongruent. To capture the long-term perspective of employees, we investigate the level of executives (long-term) variable pay and deferred bonus compensation.

Furthermore, all shareholders hold a call option on the firm's value (Jensen & Meckling, 1976), which increases with firm risk. However, a higher business risk tends to increase the likelihood of financial distress and job loss. Unlike shareholders, employees cannot diversify this risk, because their salaries are their main source of financial income. We analyse the use of stock options in executive compensation to address employees' (lack of) risk appetite.

Finally, employees and shareholders may disagree on specific employment-related issues. Improving working and safety conditions beyond the legal requirements and increasing employee pay above market levels would be of interest to employees but would reduce the net profit available for distribution to shareholders. Therefore, we analyse the use of employee-related performance criteria.

We expect that more powerful employee control rights will strengthen the influence of employee representatives on executive compensation in their interests, for example, with regard to (long-term) variable pay, deferred bonus compensation, the use of stock options, and employee-related performance criteria. We discuss these claims in detail below.

2.2.2 The link between codetermination and executive compensation

As shown above, the board of directors is responsible for designing executive compensation. If codetermination is mandated, employee representatives participate in executive compensation decisions. For simplicity, we assume that employee representatives are perfect agents of employees. We conjecture that employees are interested in the firm's long-term performance. Employees often make specific investments to adapt to the requirements, procedures, and culture of a new firm. Outside the firm, this specific human capital has much lower value. In addition, bankruptcy or even financial distress is likely to result in job losses with adverse personal and financial consequences (Couch & Placzek, 2010).[7]

On the one hand, variable executive pay may be at odds with this interest in the firm's long-term performance because it induces executives to take higher business risks, resulting in a higher likelihood of financial distress and employee dismissal. On the other hand, variable executive pay may also be in line with employees' interest in the firm's long-term performance. First, fixed-wage contracts tend to induce minimal executive effort. Only successful firms can achieve sufficient long-term performance to avoid financial distress. Second, because the common agency problem induces individual principals to free-ride on executive monitoring (Edmans & Manso, 2011), incentive-based pay becomes more important in mitigating executives' moral hazard. Third, if employee representatives have firm-specific knowledge (Freeman & Lazear, 1995; Overland & Samani, 2022), such as its true operational and financial position, this information may help in selecting and fine-tuning appropriate performance measures ex ante. For example, employees' internal information is generally helpful for detecting and correcting false positives and negatives. This increases the informativeness of the performance measure and decreases the costs of performance-based compensation (Holmström, 1979), making it more likely to be preferred over fixed-wage contracts. Considering this dual reasoning, we propose Hypothesis 1 without direction.

[7] Using a German dataset, Couch (2001) finds that employees received up to 13.5% lower salaries in the year following their job loss. In the U.S., layoffs were associated with salary losses of up to 12% even six years after the initial job loss. Lachowska et al. (2020) argue that more than half of a salary decrease can be attributed to the loss of firm-specific human capital and the benefits associated with the employee-employer relationship. Hence, job loss causes psychological distress that can be as severe as the mere loss of pay (Linn et al., 1985; Britto et al., 2022).

H1: *The level of codetermination is associated with the proportion of variable CEO pay to total CEO pay.*

Because employees suffer from psychological costs and salaries that decrease when the firm goes bankrupt, they also lose the value of certain investments, and should therefore be particularly interested in variable compensation based on long-term performance. Shareholders with long-term perspectives share similar interests. Flammer and Bansal (2017) argue that long-term horizons are important for establishing and strengthening relationships and trust with employees and other company stakeholders, thereby increasing labour productivity (Flammer, 2015). Edmans (2011) also reports that employee satisfaction is significantly positively associated with long-term stock returns. Hence, one possible solution to align shareholder and employee goals is to pay executives with shares that they must hold for many years (Edmans, 2023). Long-term incentive pay is suitable for improving *both* financial and (employee-related) ESG performance. Flammer and Bansal (2017) find causal evidence supporting this claim.

To date, this reasoning has been based on the implicit assumption that employees have a long-term perspective. Employee representatives are less likely to insist on providing incentives for long-term performance if they expect it to be well protected in the event of bankruptcy. In addition, some employees might not have a long-term perspective, for example, due to personal circumstances, such as being close to retirement. Therefore, we posit Hypothesis 2 without direction.

H2: *The level of codetermination is associated with the proportion of long-term variable CEO pay to total CEO pay.*

Hypotheses H1 and H2 refer to ex-ante pay levels that are usually unobservable. Therefore, we employ ex-post pay levels in our empirical design. While H1 and H2 address the general level of incentive pay, Hypotheses 3 and 4 relate to specific compensation instruments, namely, deferred bonus compensation and stock option plans.

With deferred bonus compensation, the anticipated bonus payments generally depend on sufficient future firm performance (Edmans et al., 2017). Consequently, deferred bonus compensation reduces executives' incentives to increase short-term profits at the expense of long-term performance. In addition, deferred bonus compensation is likely to make executives more willing to undertake investment projects with a positive NPV, but do not pay off in the short term. Firms whose shareholders have longer time horizons are more likely to employ deferred bonus compensation for their executives (Li & Wang, 2016).

We conjecture that employees favour deferred bonus compensation for reasons similar to those discussed for long-term variable pay. Deferred bonus compensation induces executives to enhance a firm's long-term performance, which reduces the risk of job loss and incentivises employees to make specific investments. Again, if employees expect to be well protected in the event of bankruptcy, or if they do not have a long-term perspective, they will not be interested in deferred bonus compensation. Consistent with Hypothesis 2, we posit Hypothesis 3 without direction.

H3: *The level of codetermination is associated with the use of deferred bonus compensation for CEOs.*

The stock options used for compensation are likely to affect executives' risk attitudes. The convex payoff profile of (call) options gives executives an incentive to increase operating and financial risk because the fair value of a call option increases with the price volatility of the underlying stock (Rajgopal & Shevlin, 2002). We expect that employees are not interested in high firm risk. The values of stocks and stock options respond positively not only to increases in firm value but also to increased firm risk. However, the respective sensitivities are (much) weaker for stocks than for stock options (Bergstresser & Philippon, 2006). Hence, a trade-off exists between providing performance incentives and limiting risk-taking incentives. Because employees suffer from significant economic and psychological costs when a firm becomes financially distressed, this trade-off might be better solved with stock-based pay than with stock option plans, because the former provides weaker incentives for risk-taking while still stimulating improvements in long-term performance. For instance, Hou et al. (2020) show that while stock option pay raises the probability of extreme outcomes in both directions, substantial gains and losses, restricted stock grants are associated with a lower likelihood of significant losses. We therefore posit:

H4: *With stronger codetermination, stock option plans are less likely to be part of CEO compensation.*

Because the board of directors is responsible for executive compensation, employee representatives are likely to have input on the performance measures used for executive compensation. Despite the general trend towards the increased use of non-financial measures associated with the environmental, social, and governance aspects of a firm, we expect that employees will be particularly interested in appropriate measures related to employee well-being, such as promoting better working conditions. With more powerful employee representatives, we expect a greater likelihood of employee-related performance measures being used for executive compensation. We therefore posit:

H5: *With stronger codetermination, CEO compensation is more likely to include employee-related performance measures*.

In summary, we argue that allocating control rights, such as employee board representation, is a way to sufficiently protect employees' firm-specific investments. Employees have both the incentive and the ability to motivate executives to promote long-term performance by using variable pay and deferred bonus compensation to curb risk-taking incentives (i.e., by avoiding stock option plans) and to link executive compensation to employee-related performance measures.

3. Empirical analysis

3.1 Data selection

We focus on German firms listed on the DAX, MDAX, and SDAX, which at the time of data collection, comprised the 30, 60, and 70 largest companies by market capitalisation and trading volume, respectively, as of April 30, 2021.[8]

We collect data for the period 2015–2022. Since 2015, the German Corporate Governance Code required firms to disclose executive compensation data using a standardized template (GCGC, 2013, Sec. 4.2.5), improving data consistency and comparability across firms and years. Accordingly, we focus on firms complying with the GCGC. Following an amendment to the Stock Corporation Code (*Aktiengesetz*) effective January 1, 2020 (Section 87 I sentence 2), use of the standardized template was no longer mandatory, although many firms continued to apply it. To enhance statistical power and model validity, we nevertheless include executive compensation data for 2020–2022.

We obtained financial accounting data from Dafne (Bureau van Dijk) and financial market data from Eikon (Thomson Reuters). We hand-collected data on the characteristics of the board of directors and the level of codetermination from the companies' financial reports. BoardEx (Wharton Research Data Services) provides data on CEO's network size, number of qualifications, time to retirement, and time spent in the company, all of which could be related to CEO compensation.

Panel A in Table 2 shows that we had to drop 21 firms that did not provide executive compensation data according to the GCGC. Ten firms had a non-German legal form (*Société*

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[8] The firms included in the Prime Standard comply with the most stringent disclosure standards, requiring financial statements in accordance with IFRS or U.S. GAAP, quarterly reporting, disclosure of inside information in English, and the organisation of at least one analyst conference per year. See https://deutsche-boerse.com/dbg-de/unternehmen/wissen/boersenlexikon/boersenlexikon-article/Prime-Standard-243290.

Anonyme or *Naamloze Vennootschap*) and were, therefore, not subject to codetermination provisions. We lost another six firms because they went public after 2018 and had to delete another 15 firms because of incomplete data on the control variables. The remaining unbalanced panel comprised 724 firm-year observations of 111 firms. The dataset includes four banks subject to CEO compensation regulations introduced in the Bank Supervision Law in 2010.[9] We retained these entities in the sample because the regulation provided continued considerable discretion, which may be associated with codetermination.

--Insert Table 2 about here--

3.2 Research design

We investigate the association between codetermination and the variables of CEO compensation using the following Mundlak random effects model:

$$\begin{aligned} Compensation\_Variable_{it} \\ &= \alpha_0 + \alpha_1\, Codetermination_{it} + \sum_{j=2}^{7} \alpha_j Firm\ controls_{jit} \\ &+ \sum_{j=8}^{11} \alpha_j CEO\ controls_{jit} + year + industry \\ &+ time\ means\ of\ control\ variables_i + \varepsilon_{it}. \end{aligned} \tag{1}$$

We have panel data but cannot run a fixed effects model because some (binary) variables and measures of codetermination do not vary over time. Following Mundlak (1978), we run a random effects regression model by adding the firm-specific time averages of the

[9] As of 2010, performance-based pay for German bank executives may not exceed 200% of the fixed compensation. Moreover, variable pay must be based on performance indicators measured over at least three years; see Deutsche Bundesbank (2021). Insurance companies are subject to much less stringent executive compensation regulations, while real estate firms are not subject to any regulation.

time-varying control variables[10] as independent variables. We also test the robustness of our results using pooled ordinary least squares (OLS) and pooled logit regression models.

The $Compensation\_Variable_{it}$ is defined according to the hypothesis under investigation. $Var\_Compensation_{it}$ is the proportion (in %) of variable CEO pay to the sum of fixed and variable CEO pay. $Long\_Term\_Compensation_{it}$ is the ratio (in %) of the variable pay elements paid out over more than one year, such as deferred bonuses, other deferred variable pay, other long-term incentive pay, stock, and stock option plans, to the sum of fixed and variable CEO pay. Note that we measured ex-post pay levels because ex-ante pay levels are usually unobservable. $Options_{it}$ (Def_Bonus_{it}) is a binary variable equal to 1 if the CEO was granted stock options (deferred bonus compensation) in *t* as part of her compensation package. We investigate Hypothesis 5 using the dependent variable *Employee_Criteria*, which is binary and takes the value of 1 if the CEO's variable pay is tied to at least one employee-related performance measure, such as employee satisfaction or professional training of employees, and the value of 0 if not.

We measure the codetermination variable (employee control rights) using the three channels through which employees can voice their interests. First, we measure the proportion of employee representatives on the board of directors (*Aufsichtsrat*), which decides on the actual level and structure of executive compensation (Sec. 87 CC). Second, we measure the proportion of employee representatives on the firm's compensation committee (*Personal-* or *Vergütungsausschuss*) or, if this committee is absent, on a committee with specialised knowledge on executive compensation (e.g. the *Präsidialausschuss*). As committees deal with specialised issues on behalf of the board of directors, they have significant power in corporate

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[10] For instance, firm size is included as a control variable and is proxied by the natural logarithm of total assets. For each firm *i*, this measure varies over time; we compute a firm-specific time average by summing ln(Total Assets) across all sample periods *T* for firm *i* and dividing by the number of periods *T* the firm is observed.

governance (Kolev et al., 2019). Third, we determined whether the *deputy* chair of the board of directors is an employee representative. The chair of the board of directors must represent investors. However, employee positions are stronger when the deputy chair represents their interests.

We integrate these three channels into a composite score. In the first step, we standardised each channel such that the value of 1 was attached to the highest possible outcome and the value of zero to the lowest. For instance, 0% and 50% are the lowest and highest proportions of employee representatives on the board of directors and compensation committee, respectively. Recall that employees may not hold more than 50% of the seats on the board of directors. This restriction also applies to board committees, including the audit and compensation committee, pursuant to Section 27 III of the Law on Codetermination. We divide the actual proportion of employee representation by the respective maximum value, that is, 50%. Hence, for 50% (0%) employee representation, the scaled value for this channel is 1 (0). For 33% employee representation, the scaled value was 0.667 (= 0.333 / 0.5). A linear transformation is not required for the binary deputy chair variable.[11]

[11] Scholz and Vitols' (2019) codetermination score consists of six components: (1) the proportion and type (work council members or trade union members) of employee representatives on the board of directors, (2) whether the deputy chair of the board of directors is an employee representative, (3) the proportion of employee representation on board subcommittees, (4) the proportion of employees located in the 'home' country of a multinational firm, (5) the extent of decision-making powers of the board of directors that varies across legal forms, and (6) whether the CEO or CFO has primary responsibility for personnel policy. Our index mainly refers to items (1), (2), and (3), but due to lack of data, our index ignores the type of employee representatives and items (4) and (6). Concerning (5), we only have the legal forms of *Aktiengesellschaft* and Societas Europea, for which we include controls.

We primarily use the *CO_DET1* score, which weighs all elements equally, that is 1/3.[12] Employee influence on the board of directors may be the most important factor. In the robustness checks, we also use the score *CO_DET2*, which assigns a 50% weight to the proportion of employee representatives on the board of directors and 25% to the other two codetermination channels.[13] *CO_DET1* and *CO_DET2* range between 0 and 1.

We consider a wide range of firm- and CEO-specific control variables. Concerning firm characteristics, we employ firm size, measured by the logarithm of total assets, $\ln(Total\ Assets)_{it}$, because previous studies show that firm size explains approximately 40% of the variation in CEO compensation (Tosi et al., 2000; Frydman & Saks, 2010). Furthermore, we control for $Revenue\ Growth_{it}$, measured as the increase in sales from year *t-1* to *t*, as previous studies suggest that firm growth is positively associated with CEO compensation (Bliss & Rosen, 2001; Chen et al., 2017). Chemmanur et al. (2013) and Tosi et al. (2000) find that total CEO compensation and cash and stock compensation increase with firm profitability. Tosi et al. (2000) report that 6% of the variation in CEO compensation could be explained by return on equity or return on assets. Therefore, we include *ROA* in our model, measured as net earnings before taxes divided by lagged total assets. Moreover, we control for $Leverage_{it}$, which is the ratio of total debt to total assets in book value. Chemmanur et al. (2013) find that both higher total CEO compensation and higher stock-based CEO compensation are associated with higher leverage, which is consistent with Berk et al.'s (2010) argument that higher default

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[12] For instance, if the board of directors has one-third codetermination (maximum: 50%), with the deputy chair being an employee representative, and 20% of the members of the compensation committee are employee representatives (maximum: 50%), we assigned a *CO_DET1* score of $\frac{1}{3}\left(\frac{0.33}{0.5}+1+\frac{0.2}{0.5}\right)=\frac{31}{45}\sim 0.689$.

[13] If we could not find information on a firm's compensation or comparable committee, we assigned a weight of 50% to the proportion of employee representatives on the supervisory boards and a weight of 50% to the deputy chair variable, for *CO_DET1*. For *CO_DET2*, the respective weights were 2/3 and 1/3.

risk needs to be compensated. Finally, according to Bebchuk and Fried (2004) and Clifford and Lindsey (2016), institutional blockholders have better incentives and greater resources to monitor the executive board effectively, such that incentive-based pay becomes less necessary. We define a binary variable, $Blockholder_{it}$, with a value of 1 if one institutional shareholder holds at least 5% of the shares, and 0 otherwise. We also control for new CEOs using the binary variable $CEO\ Change_{it}$.

Regarding CEO characteristics, we control for CEO age using the $Time\ Retirement_{it}$ variable, measuring the time until the CEO retires, assuming that this will happen at age 66. This variable also reflects the CEO's time horizon (Brickley et al., 1999; Dechow & Sloan, 1991; Matějka et al., 2009). $Time\ in\ Company_{it}$ measures the length of time a CEO has been with a firm. In the case of a longer tenure, CEOs tend to have more power to influence the board of directors' decisions (Bebchuk & Fried, 2006). Van Essen et al. (2015) find that as CEO tenure increases, CEO compensation becomes less sensitive to firm performance and less based on long-term incentive plans. The human capital of a CEO is likely to influence her compensation (Datta & Iskandar-Datta, 2014; Falato et al., 2015; Frydman, 2019). The $\#Qualifications_{it}$ variable measures the number of academic degrees the CEO earned, that is, Bachelor degrees or higher. The size of a CEO's network is measured by the number of overlaps with other executives during education or while working on a job ($NetworkSize_{it}$). Engelberg et al. (2013) and Butler and Gurun (2012) suggest that CEO compensation increases with network size. Furthermore, we control for industry- and year-fixed effects.

3.3 Descriptive results

Table 3 presents the summary statistics. In Panel B, the level of codetermination (*CO_DET1*) has a relatively skewed distribution, with a median of 0.889 and mean of 0.622, suggesting that most of our sample firms have a considerable level of codetermination. More than 25% of the sample firms had no codetermination. Table 3 shows that firms in the legal form of Societa

Europaea have a much lower level of codetermination. Nevertheless, more than 25% of the firms exhibited the highest codetermination value of 1, implying that employee representatives hold 50% of the seats on both the board of directors and the compensation committee, and they also hold deputy chairs on the board of directors. We also obtain a relatively skewed distribution with an alternative weighting of the three codetermination elements (*CO_DET2*).

--Insert Table 3 about here--

Table 3 shows that, with the median CEO, variable compensation accounts for 64.6% of the total fixed and variable CEO pay, with long-term compensation being more important than short-term bonuses (33.8% vs. 28.0% of the total fixed and variable CEO pay). The mean total CEO compensation was €3.4 million (Table 4). The level and structure of CEO compensation of publicly listed U.S. firms of similar but smaller size (median total assets of U.S. firms in 2015: USD 3.2 billion) differ significantly from these figures. Pan and Zhou (2018:2280) report a mean total CEO compensation of USD 7.5 million, of which 74% is related to variable pay, including 23% to (short-term) bonuses, 18% for stock option grants, and 33% for restricted stock awards.

Firm size also has a skewed distribution, with mean total assets of €54.0 billion and a median of €6.1 billion. The median ROA amounts to 6.0%. The median debt ratio was 60%, and the median sales growth was 5.5%. Concerning CEO characteristics, Panel C shows that the median CEO has been active in the firm for 7.9 years and retires in ten years. The median CEO earned two academic degrees and had a network of 587 other managers, as measured by overlaps in employment, other activities, and education. The Pearson correlation coefficients do not suggest severe multicollinearity problems (see Table O1 in the online appendix).[14]

[14] Mean VIFs are low in the OLS models (1.54–1.56), indicating limited multicollinearity, while they are higher in the Mundlak models (9.0–10.3) due to the simultaneous inclusion of controls and their time averages. Accordingly, we report results from both specifications.

--Insert Table 4 about here--

Panel A of Table 4 shows the distribution of absolute CEO compensation related to total pay, and short- and long-term variable pay. Panel B in Table 4 shows that approximately 11% of firms grant stock option plans to their CEOs, while 91% have introduced deferred bonus compensation.

We checked the characteristics of deferred bonus compensation in more detail and found that in about 60% of the observations, deferred bonus compensation was based mainly on share price performance, either on share price or total shareholder returns (these and the following descriptive statistics are not tabulated). Accounting-based earnings measures such as EBITDA, net earnings, and return on capital employed, are used in about one-third of deferred bonus compensation plans. Approximately two-thirds of deferred bonus compensation plans measure the share price performance relative to a peer group or an index. The most common types of bonus compensation are performance or virtual shares, and cash bonuses; stock options are rarely used. The median performance period for the deferred bonus compensation was three years.

--Insert Table 5 about here--

Table 5 provides bivariate statistics on whether the structure of CEO compensation differs among firms with 0%, 33%, and 50% employee representation on the board of directors. This result indicates that variable CEO pay becomes more important with higher levels of codetermination. This holds for long-term compensation but not for short-term variable pay. These differences are more pronounced when we exclude firms with the SE legal form. Firms may strategically choose this legal form to circumvent or limit employee representation on boards, even though there are legal safeguards (Sec. 22ff, 34ff, SE-Beteiligungsgesetz).

3.4 Regression results

Columns 1-4 in Table 6 show the results of the multivariate regression analysis of CEO compensation. In the full sample, the coefficient of *CO_DET1* is positive and modestly significant (Column 1). In economic terms, a change from zero to one-third employee representation on the board of directors and compensation committee implies a (0.667 – 0) × 2/3 × 3.72 = 1.65% increase in the variable CEO pay ratio, which translates to 2.7% of the mean value of *Var_Compensation*. When we exclude firms with the SE legal form, *CO_DET1* remains weakly significant (Column 2). The sample excluding banks yields a positive but insignificant coefficient for *CO_DET1* (see Column 3). When we employ pooled OLS regressions, *CO_DET1* exhibits a significantly positive sign for the full sample ($p < 1\%$; Column 4). This also holds true in the pooled OLS regressions excluding SEs and banks (not tabulated). In sum, we find weak support for Hypothesis 1, namely, that stronger codetermination seems to be associated with higher levels of performance-based CEO pay.

--Insert Table 6 about here--

Columns 5-6 in Table 6 present the multivariate regression results for the level of long-term variable compensation. In contrast to the bivariate statistics shown in Table 5, the coefficient of *CO_DET1* is not significant. We obtained a similar finding when we excluded banks or SE firms (not tabulated). Overall, Hypothesis 2 was rejected.

Table 7 reports the results of logit regressions, where deferred bonus compensation (Columns 1-4), stock options (Columns 5-6), and employee-related performance criteria (Columns 7-10) are the dependent variables.

--Insert Table 7 about here--

Columns 1-4 in Table 7 indicate that deferred bonus compensation is significantly more likely to be used in CEO compensation with higher levels of codetermination. This finding is robust over several model specifications and is in line with Hypothesis 3, which suggests that employees seek to mitigate CEO myopia and improve their long-term performance.

Columns 5 and 6 show no significant association between the level of codetermination and the use of stock option plans for CEO compensation. This result also holds when we exclude banks or firms with the legal form of SE (not tabulated) and does not support Hypothesis 4.

Columns 7-10 in Table 7 indicate weak evidence that a higher level of codetermination is associated with a greater likelihood of employee-related performance measures being used in CEO compensation, such as working conditions or professional employee training. We expected a positive association, given that employee representatives use their power in CEO compensation contracts (see Hypothesis 5).

In summary, we find empirical evidence suggesting that codetermination is positively associated with the propensity to employ deferred bonus compensation and weakly positively associated with CEO variable pay and the use of employee-related performance measures. Overall, employee representatives seem interested in creating long-term value-enhancing incentives for CEO.

3.5 Robustness tests

3.5.1 Alternative measures of codetermination

We tested the robustness of the results using alternative measures of codetermination. First, we discuss the results based on a different composite score, *CO_DET2*, where we attach 50% weight to the proportion of employee representatives on the board of directors and 25% to each of the other two items (employee representatives on the compensation committee and the deputy chair).

In Table 8, *CO_DET2* is positively related to variable CEO pay (p < 10%), deferred bonus compensation (p < 1%), and the use of employee criteria (p < 10%).[15] In the pooled OLS or logit regressions, *CO_DET2* has a higher statistical significance (each at p < 1%)

--Insert Table 8 about here--

In contrast to *CO_DET1*, the other measures of codetermination are partly significantly negatively associated with the use of stock option plans. This holds true for measures $Emp\_Committee_{it}$ and $Quasi\_Parity_{it}$. Quasi-parity implies that employee representatives hold 50% of board seats. $Emp\_Committee_{it}$ reflects the percentage of employee representatives on the compensation committee. Recent literature shows that subcommittees, including compensation committees, have considerable influence on board decisions (e.g. Kolev, 2019) and the coefficient of the $Emp\_Committee_{it}$ variable in the Mundlak model suggests a stronger resistance of employee representatives to stock option plans on the compensation committee than on the board of directors. However, Panel A of Table 8 suggests employee representatives' preference for variable CEO compensation on the board of directors, but not on the compensation committee (see results for H1). Although employee representatives on both committees appear to support the use of deferred bonus compensation, they seem to have different interests in terms of variable CEO pay and stock options plans.

Whether the deputy chair of the board of directors is an employee representative (Deputy = 1) also plays a role. When Deputy = 1, there are higher levels of variable CEO compensation and the use of employee-related performance criteria is more likely (p < 10%).

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[15] Concerning the Mundlak model on employee criteria, the F-statistics is poor. The model significantly improves when we exclude industry-fixed effects; *CO_DET2*, *Emp_Supervisory*, and *Emp_Committee* turn (highly) significant (not tabulated, p < 1% or p < 5%). To avoid overloading Table 8, we present the robustness tests for Hypothesis 2 in Table O2 in the online appendix. We find weak evidence that *Emp_Committee* positively affects the usage of long-term compensation (10%-level).

These findings support the conjecture that codetermination works differently through different channels. Prior studies often focus only on employee representation on the board of directors (e.g. Fauver & Fuerst, 2006; Gorton & Schmid, 2004; Kim et al., 2018).[16] Overall, the results support Hypotheses 1, 3, and 5, and partially support Hypothesis 4.

3.5.2 Endogeneity of codetermination

Our measure of codetermination is partly determined by law and partly chosen by the firms themselves–for example, concerning their choice of deputy chair and the number of employee representatives on the compensation committee. As the law requires (higher levels of) codetermination with sufficiently large companies, codetermination is endogenous. The size also affects the level and structure of CEO compensation. However, we control for firm size in the regressions above. Reverse causality is another issue of endogeneity (Roberts & Whited, 2013), although, from a theoretical perspective, arguments as to why the level and structure of CEO compensation affects firm-level codetermination are difficult to find.

In addition, descriptive evidence from Sick (2024) suggests that some firms lack 50% (quasi-parity) codetermination on the board of directors, even though they are required to do so according to legal size criteria, especially firms operating in facility management, retail sales,

[16] Though Scholz and Vitols (2019) developed a codetermination score consisting of six components, they did not run analyses with the single components.

and temporary labour supply.[17] There seems to be a lack of enforcement (Sick, 2024).[18] Indeed, 9 out of the 66 firms in our sample that are subject to quasi-parity codetermination exhibit less than 50% employee board representation. Another way to avoid or limit codetermination is to choose the European SE legal form before reaching the size thresholds that make codetermination mandatory for the legal forms of *AG* or *GmbH* (Sick, 2024). Table 3 shows that the level of codetermination is substantially lower for *SEs* than for other types of corporations.

Several methodological approaches address endogeneity concerns, including difference-in-differences and regression discontinuity designs (Kim et al., 2018; Lin et al., 2018). Unfortunately, there were no (legal) shocks surrounding codetermination during the investigation period that would have allowed the use of such designs. Therefore, we address the potential endogeneity issue using an instrumental variable approach. With a continuous dependent variable (Hypotheses 1 and 2), we employ a two-stage least squares (2SLS)

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[17] SE firms have more discretion than German legal forms to voluntarily choose the level of codetermination. When we proxy the value of employees' specific investments by the average gross salary of employees in the specific industry (https://de.statista.com/statistik/daten/studie/1789/umfrage/durchschnittseinkommen-in-deutschland-nach-branchen/), the mean *CO_DET1* and *CO_DET2* scores are significantly higher for the three industries with the highest salaries (financial and insurance sector, information & communication, professional, scientific, and technical activities; WZ codes K, J, M) than the corresponding scores for the industries that pay below-average salaries in the German economy (retail trade and wholesale (G), transportation and storage (H), other service activities (N, S), and other industries (A, D, F, R)). For high-salary industries, the means of *CO_DET1* and *CO_DET2* are 0.268 and 0.286, respectively; for other industries *CO_DET1* and *CO_DET2* are 0.111 and 0.144, respectively (t-test with unequal variances, $p < 0.01$ each).

[18] Similarly, firms with between 500 and 2,000 employees try to circumvent one-third codetermination by choosing a suitable legal form (e.g. AG & Co. KG) or by structuring the group such that not all employees are counted for the purposes of codetermination. In fact, more than 50% of the firms subject to mandatory one-third codetermination seem able to circumvent the regulation using legal tricks; see Sick (2024).

approach. With a binary dependent variable (Hypotheses 3, 4, and 5), we employ an IV Probit regression using a maximum likelihood estimator.

Both approaches require a valid instrumental variable for the endogenous variable x_k, which is the level of codetermination (Roberts & Whited, 2013). A valid instrument *Z* needs to meet two conditions. First, the relevance condition requires that the partial correlation between the endogenous variable x_k and the instrument *Z* is not zero; hence, the coefficient γ of the following regression must not be zero:

$$x_k = \alpha_0 + \alpha_1 x_1 + \cdots + \alpha_{k-1} x_{k-1} + \gamma Z + \vartheta. \qquad (2)$$

F-test statistics and R^2 of the first stage and *t*-test statistics of the coefficient γ allow us to assess whether instrument Z is sufficiently valid (Roberts & Whited, 2013). Second, the exclusion restriction requires no correlation between the instrument and the error term of the second-stage regression u. We test this requirement by applying Wooldridge's robust score test of over-identifying restrictions, which is similar to Sargan's (1958) test but allows for robust standard errors (Wooldridge, 1995).

In the following, we first estimate the value $\hat{x}_k$ of the endogenous variable x_k. We employed all the control variables x_1 to x_{k-1} and the instrumental variable *Z*, as depicted in (2). In the second stage, we replace the endogenous variable x_k with the estimated values $\hat{x}_k$ from the first stage. Finally, we regress the dependent variable Y, thus, the different characteristics of the CEO compensation structure on all control variables x_1 and x_{k-1}, as well as $\hat{x}_k$:

$$Y = \beta_0 + \beta_1 x_1 + \cdots + \beta_{k-1} x_{k-1} + \hat{\beta}_k \hat{x}_k + \varepsilon^*. \qquad (3)$$

The estimate $\hat{\beta}_k$ reflects the endogeneity-adjusted coefficient of variable x_k. Generally, it is difficult to find a suitable instrumental variable that fulfils both the relevance and exclusion restrictions.

We employ two instrumental variables, *LN_EMPL,* which is the natural logarithm of the number of employees, and the binary variable *SE*, which takes the value of 1 if the firm has the SE legal form and 0 otherwise. Recall that German codetermination rules only apply to an SE if a firm has converted from a German legal form to an SE and if the firm was already subject to codetermination provisions in its German legal form. Otherwise, SEs do not have to introduce codetermination.

As the legal form may not be completely exogenously determined (Sick, 2024),[19] we employ the second instrumental variable, *LN_EMPL*. Codetermination provisions are mandatory when firms are sufficiently large. The correlation between *SE* and *LN_EMPL* is moderate (−0.22). Thus, the first stage is modelled as

$$\widehat{CO\_DET}1_{it} = \beta_0 + \sum_{k=1}^{6} \beta_k Firm\_Control_{k_{it}} + \sum_{k=7}^{10} \beta_k CEO\_Control_{k_{it}} \\ + \gamma_1 LN\_EMPL_{it} + \gamma_2 SE_{it} + \mu_t + \delta_j + \vartheta_{it} \tag{4}$$

In addition to the instrumental variable, we consider all of the firm and CEO controls used above and we control for year- and industry-fixed effects, μ_t and δ_j.

Table 9 presents the results of the first-stage regression for Hypothesis 1. Both *LN_EMPL* and *SE* were significantly associated with *CO_DET1* ($p < 0.001$), which also holds for the first-stage regressions on the other hypotheses with slightly different sample sizes (not tabulated). The partial R^2, F-statistics and minimum eigenvalue statistics indicate that the instrumental variables satisfy the relevance condition.

[19] Other motives for choosing the SE legal form are that it allows a more flexible design of the board of directors than the German corporate law (e.g. a single-tier system is possible). Moreover, the SE form makes it easier to relocate the registered office within the European Union and to carry out cross-border M&A transactions.

--Insert Table 9 about here--

In the second stage, we run Model (3) using the estimated values for *CO_DET1* from the first stage (see Model (4)). Table 9 presents the results in the columns to the right of the first-stage regression. The endogeneity-adjusted levels of codetermination are not significantly associated with the level of variable pay and long-term compensation, but Wooldridge's robust score tests for over-identifying restrictions suggest that for H1 and H2, the estimated residuals are not independent of the instruments and that the null hypothesis of having valid instruments must be rejected. When we used only *LN_EMPL* as an instrument, $\widehat{CO\_DET}1_{it}$ was positively and significantly associated with the level of variable pay and long-term compensation (see Table 9). However, when we employed SE as a single instrument, the coefficients were not significant (not shown).

Concerning Hypotheses 3, 4, and 5, the endogeneity-adjusted levels of codetermination are significantly positively related to the use of deferred bonus compensation and employee-related performance criteria, and weakly negatively related to the use of stock option plans. With these regressions, Wooldridge's robust score test of over-identifying restrictions[20] shows that the null hypothesis of valid instruments cannot be rejected.

Significant Durbin and Wu–Hausman test statistics reject the null hypothesis of exogeneity for the independent variables in the analyses of long-term and deferred bonus compensation (when both instruments are used) and of the variable compensation share (when *LN_EMPL* is used as an instrument). Consequently, in these cases, the IV estimation results are more reliable than those of the baseline regressions.

[20] Note that we calculated the Wooldridge robust score tests of over-identifying restrictions based on 2SLS regressions because it cannot be determined with IV Probit models.

4. Discussion

External validity. This study's results apply to publicly listed companies. Private firms are expected to maintain long-term relationships with their stakeholders, including employees, especially if they are family owned and managed (Prencipe et al., 2014). In this case, companies have less of a need to incentivise executives to pursue long-term goals. Unfortunately, private firms do not have to disclose data on executive compensation, which makes it difficult to test this claim.

Our results may be transferable to publicly listed firms in other European countries that mandate relatively strong employee board representation for sufficiently large companies, including Austria, Denmark, Finland, Norway, Slovakia, Slovenia, and Sweden (Conchon, 2015). In countries that do not mandate employee board representation, such as the U.S. and the United Kingdom, companies might still find it advisable to voluntarily allocate board seats to employee representatives when employees‘ firm-specific investments are important for firm value but cannot be protected in incomplete employment contracts (Feils et al., 2018). This, in turn, encourages employees to make firm-specific investments in the first place. Feils et al. (2022) find evidence consistent with this claim.

Internal validity. Firms like Brenntag and Hello Fresh changed their legal form to SE before they reach the size thresholds that mandate employee board representation (Gieseke et al., 2021; Sick, 2024). Currently, 14 out of 40 firms listed in the DAX are organised as SEs, and three of them use it to avoid quasi-parity employee board representation (*Deutsche Wohnen, Vonovia, Zalando*; see Gieseke et al., 2021). In addition, many firms employ legal tricks to circumvent the mandatory one-third codetermination (Sick, 2024). Hence, self-selection is an issue, though we believe that it is not critical. Theoretically, firms are more likely to avoid granting employee board representation if they deem employee control rights too costly relative to the employees' firm-specific investments. Firms in the facility management, retail, and temporary employment sectors try to circumvent codetermination, while firms in the manufacturing, construction, and pharmaceutical industries do not (Sick, 2024). Employees in the first group may make lower specific investments than those in the second. Thus, firm self-selection is in line with the conjecture that higher specific employee investments are likely to drive both the level of codetermination and the provision of long-term incentives to executives. The theoretical considerations presented in Section 2.2 are consistent with these insights.

We employed robust standard errors adjusted for heteroscedasticity but did not cluster standard errors at the firm level. Recent literature indicates that researchers often find clustered standard errors to be ten or twenty times larger than robust standard errors and often "unnecessarily large" (Abadie et al., 2022). Clustering standard errors at the firm level preserves our results for Hypotheses 1 (variable CEO compensation) and 3 (deferred bonus compensation) and partially supports Hypothesis 5 (employee-related performance criteria), but does not preserve them for stock option plans (not tabulated).

5. Summary

If employees make firm-specific investments to obtain and perform their jobs, and suffer psychological and financial costs in the event of financial distress, they may be interested in the firm's long-term performance, ensuring low firm risk, and favourable working conditions. Mandatory codetermination in Germany provides employees with control rights via the board of directors and enables them to influence executive compensation. Therefore, we predict that higher levels of codetermination will affect the structure of executive pay. Based on an analysis of the compensation and financial reports of 111 listed German firms from 2015 to 2022, we find evidence that the weight of variable CEO pay increases with higher levels of codetermination. Furthermore, firms with stronger codetermination are significantly more likely to offer deferred bonus compensation and employ employee-related performance measures. These results are generally robust when we use alternative measures of codetermination and when we account for the endogenous choice of codetermination.

Our study has some limitations. In the theoretical framework, we assume that employee representatives are perfect agents of employees even though they may pursue their own goals. A qualitative analysis of the relationship between employees and employer representatives could shed light on the validity of this assumption. Furthermore, although we control for endogeneity, we could not prove causality. Future research should take advantage of quasi-experimental settings, such as a major change in codetermination regulation. Furthermore, the German setting is relatively specific because there is a two-tier board system and a high level of codetermination, whereas Anglo-Saxon countries have a single-tier board system and virtually no employee representation. Nevertheless, our results potentially stimulate political and legal discussions on whether and under which circumstances codetermination can mitigate executive boards' myopia and instead encourage them to pursue long-term goals.

Our results suggest that codetermination helps create incentives for CEOs regarding long-term financial performance, which is likely to protect employees' firm-specific investments. This outcome also implies that codetermination is less desirable, and possibly even detrimental, for firms in which employees' specific investments are negligible. Hence, recent legal initiatives to restrict or circumvent codetermination (Sick, 2024) require further discussion.

Another interesting research avenue is whether codetermination provides incentives for socially responsible behaviour, such as environmental issues, human rights, or tax avoidance, especially when it comes at a cost for the firm and indirectly for the workforce (Scholz & Vitols, 2019). We must leave these questions for future research.

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Appendix

Table A1: Description of variables

Dependent variables		*Source*
Var_Compensation	The ratio of CEO variable compensation to the total fixed and variable CEO compensation, in %.	For each item: financial or compensation reports
Short_Term_ Compensation	The ratio of short-term variable CEO pay, e.g. bonuses, to the total of fixed and variable CEO compensation, in %.	
Long_Term_ Compensation	The ratio of long-term variable CEO pay (e.g. deferred bonus compensation, stock and stock option plans with vesting period ≥ 1 year) to the total fixed and variable CEO compensation, in %.	
Def_Bonus	A dummy variable equal to 1 if deferred bonus compensation exists for the CEO, and 0 otherwise.	
Options	Dummy variable equal to 1 if a stock option plan exists for the CEO, and 0 otherwise.	
Employee_Criteria	Dummy variable with a value of 1 if the CEO's variable pay is tied to at least one employee-related performance measure, and 0 otherwise.	
Main independent variables		***Source***
CO_DET1	Standardised index value based on three equally weighted factors: (1) the proportion of employee representatives on the board of directors, (2) the proportion of employee representatives on the compensation committee, and (3) a dummy equal to 1 if an employee representative is the deputy chair of the board of directors, and 0 otherwise. For each factor, 1 and 0 indicate the highest and lowest values, respectively.	For each item: financial reports
CO_DET2	Standardised index value where we assign a 50% weight to the proportion of employee representatives on the board of directors and a 25% weight to each of the other two characteristics.	
Emp_Supervisory	The proportion of employee representatives on the board of directors.	
Emp_Committee	The proportion of employee representatives on the compensation committee.	
Deputy	Dummy equal to 1 if an employee representative is the deputy chair of the board of directors, and 0 otherwise.	
Quasi-Parity	Dummy equal to 1 if 50% employee representation on the board of directors is mandated by law, and 0 otherwise.	

Tables

Table 1: Legal rules on codetermination in Germany

Drittelbeteiligungsgesetz (Law on one-third codetermination)	- addresses corporations with > 500 and < 2,000 employees - the size of the board of directors: between 3 and 21 members, thereof • $^{2}/_{3}$ shareholder representatives • $^{1}/_{3}$ employee representatives
Mitbestimmungsgesetz (Law on codetermination)	- addresses corporations with ≥ 2,000 employees - the size of the board of directors: 12, 16, or 20 members, thereof • 6, 8, or 10 shareholder representatives • 6, 8, or 10 employee representatives, thereof 2, 2, and 3, respectively from trade unions - with more than 10,000 (20,000) employees, the board of directors must have ≥ 16 (≥ 20) members
Montan-Mitbestimmungsgesetz (Law on codetermination in the coal & steel industry)	- addresses firms in the coal- and iron-mining and steel industry - with more than 1,000 employees - the size of the board of directors: 11, 15, or 21 members, depending on the firm size, thereof • 5 (7, 10, respectively) shareholder representatives • 5 (7, 10, respectively) employee representatives • 1 neutral representative
Montan-Mitbestimmungs-ergänzungsgesetz (Supplement on the law on codetermination in the coal & steel industry)	- addresses firms that control one or more firms in the coal- and iron-mining and steel industries and where their employees equal or exceed one-fifth of the total of the group's employees - the size of the board of directors: 15 members, thereof • 7 shareholder representatives • 7 employee representatives • 1 neutral representative

This table shows the different laws that address codetermination in German firms.

Table 2: Data selection and distribution across industries

Panel A: Data selection

Selection step	#firms	#observations (2015–2022)
Firms listed in the DAX, MDAX, or SDAX market segment on April 30, 2021	160	
minus observations with IPOs after 2018	–6	
minus observations with foreign legal forms (e.g., N.V. or S.A.)	–10	
minus observations with missing compensation data according to the German Corporate Governance Code	–21	
minus missing data on control variables	–15	
Final sample	111	724

Panel B: Distribution across industries

Industry	WZ codes	# firms	# observations
Manufacturing	C	32	218
Retail trade and wholesale	G	4	21
Transportation and storage	H	3	22
Information & communication	J	8	49
Financial and insurance activities	K	17	110
Real estate activities	L	7	37
Professional, scientific, and technical activities	M	32	221
Other service activities	N, S	4	22
Other	A, D, F, R	4	24
Total		111	724

This table exhibits the data selection procedure (Panel A) and the distribution of firms and observations across industries (Panel B). N.V.: *Naamloze Vennootschap*; S.A.: *Société Anonyme*.

Table 3: Descriptive statistics

Variable	**n**	**Mean**	**Standard deviation**	**1st quartile**	**Median**	**3rd quartile**
Panel A: CEO compensation characteristics (dependent variables)						
Var_Compensation	724	61.81	13.77	54.32	64.62	70.70
Short_Term_Compensation	724	29.22	13.01	22.67	28.03	34.77
Long_Term_Compensation	724	32.39	22.47	18.58	33.79	42.71
Def_Bonus	724	0.9075		1	1	1
Options	724	0.1091		0	0	0
Employee_Criteria	724	0.2555		0	0	1
Panel B: Firm-specific control variables						
CO_DET1	724	0.6217	0.4406	0	0.8889	1
CO_DET1, SEs only	219	0.2543	0.3910	0	0	0.4167
CO_DET1, w/o SEs	505	0.7810	0.3581	0.6667	1	1
CO_DET2	724	0.6363	0.4371	0	0.9167	1
Emp_Supervisory	724	0.3392	0.2209	0	0.5	0.5
Emp_Committee	603	0.3219	0.2153	0	0.5	0.5
Deputy	724	0.6050		0	1	1
Quasi_Parity	696	0.5963		0	1	1
ln (Total Assets)	724	22.691	1.981	21.253	22.524	24.201
Total Assets (in millions of €)	724	53,996	164,380	1,698	6,056	32,399
ROA	724	0.0641	0.0680	0.0235	0.0601	0.0977
Leverage	724	0.6081	0.1792	0.4970	0.6032	0.7238
Revenue Growth	724	0.0479	0.1699	-0.0010	0.0547	0.1215
Blockholder	724	0.5787		0	1	1
CEO_CHANGE	724	0.1436		0	0	0
Panel C: CEO-specific control variables						
Time before Retirement	724	10.598	5.367	7	10	14
Time in Company	724	10.598	8.663	3.671	7.921	15.882
# Qualifications	724	1.8909	1.0883	1	2	2
Network Size	724	999.23	1,071.4	273	587	1,316

This table exhibits descriptive statistics on CEO compensation characteristics, firm characteristics, and CEO characteristics. All variables are winsorized at the 1% and 99% level, except for binary variables and the codetermination variables. For a description of variables, see Table A1 in the appendix.

Table 4: Descriptive statistics on the structure of CEO compensation

Panel A: Level of compensation (in thousands of €)

Type of CEO compensation	n	Mean	Standard deviation	1st quartile	Median	3rd quartile
Fixed compensation	724	967	562	506	831	1,250
Fringe benefits	724	53	110	15	25	44
Short-term compensation	724	862	780	360	658	1,200
Long-term compensation	724	1,122	1,334	300	781	1.645
Retirement benefits	724	396	451	0	247	647
Total compensation	724	3,401	2,390	1,447	2,825	4,923

Panel B: Stock option plans and deferred bonus compensation (Def_Bonus)

Year	n	Def_Bonus = 1	Def_Bonus = 0	Options = 1	Options = 0
2015	82	72	10	11	71
2016	84	74	10	9	75
2017	90	81	9	8	82
2018	99	88	11	11	88
2019	93	85	8	9	84
2020	96	89	7	11	85
2021	90	84	6	10	80
2022	90	84	6	10	80
Total	724	657 (91%)	67 (9%)	79 (11%)	645 (89%)

This table shows additional descriptive statistics on CEO compensation characteristics.

Table 5: Bivariate statistics

	0% codetermination (N = 208)	33%-codetermination (N = 68)	50%-codetermination (N = 436)	Difference 0% to 33% (p-value)	Difference 0% to 50% (p-value)	0%-codetermination (N = 69)	33%-codetermination (N = 40)	50%-codetermination (N = 387)	Difference 0% to 33% (p-value)	Difference 0% to 50% (p-value)
	Full sample					Sample without Societas Europaea				
Var_Compensation	0.560	0.614	0.646	-0.053*** (0.005)	-0.086*** (0.000)	0.494	0.586	0.638	-0.091*** (0.005)	-0.143*** (0.000)
Short_Term_Compensation	0.283	0.269	0.302	0.015 (0.435)	-0.019* (0.074)	0.282	0.252	0.305	0.031 (0.203)	-0.023 (0.137)
Long_Term_Compensation	0.276	0.346	0.342	-0.070*** (0.002)	-0.066*** (0.000)	0.208	0.335	0.331	-0.127*** (0.000)	-0.122*** (0.000)

This table exhibits bivariate statistics comparing subsamples of firms with 0% and 33% codetermination and with 0% and 50% codetermination, respectively, as measured by the percentage of seats on the board of directors held by employees. N represents the number of observations with the specific level of codetermination, e.g., with 50% codetermination we have 436 observations. The differences in the means of the sub-groups are tested with t-tests (assuming unequal variances). On the left side of the table, bivariate statistics are shown for the full sample, on the right side with the sample after excluding firms in the legal form of Societas Europaea (SE) for which mandatory employee board representation generally does not apply. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed test. For a definition of variable, short-term, and long-term compensation, see Table A1 in the appendix.

Table 6: Codetermination and variable CEO pay, long-term variable CEO pay, and the existence of stock option plans

Dependent variable:	***H1: Var_Compensation*** coefficient				***H2: Long_Term_ Compensation*** coefficient	
	All firms (1)	w/o SE firms (2)	w/o banks (3)	All firms (4)	All firms (5)	All firms (6)
	Mundlak model (z-value)			Pooled OLS (t-value)	Mundlak model (z-value)	Pooled OLS (t-value)
CO_DET1	3.72* (1.65)	4.62* (1.66)	3.63 (1.58)	3.78*** (2.74)	2.38 (0.85)	1.15 (0.69)
Ln (Total Assets)	0.13 (0.05)	-0.28 (-0.09)	0.02 (0.01)	2.36*** (6.84)	0.53 (0.19)	2.51*** (6.08)
ROA	31.50*** (2.92)	20.10 (1.62)	31.7*** (2.93)	12.40 (1.50)	17.3 (1.37)	-11.9 (-1.19)
Leverage	15.20** (2.19)	13.20 (1.64)	15.50** (2.22)	12.70*** (3.35)	12.80* (1.66)	-7.19* (-1.53)
Revenue Growth	1.13 (0.55)	5.45* (1.65)	1.30 (0.62)	0.72 (0.22)	-3.23 (-1.21)	0.84 (0.24)
Blockholder	-0.74 (-0.55)	0.12 (0.07)	-0.45 (-0.32)	-0.98 (-0.99)	1.20 (0.67)	1.96 (1.57)
CEO Change	0.45 (0.35)	-0.01 (-0.01)	0.28 (0.21)	0.43 (0.31)	1.37 (0.82)	-0.60 (-0.34)
Time Retirement	0.15 (1.02)	-0.02 (-0.13)	0.15 (1.02)	0.23** (2.48)	-0.26 (-1.15)	-0.11 (-0.93)
Time in Company	0.05 (0.43)	0.04 (0.30)	0.05 (0.38)	0.10* (1.90)	-0.09 (-0.62)	-0.13* (-1.93)
#Qualifications	-0.37 (-0.53)	0.48 (0.69)	-0.39 (-0.57)	2.61*** (5.82)	-0.55 (-0.55)	2.15*** (3.65)
Network Size	-0.00 (-0.45)	-0.00 (-0.33)	-0.00 (-0.75)	-0.00 (-1.48)	-0.00 (-0.09)	-0.00 (-0.14)
Constant	-3,801* (-1.92)	-6,647*** (-2.71)	-3,419 (-1.63)	8.23 (1.21)	-51.40 (-0.02)	-22.20*** (-2.66)
Year- and industry-FE	Included	Included	Included	Included	Included	Included
Means of controls	Included	Included	Included	--	Included	--
N =	724	505	700	724	724	724
Adj. / Pseudo R^2 (*Overall* R^2) in %	*33.2*	*41.8*	*33.6*	26.3	*26.4*	21.7
F-Stat./ *Chi*^{2} (p-value)	*170.6* (0.000)	*251.9* (0.000)	*152.9* (0.000)	12.7 (0.000)	*143.8* (0.000)	10.9 (0.000)

This table exhibits multivariate regression results concerning Hypothesis 1 (Columns 1–4) and Hypothesis 2 (Columns 5-6). For each hypothesis, we present the results based on Mundlak (1978) random effects regressions, controlling for the firm-specific time averages of time-varying control variables; Columns 1 and 5 include the full sample, Columns 2 (and 3) refer to the sample excluding firms in the legal form of Societas Europaea (excluding banks, respectively). Columns 4 and 6 present results for Pooled OLS or Pooled Logit regressions on the full sample. FE stands for fixed effects. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed test. Robust standard errors have been adjusted for heteroscedasticity. For a definition of variables, see Table A1 in the appendix.

Table 7: Codetermination and the existence of deferred bonus compensation, and employee-related performance measures

Dependent variable:	***H3: Def_Bonus*** coefficient (z-value)				***H4: Options*** coefficient (z-value)		***H5: Employee_Criteria*** coefficient (z-value)			
	All firms (1)	w/o SE firms (2)	w/o banks (3)	All firms (4)	All firms (5)	All firms (6)	All firms (7)	w/o SE firms (8)	w/o banks (9)	All firms (10)
	Mundlak Logit model			Pooled Logit model	Mundlak Logit model	Pooled Logit model	Mundlak Logit model			Pooled Logit model
CO_DET1	17.45*** (4.41)	50.51*** (5.33)	20.51*** (5.31)	2.61*** (4.58)	-2.63 (-0.79)	-0.62 (-1.58)	4.58* (1.84)	4.74 (0.96)	4.65* (1.73)	1.07*** (2.92)
Ln(Total Assets)	-2.11 (-0.63)	-5.35 (-0.59)	-2.07 (-0.56)	0.41*** (2.89)	1.45 (0.56)	-0.15* (-1.65)	2.07 (1.23)	0.98 (0.42)	2.74 (1.54)	0.52*** (6.52)
ROA	-18.51 (-0.84)	-16.64 (-0.26)	-18.24 (-0.74)	-1.58 (-0.63)	-11.70 (-1.13)	-2.84 (-1.47)	0.80 (0.12)	7.86 (0.72)	-0.12 (-0.02)	0.03 (0.01)
Leverage	-19.71 (-1.58)	-43.95 (-1.46)	-16.03 (-1.27)	-2.29** (-2.55)	2.01 (0.27)	-1.08 (-1.05)	-9.44* (-1.78)	-28.14*** (-2.84)	-10.46** (-2.00)	-2.28*** (-2.66)
Revenue Growth	4.23 (0.98)	13.30 (1.14)	4.55 (0.99)	0.16 (0.20)	1.64 (0.58)	0.28 (0.30)	1.07 (0.56)	0.22 (0.09)	1.30 (0.68)	0.48 (0.63)
Blockholder	-2.45 (-0.85)	-1.07 (-0.13)	-3.08 (-0.87)	-0.19 (-0.56)	-1.32 (-0.99)	0.14 (0.50)	1.82** (2.09)	1.72 (1.60)	1.58* (1.80)	-0.06 (-0.26)
CEO Change	-2.35 (-1.14)	-6.68 (-1.50)	-2.97 (-1.36)	-0.13 (-0.24)	-0.30 (-0.20)	1.24*** (3.51)	0.69 (0.94)	1.09 (1.23)	0.58 (0.77)	-0.14 (-0.51)
Time Retirement	0.10 (0.30)	-0.39 (-0.34)	0.01 (0.01)	0.05 (1.49)	-0.10 (-0.62)	-0.04 (-1.58)	-0.10 (-0.87)	-0.13 (-0.89)	-0.07 (-0.57)	0.40* (1.78)
Time in Company	-0.11 (-0.57)	-0.45 (-0.90)	-0.14 (-0.59)	-0.02 (-0.90)	-0.31* (-1.69)	0.05*** (3.13)	0.10 (1.49)	0.08 (1.01)	0.10 (1.50)	-0.05*** (-3.29)
#Qualifications	0.02 (0.01)	-1.53 (-0.40)	0.09 (0.04)	0.94*** (4.91)	1.05 (0.79)	0.42*** (3.27)	0.30 (0.56)	0.07 (0.09)	0.15 (0.27)	-0.02 (-0.16)
Network Size	0.00 (0.61)	0.00 (0.73)	0.00 (0.67)	0.00 (0.63)	0.00 (0.43)	-0.00*** (-2.75)	-0.00 (-1.59)	-0.00 (-1.19)	-0.00* (-1.78)	0.00 (1.02)
Constant	-3,307 (-1.30)	-21,810*** (-2.74)	-2,781 (-0.97)	-8.44*** (-2.80)	1,91 (0.61)	0.56 (0.29)	516.1 (0.24)	-922.8 (-0.40)	-618.5 (-0.33)	-12.87*** (-7.72)

Year- and industry-FE	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Means of controls	Included	Included	Included	--	Included	--	Included	Included	Included	--
N =	653	435	629	653	657	657	702	476	678	702
Pseudo R^2 / *Overall R^2 in %*	*32.7*	*53.2*	*34.0*	31.8	*28.3*	19.5	*28.6*	*30.7*	*29.2*	22.9
F-Stat./ *Chi^2* (p-value)	*103.5* (0.000)	*78.6* (0.000)	*109.2* (0.000)	*78.3* (0.000)	*227.2* (0.012)	*92.8* (0.000)	*45.9* (0.125)	*50.6* (0.043)	*55.4* (0.020)	*128.3* (0.000)

This table exhibits multivariate regression results concerning Hypothesis 3 (Columns 1–4), Hypothesis 4 (Columns 5–6), and Hypothesis 5 (Columns 7–10). For each hypothesis, we present the results based on Mundlak (1978) random effects regressions, additionally controlling for the firm-specific time averages of time-varying control variables; Columns 1, 5 and 7 include the full sample, Columns 2 and 8 refer to the sample excluding firms with the legal form of Societas Europaea and Columns 3 and 9 to the sample excluding banks. Columns 4, 6 and 10 present the results for Pooled Logit regressions on the full sample. FE stands for fixed effects. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed test. Robust standard errors have been adjusted for heteroscedasticity. For a definition of variables, see Table A1 in the appendix.

Table 8: Robustness test: alternative codetermination measures (Mundlak random effects model and Pooled OLS/Logit)

Panel A: Variable compensation and deferred bonus compensation with alternative codetermination measures

Dependent variable:	***H1: Var_Compensation*** coefficient										***H3: Def_Bonus*** coeffcient									
	Mundlak model (z-value)					Pooled OLS (t-value)					Mundlak Logit model (z-value)					Pooled Logit (z-value)				
CO_DET2	3.93* (1.69)					4.09*** (2.91)					18.60*** (3.76)					2.63*** (4.50)				
Emp_ Supervisory		8.25* (1.74)					9.05*** (3.22)					32.73*** (3.94)					4.87*** (4.38)			
Emp_ Committee			0.22 (0.06)					3.21 (1.40)					34.85*** (2.85)					5.20*** (4.53)		
Deputy				3.91* (1.92)					3.76*** (3.04)					8.99*** (2.73)					1.98*** (4.98)	
Quasi_parity					-1.29 (-0.87)					-1.17 (-1.12)					6.38** (2.30)					1.05*** (3.36)
Year- and industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CEO controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Means of controls	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No
N =	724	724	603	724	696	724	724	603	724	696	653	653	489	653	625	653	653	489	653	625
Adj./ Pseudo (*Overall*) R^2 in %	*33.3*	*33.4*	*32.0*	*33.4*	*32.8*	26.5	26.8	26.6	26.5	25.3	*33.1*	*32.6*	*57.8*	*32.1*	*31.5*	20.8	31.5	35.4	32.2	30.6
F-Stat./ *Chi²* (p-value)	*170.4* (0.000)	*171.3* (0.000)	*187.0* (0.000)	*173.5* (0.000)	*174.5* (0.000)	12.6 (0.000)	12.6 (0.000)	11.4 (0.000)	13.2 (0.000)	12.1 (0.000)	*126.6* (0.000)	*69.6* (0.000)	*64.1* (0.001)	*87.4* (0.000)	*104.0* (0.001)	*79.9* (0.000)	*84.3* (0.000)	*71.7* (0.000)	*75.2* (0.000)	*69.5* (0.000)

Table 8 cont'd: Robustness test: alternative codetermination measures (Mundlak random effects model and Pooled OLS/Logit)

Panel B: Existence of existence of stock option plans and employee-related performance criteria with alternative codetermination measures

Dependent variable:	***H4: Options*** coefficient										***H5: Employee_Criteria*** coefficient									
	Mundlak model (z-value)					Pooled Logit (z-value)					Mundlak model (z-value)					Pooled Logit (z-value)				
CO_DET2	-2.21					-0.65*					4.68*					1.08***				
	(-0.88)					(-1.64)					(1.84)					(2.82)				
Emp_ Supervisory		-1.12					-1.42*					9.43*					1.91**			
		(-0.19)					(-1.82)					(1.78)					(2.52)			
Emp_Committee			-18.84**					-2.71***					5.27					1.84***		
			(-2.14)					(-3.50)					(1.23)					(3.01)		
Deputy				-3.75					-0.59*					4.08*					0.80***	
				(-1.24)					(-1.71)					(1.66)					(2.60)	
Quasi_Parity					-7.26**					-1.49***					0.89					0.55**
					(-2.13)					(-4.62)					(0.51)					(2.23)
Year- and industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CEO controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Means of controls	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No
N =	657	657	556	657	630	657	657	556	657	630	702	702	594	702	674	702	702	594	702	674
Adj./ Pseudo (*Overall*) R^2 in %	*28.0*	*28.2*	*66.9*	*28.5*	*29.8*	19.6	19.7	25.0	22.1	26.6	*28.6*	*28.5*	*30.9*	*28.5*	*34.0*	22.8	22.6	19.1	*23.7*	*28.0*
F-Stat./ *Chi*^{2} (p-value)	*60.8* (0.003)	*50.9* (0.003)	*45.2* (0.095)	*54.4* (0.014)	*56.8* (0.008)	*93.5* (0.000)	*95.4* (0.000)	*98.4* (0.000)	*94.2* (0.000)	*107.9* (0.000)	*44.5* (0.156)	*47.6* (0.093)	*43.3* (0.187)	*43.1* (0.195)	*46.9* (0.105)	*127.4* (0.000)	*126.3* (0.000)	*98.3* (0.000)	*133.4* (0.00)	*125..1* (0.000)

This table exhibits regression results concerning Hypotheses 1 and 3 (Panel A) and Hypotheses 4 and 5 (Panel B) employing alternative codetermination measures. For Hypothesis 2, see Table O2 in the online appendix. *Emp_Supervisory* (*Emp_Committee*) reflects the proportion of employee representatives on the board of directors (on the compensation committee). *CO_DET2* is an index value where we assign a 50% weight to the proportion of employee representatives on the board of directors and a 25% weight each to the proportion of employee representatives on the compensation committee and on the fact whether the deputy chair of the board of directors is an employee representative. *Deputy* is a dummy with the value of 1 if an employee representative is the deputy chair of the board of directors, and with the value of 0 if not. *QUASI_ PARITY* is a dummy with a value of 1 if 50% employee representation on the board of directors is mandated by law, and with a value 0 if not. FE stands for fixed effects. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed test. Robust standard errors have been adjusted for heteroscedasticity. T-values are depicted in brackets. Firm controls include Ln(Total Assets), ROA, Revenue Growth, Leverage, Blockholder, and CEO Change. CEO controls include Time Retirement, Time in the Company, # Qualifications, and Network Size. For a definition of variables, see Table A1 in the appendix.

Table 9: Second-stage regression of the IV approach (H1 and H2) and IV Probit using the maximum likelihood estimator (H3 to H5)

Dependent variable:	***CO_DET1* (*1st stage, H1*)** coeff. (t-value)	***H1: Var_Compensation*** coeff. (z-value)	***H2: Long_Term_Compensation*** coeff. (z-value)	***H3: Def_Bonus*** coeff. (z-value)	***H4: Options*** coeff. (z-value)	***H5: Employee_Criteria*** coeff. (z-value)	***CO_DET1* (*1st stage, H1*)** coeff. (t-value)	***H1: Var_Compensation*** coeff. (z -value)	***H2: Long_Term_Compensation*** coeff. (z-value)
LN_EMPL	0.117*** (12.54)						0.123*** (11.80)		
SE	-0.420*** (-17.03)								
$\widehat{CO\_DET}1$		1.69 (0.93)	-2.41 (-1.06)	0.90*** (2.64)	-0.48* (-1.89)	0.86*** (3.32)		0.11*** (4.65)	0.05* (1.69)
Year- and industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CEO controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N =	696	696	696	625	630	674	696	696	696
Adj. R^2 (Partial R^2) / *Pseudo* R^2 in %	67.2 (45.6)	25.7	20.6	*37.5*	*37.6*	*29.3*	53.8 (20.3)	22.3	20.2
F-test stat./ χ^2 *stat.* (p-value)	90.0 (0.000)	*341.7* (0.000)	*283.5* (0.000)	*77.0* (0.000)	*96.1* (0.000)	*154.3* (0.000)	58.2 (0.000)	*351.3* (0.000)	*289.0* (0.000)
Minimum eigenvalue stat.	279.9						170.4		
Durbin Score (p-value)		2.11 (0.146)	3.92 (0.048)	4.61 (0.031)	0.17 (0.683)	1.29 (0.256)		14.37 (0.000)	2.27 (0.132)
Wu-Hausmann test (p-value)		2.06 (0.152)	3.82 (0.051)	4.58 (0.033)	0.16 (0.689)	1.24 (0.266)		12.80 (0.000)	2.14 (0.144)
Wooldridge's robust score test of overidentifying restrictions (p-value)		25.78 (0.000)	9.38 (0.002)	0.43 (0.512)	0.01 (0.903)	0.93 (0.335)		--	--

This table presents the results of an instrumental variable approach. At the first stage, the level of codetermination (*CO_DET1*) is instrumented on LN_EMPL and SE. LN_EMPL is the natural logarithm of the number of employees. SE is a dummy with a value of 1 if the firm has the legal form of Societas Europaea, and with a value of 0 if not. Concerning Var_Compensation and Long_Term_Compensation, we use a 2SLS model; with regard to the binary dependent variables, we employ an IV Probit regression using a maximum likelihood estimator. The partial R^2 for the first-stage regression is computed as 1 − SSE_full / SSE_reduced, where SSE_full is the sum of squared residuals (SSE) from regressing the endogenous variable on the instruments and exogenous covariates and SSE_reduced is the SSE from regressing the endogenous variable on the exogenous covariates only. The Wooldridge's robust score test of overidentifying restrictions is similar to the Sargan test, but allows for robust standard errors. The test statistics (Durbin Score, Wu-Hausmann & Wooldridge robust score test) for Hypotheses 3, 4, and 5 are calculated based on a 2SLS regression. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed test. Robust standard errors have been adjusted for heteroscedasticity. T-values are depicted in brackets. Firm controls include Ln(Total Assets), ROA, Revenue Growth, Leverage, Blockholder, and CEO Change. CEO controls include Time Retirement, Time in the Company, # Qualifications, and Network Size. For a definition of variables, see Table A1 in the appendix.

Online Appendix

Table O1: Pearson correlation coefficients

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
(1) Total compensation																				
(2) Var_Compensation	0.54**																			
(3) Long_Term_Comp.	0.44**	0.64**																		
(4) Options	-0.04	-0.01	0.02																	
(5) Def_Bonus	0.23**	0.27**	0.34**	-0.23**																
(6) Employee_Criteria	0.32**	0.14**	0.11*	-0.11**	0.06															
(7) CO_DET1	0.44**	0.25**	0.18**	-0.14**	0.31**	0.28**														
(8) CO_DET2	0.44**	0.26**	0.18**	-0.15**	0.31**	0.28**	0.99**													
(9) Emp_Supervisory	0.44**	0.28**	0.18**	-0.16**	0.31**	0.27**	0.96**	0.98**												
(10) Emp_Committee	0.30**	0.02	0.09*	-0.14**	0.24**	0.23**	0.94**	0.93**	0.84**											
(11) Deputy	0.46**	0.25**	0.16**	-0.13**	0.28**	0.27**	0.96**	0.94**	0.87**	0.83**										
(12) Ln(Total Assets)	0.65**	0.28**	0.30**	-0.14**	0.21**	0.38**	0.47**	0.47**	0.46**	0.30**	0.49**									
(13) ROA	-0.08*	0.02	-0.14**	-0.04	-0.10*	-0.10**	-0.17**	-0.17**	-0.16**	-0.09*	-0.15**	-0.31**								
(14) Leverage	0.27**	0.00	0.15**	-0.11**	0.14	0.15**	0.36**	0.36**	0.34**	0.33**	0.35**	0.58**	-0.40**							
(15) Revenue_Growth	-0.05	0.03	0.00	0.04	-0.05	0.01	-0.14**	-0.15**	-0.14**	-0.12**	-0.14**	-0.09	0.29**	-0.11**						
(16) Blockholder	0.11**	0.02	0.12**	0.03	-0.00	0.03	-0.02	-0.03	-0.05	-0.03	-0.01	0.09	-0.08*	0.01	0.02					
(17) CEO Change	0.04	0.05	0.01	0.07	0.02	0.02	0.02	0.02	0.01	0.03	0.03	0.03	-0.07	-0.00	-0.01	-0.04				
(18) Time Retirement	-0.17**	0.05	-0.02	-0.00	-0.03	0.02	-0.21**	-0.21**	-0.20**	-0.16**	-0.23**	-0.13**	0.07	-0.16**	0.08*	-0.00	0.16**			
(19) Time in Company	0.15**	0.14**	-0.04	0.05	0.00	-0.03	0.11**	0.12**	0.13**	0.09*	0.11**	0.11**	0.05	-0.14**	-0.05	-0.03	-0.14**	-0.25**		
(20) Network Size	0.42**	0.21**	0.18**	-0.09	0.16**	0.25**	0.26**	0.26**	0.25**	0.21**	0.24**	0.46**	-0.12**	0.28**	-0.05	0.19**	0.01	-0.03	0.09*	
(21) #Qualifications	0.10**	0.18**	0.16**	0.10**	0.19**	0.05	0.04	0.04	0.04	-0.04	0.05	0.06	-0.14**	0.05	0.09*	0.08*	0.10**	0.08*	-0.06	0.27**

* and ** indicate significance at the 5% and 1% levels, respectively, using a two-tailed test. For a definition of variables, see Table A1 in the appendix.

Table O2: Robustness test on Hypothesis H2 with alternative codetermination measures (Mundlak random effects model and Pooled OLS)

Dependent variable:	***H2: Long_Term_Compensation*** coefficient									
	Mundlak model (z-value)					Pooled OLS (t-value)				
CO_DET2	2.27 (0.81)					1.37 (0.82)				
Emp_ Supervisory		3.45 (0.65)					3.26 (1.01)			
Emp_ Committee			7.93* (1.73)					2.66 (0.88)		
Deputy				1.42 (0.52)					0.07 (0.05)	
Quasi_Parity					-0.92 (-0.48)					-1.57 (-1.20)
Year- and industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CEO controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Means of controls	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No
N =	724	724	603	724	696	724	724	603	724	696
Adj./ Pseudo (*Overall*) R^2 in %	*26.4*	*26.4*	*23.7*	*26.3*	*26.1*	21.7	21.7	17.0	21.6	21.2
F-Stat./ *Chi*^{2} (p-value)	*144.3* (0.000)	*145.9* (0.000)	*210.5* (0.000)	*142.2* (0.000)	*137.9* (0.000)	10.9 (0.000)	11.0 (0.000)	6.9 (0.000)	10.9 (0.000)	10.8 (0.000)

This table shows the regression results of Hypothesis 2 employing alternative codetermination measures. *Emp_Supervisory* (*Emp_Committee*) reflects the proportion of employee representatives on the board of directors (on the compensation committee). *CO_DET2* is an index value where we assign a 50% weight to the proportion of employee representatives on the board of directors and a 25% weight each to the proportion of employee representatives on the compensation committee and to whether the deputy chair of the board of directors is an employee representative. *Deputy* is a dummy with the value of 1 if an employee representative is the deputy chair of the board of directors, and with the value of 0 if not. *Quasi_ Parity* is a dummy with a value of 1 if 50% employee representation on the board of directors is mandated by law, and with a value 0 if not. FE stands for fixed effects. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively, using a two-tailed test. Robust standard errors have been adjusted for heteroscedasticity. T-values are depicted in brackets. Firm controls include Ln(Total Assets), ROA, Revenue Growth, Leverage, Blockholder, and CEO Change. CEO controls include Time Retirement, Time in the Company, # Qualifications, and Network Size. For a definition of variables, see Table A1 in the appendix.