Do firms' disclosure choices conform to social attitudes? Evidence from the CEO pay ratio estimation

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First version: Jan 20, 2021
This version: June 24, 2022

Abstract

We use the first mandated pay inequality disclosure in U.S. firms, the CEO-employee pay ratio disclosure, to examine the relation between firms' disclosure decisions and social attitudes. The SEC affords firms considerable discretion in estimating the pay ratio. We show that disclosed pay ratios are systematically lower when firms use complex methods to identify the median employee, whose pay is the denominator in the ratio. Firms are more likely to choose complex methods, and hence disclose a lower pay ratio, when their headquarter states exhibit stronger income inequality aversion and when the CEO has higher pay or reputation concerns. Industry, size, and compensation design differences do not explain these choices. We find no evidence that firms make real changes to reduce the pay disparity between CEOs and employees. Our results emphasize the importance of understanding both the disclosed pay ratio and the estimation process. More generally, our results inform on the relation between disclosure discretion and transparency in mandated disclosure of ESG issues.

JEL Classifications: G38, D63, D78, M12, M14

Keywords: CEO Pay ratio; ESG Disclosure; Discretionary disclosure choices; Income inequality aversion; Mandates; Local social attitudes

We thank Vikas Agarwal, Alex Edmans, Meng Gao, Stuart Gillan, Guojin Gong, Lixin Huang, Minjie Huang, Omesh Kini, Katie Moon, Yihui Pan, Casey Schwab, Lili Sun, Josh White, Baozhong Yang, and seminar participants at the 2021 *Conference on Financial Economics and Accounting*, the 2021 *Financial Management Association Annual Meeting*, the 2022 *Midwest Finance Association Annual Meeting, Georgia State University*, the *University of North Texas*, the *Indian Institute of Management-Ahmedabad*, the *Indian Institute of Management-Calcutta*, for helpful comments. We appreciate research assistance of Ashupta Farzana, Mahnaz Parsanasab, and Bowen Song. Satish Mudduluru provided helpful programming assistance. Ghosh gratefully acknowledges support from *Gladstein Professorship of Business and Innovation*. Ryan gratefully acknowledges support from the *Truist Professorship of Capital Markets*. All errors remain our own.

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Evidence from the CEO pay ratio estimation

1. Introduction

We use the *Security and Exchange Commission's* (SEC) CEO pay-ratio disclosure rule, the first mandated disclosure of pay inequality in U.S. publicly held firms, to examine compensation disclosure choices and their relation to social attitudes toward income inequality. The mandate requires firms to disclose the ratio of CEO pay to the median employee pay (pay ratio, hereafter). Income inequality in the United States has increased significantly since the 1970s (Picketty and Saez, 2003; 2014), and estimates suggest that within-firm wage inequality accounts for as much as one-third of the increase (Song et al., 2019). The popular media prominently portrays the impact of these trends on society (e.g., Krugman, 2013). Shareholders also show concerns about within-firm pay inequality and high CEO compensation. For instance, institutional investors list excessive management compensation and socially "irresponsible" corporate behavior as significant triggers of shareholder engagement (McCahery, Sautner, and Starks, 2016). In light of such attitudes, some scholars (e.g., Hart and Zingales, 2017, 2022) propose an expanded role for shareholder governance to reflect social and environmental preferences, which requires accurate and transparent disclosure of environmental, social, and governance (ESG) criteria (see, e.g., Karpoff, 2021, Karpoff, Litan, Schrand, and Weil. 2022; SEC Response to Climate and ESG Risks and Opportunities[1]).

The SEC states that the pay ratio disclosure provides new data for investors to better understand within-firm pay disparity (e.g., Menendez, 2011; White, 2015; SEC Final Rule No. 33-9877, Final Rule hereafter). News articles frequently cite these disclosed pay ratios to criticize income inequality in U.S. firms (e.g., Wilmot, 2017; Zarroli, 2019; Bump 2019; Leung, 2021; McCarthy, 2021). We know little, however, about the process and methods that firms use to estimate the mandated ratio and whether their disclosure decisions reflect societal attitudes toward income inequality. We provide evidence on these questions by focusing on how firms *estimate* the disclosed pay ratios when corporate headquarters (HQ) are located in geographic

[1] https://www.sec.gov/sec-response-climate-and-esg-risks-and-opportunities

regions with divergent aversion to income inequality. Our findings shed light on the transparency of the pay ratio disclosure in particular and, more generally, on the informativeness of ESG disclosure.

Firms bear direct and indirect costs when they disclose higher CEO pay ratios. Both federal and state lawmakers have proposed surtaxes on firms with pay ratios above certain benchmarks, and municipalities have imposed surtaxes (Bank and Georgiev, 2019). Evidence also suggests that customers and employees pay attention to the pay ratio and view it as a signal of pay inequality (Mohan et al., 2018; Green and Zhou, 2019; Balsam and Liang, 2019). Disclosing high pay ratios can also create negative public perception of firms' pay equality. The media often compare disclosed pay ratios across firms and use these comparisons to "name and shame" CEOs and firms with high pay ratios (e.g., Glazer, 2018; Bank and Georgiev, 2019; Zarroli, 2019; Bump, 2019, Leung, 2021), which creates reputation costs for firms and CEOs.

Given the importance of the pay-ratio disclosure mandate and the potential costs to firms and management of disclosing a high pay ratio, we examine two empirical questions. One, do firms use discretionary choices to estimate a lower pay ratio? Two, are firms more likely to use these choices to disclose lower pay ratios when located in areas in which social attitudes reflect greater aversion toward income inequality? Our analyses suggest that the answer to both questions is yes.

SEC guidelines afford firms discretion in how they estimate the pay ratio. During the rulemaking process, firms lobbied for more discretion with the stated purpose of reducing compliance costs. Since SEC policy already requires firms to disclose the details of the CEO's pay, the final rule focuses primarily on choices related to estimating the median employee pay, especially decisions that influence how firms identify the median employee. To identify the median employee, all firms must use a consistently applied compensation measure (CACM) that can comprise annual total compensation or any compensation measure as long as the company consistently apples the measure to all employees included in the ratio calculation. To simplify the pay estimation for each employee, firms may use statistical sampling to reduce the data collection costs or apply various exemptions to exclude certain employees. Once the median employee is identified, firms have no discretion on how they estimate the median employee's total pay (the denominator of the ratio) and must estimate it in the same way that they estimate the CEO's total pay (the numerator).

As discussed in the next section, we focus on the CACM choice in our analysis (and control for other discretionary choices). A perusal of our data reveals that CACMs that are more complex are associated with significantly lower *disclosed* pay ratios. For example, the average disclosed CEO pay ratio is 192 times the median employee pay when firms choose the simplest CACM, but the average disclosed pay ratio drops to 70, a 64% decline, for firms that choose the most complex CACM.

Firms that face greater societal aversion toward pay inequality have incentives to disclose lower pay ratios that conform to social norms in order to protect their public reputation and minimize public outcry that could lead to additional regulation or surtaxes. For instance, research finds that companies modify compensation design after negative press coverage about CEO pay (Kuhnen and Niessen, 2012) and are more likely to replace CEOs after negative news related to ESG criteria (Colak, Korkeamäki, and Meyer, 2020). Surveys and media coverages also reveal negative public sentiment toward high CEO pay and high CEO-employee pay gaps (Larcker, Donatiello, and Tayan, 2016; Bump, 2019; Zarroli, 2019; Doyle, 2020).

To disclose a smaller pay ratio, firms can take real actions and decrease (increase) CEO (median employee) pay, or they can choose a CACM that allows them to estimate a lower pay ratio. Competition in the CEO labor markets can make it difficult to cut CEO pay, and increasing the pay for the majority of rank-and-file employees can be too costly. Thus, it is plausible that firms will choose a CACM that results in a lower disclosed pay ratio. In other settings, researchers provide evidence that firms respond to economic incentives and use discretionary choices to make disclosures look better to outsiders. For instance, larger abnormal accruals are associated with greater equity-based incentives, which suggests that some firms use accruals to manage reported earnings and potentially boost their stock prices (e.g., Gao and Shrieves, 2002; Bergstresser and Philippon, 2006; Burns and Kedia, 2006; Efendi, Srivastava, and Swanson, 2007).

Direct and indirect costs associated with choosing a particular CACM will likely influence firms' choices. Complex CACMs increase the direct data compilation cost for firms since they need to gather and estimate more compensation items. The CACM choice can also increase indirect disclosure costs, such as higher board monitoring expenses or spillover effects that reveal proprietary information to competitors. Moreover, the earnings management literature suggests that the revelation of strategic disclosure choices

can result in negative investor reactions (e.g., Palmrose, Richardson, and Scholz, 2004; Bardos, Golec, and Harding, 2011) and lead to SEC enforcement actions (e.g., Karpoff, Lee, and Martin, 2008; Johnson, Ryan, and Tian, 2009). Thus, we expect firms to choose complex CACMs to lower the disclosed pay ratio only when the perceived benefits of disclosing lower pay ratio exceed the costs of using complex CACMs, e.g., when firms face strong aversion towards income inequality.

To examine the CACM choice and its relation with the disclosed pay ratio, we use a machine process to parse and extract the pay-ratio disclosure section from publicly available DEF-14A proxy statements on the SEC Edgar databases and combine textual analysis with manual verification to classify the data. Our final sample comprises 4,609 pay-ratio disclosures that cover 2,678 firms in fiscal years 2017 and 2018, the first two years in which the mandate requires firms to disclose the ratio. We collect information on the CACMs used to identify the median employee and codify these methods from the simplest method (salary only) to the most complex method (all components of total compensation).

We first use a hand-coded complexity CACM rank or a complexity index based on principal component analysis (PCA) to analyze the relation between the disclosed pay ratio and the complexity of the CACM. The analysis reveals a strong negative relation between the disclosed pay ratio and the CACM complexity. Industry, firm size, and compensation structure do not explain the relation, and the results are robust to controls for governance, other discretionary choices that can influence the pay ratio, and various firm and CEO characteristics. The relation between the pay ratio and complexity is economically significant as well. Increasing the complexity rank by one rank is associated with more than a 10% reduction in the disclosed pay ratio, ceteris paribus.

We next examine the relation between CACMs and social attitudes toward income inequality. We use three proxies to measure inequality aversion in the firm's headquarter state. Our first proxy is the first principal component from a principal component analysis of state-level variables that capture aversion to income inequality (Pan et al., 2022). The state-level union coverage, which indicates a more employee-friendly social environment, serves as our second proxy. As our third proxy, we use a variable to indicate whether the state legislature has proposed a pay ratio surtax for reporting a pay ratio greater than some

threshold. We find that the CACM complexity relates positively to all three measures, which suggests that firms headquartered in more inequality-averse states are more likely to choose complex CACMs.

The perceived benefits of choosing a more complex CACM vary within the inequality-averse states as well. For firms with moderate or low CEO pay levels, the expected pay ratio would likely be lower, which weakens the incentives to choose a more complex CACM to estimate a lower pay ratio. Similarly, CEOs that are close to retirement have fewer career and reputation concerns and hence weaker incentives to choose a more complex CACM. Consistent with these views, we find that firms with relatively lower CEO pay levels and CEOs at retirement age are less likely to choose a complex CACM even when their firms' headquarters are located in more inequality-averse states.

An alternative explanation for our findings is that firms headquartered in more inequality-averse states use different compensation designs and that the CACMs simply reflect these compensation designs or that the compensation designs restrict the firm's abilities to choose certain CACMs. Either case could create a spurious relation between the CACM and the inequality aversion. We use multiple approaches to examine this alternative explanation. First, we include control variables for firm types that would influence compensation design such as firm size, industry fixed effects, and the presence of foreign employees in all regressions. Our results also remain robust when we add additional controls for CEO or employee compensation design. Second, we segregate the sample into various subsamples based on firm type and compensation design. We find similar results if we exclude (i) finance and/or high-tech and biotech firms that are likely to have higher employee pay and a more complex pay design, (ii) firms headquartered in California or New York, and (iii) firms with foreign employees that may be subject to different pay schemes.

To address the possibility that CACMs simply reflect the use of equity compensation (options or stock units) for rank-and-file employees, we analyze the subsample of firms that provide equity pay to rank-and-file employees. To identify this subsample, we follow Bergman and Jenter (2007) and Call, Kedia, and Rajgopal (2016) to extrapolate a firm's use of employee equity compensation from the difference between the firm's total equity compensation and executive equity compensation. Among firms that grant higher (top tercile of our sample) equity compensation for employees, we continue to find considerable variations

in their CACM choices that compare to those in the full sample. About 78% of this subsample still choose simpler CACMs (17% choose salary and 61% choose cash compensation) even though their compensation designs allow them to choose a more complex method. We confirm in this subsample that firms prefer a more complex CACM when the inequality aversion of their HQ states is higher. These results suggest that observed CACMs are discretionary choices and do not merely reflect compensation design.

We refine this subsample in two additional ways. First, we assume there are more unnamed executives, which reduces our estimate for employees' equity compensation. Second, we classify a firm as granting equity compensation to rank-and-file employees only if they specifically state in the pay ratio disclosure that the median employee receives equity compensation. For these subsamples, we continue to find that firms use complex CACMs when their HQ states have higher inequality aversion scores. Together, the results of these tests suggest that the relation between the inequality aversion measures and the CACM choice is unlikely to be a result of firm type or compensation design differences.

Firms could also take real actions to lower the disclosed pay ratio by reducing the CEO pay or eliminating lower-paid employees to shift the median employee pay upward. If firms headquartered in more inequality averse states are more likely to take these actions in concert with their CACM choice, our findings could be a joint outcome of both decisions. To assess this possibility, we examine the trend in CEO pay and employee size before and after the disclosure mandate. The average CEO pay in our sample increases monotonically from 2015 to 2018 for firms in states with both strong and weak inequality aversion. The average number of employees also increases from 2015 to 2018. These results do not support the premise that firms cut CEO pay or eliminate employees to reduce the pay ratio.

Our results are robust to additional analyses that mitigate omitted variable concerns. First, we examine whether firms in inequality-averse states are more likely to provide a voluntary supplemental ratio and discussion to shape how people view the disclosed ratio. The data reveal that the use of these other discretionary choices in high inequality averse states is comparable to or lower than that in low inequality averse states. Second, we include "say-on-pay" voting outcomes and the CEO-VP pay gap in our regression models to control other concerns on executive pay design that may influence the firm's CACM decisions.

Third, we include compensation consultant fixed effects to control the styles of different compensation consultants. None of these additional tests or control variables undermines the relation between inequality aversion and the CACM choice.

We conduct two additional tests to assess the importance of the CACM as a mechanism to transmit the influence of local inequality aversion to the disclosed pay ratio. In the first test, we conduct a path analysis to separate the direct and indirect effects of inequality aversion on the disclosed pay ratio. We find a significant indirect effect (via the CACM), which confirms that the CACM is an important mechanism through which inequality aversion relates to the disclosed pay ratios. In the second test, we analyze within-firm method revisions from fiscal year 2017 to 2018 and find that the average inequality aversion in headquarter states is significantly higher for firms that revise the CACM complexity upward than for firms that revise the complexity downward.[2] The upward revision in method complexity is associated with more than a 60% reduction in the disclosed pay ratio from 196 in 2017 to 75 in 2018.

Our results inform on the relation between firms' disclosure decisions and societal attitudes. We show that firms choose methods to make disclosed metrics conform more closely to local social preferences, which highlights the influence of stakeholder activism on social disclosure. Pan et al. (2022) find that shareholders react negatively to the disclosure of higher pay ratios and suggest that investors who are averse to income inequality can serve as a channel to change firm culture and policies. Our evidence complements their study and shows that disclosed pay ratios reflect firms' estimation choices and may not always accurately represent the true pay disparity between the CEO and employees. ESG disclosure could potentially enhance governance, but our findings suggest that ESG disclosure mandates may not achieve the requisite transparency.

To our knowledge, our research is the first to focus on the estimation method of the disclosed pay ratio. Jung, Kim, Ryu, and Shin (2021) demonstrate that supplementary pay ratio disclosures relate to both opportunistic and informational motives, and Boone et al. (2022) find evidence that firms use "spin" words

[2] A caveat to this analysis is that the sample size is small. Only 19 firms revised their CACMs, possibly because the SEC allows firms to keep the same median employee for three years.

to portray the firm more positively. Our research differs from these studies and provides novel evidence that firms make choices that *directly* influence the disclosed pay ratio and that these choices relate to local social attitudes. Our study thus responds to Leuz and Wysocki's (2016) call for more research on how political and social forces shape the implementation of disclosure regulations.

Our results provide useful information to scholars, practitioners, and policymakers as they debate the role of ESG disclosure and governance (e.g., Hart and Zingales, 2017, 2022; Karpoff, 2021; Karpoff et al., 2022). Scholars have long been interested in the wealth effects of voluntary environmental disclosure (e.g., Blacconniere and Patton, 1994). There is a substantial body of knowledge on the role of mandatory and voluntary financial disclosures (e.g., Healy and Palepu, 2001; Verrecchia, 2001; Wagonhofer, 2011). Studies show that discretionary disclosure choices relate to the economic incentives of the decision makers, and these choices influence disclosed financial metrics (e.g., Bergstressor and Phillipon, 2006; Burns and Kedia, 2006). Our study complements and extends this literature by demonstrating that firms use discretionary choices to make pay-inequality disclosures conform to the social attitudes in the locations of the decision makers, which reduces the informativeness of the disclosure. From a policy perspective, our study points to the importance of carefully assessing discretionary choices in ESG disclosure mandates.

2. Institutional background and conceptual motivations

Section 953(b) of the Dodd-Frank Act of 2010 requires a CEO-to-employee pay ratio disclosure for U.S. public firms. The Security Exchange Commission (SEC) adopted the final rule for the pay ratio disclosure on August 2015. The mandate requires firms to start reporting the pay ratio disclosure for the fiscal year beginning on or after January 1, 2017. The rule requires the SEC-reporting firms to disclose in annual proxy statements: (i) the median annual total compensation of all employees of the firm, excluding the CEO, (ii) the annual total compensation of the firm's CEO, and (iii) the ratio of the two amounts. The SEC affords firms considerable flexibility in estimating the pay ratio. If firms apply a specific method or exemption when estimating the pay ratio, they are required to provide additional disclosure on that method or exemption choice.

2.1. The social environment during the rulemaking period and criticism of the pay ratio mandate

In the period leading up to and during the rulemaking years (2010-2015), some pundits argue that incentive compensation encouraged bank executives to take excessive risk prior to the financial crisis (*Wall Street Journal*, 2009; Treasury Department, 2009). As a result, there was heightened negative public attitudes toward executive compensation, which motivated executive compensation reforms in the Dodd-Frank Act (Jensen and Murphy, 2018; Strine and Smith, 2020; Fischer and Lindermoyer, 2020). Moreover, the increasing income inequality in the U.S. led the public to pay greater attention to the pay differences between top executives and rank-and-file employees (e.g., Krugman, 2013; Anginer et al., 2020; Green and Zhou, 2019; the Occupy Wall Street movement in 2011[3]). These social views about income inequality and the level of executive pay shaped both the mandate and the reaction to the regulation. From the onset, the mandate was controversial and elicited strong reactions from both proponents and critics (Bank and Georgiev, 2019). Opponents of the rule charged that Congress passed the rule without a clear purpose, and critics perceived the requirement as "put forth for those who feel compelled to check the behavior of companies to ensure that they hew to whatever social standards policymakers are embracing at the moment" (Batkins and Brannon, 2019, page 6).

Amidst this backdrop, many analysts view the pay ratio rule as a naming and shaming disclosure instead of a regulation that serves an informational function (e.g., Brannon, 2014; Piwowar, 2015; Anginer et al, 2020; Yadin, 2019; Lokin, 2019). The SEC and some supporters of the rule maintain that the disclosure provides new data for investors to understand compensation policies (e.g., Menendez, 2011; White, 2015; Final Rule). Additionally, the SEC states in the final rule that the ratio is "company specific" and not appropriate for cross-sectional comparisons. Many firms include do-not-compare discussions in their disclosure to remind shareholders that they should not compare pay ratios across firms.[4]

[3] The Occupy Wall Street movement in 2011 is a demonstration of the public outcry over the unequal wealth distribution between the top 1% and the remaining 99% in the U.S.

[4] About 51% of our sample firms explicitly mention in their disclosure that their pay ratios should not be compared with the ratios in other firms due to different methods and exemptions applied.

Other critics focused on the economic costs of estimating the pay ratio, and firms lobbied aggressively for more method flexibility during the rulemaking process (Final Rule; Boone et al., 2022). Reducing compliance costs provides the main motivation for the SEC to afford firms with flexibility in the methods they use to estimate the pay ratio (Final Rule). Although this discretion can reduce compliance costs by allowing firms to choose less expensive methods to prepare data that they do not routinely compile or estimate, it can also reduce the information and accuracy of the disclosure if the firms' choices influence the disclosed pay ratios (Bank and Georgiev, 2019).

2.2. The complexity of pay ratio estimation and why we focus on the CACM

To determine the pay ratio, firms need to estimate the total pay of the CEO and the total pay of the median employee. SEC regulations have long required firms to report the total pay of the CEO, which is the numerator in the pay ratio, in the summary compensation table of the proxy statement. The total pay of the median employee provides the new data point for the pay ratio disclosure. To calculate the total pay of the median employee, the main choice lies in how to identify the median employee. Once a firm identifies the median employee, they must follow Item 402(c)(2)(x)[5] of Regulation S-K to calculate the total pay of that employee. We summarize the typical process firms follow to estimate their pay ratios in Figure 1.

As indicated in Figure 1, most of the complication in estimating the pay ratio occur in the first step – identifying the median employee. In their comment letters on the proposed rule, many commentators attributed the lion's share of the compliance cost to this step (Letter from Chamber of Commerce, KBR, Avery Dennson, Intel, FEI, FuelCell Energy, among many others). Based on the comment letters and feedback, the SEC revised the proposed rule and afforded firms more flexibility in identifying the median employee, with the objective of lowering the cost of compiling the employee pay data.

In the first step, firms make three decisions. First, firms pick a date within the last three months of the fiscal year end to determine the employee base (the determination date). Second, firms identify the

[5] Item 402(c)(2)(x) of the SEC's Regulation S-K requires firms to report an executive's total compensation for the covered fiscal year as the sum of the individual pay items reported in the summary compensation table, which incorporates salary, bonus, equity awards, non-equity incentive awards, change in pension value, and all other compensation. For details, refer to https://www.sec.gov/divisions/corpfin/ecfr/17cfr229.402a.pdf.

employee population to be included for the median employee determination (employee population identification). In this decision, firms can either use the entire employee population or identify a suitable subsample of employee population by applying a statistical sampling method or certain exemptions.[6] The regulation allows three types of exemptions. Firms can exclude employees from a foreign jurisdiction if those employees account for fewer than 5% of the total employee population (De Minimis exemption). Firms can also exclude employees or if a foreign jurisdiction's data privacy law prohibits the collection and disclosure of pay data (Foreign Privacy exemption). Lastly, firms can exclude employees from a business combination/acquisition activity in the year such activity occurs (M&A exemption).

In the third decision, firms estimate the pay for each employee and use this information to identify the median employee. Recognizing the cost of estimating all the components of total pay for each employee, the SEC allows firms to use a *Consistently Applied Compensation Measure (CACM)* to calculate the pay for each employee and determine the median employee. The CACM can include one or more components of total pay as long as the firm consistently applies the compensation measure for all employees. Firms may also apply cost-of-living adjustments, presumably to make pay levels comparable across different countries.

We focus on the complexity in the third decision – estimating the pay for each employee – and control for other decisions. Our focus on the third decision for the following reasons. First, the use of a statistical sampling method (in the second decision) to identify a subsample of employees is not common (fewer than 4% of our sample). Second, the three exemptions allowed for the second decision (identification of the employee population) are all subject to selection biases. Specifically, the ability of a firm to apply the De Minimis exemption, the Foreign Privacy exemption, or the M&A exemption depends on whether the firm has foreign employees or has merger/acquisition activities in the fiscal year. In contrast, all firms pay their employees all or the majority of the various pay components that comprise the CACM. Thus, firms' choices

[6] Examples of statistical sampling from the pay ratio disclosure: "We identified all employees within 5% of the median, and from this group used statistical sampling to select an employee as a reasonable representative of our median employee" (Coca-Cola, 2017); "We identified approximately 240 employees to whom we paid approximately the same base compensation during 2018. From that group of employees, we conducted a random sample to identify a sub-group of employees from which to select our median employee" (Harley-Davidson, Inc., 2018).

on what to include in the CACM better reflect their preferences for the disclosed pay ratio. Third, the allowed exemptions are more likely to affect the tails of the employee pay distribution and may not affect the identification of the median employee. Once the median employee is determined, firms estimate the compensation of this employee according to Item 402(c)(2)(x) of Regulation S-K to calculate the total pay of the median employee the same way they estimate the total pay of the CEO.

As demonstrated in Figure 1, firms also have some flexibility in the final step – drafting the pay ratio disclosure. In this step, firms can include additional disclosure on supplemental ratios (Jung et al., 2021), use dialog to influence shareholder impressions (Boone et al., 2022), or supply additional discussions to help put the pay ratio disclosure in context (LaViers et al., 2020). The additional information may help shape how people view the disclosed pay ratios after the pay ratios are determined. In comparison, we focus on the firm's CACM choice that directly influences the estimation of the pay ratio.

3. Data and variable construction

3.1. Sample

To construct our pay ratio disclosure sample, we first gather from the SEC Edgar filing website all proxy statements (7,389 in total) that Compustat firms filed for the fiscal year 2017 and 2018. We then use a software developed by metaHueristica LLC to parse these proxy statements into subsections, sentences, and words. After the parsing, we use the Java Natural Language Processing Tool to extract the needed data to construct our disclosure variables. Companies exempted from the pay ratio disclosure include smaller reporting companies, emerging growth firms, foreign private issuers, multijurisdictional disclosure system filers, and registered investment companies. We are able to collect pay ratio disclosure information for 4,681 firm-year observations (63.35% of the sample with a proxy statement). Next, we manually read the discussion of the median employee identification and classify for each firm the compensation components included in its CACM. We exclude 29 firm-year observations that do not contain information to identify the CACM choice.

We use computer code to extract the pay ratio, CEO pay, and the median employee pay for about 90% of the disclosures. We hand collect the rest of the observations and manually verify when there are discrepancies in the extracted pay ratio, CEO pay, and median employee pay figures. We also collect other disclosure information such as statistical sampling, De Minimis exemption, M&A exemption, the disclosure of supplemental ratio, the presence of foreign employees, and total number of employees via a combination of computer algorithm and hand collection. We drop an additional 43 observations with a "zero" or "undefined pay ratio" because either the CEO or the employees do not receive any compensation from the firm. Our final sample consists of 4,609 firm-years and 2,678 unique firms from 2017-2018.[7] Our sample compares to 4,669 firm-years and 2,535 unique firms in Boone et al. (2022) and 2,307 unique firms in Pan et al. (2022). For clarity, we summarize the sample construction process in Appendix A.

3.2. Classifying the CACM choice

SEC guidelines require firms to disclose the pay components that comprise their CACM. We hand code this information and describe the details of the codification in Appendix B. Firms can choose to include one or more of the following five pay components in their CACM: (i) salary, (ii) short-term incentives (i.e., annual bonuses), (iii) long-term incentives (i.e., cash or equity incentives), (iv) retirement benefits, and (v) other benefits (e.g., allowances, health and insurance benefits). Firms could also choose to estimate total pay, which includes all five individual pay components, for each employee.

We also collect information on whether the values of long-term incentives are vested amounts of past grants or fair values of new grants. This differentiation of long-term incentives is necessary because the values of vested grants are already disclosed in tax records and do not require much additional effort to estimate. In contrast, using fair values of new grants requires firms to follow the same procedure they use for top executives to estimate the fair values of new compensation grants for each employee, which requires applying valuation models and reasonable probability assumptions of the likelihood of achieving various

[7] 2,249 and 2,385 unique firms in 2017 and 2018, respectively, disclose their pay ratios.

performance hurdles. Thus, reporting fair-value of long-term grants is more complex than reporting the vested amount of long-term grants.

We use two approaches to capture the complexity of CACMs. In the first approach, we group the various combinations of compensation components into four categories and rank these categories based on the complexity of estimating the values of the included pay components:

- Complexity rank 1 - Salary only: firms use only the base salary or wage of each employee to determine the median employee.
- Complexity rank 2 - Cash compensation: firms use either total cash compensation, total taxable wage, or total direct wage to determine the median employee. It typically includes salary, annual bonuses, and the vested amount of long-term incentives in the covered year.
- Complexity rank 3 - Cash compensation plus: in addition to cash compensation, firms also include either the estimated fair value of long-term incentives or some sorts of benefits such as health or life insurance in each employee's pay.
- Complexity rank 4 – Total Compensation: firms estimate a total pay that sums all five pay components for each employee when determining the median employee.

The first rank, salary only, is the simplest and the fourth rank, total compensation, is the most complex. The second and third groups lie in between with the second group being simpler than the third group. As shown in Table 1 Panel A, the distribution is not uniform. About 13% of the firms choose the first method (Rank 1), 63% choose the second method (Rank 2), 16% choose the third method (Rank 3), and 8% choose the fourth method (Rank 4).

In the second approach, we estimate a principal component analysis (PCA) on six indicator variables. The first five variables indicate the inclusion of each of the five pay components in the CACM, respectively, and the sixth indicates the use of total compensation as the CACM.[8] We extract the first component from the PCA and use it as an alternative measure of CACM complexity - *Complexity index*. Panel B of Table 2

[8] Out of the 378 observations that use "Total Compensation", 80 did not disclose the individual components included in the total compensation.

presents the loadings of the first component. The first component has an eigenvalue of 3.299 and explains 55% of the total variance in the six variables. The loadings on each of the individual pay components are consistent with expectations: The factor loading is negative for simpler compensation items, i.e., salary and cash components, but positive for more complex compensation items.

3.3. Measures of inequality aversion

Our analysis builds upon the premise that firms choose a CACM in response to the social attitude toward pay inequality in their headquarter states. Research shows that headquarter locations influence firm decisions and investor focus (e.g., Coval and Moskowitz, 1999; Malloy, 2005; Hasan et al., 2017a and 2017b; Hoi et al., 2019). Our first measure of income inequality aversion in the firms' headquarter states is *HQ state inequality aversion score*. Following Pan et al. (2022), we calculate each state's *inequality aversion score as* the standardized[9] first principal component of the following three state-level variables: *minimum wage*, *state tax differential*, and *democratic leaning*.[10] *Minimum wage* is the minimum hourly wage (in $) of the HQ state in 2017. *State tax differential* is the difference in percentage between a state's maximum and minimum personal income tax rates as of 2017 and is zero for the states with no state income tax. *Democrat leaning* is the fraction of voters in the state that voted for Hillary Clinton in the 2016 presidential election. The first component of the PCA has an eigenvalue of 2.191 and explains 73% of the total variance in the three variables. The loadings on the individual state components are positive, which implies that higher PCA scores indicate a more inequality-averse social attitude in the state.

Labor unions can play an important role in promoting income equality. Thus, our second proxy for inequality aversion is the percentage of union coverage of workers in the firms' headquarter states. We obtain union coverage data from the Current Population Survey of the *Bureau of Labor Statisti*cs. *Union*

[9] PCA is sensitive to the scales of measures and the magnitude of the variability within variables. To avoid the disproportionate effect of the included variables, we standardize the means and standard deviations of all principal components to between 0 and 1, respectively.

[10] The results are qualitatively similar if we include *minimum wage attitude* as the fourth component and calculate the first principal component of four state-level variables. *Minimum wage attitude* measures the fraction of residents in the HQ state that favor increasing the minimum wage to $15 per hour, based on a 2016 survey by the Atlantic.

coverage measures the yearly percentage of wage and salary workers in a headquarter state that are union members or who report no union affiliation but whose jobs are covered by a union or an employee association contract.

Finally, government policies that levy higher taxes on firms that disclose higher pay ratios provide incentives for firms to choose a more complex CACM that results in a lower disclosed pay ratio. To capture this incentive, we use an indicator variable, *HQ state w/ pay ratio surtax*, which equals one if the headquarter states have proposed a business surtax if the pay ratio of a firm doing business in those states exceeds a certain threshold. The states with proposed surtaxes are California, Connecticut, Illinois, Massachusetts, Minnesota, Oregon, Rhode Island, and Washington.

3.4. Firm, board, and CEO characteristics

We acquire financial and stock return data from Compustat and CRSP, respectively. We measure firm size, *Total asset*, as the natural logarithm of one plus total assets. *Market-to-book* is the ratio of market value to book value of equity. *Leverage* is the ratio of total debt to total assets, where total debt equals the sum of debt in current liabilities and long-term debt. *Ind. adj. ROA* is the ratio of EBIT to total assets and adjusted for the median ROA in the firm's industry classified based on two-digit SIC codes. We calculate *Annual stock return* by compounding CRSP monthly returns over the fiscal year. *Std. dev of stock return* is the standard deviation of CRSP daily stock returns over the fiscal year.

Foreign employee is an indicator variable that equals one if the firm has foreign employees and zero otherwise. About 74% (3,441 obs.) of the sample firms report in the pay ratio disclosure whether or not the firm has foreign employees. We extrapolate foreign employee information of the remainder of the firms from WRDS' Subsidiaries and Segment databases. To do so, we gather the names of the subsidiaries along with the location (country) from Exhibit 21 of 10-K filings, which include information for all the subsidiaries whose financial results comprise the consolidated the financial statements of the firm. We consider a firm as having foreign employees if they have a foreign subsidiary. We alternatively infer foreign employee information from the Compustat Segment database based on whether it has a geographic segment

with positive assets values outside the U.S. Combining these two approaches, we are able to determine if the firm has foreign employees for about 98% of the firms. The remaining observations for which we are not able to extrapolate foreign employee information are all in 2018. For these observations, we adopt the information in 2017 for 2018.

We obtain CEO and board variables from the Execucomp and ISS Directors databases, respectively. Board variables include *Board size*, the natural logarithm of the number of board directors plus one, and *Outside directors*, the percentage of directors that are not affiliated with the firm. In addition, we gather information on *CEO tenure*, *CEO pay*, percentage of firm shares held by the CEO (*CEO stock ownership*), and whether the CEO serves as board chair (*CEO duality*). We obtain information on *Institutional block holding* from the Thomson Reuters Institutional Holdings (13f) database and hand collect the data from proxy filings when the information is missing in the database. Appendix C provides variable descriptions.

3.5. Summary statistics

Panel C of Table 1 reports the summary statistics of the pay ratio and related variables for 4,609 firm-year observations. The average (median) pay ratio is 142.83 (72.00) for our sample firms, which compares to pay ratios reported in other studies (e.g., Pan et al., 2022). The complexity rank variable has a mean of 2.17 and a median of 2, which suggests that a typical firm in the sample uses cash compensation as the CACM to identify the median employee. The standardized PCA-based complexity index has a mean of 0.00 and a median of -0.90. The negative median confirms that most of the firms use simpler CACMs, such as salary only or cash compensation. The average (median) CEO earns $6.54 ($4.70) million.

Out of 4,609 observations, 4,510 have complete data for the firm financial variables. We report the summary statistics for firm characteristics in the second section of Table 1 Panel C. The average (median) firm has total assets of $17.84 billion ($2.60 billion) and 16,326 (2,900) employees, respectively. The average (median) firm has a market-to-book ratio of 3.43 (2.27), industry adjusted ROA of 3.84% (5.20%), leverage of 27.47% (24.81%), and annual stock return of 21.23% (16.82%) over the prior fiscal year. The mean (median) standard deviation of stock returns in the prior fiscal year is 2.19% (1.89%). The average

(median) for the total ownership of all institutional investors that own 5% or more of the firm's common stocks is 28.41% (27.70%).

Because the Execucomp and the ISS Directors databases draw their samples from the S&P1500 firms, the sample size for the governance variables is smaller than that for financial variables. A typical board in our sample consists of nine directors, of which 81.34% are unaffiliated. About 39% of the CEOs of an average firm also serves as board chair. The average (median) CEO has served in their role for a little over nine (seven) years, and owns 1.44% (0.29%) of the share of the firm.

In the bottom section of Table 1 Panel C, we present summary statistics for variables related to inequality aversion at firms' HQ states. One hundred and one firms (covering 192 firm-year observations) have headquarters in a foreign country, which reduces the sample for the inequality aversion measures to 4,318 observations. The average (median) *HQ state inequality aversion score* is -0.002 (-0.214). A higher value implies stronger inequality aversion. For example, California has an inequality aversion score of 2.565 compared to a score of -2.692 in Utah. On average, unions cover 12.91% of wage and salaried workers in the sample. About 32% of the observations (810 firms) have HQs in states in which legislators have proposed surtaxes on high CEO pay ratios.

4. The relation between firms' CACM choices and the disclosed pay ratio

We first examine the relation between the disclosed pay ratio and CACM complexity. If incentive pay and benefits are constant or increase monotonically with base salary, we do not expect the choice of the CACM to matter to identify the median employee since using base salary or a combination of base salary and any other compensation items to estimate employee pay would not change the ranking of the employees. In practice, however, incentive pay and benefits are often not constant or monotonically increasing in base salary. Hence, sorting employees by incentive pay and benefits can result in different employee ranks than sorting employees by base salary. By choosing different CACMs (i.e., the ranking system), firms can influence disclosed pay ratios by identifying different median employees.

4.1. Univariate results

4.1.1. The relation between CACM choices and pay ratio

Table 2 indicates a strong negative association between CACM complexity and the disclosed pay ratio. As shown in Panel A of Table 2, the mean pay ratio declines monotonically from 192 to 70 as the complexity rank of the CACM increases from 1 to 4. The differences in the mean pay ratios between different complexity ranks are significant. This pattern suggests that using a more complex CACM is associated on average with a lower pay ratio. In Panel B of Table 2, we present the correlations between the pay ratio and the six indicator variables of pay components included in the CACM. Pay ratios correlate positively with indicator variables for the simpler pay items, such as salary and cash compensation, and negatively correlated with indicator variables for the more complex pay items, such as equity, retirement, and other benefits. The pay ratio is also lower for firms that use the total compensation as the CACM. We next examine whether firm size, industry, or compensation design explain this negative relation.

4.1.2. The relation between CACM choices and firm size

If larger firms are also more likely to have a higher pay ratio, the negative relation between CACM complexity and the pay ratio may be spurious. To explore this possibility, we divide our sample firms into five quintiles based on *Total assets*, and then examine the different CACM choices for each size quintile. If the relation between CACM complexity and pay ratio primarily derive from firm size, we would find that larger firms (firms in the higher size quintiles) primarily use complex methods and smaller firms (firms in the lower size quintiles) primarily use methods that are more complex. As shown in Figure 2a, however, the two simpler methods, salary only (*Complexity rank* 1) and cash compensation (*Complexity rank* 2) are reasonably equally distributed across different size quintiles. Although the more complex methods, cash compensation plus and total compensation are more likely to be used by smaller firms (26.4% and 32.8% for the smallest quintile, respectively), a substantial number of larger firms also use these more complex methods (20% and 15.1% for the largest quintile, respectively). Overall, the evidence in Figure 2a does not support that firm size alone drives firms' CACM choices.

4.1.3. The relation between CACM choices and industry

We also examine the relation between industry and firms' CACM choices. The SEC requires firms to include all employees, including seasonal, temporary, and part-time employees, in the pay ratio estimation (Final Rule, page 45). The use of seasonal and part-time employees depends on the industry. For example, firms in retail industries rely heavily on hourly and seasonal employees. Figure 2b presents the within-industry distribution of the CACM complexity choices. Cash compensation (*Complexity rank* 2) is the most prevalent CACM in all industries, with the highest percentage (78%) in the wholesale/retail industry. The healthcare industry makes the most use of cash compensation plus (*Complexity rank* 3) at 32% and the finance industry has the highest usage of total compensation (*Complexity rank* 4) at 14%. Although there are some cross-industry differences in the usage of the CACMs, we continue to observe significant within-industry variation in the CACM, which suggests that the CACM choice remains an important firm decision within each industry.

4.1.4. The relation between CACM choices and compensation structure

A firm's compensation design for rank-and-file employees may determine or restrict the CACM that the firm chooses. For example, firms that only use base salary to compensate the majority of their employees may choose a simpler CACM and firms that pay equity compensation to employees may choose a more complex CACM. Under these scenarios, the negative relation between the pay ratios and the CACM complexity may be spurious and simply reflects the firms' compensation designs for rank-and-file employees. We follow Bergman and Jenter (2007) and Call, Kedia, and Rajgopal (2016) and extrapolate the amount of equity compensation for rank-and-file employees based on the differences between the total value of equity compensation and the value of executive equity compensation. First, we obtain from the Execucomp database the fair value of equity compensation (stock awards plus option awards) for each of the named executives and sum these values to compute the total value of executive equity compensation.[11] Second, we estimate the amount of equity compensation for rank-and-file employees as the difference

[11] The SEC requires compensation disclosure on the top five highest paid executives.

between the total equity compensation used by the firm (the value of options granted plus total stock compensation expense) and the total equity compensation for named executives in the firm for the fiscal year. We scale the difference by the value of total equity compensation to compute the percentage of equity grants for employees (*Employee equity compensation%*). The mean (median) for *Employee equity compensation%* is 66.71% (74.22%) for 2,989 observations with the required compensation data.[12]

To examine the relation between CACMs and compensation design, we divide our sample into three terciles based on *Employee equity compensation%.* Tercile 1 (tercile 3) comprises firms that use lower (higher) equity compensation for rank-and-file employees. Figure 2c presents the distribution of CACMs within each tercile. As shown in the figure, the within-tercile distribution of CACMs is similar across the three terciles and comparable to the distribution in the entire sample (Table 2 Panel A). In the lowest tercile (tercile 1), where firms use less equity compensation for employees, 21.97% still choose more complex CACM methods (rank 3 or rank 4). In the highest tercile (tercile 3) where firms use more equity compensation for employees, most of the firms (78.01%) still opt for the simpler CACM methods (rank 1 or rank 2) and 21.99% of firms choose the more complex CACM methods (rank 3 or rank 4). Thus, the data do not support an alternative explanation that CACM choices simply reflect compensation design.

4.2. Multivariate results

We use the following multivariate model to control for the various firm and industry characteristics:

$$Ln(1+Pay\ ratio)_{it} = \alpha + \beta_1 CACM\ complexity_{it} + \sum_{k=2}^{n} \beta_k control\ variable_{kt-1} + YR_{2018} + \gamma_n \qquad (1)$$

$Ln(1+Pay\ ratio)_{it}$ is the natural log value of one plus the disclosed pay ratio of firm *i* in fiscal year *t*. We use the natural log value of pay ratios to mitigate the skewness in the data. Fiscal year *t* can be either 2017 or 2018. $CACM\ complexity_{it}$ is either the *Complexity rank* or *Complexity index* for firm *i* in year *t*. All models include industry fixed effects (γ_n, based on Fama and French 48 industries) and a binary variable,

[12] For robustness, we also estimate an *Employee option compensation%* variable that only uses information based on option-based grants (in shares). Specifically, *Employee option compensation%* is the difference between total options granted in shares minus the total options granted in shares to the disclosed executives scaled by the number of options granted in that year. Our results are similar when we use only options to identify firms with equity grants.

YR_{2018}, that equals one for fiscal year 2018 and zero for 2017 to control for year fixed effects. We winsorize all non-binary variables at the 1% and 99% values and base statistical significance on robust standard errors.

We include three sets of control variables in the regressions. The first set of control variables includes various firm characteristics. Following earlier studies on the determinants of pay ratio (e.g., Boone et al., 2022; and Pan et al., 2022), we control for firm size (*Total assets)*, the presence of foreign employee (*Foreign employee*), firm accounting and stock performance (*Ind. adj. ROA* and *Stock return*, respectively), firm risk (*Std. of stock return*), financial leverage (*Leverage*), and growth prospect (*Market-to-book*). We measure all these variables in the year prior to the year of the disclosed pay ratios. Given that firms in the S&P1500 index are likely to receive more public scrutiny than firms that are not in the index, we also include a binary variable that equals 1 if the firm is a constituent of the S&P1500 index and 0 otherwise.

The second set of control variables includes four indicator variables that capture the firm's other disclosure choices. These choices include whether (i) the firm uses statistical sampling to determine the employee population for median employee identification (*Statistical sampling*), (ii) the firm applies the De Minimis exemption (*De Minimis exclusion*), (iii) the firm applies the M&A exemption (*M&A exclusion*), and (iv) the firm reports a supplemental ratio (*Supplemental ratio*). We report the summary statistics of these disclosure variables in Panel B of Table 1. Lastly, we also include a set of control variables for CEO power and governance characteristics. To control for CEO power, we include *CEO tenure*, *CEO stock ownership*, and *CEO duality* (Hermalin and Weisbach, 1998; Berger, Ofek, and Yermack, 1997; Denis, Denis, and Sarin, 1997; Adams, Almeida, and Ferreira, 2005). Governance variables include *Board size*, board independence (*Outside directors*), and *Institutional block holding*.

We present regression results in Table 3. Columns 1 and 2 do not include any control variables except for the year indicator and industry fixed effects. The dependent variable is the natural log value of the pay ratio. The independent variable of interest is *Complexity rank* in column 1 and *Complexity index* in column 2. Confirming the univariate evidence, the coefficients on both CACM complexity variables are negative and significant. The coefficient on the year dummy is positive and significant, which suggests that pay ratio is higher on average in 2018 than in 2017. This increase in the pay ratio results from higher CEO

compensation in 2018 – the mean (median) CEO compensation reported to the SEC for same CEO-firm pairs increased by over $442,731 ($409,265) from 2017 to 2018, an increase of about 5.56% (7.12%).

In columns 3 and 4, we include the first set of control variables on firm characteristics. The coefficients on the CACM complexity variables remain negative and significant. The coefficients on the control variables are consistent with the findings in Boone et al. (2022). Firms that report higher pay ratios are larger, have better performance, higher leverage, higher institutional block holding, and are more likely to be in the S&P 1500 index. They are also more likely to have foreign employees. The R^2 increases from 0.230 in column 1 to 0.535 in column 3, which indicates that adding these additional firm controls significantly improves the fit of the regressions.

In columns 5 and 6, we add the second set of control variables for the additional disclosure choices. Pay ratios are significantly higher for firms that use statistical sampling and include discussions on supplemental ratios in the disclosure. We find no relation between the De Minimis exemption or M&A exemption and the pay ratio. More importantly, the coefficients on the complexity variables remain negative with similar magnitudes and statistical significance as those in columns 3 and 4.

In columns 7 and 8, we add the third set of control variables on CEO and board characteristics. We drop the S&P 1500 indicator because observations with CEO and board characteristics are from the S&P 1500 firms. Firms with a higher percentage of outside directors and lower CEO stock ownership have higher pay ratios. Although the sample is smaller, the signs, magnitudes, and statistical significance of the coefficients on the two complexity variables compare to the coefficients in columns 3-6.

The relation between the disclosed pay ratio and CACM complexity is also economically significant. Increasing *Complexity rank* by one rank is associated with 10.8% (12.6%) decrease in pay ratio based on the coefficient in column 5 (7). Likewise, one standard deviation increase in *Complexity index* is associated with 6.54% (6.35%) decrease in pay ratio based on the coefficient in column 6 (8). In summary, the findings in Table 3 demonstrate a significantly negative relation between pay ratio and CACM complexity. The relation remains strong after controlling for various firm, CEO, and disclosure factors.

5. Social attitudes and firms' CACM choices

The significant negative relation between the CACM complexity and pay ratio raises the possibility that some firms may choose a CACM to disclose lower pay ratios. Activists can interpret a higher pay ratio, which indicates a greater pay difference between the CEO and a typical employee in the firm, as a signal of greater pay inequality (e.g., Bump, 2019; Zarroli, 2019; Doyle, 2020). Evidence shows that inequality-averse investors react negatively to high pay ratio disclosures (Pan et al., 2022). Policymakers cite high pay ratios as evidence of income inequality and use them to motivate the passage of policies to promote social equity. For example, the cities of Portland and San Francisco passed a surtax on local businesses that report pay ratios exceeding 100, and legislators in eight states have proposed a surtax on high pay ratios (Bank and Georgiev, 2019). Given the negative perceptions about high ratios and the threat of pay ratio surtaxes, firms have social and economic incentives to estimate and disclose lower pay ratios to conform to a more inequality averse local attitude.

5.1 Inequality aversion and the CACM complexity

To examine the relation between social attitudes and firms' CACM choices, we regress the CACM complexity on the proxy for inequality-aversion in firms' headquarter states, i.e., *HQ state inequality aversion score*. We control for various firm and CEO characteristics that may influence the firm's CACM choice. We include *Total assets* as a control for firm size and a binary variable, *Foreign employee*, to control if the firm has foreign employees. Larger firms and firms with foreign employees are likely to face higher direct and indirect costs of using a more complex method.

Firms' CEO pay levels and performance may influence their motivation to disclose a low pay ratio. Firms with high CEO pay may prefer to disclose a lower pay ratio to avoid leading the public to believe that their high CEO pay magnifies income inequality, and stakeholders might be more accommodating of a high pay ratio when the firm performs well. We measure firm performance in three ways, stock performance (*Stock return*), accounting performance (*Industry-adjusted ROA*), and growth potential (*Market-to-book*). We also include financial leverage (*Leverage*) to control for financial risk, *Std. dev of*

stock return to control for equity risk, *Institutional block holding* to capture the likelihood of institutional investor monitoring, and the *S&P 1500 indicator* variable as a measure for public scrutiny. All firm-level variables are measured in the year prior to the year of the disclosed pay ratio except CEO pay, which is from the same year as the disclosed pay ratio since it directly relates to the expected pay ratio and could influence a firm's CACM choice. All models include industry fixed effects and the YR_{2018} indicator.

Table 4 Panel A presents the regression results. The dependent variable is *Complexity rank* in column 1 and *Complexity index* in column 2. The coefficient on *HQ state inequality aversion score* is positive and significant, which supports our prediction that firms headquartered in a more inequality-averse state prefer a more complex CACM. The coefficient on *Total assets* is negative and significant, consistent with our expectation that larger firms prefer simpler method to reduce costs. We find no significant relation between the CACM complexity and firm performance or risk. Firms with a higher financial leverage are less likely to use a more complex method. We include board and CEO characteristics as additional controls in columns 3 and 4. The results in these two columns are qualitatively similar to those in the first two columns. The coefficient on *HQ state inequality aversion score* remains positive and significant.

The results in Table 4 Panel A identify a positive relation between the CACM complexity and the proxy for inequality-aversion in the firms' headquarter states. In states with a stronger emphasis on income equality, firms may prefer to report a lower pay ratio to avoid the perception of acting against the social norm. Firms could also face direct or indirect economic costs of a high pay ratio in inequality-averse states. We study these economic costs in the next section.

5.2 Alternative inequality aversion measures and CACM complexity

We consider two factors that are likely to increase the economic costs of disclosing a high pay ratio: labor unions and government tax policies. The labor economics literature demonstrates that labor unions engage in activities that encourage income equality (e.g. Freeman, 1992; DiNardo, Fortin, and Lemieux, 1996; Card, Lemieux, and Riddell, 2004; Western and Rosenfeld, 2011). Labor unions can take actions that are costly to the firm, such as demanding pay raises for all rank-and-file employees or using strikes as a

bargaining tool. Even if a firm is not unionized, it may face pressure to conform to the local pay norms influenced by union presence. We use the union coverage in the firm's HQ state to study the relation between union influence and the CACM choice.

In 2016, the city of Portland, Oregon adopted the first tax penalty on high CEO-worker pay gaps: a surtax of 10% of the business tax liabilities for companies with a CEO-worker pay ratio of more than 100 to 1 and 25% for companies with a ratio of more than 250 to 1. San Francisco voters passed a similar ordinance in 2020. Lawmakers in eight U.S. states have proposed similar surtax legislation. The main purpose of these surtaxes is to reduce income inequality by creating an incentive for firms to reduce the CEO-employee pay gap (Anderson and Collins, 2019). We use an indicator variable, *HQ state w/ payratio surtax*, to identify the eight states in which legislators have proposed a pay ratio surtax and examine whether the proposed surtaxes motivate firms to choose more complex CACMs.

We present results based on union coverage in Table 4 Panel B and results based on proposed pay ratio surtaxes in Table 4 Panel C. The model specifications are similar to Panel A except that we replace the *HQ state inequality aversion score* with either *HQ state union coverage* or *HQ State w/ payratio surtax,* respectively. To preserve space, we present only the coefficients on the interest variables. As shown in the panels, the coefficient on *HQ state union coverage or HQ state w/ pay ratio surtax* is positive and significant in all four models, which confirms the results in Panel A. Although pay ratio surtaxes, if passed, apply to all corporations that incur business tax liabilities in the states, we focus on firms' headquarter locations because the impact of the surtax would be larger for firms with more substantial business activities in these states. Together, Panels B and C of Table 4 show that union presence and tax considerations also contribute to firms' decisions to choose a more complex estimation method to identify the median employee.

5.3 Inequality aversion and the CACM complexity – Firm decisions or compensation design differences?

In this section, we examine whether firms' CACM choices in inequality-averse states reflect their disclosure decisions or their compensation designs. Firms in high (low) inequality aversion states could use a more complex (simpler) method not because they choose to do so but because they only offer complex

(simple) compensation to their employees. We examine this possibility in three ways. First, we repeat our analysis after excluding firms that are more likely to have different compensation designs for employees. Second, we include various controls for compensation design. Third, we identify subsets of firms with more complex compensation structures and examine whether firms choose a more complex CACM in inequality-averse states when they have compensation structures that allow them to make such choices.

5.3.1 Excluding firms with different compensation designs

As shown in Figure 2b, the finance industry has the highest usage of the most complex CACM - total compensation. The finance industry also has higher employee pay and more incentive compensation on average, which could influence these firms' choice of a more complex method. Similarly, firms in the high-tech industries tend to have higher employee pay and are more likely to offer equity-based compensation for their employees. Many financial and high-tech firms are located in states with higher inequality aversion scores (e.g., New York, and California), which raises the possibility that the positive relation between the CACM complexity and HQ states' inequality aversion scores could be driven by financial and high-tech firms. To address this concern, we estimate the analysis in Table 4 on a sample that excludes all firms in the financial sector (Panel A of Table 5), or the high-tech and biotech sector (Panel B of Table 5), or both sectors (Panel C of Table 5). To preserve space, we only report the coefficients on the first inequality aversion variable, *HQ state inequality aversion score*. Our results hold for both *Union coverage* and *HQ state w/pay ratio surtax*. As shown in the panels, coefficients are positive and significant in all regressions. In untabulated analyses, we also confirm that our results hold when we exclude firms headquartered in California or New York states. The analysis suggests that excluding financial and high-tech firms does not materially influence our findings.

Another possible concern is that firms located in high inequality averse states differ from firms located in low inequality averse states in their labor composition, which results in different compensation design and consequently, different CACM choices. For example, firms in high inequality averse states may be more likely to have foreign employees or more complex business structures that can lead to a greater within-firm dispersion in pay design. Given various pay designs, these firms may have to use a simple CACM that

that they can consistently apply to all employees across different business and geographic subsidiaries. To control for this possibility, we exclude all firms with foreign employees (Panel D of Table 5) or include a control for #segments (Panel E of Table 5). Our results hold in these two alternative specifications.

5.3.2 Adding controls for compensation design differences

We include additional control variables in the regressions to alleviate the concern that the compensation design may differ between the states with high and low inequality aversion scores. The first control variable is the total pay of the median employee, which mitigates compensation design differences across firms that can result in different employee pay levels. The second control variable is the percentage of the CEO's pay that is equity-based. To the extent that firms that award CEOs more equity compensation are more likely to grant employees equity compensation, this robustness check mitigates the bias introduced by differential usage of equity compensation. Panels F and G of Table 5 report the regression results. The sample size is smaller in Panel G because the data on CEO equity compensation are only available for firms in the Execucomp database. As shown in the panels, the relation between inequality aversion and the CACM complexity is robust to these two additional controls.

5.3.3 Analyses within firms with more complex compensation design

As an additional step to address the concern that using equity-based pay for rank-and-file employees shapes CACM choices, we identify subsamples of firms that are more likely to grant equity compensation to rank-and-file employees. Firms in these subsamples have the option to choose either a simpler (e.g., salary only) or more complex (e.g., cash compensation plus equity) CACM. By restricting our analysis to these firms, we minimize the possibility that the relation between inequity aversion and CACM choice is an artifact of compensation design instead of firms' decisions.

As we described in Section 4.1.4, we extrapolate the amount of equity compensation for employees based on the differences between the total value of equity compensation and the value of executive equity compensation. Ideally, we would like to identify firms that grant equity compensation to the majority of the employees (i.e., firms in which we expect the median employee to receive equity compensation). Since

we cannot observe firms' within-firm distributions of equity compensation, we err on the side of caution and focus on the top tercile by *Employee equity compensation%* of firms with equity compensation data.[13] We present results based on this subsample in Panel A of Table 6. The coefficient on *HQ state inequality aversion score* is positive and statistically significant in all specification.

Firms may have executives that the proxy statement does not name, but who also receive equity compensation. Since such executives do not appear in the proxy statement, their compensation is not observable. To better estimate the equity compensation of rank-and-file employees, we identify the lowest ranked (based on salary) named executive in the proxy statement and conservatively assume that 15 additional executives receive equity compensation.[14] We then estimate total executive equity compensation as the sum of the equity compensation of the top 20 executives and redefine *Employee equity compensation%* based on the revised total executive equity compensation. We repeat our analysis in the subsample of firms with the modified *Employee equity compensation%* in the top tercile of the sample and present the result in Panel B of Table 6. Again, the coefficient on inequity aversion is positive and significant in all specifications, which supports the premise that firms *choose* a more complex CACM when local society exhibits greater income inequity aversion.

Some firms in the Panel A subsample voluntarily disclose in the pay ratio disclosure that the median employee receives equity compensation. We use this information to examine if firms include the fair value (instead of the vested value) of equity-based pay in the CACM to identify the median employee. If firms include the fair value of equity-based pay in the CACM, they will have a CACM complexity rank of at least 3. In contrast, if a firm includes the vested value of equity-based pay (which they already disclose as part of the total taxable wage in cash compensation), the firm will have a CACM complexity rank of 2. For

[13] For completeness, in untabulated results, we confirm that the positive relation between CACM complexity and inequality aversion holds in the bottom and middle terciles as well.

[14] The SEC requires firms to disclose the compensation of the top five highest paid executives, which implies that the undisclosed executives should have lower compensation than the disclosed ones. Moreover, many firms may have fewer than 20 top executives. Applying the equity compensation of the lowest ranked disclosed executive to the undisclosed executives and assuming there are 20 top executives will likely overestimate the total equity compensation for executives and bias against us in identifying firms with employee equity grants.

this subsample of firms, the decision to include the fair value of equity pay in the CACM directly influences the CACM complexity. Because all these firms offer equity pay to the median employee, the CACM complexity (which reflects their decision to include the fair value of equity pay) cannot relate mechanically to the use of equity pay for rank-and-file employees. As shown in Panel C of Table 6, the firm's decision to report fair value relates positively and significantly to *HQ state inequality aversion score* in both regressions. The results again support the proposition that firms are more likely to *choose* a more complex CACM when the firm is located in an inequality-averse state. One caveat of this analysis is that the number of firms voluntarily disclose this information is relatively small (about 21% of our sample).

5.4 Inequality aversion and the CACM complexity – the moderating effect of CEO pay and CEO age

Although firms with headquarters in the same state face similar social attitudes, the expected benefits and costs of choosing a more complex CACM can still vary across these firms. Firms with lower CEO pay likely have lower expected pay ratios, ceteris paribus, which would not trigger significant inequality concerns for these firms. In this case, firms have weaker incentives to choose a complex CACM. Thus, we expect firms headquartered in inequality-averse states but with low CEO pay to be less likely to choose CACMs that are more complex. Similarly, firms with CEOs closer to retirement also have lower reputation concerns and weaker incentives to use a complex CACM. We examine these conjectures in Table 7.

We classify firms as having low CEO pay if their CEO pay in the last fiscal year is in the bottom quartile of our sample. We use the CEO pay in the last fiscal year because CEO pay is often sticky and has a high serial correlation. The last year's pay helps set a benchmark for the expected CEO pay in the disclosure year. We obtain CEO pay information from Execucomp, which only covers S&P 1500 firms and reduces the sample size to 2,853 firm-year observations. As shown in columns 1 and 2 of Table 7, the coefficient of the interaction term, *HQ state inequality aversion score × CEO pay in bottom quartile*, is negative and significant for both CACM complexity measures. We obtain similar results when we classify firms as having low CEO pay if their CEO pay in the last fiscal year is below sample median. Next, we classify a CEO as close to retirement if the age of the CEO is age 63 or higher. We interact the *CEO at retirement*

age variable with *HQ state inequality aversion score* to analyze whether the relation between CACM complexity and inequality-aversion is weaker for retiring CEOs and present the results in columns 3 and 4. The coefficient on the interaction term is negative and significant in both columns. These results support our conjecture that firms with lower CEO pay and CEOs near retirement age are less likely to choose a complex CACM.[15]

6. Alternative explanations and robustness checks

The primary goals of our study are (i) examine a systematic association between the CACM choice and the disclosed pay ratio, and (ii) document firm- and state- level variables that relate to firms' CACM choices. Our key variables of interest, such as the HQ states' inequality aversion and union coverage, predate the pay-ratio disclosure mandate and the choice of the CACM. The decisions by individual firms likely have little effect on the state attitudes toward income inequality. Nevertheless, we conduct various robustness tests to rule out alternative explanations and mitigate endogeneity concerns.

6.1 Do firms take other actions to lower the disclosed pay ratio?

Firms may implement other strategic actions to lower the disclosed pay ratio (Edmans, 2017). For example, firms may lay off or outsource low-paying jobs to shift the median employee pay higher. We examine this possibility in Table 8. In Panel A, we present the average number of employees per firm from 2015 to 2018. We start with all firms in 2018 and then move backward to identify the number of employees for each firm in each year from 2015 to 2018. If firms outsource or lay off employees, we would observe that the total number of employees decreases in the years of pay ratio disclosure (2017-2018) or the years leading up to the disclosure (2015-2016). The trend in the panel does not support this argument. The average number of employees of our sample firms monotonically increases from 2016 to 2018. We also divide the sample based on high and low *HQ state inequality aversion scores.* In high inequality averse states, the overall trend of employee size increases through 2018, but there is a slight decline from 2016 to

[15] Conceptually, one would also expect firms that expect a high median employee pay may also have weaker incentives to use a complex CACM to lower the reported pay ratio. Unfortunately, we cannot examine this conjecture due to the lack of median employee pay data prior to the disclosure.

2017 (about 2% decline). The small magnitude of the decline and the rebound of the employee size in 2018 do not suggest that firms cut employees to lower the pay ratio.

Alternatively, firms could reduce CEO pay to lower the pay ratio. In this case, we expect to observe a decline in CEO pay in the years leading up to the implementation of the pay-ratio disclosure mandate. We present the average CEO pay of our sample firms from 2015 to 2018 in Panel B of Table 8. CEO pay increases from 2015 to 2018 for the entire sample (on the left) and for the subsamples of firms with *HQ state inequality aversion score* above or below the sample median (on the right). The trend does not support the premise that our sample firms on average cut the CEO pay to lower the disclosed pay ratio.

Other disclosure choices made by the firms can also alter the choice of the median employee and thus influence the pay ratio. These disclosure choices include statistical sampling, providing a supplemental pay ratio, exercising the De Minimis exemption, or exercising the M&A exclusion. Panel C presents the firms' disclosure choices in 2017 and 2018. The percentages of firms that apply these choices from one year to another remain stable. Fewer firms in high inequality averse states use M&A exclusions and statistical sampling. The proportion of firms that use either De Minimis exclusion or supplemental ratios is comparable between high and low inequality averse states. These trends do not suggest that firms in high inequality averse states use other disclosure choices extensively to influence the pay ratio.

6.2 The direct and indirect relations between inequality aversion and the pay ratio – path analysis

Societal inequality aversion can influence the disclosed pay ratio directly or indirectly. Our analyses in Tables 4-7 suggest that the headquarter states' inequality aversion indirectly influences the disclosed pay ratio via the choice of the CACM. Alternatively, firms in inequality-averse states may just have a smaller disclosed pay gap between the CEO and employees because of compensation policy differences (direct effect). We use a path analysis (e.g., Landsman, Maydew, and Thornock, 2012; Goldstein, Yang, and Zuo, 2020) to assess the direct and indirect influence of local inequality aversion on the disclosed pay ratio. Although the path analysis does not solve endogeneity, the analysis validates the significance of the CACM choice as a mechanism through which inequality aversion influences the pay ratio.

Figure 3 demonstrates the hypothesized relations between the source variable (inequality aversion score in the headquarter state) and the outcome variable (disclosed pay ratio). If there is a direct effect, we expect a significant direct path coefficient between inequality aversion and the pay ratio. If there is an indirect effect, we expect inequality aversion to relate positively to CACM complexity (as shown in Table 4) and that CACM complexity will negatively relate to a lower disclosed pay ratio (as shown in Table 3). The total indirect effect of inequality aversion on the disclosed pay ratio is the product of the path coefficients leading to and from the mechanism variable, CACM complexity. To examine these paths, we use a structural equation model (SEM) to estimate the direct and indirect effects simultaneously. Each regression includes all the control variables as in Table 4, and the estimation method relies on correlated disturbance terms. We base the significance of the indirect effect on bootstrapped standard errors with 500 replications[16] and report the estimated path coefficients for *Complexity rank* in Figure 3. We obtain similar results if we use *Complexity index* as the mechanism variable.

Figure 3a presents the path coefficients when the source variable is *HQ state inequality aversion score*. The direct effect of *HQ state inequality aversion score* on pay ratio is negative and significant. The path coefficient from *HQ state inequality aversion score* to *Complexity rank* is positive and significant and the path coefficient from *Complexity rank* to *Ln(1+Pay ratio)* is negative and significant, confirming the results in Tables 4 and 3, respectively. The indirect effect, which is the product of the two path effects (0.051 × -0.170), is negative and significant. This result supports our hypothesis that firms in inequality-averse environments use a more complex CACM to lower their disclosed pay ratios. Figure 3b shows that *HQ state union coverage* does not have a significant direct effect on the disclosed pay ratio, but has a strong indirect effect on pay ratio via the choice of the CACM. In Figure 3c, *HQ state pay ratio surtax* has both a significant direct effect and a significant indirect effect on the disclosed pay ratio. Together, the path

[16] Results are similar if we use 1000 replications, or if we base the significance on Sobel (1982) test used in Landsman et al. (2012). As suggested in Shrout and Bolger (2002), the bootstrapping procedure better controls data skewness than the Sobel (1982) test.

analysis corroborates that the CACM choice is a key mechanism through which the inequality aversion measures influence the disclosed pay ratio.

6.3 Other determinants to the CACM choice?

In this section, we consider additional potential determinants to firms' CACM choices. Controlling for these potential determinants will help mitigate omitted variable concerns for the relation between the CACM choice and the HQ states' inequality aversion.

Public scrutiny of a firm's compensation design could influence the firm's preference for a lower disclosed pay ratio. In addition to the proxies for public scrutiny included in the regressions, the S&P1500 indicator and firm performance, we expect the most recent Say-on-Pay voting outcomes (SOP) and the CEO-VP pay gap could also attract public attention to the firm's pay ratio disclosure. Higher SOP support suggests that shareholders are satisfied with the firm's executive compensation design, which reduces the need for the firm to disclose a lower pay ratio. Alternatively, a firm with a higher pay gap between the CEO and other executives (VPs) may prefer to disclose a lower pay ratio to avoid as the perception of having high pay inequality. In Panels A and B of Table 9, we control for the percentage of "yes" votes from the most recent SOP vote, *% voted for SOP*, and the ratio of CEO pay to the median VP's pay, the *CEO-VP pay ratio*, respectively. We obtain data on SOP voting outcomes from the ISS Voting Analytics database and the data to estimate the CEO-VP pay ratio from the Execucomp database. Consistent with our expectations, the coefficient on SOP vote is significantly negative whereas the coefficient on CEO-VP pay ratio is significantly positive. However, controlling for these two variables has no material influence on the relation between the CACM complexity and HQ state inequality aversion score.

Firms in the banking and transportation industries (about 20% of the firms in our sample) disclose aggregate staff expense (Compustat Item XLR) prior to the pay ratio rule. Since stakeholders can better estimate pay inequality when firms disclose staff expense, these firms have weaker incentives choose a CACM that lowers the disclosed pay ratio. If these firms are also more likely to have headquarters in states with low inequality aversion, the disclosure of staff expense can be an omitted variable behind the positive relation between the CACM choice and inequality aversion. To address this potential omitted variable, we

control for *Staff expense disclosure*, an indicator variable that takes the value of one if the firm reports staff expense in 2016, prior to the pay ratio disclosure rule, zero otherwise. Panel C of Table 9 shows that the disclosure of staff expense does not relate to CACM complexity. Controlling for this variable has no discernible impact on the coefficients of *HQ state inequality aversion score*, which remains positive and significant in all specifications. In untabulated results, we also verify that our results hold after excluding the firms that disclosed staff expenses prior to the pay ratio disclosure.

Many firms hire compensation consultants to help them design compensation and comply with the compensation disclosure. If compensation consultants recommend particular CACMs and their clients cluster geographically, the influence of compensation consultants could potentially explain the relation between the CACM complexity and the HQ states' inequality aversion. To mitigate this concern, we obtain the compensation consultant information from the ISS Incentive Lab database, which covers the largest 750 firms in Compustat each year with backfill and forward-fill. Using these data, we identify compensation consultant information for 1,584 observations in our sample. We then estimate our regressions presented in Table 4 for this subsample with compensation consultant fixed effects. Panel D of Table 9 presents the results. Although including the consultant fixed effects significantly improves the adjusted R^2, the coefficient on *HQ state inequality aversion score* remains positive and significant in all models.

6.4 Additional robustness checks

The significant relation between the CACM complexity and proposed pay ratio surtaxes in the HQ state raises the possibility that firms do not respond to local social attitudes per se, but simply respond to regulatory costs (i.e., surtaxes) associated with disclosing a high pay ratio. To shed light on this issue, we exclude firms headquartered in the states in which legislators have proposed pay ratio surtaxes and estimate the baseline regressions of Table 4 on this subsample. As shown in Panel A of Table 10, the coefficient on *HQ state inequality aversion score* is positive and significant in all regressions, which do not suggest that our findings simply reflect states with proposed pay ratio surtaxes.

In our analyses thus far, we measure firm size based on total assets. Companies with similar asset size can have significantly different employee size, and it is feasible that the CACM choice depends more on employee size than asset size. To address this possibility, we replace *Ln(1+total assets)* with *Ln(1+# of employees)* in our baseline regressions. Panel B of Table 10 presents the results. The coefficients on *HQ state inequality aversion score* remain positive and significant.

We also examine whether the negative relation between CACM complexity and pay ratio depends on one type of CACM choice. In this analysis, we estimate the regressions presented in Table 3 but replace the complexity rank with indicator variables that represent the individual categories in the complexity rank variable. The benchmark category is the group of firms that use the least complex method – *Salary only* (*Complexity rank* 1). As shown in Panel C of Table 10, the coefficients of the three indicator variables are all negative and significant, and the magnitude of the coefficients is monotonically increasing from *Complexity rank* 2 to 4. These results suggest that the negative relation between method complexity and pay ratio persists through all complexity ranks.

Lastly, we examine whether firms revise their CACM in a way that is consistent with our main findings. The SEC allows firms to identify the median employee once every three years unless there has been a significant change in its employee population/compensation that would result in a significant shift in the pay ratio disclosure. Thus, we do not expect many firms to revise their methods from fiscal year 2017 to 2018. In total, 19 firms changed their CACM. Thirteen firms changed from a simpler method to a more complex method and six firms changed from a more complex method to a simpler one. With the caveat that this comparison is based on a small sample, we find that the average inequality aversion score in the firms' HQ states is significantly higher for firms that revise the CACM complexity upward (*HQ state inequality aversion score* = 1.453) than for firms that revise the CACM complexity downward (*HQ state inequality aversion score* = -0.546). Consistent with our general finding of a negative relation between the disclosed pay ratio and CACM complexity, the average pay ratio for firms that increased the CACM complexity ratio declines from 196 in 2017 to 75 in 2018.

7. Conclusion

Congress mandated the disclosure of a CEO-to-employee pay ratio for U.S. public firms as part of the Dodd-Frank Act during a period of heightened public attention toward pay inequality in the United States. To implement the mandate, the SEC adopted the pay-ratio disclosure rule with the stated intention of providing investors new information to gain a better understanding of within-firm pay disparity. Advocates for the pay ratio rule also hope that the pay ratio disclosure can motivate firms to increase worker pay. We exploit the discretion imbedded in the regulation to examine the relation between disclosure decisions and social attitudes toward income inequality in publicly held firms. Our findings suggest that some firms strategically estimate *disclosed* pay ratios to conform to local social attitudes.

We follow the SEC's guidelines on the pay ratio disclosure to codify the consistently applied compensation method (CACM) that firms use to identify the median employee. Our analysis reveals a strong negative association between the disclosed pay ratio and the complexity of the CACM choice, which is likely an unintended outcome of the SEC's decision to grant firms the discretion to lower their compliance cost. This systematic relation suggests that firms can influence the disclosed pay ratio by choosing a different CACM without actually changing either CEO or employee pay.

Our analysis of the determinants of the CACM choice reveals that firms with headquarters in states that exhibit stronger aversion toward income inequality are more likely to choose a more complex CACM, which results in a lower disclosed CEO pay ratio. This relation between the choice of method and inequality aversion in the headquarter state is not subsumed by differences in firm type, compensation design, expected public attention toward the pay ratio, or compensation consultant styles. Firms also do not seem to combine the choice of method with other actions, such as eliminating employees or cutting CEO pay. Firms' tendencies to use a more complex estimation method, however, declines when the CEO has lower pay and is close to retirement, suggesting that firms rationally trade off the benefits of reducing the pay ratio with the costs of strategic disclosure.

Practitioners, academics, and policy makers are currently debating the role of ESG disclosure as it relates to the social responsibilities and governance of publicly held firms, the merit of shareholder

capitalism relative to stakeholder capitalism, and the ability of shareholders to influence corporate culture and policies. Within-firm income inequality is an important stakeholder consideration, and the role that disclosure plays to allow shareholders to internalize and limit negative stakeholder externalities is important to the more general debate. By focusing on firms' decisions regarding the pay ratio estimation, we gain insights about societal influences inside the black box of firm decision-making. Our results show that firms make disclosure decisions that respond to local social attitudes toward income inequality. This finding highlights the importance of stakeholder activism in general but also points to a potential dark side of discretion in ESG disclosure – the ability of firms to make choices to make disclosures conform to social attitudes reduces the informativeness of the disclosure. More generally, our results inform on the current debate on the role of ESG disclosure and underscore the need for more research on the discretions embedded in mandatory disclosures.

Appendix A. Sample construction

Panel A: Sample construction for pay ratio disclosure and compensation method

	# of Obs
Total number of firm-year observations for all Compustat firms with a proxy statement filed for fiscal years 2017 and 2018	**7,389**
Less:	
#Obs of firms that do not report a pay ratio disclosure in the proxy statement (investment companies, small reporting company, emerging growth firms, no direct employee (externally managed), etc.	2,708
#Obs of firms without a compensation method description in the disclosure	29
#Obs of firms with a zero or undefined pay ratio (CEO does not earn a salary or earn a token salary, or firms have a few employees who do not receive any salary)	43
Final sample of firm-year observations with pay ratio disclosure	**4,609** (2,678 unique firms)

Panel B: No. of unique firms by fiscal year

Fiscal Year	# of Obs
2017	2,224
2018	2,385
Total	**4,609**

Appendix B. Construction of *complexity rank* and *complexity index*

According to the pay ratio rule, firms can identify their median employee by applying a consistently applied compensation measure (CACM) to all employees included in the calculation. We manually read each disclosure to locate the discussion of the CACM and classify the compensation components included in the CACM into six categories:

1. Salary: wages and salaries, salary/hourly wage, cash, annual base salary, base salary plus overtime, commissions
2. Short-term incentives: bonus, annual incentive program, target bonus, incentive bonus, nonequity incentive plan, accession bonus
3. Long-term incentives: (a) long-term cash incentive - vested, (b) long-term cash incentive – fair value, (c) equity awards – vested, (d) equity awards- fair value
4. Retirement benefits: 401K matching contributions, deferred compensation earnings, state health and pension scheme, defined contribution
5. Other benefits:
    - Company allowance: company allowance, vacation premium
    - Health savings account: health savings accounts, supplemental health and dental plans
    - Benefits: company costs of benefits, any perquisites and other benefits, cash benefits
    - Life/ LT disability insurance: life and other insurance, long-term disability insurance
6. Total compensation: Annual total compensation calculated on the same basis as the total compensation for executives reported in the Summary Compensation Table.

We then create two variables, *Complexity rank* and *Complexity index*, to capture the relative difficulty of gathering and assimilating the payroll information of various compensation components. For *Complexity rank*, we consolidate the six categories and create the following four main compensation methods in ascending complexity:

Compensation methods	**Category (#)**	**Complexity rank**
Salary only	1	1 (Least complex)
Cash compensation (CC)	1, 2, 3a, 3c	2
Cash compensation plus	(1, 2, 3b, 3d) or (1, 2, 4) or (1, 2, 5)	3
Total compensation	6 or (1, 2, 3, 4, 5)	4 (Most complex)

For *Complexity index*, we extract the first principal component (PCA) of six indicator variables that correspond to six compensation categories mentioned above and are defined as follows:

1. *Salary only* equals one if the firm uses salary to determine the median employee and zero otherwise.
2. C*ash compensation* equals one if the firm uses salary plus annual bonuses plus vested long-term incentives to determine the median employee and zero otherwise;
3. *Equity - fair value* equals one if the firm includes long-term incentives (in fair value terms) in the determination of median employee and zero otherwise;
4. *Retirement benefits* equals one if the firm includes retirement benefits in the determination of median employee and zero otherwise;
5. *Other benefits* equals one if the firm includes other benefits in the determination of median employee and zero otherwise;
6. T*otal compensation* equals one if the firm uses total compensation to determine the median employee and zero otherwise.

Appendix C. Variable definitions

Compensation methods (CACM-related) variables:

Cash compensation (CC): An indicator variable that equals one if the firm uses total cash compensation, i.e., the sum of salary, bonuses, and equity vested (if any) as the consistently applied compensation method (CACM) to identify the median employee, zero otherwise.

Cash compensation plus: An indicator variable that equals one if the firm uses (a) CC plus equity fair value, or (b) CC plus retirement benefits, or (c) CC plus other benefits as the CACM to identify the median employee, zero otherwise.

Complexity index: The standardized first principal component of six compensation components used to determine the median employee: *salary only*, *cash compensation*, *equity fair value*, *retirement benefits*, *other benefits*, and *total compensation.*

Complexity rank: A rank variable with a value from 1 to 4 assigned to four different compensation methods. The least complex compensation method, *salary only*, has a rank of 1, followed by *cash compensation (CC)* with a rank of 2. *Cash compensation plus* has a rank of 3 and the most complex compensation method, *total compensation*, has a rank of 4.

Salary only: An indicator variable that equals one if the firm uses only base salary as the CACM to identify the median employee, zero otherwise.

Total compensation: An indicator variable that equals one if the firm uses annual total compensation in accordance with summary compensation table methodology under the SEC's rules as the CACM to identify the median employee, zero otherwise.

Other disclosure related variables:

Pay ratio: Natural logarithm of one plus the ratio of the CEO pay to the median employee pay in the pay ratio disclosure, i.e., Ln(1+ Pay Ratio).

De minimis exclusion: An indicator variable that equals one if, to identify the median employee, a firm excludes up to 5% of non-U.S. employees under the *de minimis* exemption, zero otherwise.

Foreign employee: An indicator variable that equals one if the firm has foreign employees, zero otherwise

M&A exclusion: An indicator variable that equals one if, to identify the median employee, a firm excludes the employees from a recent acquisition under the *M&A* exemption, zero otherwise.

Median employee pay: Natural logarithm of one plus the median employee pay, i.e., Ln(1+ median employee pay). The median employee pay is obtained from pay ratio disclosure.

Statistical sampling: An indicator variable that equals one if the firm uses statistical sampling to identify the median employee, zero otherwise.

Supplemental ratio: An indicator variable that equals one if the firm discloses a supplemental pay ratio, zero otherwise.

Inequality aversion measures at headquarters states:

HQ state inequality aversion score: Following Pan et al., 2022, it is the standardized first principal component of the following three state-level variables: *minimum wage*, *state tax differential*, and *democratic leaning* calculated at the firms' headquarters.

HQ state w/ pay ratio surtax: An indicator variable that equals one if the headquarters states are California, Connecticut, Illinois, Massachusetts, Minnesota, Oregon, Rhode Island, and Washington. These states have proposed a business surtax if the pay ratio of a firm doing business in those states exceeds a certain threshold.

Union coverage: The yearly fraction of wage and salary workers in a headquarter state that are both union members and who report no union affiliation but whose jobs are covered by a union or an employee association contract, based on the Current Population Survey of the Bureau of Labor Statistics.

Democrat leaning: The fraction (%) of voters that voted for Hillary Clinton in a given state in the 2016 presidential election.

Minimum wage: The minimum wage (in USD) per hour of the headquarter state in 2017.

State tax differential: The difference between a state's maximum and minimum personal income tax rates (%) as of 2017. The value is zero for the states with no state income tax.

Firm characteristics:

Employees: Natural logarithm of one plus the number of employees reported in the pay ratio disclosure.

Leverage: Total debt divided by total assets, (DLTT +DLC /AT).

Market-to-Book: The ratio of market value to book value of equity (PRCC_F * CSHO/CEQ).

No. of segments: The number of business or operating segments of a firm.

Ind. adj. ROA: EBIT divided by total asset subtracts a firm's 2-digit SIC industry mean ROA.

Institutional block holding: Total ownership, in percentage points, by all the institutional investors that own 5% or more of the firm's common stocks.

S&P 1500: An indicator variable that equals one if the firm was included in S&P 1500 in the fiscal year

Staff expense disclosure: An indicator variable that equals one if the firm reports staff expense (Compustat Item XLR) prior to the pay ratio disclosure rule, i.e., in the fiscal year 2016; zero otherwise.

Std. of stock return: The standard deviation of CRSP daily stock return measured over the fiscal year.

Stock return: The total stock return in the prior fiscal year, which is calculated by compounding CRSP monthly returns over the fiscal year.

Total assets: Natural logarithm of one plus total assets (AT), i.e., Ln(1 + total asset).

% voted for Say-on-Pay: The quartile rank of percentage voted "yes" for Say-on-Pay vote, ranging from 1 (lowest quartile) to 4.

Employee equity compensation%: The difference between the total equity compensation used by the firm (the value of options granted plus total stock compensation expense) and the total executive equity compensation for named executives in the firm for the fiscal year, scaled by total equity compensation.

Board and CEO characteristics:

Board size: Natural logarithm of one plus the number of directors on the board.

CEO at retirement age: An indicator variable that equals one if the age of the CEO is 63 or higher, zero otherwise.

CEO duality: An indicator variable that equals one if the CEO is the chairman of the board.

CEO's equity pay: The ratio of the stock & option pay to the total reported pay of the CEO.

CEO pay: Natural logarithm of the total compensation of the CEO reported in the pay ratio disclosure.

CEO stock ownership: The percentage of firm shares held by the CEO.

CEO's reported pay: Execucomp's reported CEO pay ($) to SEC.

CEO tenure: Natural logarithm of one plus the number of years the CEO served in the firm, i.e., Ln(1 + CEO tenure).

CEO-VP pay ratio: The ratio of the total reported pay of the CEO and the median VP.

Outside director: The percentage of directors that are not affiliated with the firm.

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Figure 1. The Process of Pay Ratio Disclosure

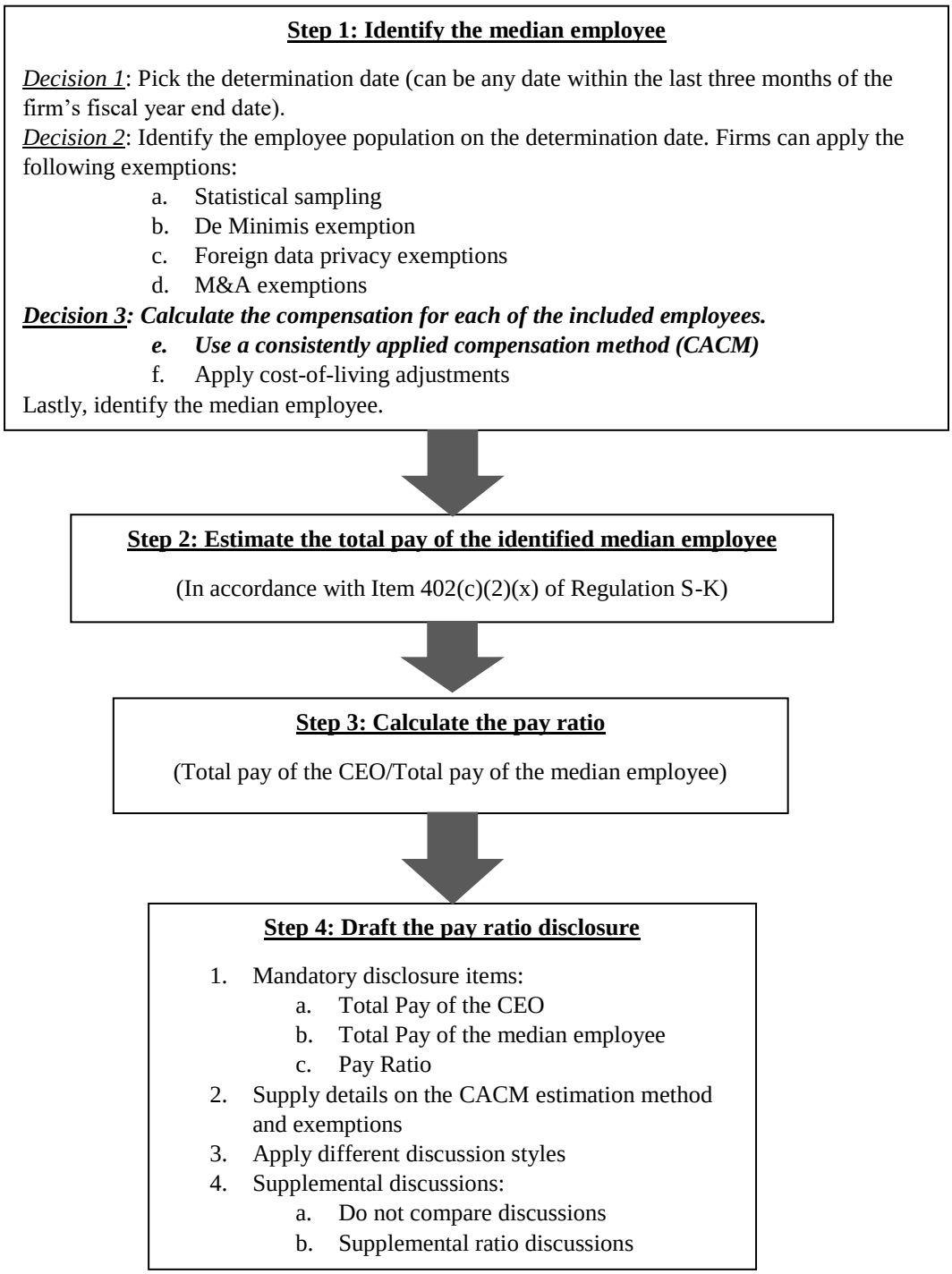


Figure 2a. The Cross-size Distribution of the Consistently Applied Compensation Method (CACM)

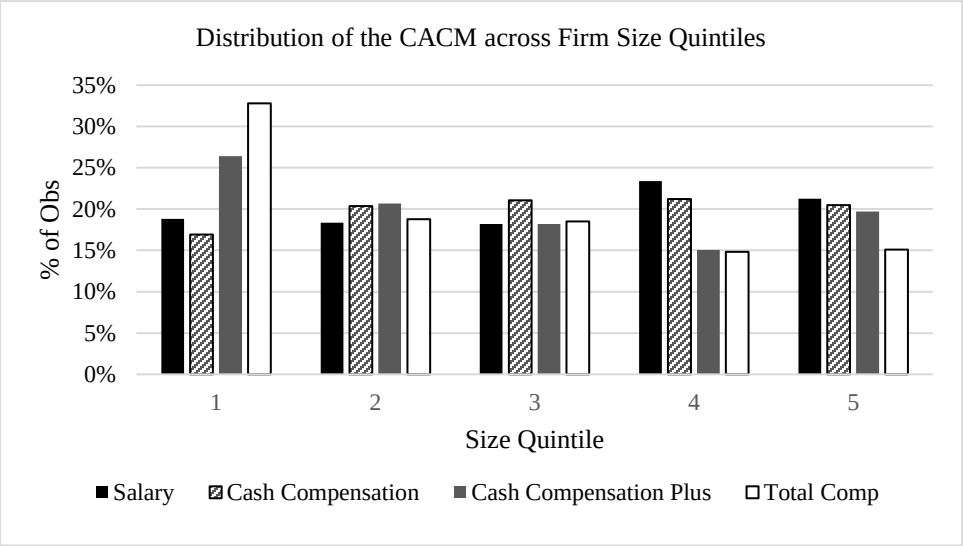


Figure 2b. The Within-industry Distribution of the CACM

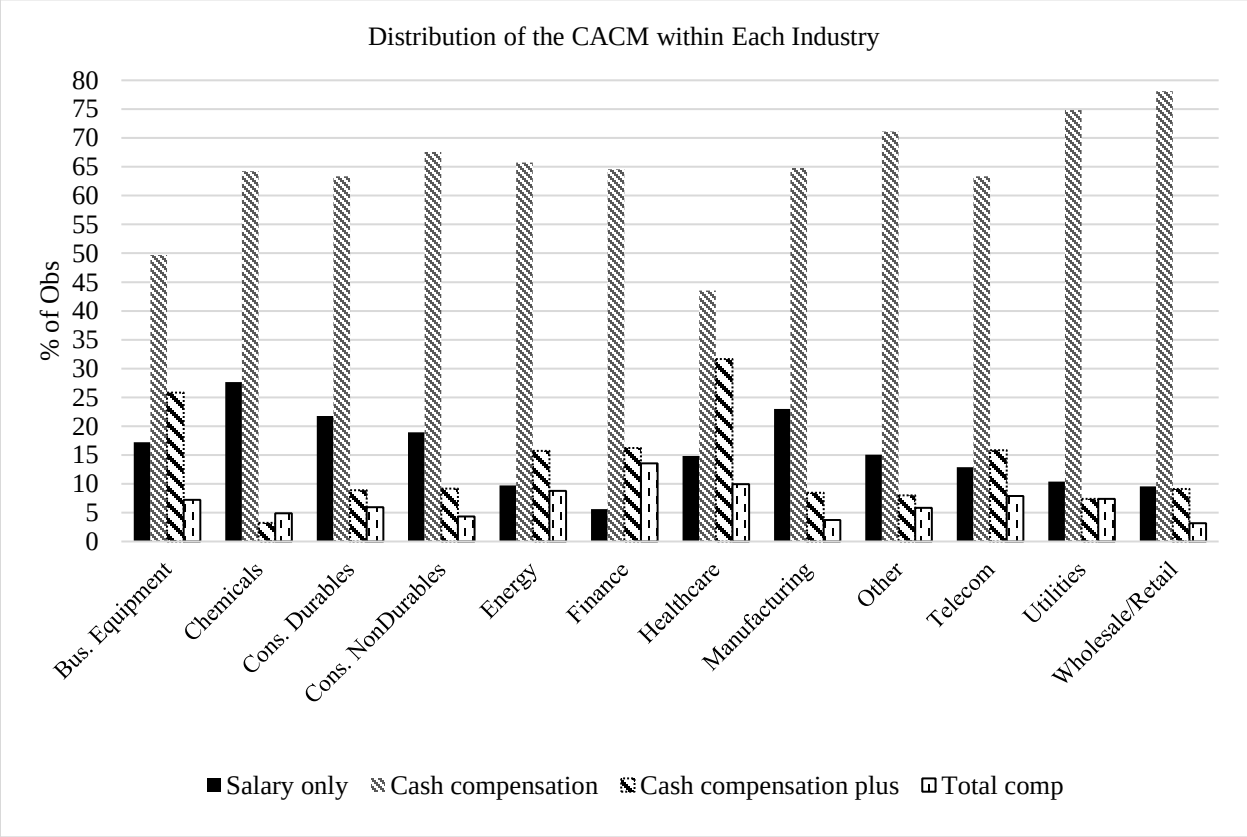
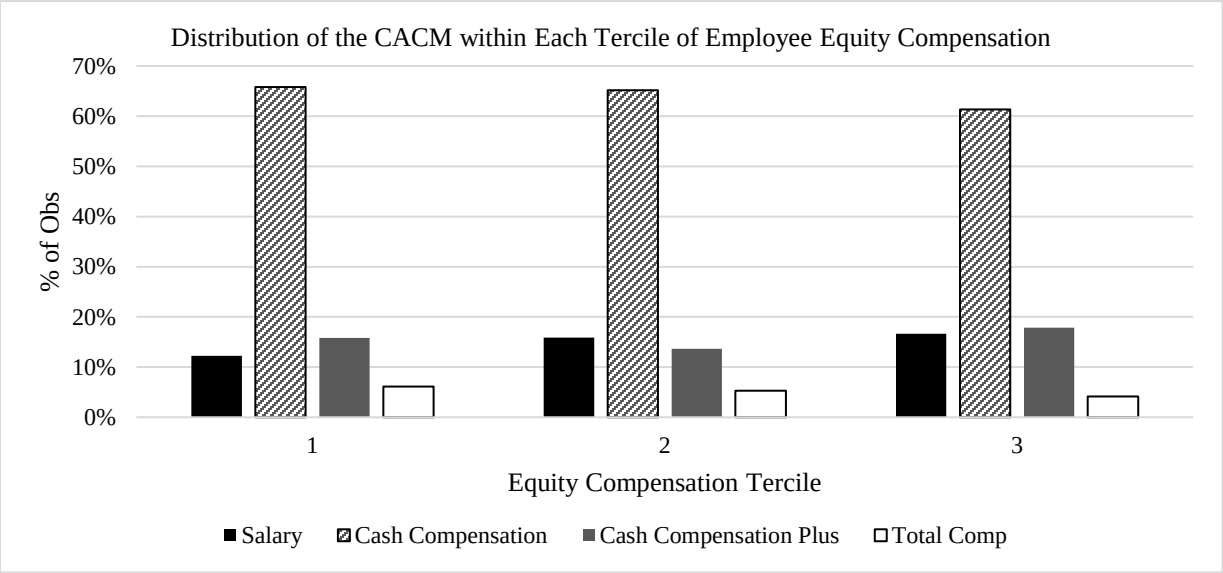


Figure 2c. The Within-compensation-design Distribution of the CACM



Notes: Figures 2a, 2b, and 2c present the distribution of the CACM across firm size quintiles, within each industry, and within each tercile of firms with different levels of employee equity compensation, respectively. The sample for Figure 2a and 2b (2c) consists of 4,609 (2,989) firm-year observations during 2017-2018. The CACM method - *Salary only*, *Cash compensation*, *Cash compensation plus* and *Total compensation* are described in detail in Appendix B. Firm size quintiles are based on the logarithm of one plus firm's total asset (Figure 2a). Industries are classified based on the Fama-French 12 industry classification (Figure 2b). The tercile of firms in Figure 2c are based on the firm's usage of employee equity compensation, *Employee equity compensation%*, which is the difference between the total value of equity compensation and the value of executive equity compensation scaled by the total value of equity compensation.

Figure 3a. Path Diagram of Direct and Indirect Effects of HQ State Inequality Aversion Score on Pay Ratio

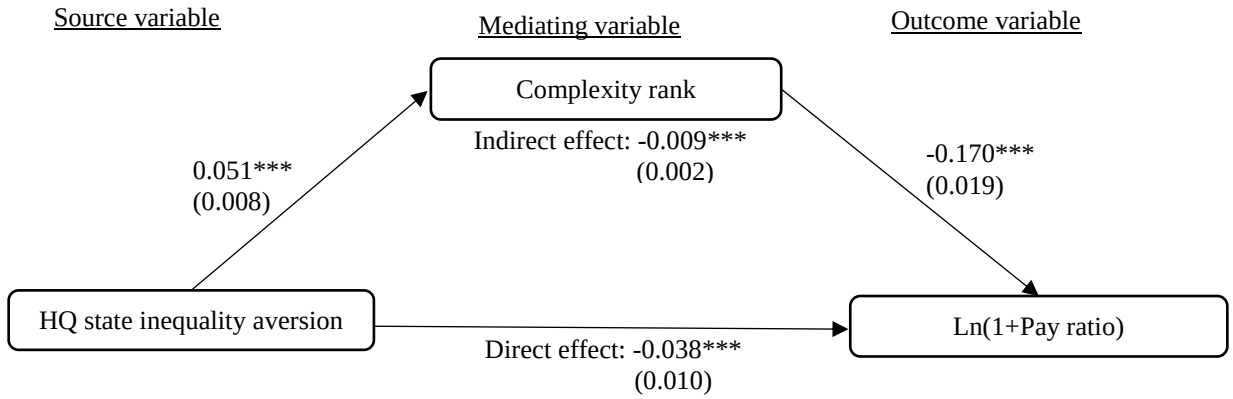


Figure 3b. Path Diagram of Direct and Indirect Effects of Union Coverage on Pay Ratio

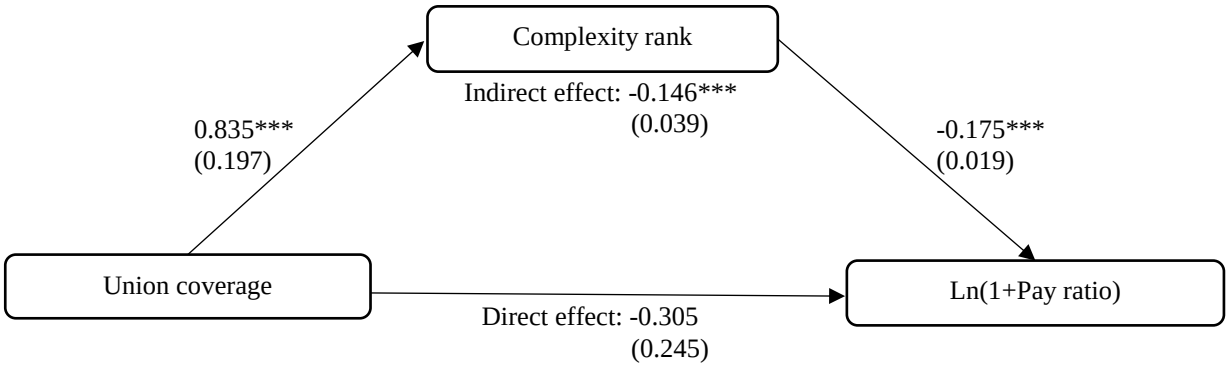
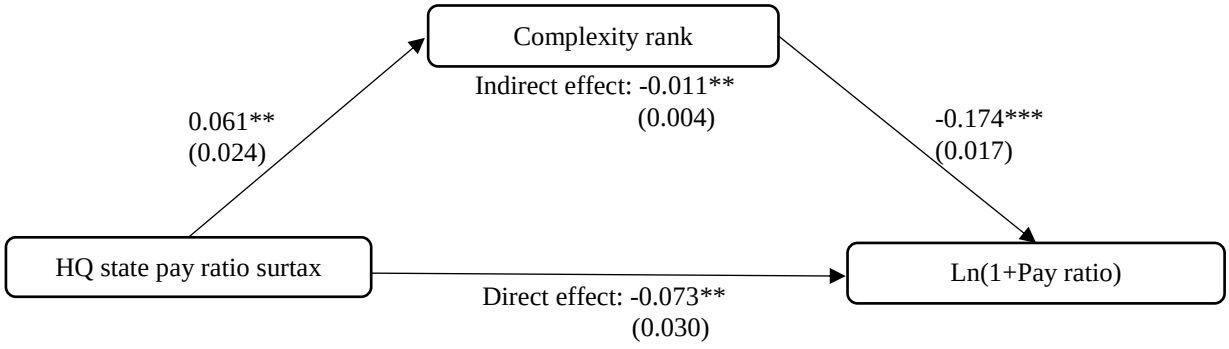


Figure 3c. Path Diagram of Direct and Indirect Effects of HQ State w/ Pay Ratio Surtax on Pay Ratio



Notes: Figures 3a, 3b and 3c present the path diagrams of the direct and the indirect effects of inequality aversion on pay ratio through CACM complexity rank. *Complexity rank* is a categorical variable ranging from 1 to 4, 1 being lowest, based on the CACM complexity described in detail in Appendix B. The path coefficients in each panel are simultaneously estimated using a structural equation model (SEM). Bootstrapped standard errors are reported in parenthesis.

Table 1. Descriptive Statistics for the Consistently Applied Compensation Method (CACM) and Other Disclosure Statistics for the Pay Ratio Disclosure

Panel A: The CACM and other disclosure statistics

Compensation Methods	Obs.	Percentage
Salary only	616	13.365%
Cash compensation	2,884	62.573%
Cash compensation plus	731	15.860%
Total compensation	378	8.201%
Total	4,609	100.000%

Panel B: Other disclosure statistics

Percentage of Disclosure With:	Percentage
De Minimis exclusion	23.780
M&A exclusion	8.266
Supplemental ratio	9.764
Statistical sampling	3.732

Panel C: Summary stats for regression variables

	Obs.	Mean	Median	S.D.
Compensation variables:				
Pay ratio	4,609	142.828	72.000	222.691
Complexity rank	4,609	2.173	2.000	0.737
Complexity index	4,609	0.000	-0.901	1.816
CEO pay ($000s)	4,609	6542.396	4700.377	6055.808
Firm, board, and CEO characteristics:				
Foreign employee indicator	4,510	0.640	1.000	0.480
Total asset ($billions)	4,510	17.837	2.604	101.851
Employees (in 000s)	4,509	16.326	2.900	65.482
Market-to-book	4,510	3.425	2.268	7.009
Ind. adj. ROA (%)	4,510	3.839	5.198	14.451
Leverage (%)	4,510	27.471	24.811	22.998
Stock return (%)	4,510	21.230	16.822	41.926
Std. of stock return (%)	4,510	2.186	1.890	1.065
Institutional block holding (%)	4,510	28.406	27.699	14.861
Board size	2,428	9.440	9.000	2.180
Outside directors (%)	2,428	81.338	84.615	9.837
CEO duality	2,428	0.390	0.000	0.488
CEO tenure (yr)	2,428	9.055	7.000	7.742
CEO stock ownership (%)	2,428	1.444	0.290	4.653
Inequality aversion measures for headquarters states:				
HQ state inequality aversion score	4,318	-0.002	-0.214	1.477
Union coverage (%)	4,318	12.909	13.200	5.993
HQ state /w pay ratio surtax	4,318	0.320	0.000	0.467

Notes: Table 1 Panel A reports the summary statistics for the CACMs that the SEC permits a firm to use to calculate each employee pay in order to identify the median employee. *Salary only* is an indicator variable equal to 1 if the firm uses only base salary to identify the median employee. *Cash compensation* is an indicator variable equal to 1 if the firm uses salary, short term incentives and/or equity vested as the CACM. *Cash compensation plus* is an indicator variable equal to 1 if the firm uses cash compensation with either equity fair value, or retirement benefits or other benefits as the CACM. *Total compensation* is an indicator variable equal to 1 if the firm uses annual total compensation in accordance with summary compensation table methodology under the SEC's rules as the CACM. Panel B reports other disclosure choices permitted by the SEC. Panel C reports the summary statistics for variables used in regression analyses. Appendix C presents variable definitions. The sample period runs from 2017 to 2018.

Table 2. Firms' Choice of Consistently Applied Compensation Methods (CACM) and Pay Ratio

Panel A: Differences in means: Pay ratios of consistently applied compensation methods (CACM)

Compensation methods	Complexity rank	Obs	Pay ratio	*t*-stat for diff. in pay ratio
Salary only	1 (lowest)	616	191.982	--
Cash compensation	2	2,884	153.081	[a]3.380***
Cash compensation plus	3	731	98.665	[b]7.493***
Total compensation	4 (highest)	378	69.910	[c]3.762***
Obs		4,609		

Panel B: Correlation and first principal component analysis of compensation components (4,609 observations)

	Pay ratio	Salary only	Cash compensation	Equity – fair value	Retirement benefits	Other benefits	Complexity index Factor loadings of 1st principal component
Pay ratio	--						--
Salary only	0.087						-0.032
Cash comp.	0.060	-0.508					-0.353
Equity	-0.130	-0.201	-0.661				0.399
Retirement	-0.102	-0.136	-0.445	0.422			0.472
Other benefits	-0.085	-0.112	-0.368	0.480	0.758		0.497
Total comp.	-0.088	-0.104	-0.344	0.485	0.761	0.929	0.496
						Eigen value:	3.299
						% of variation explained:	0.550

All correlation coefficients are significant at 1%.

[a] *Complexity rank (2-1)*
[b] *Complexity rank (3-2)*
[c] *Complexity rank (4-3)*

Notes: Table 2 Panel A compares the average pay ratio of the firms in each of the four categories of the CACM. *Complexity rank* is a categorical variable ranging from 1 to 4, 1 being lowest, based on the complexity of these compensation methods. *Salary only* is an indicator variable equal to 1 if the firm uses only base salary as the CACM to identify the median employee. *Cash compensation* is an indicator variable equal to 1 if the firm uses salary, short term incentives and/or equity vested as the CACM. *Cash compensation plus* is an indicator variable equal to 1 if the firm uses cash compensation with either equity fair value, or retirement benefits, or other benefits as the CACM. *Total compensation* is an indicator variable equal to 1 if the firm uses annual total compensation in accordance with summary compensation table methodology under the SEC's rules as the CACM. T-statistics from tests of differences in means are reported in the last column of Panel A. Panel B reports the correlation coefficients of the pay ratio with the five individual pay components and total compensation used in the CACM. An alternative measure of the CACM complexity- *Complexity index*- is the first component of PCA analysis of the six pay elements- *salary only*, *cash compensation*, *equity fair value, retirement benefits, other benefits,* and *total compensation*. The factor loadings of the first component are reported in the last column of Panel B. *** denotes statistical significance at the 1% level.

Table 3. The Relation between Pay Ratio and the CACM Complexity

	Dependent variable: Ln(1+ Pay ratio)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Complexity rank	-0.240***		-0.117***		-0.108***		-0.126***	
	(0.022)		(0.017)		(0.017)		(0.024)	
Complexity index		-0.084***		-0.038***		-0.036***		-0.035***
		(0.009)		(0.007)		(0.007)		(0.011)
Statistical sampling					0.145**	0.188***	0.171**	0.214***
					(0.070)	(0.069)	(0.080)	(0.079)
De Minimis exclusion					-0.015	-0.009	-0.016	-0.005
					(0.032)	(0.032)	(0.039)	(0.039)
M&A exclusion					-0.029	-0.028	-0.052	-0.050
					(0.040)	(0.040)	(0.049)	(0.049)
Supplemental ratio					0.535***	0.536***	0.515***	0.517***
					(0.049)	(0.049)	(0.058)	(0.058)
Foreign employee			0.224***	0.231***	0.215***	0.219***	0.231***	0.232***
			(0.029)	(0.029)	(0.031)	(0.032)	(0.042)	(0.042)
Total asset			0.335***	0.334***	0.329***	0.328***	0.284***	0.285***
			(0.011)	(0.011)	(0.011)	(0.011)	(0.017)	(0.017)
Market-to-book			-0.002	-0.002	-0.002	-0.002	-0.004*	-0.004*
			(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Stock return			0.025	0.021	0.030	0.027	0.043	0.042
			(0.033)	(0.033)	(0.032)	(0.032)	(0.052)	(0.052)
Std. of stock return			0.540	0.629	0.077	0.153	-1.195	-1.156
			(1.692)	(1.685)	(1.693)	(1.685)	(2.574)	(2.562)
Ind. adj. ROA			0.991***	0.999***	0.940***	0.946***	1.515***	1.497***
			(0.120)	(0.120)	(0.118)	(0.118)	(0.239)	(0.242)
Leverage			0.176***	0.188***	0.190***	0.200***	0.191**	0.209**
			(0.068)	(0.068)	(0.067)	(0.067)	(0.093)	(0.094)
S&P 1500			0.236***	0.241***	0.226***	0.230***		
			(0.031)	(0.031)	(0.031)	(0.031)		
Inst. block holding			0.336***	0.333***	0.313***	0.312***	0.240	0.261*
			(0.093)	(0.093)	(0.091)	(0.091)	(0.155)	(0.156)
Board size							0.005	0.005
							(0.009)	(0.010)
Outside directors							0.540**	0.516**
							(0.210)	(0.211)
CEO duality							0.051	0.056
							(0.035)	(0.035)
CEO tenure							0.009	0.004
							(0.026)	(0.026)
CEO stock ownership							-1.913***	-1.923***
							(0.550)	(0.554)
YR_{2018}	0.120***	0.121***	0.030	0.031	0.038	0.039	0.022	0.023
	(0.031)	(0.031)	(0.024)	(0.024)	(0.024)	(0.024)	(0.031)	(0.031)
Constant	4.739***	4.218***	1.437***	1.173***	1.429***	1.192***	1.637***	1.372***
	(0.054)	(0.022)	(0.111)	(0.097)	(0.111)	(0.099)	(0.226)	(0.220)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	4,609	4,609	4,510	4,510	4,510	4,510	2,491	2,491
Adj R^2	0.230	0.225	0.535	0.534	0.553	0.552	0.490	0.486

Notes: Table 3 reports the regression results of the relation between pay ratio and the complexity of firms' CACM choices. The sample includes all firm-year observations in 2017 and 2018 for which data are available. The dependent variable is the natural logarithm of (1+ pay ratio). All control variables are measured as of the immediately preceding fiscal-year-end. Appendix C presents variable definitions. We report robust standard errors in parentheses. *, ** and *** denote statistical significance at 10%, 5%, and 1%, respectively.

Table 4. Inequality Aversion and the CACM Complexity

Panel A. HQ state inequality aversion score

Dependent variable:	Complexity rank	Complexity index	Complexity rank	Complexity index
	(1)	(2)	(3)	(4)
HQ state inequality aversion score	0.043***	0.068***	0.060***	0.130***
	(0.008)	(0.022)	(0.011)	(0.028)
Foreign employee	-0.030	0.096	-0.056	-0.014
	(0.027)	(0.071)	(0.038)	(0.095)
Total asset	-0.054***	-0.156***	-0.031*	-0.077**
	(0.011)	(0.028)	(0.016)	(0.038)
Market-to- book	0.003	0.001	0.004*	0.006
	(0.002)	(0.003)	(0.002)	(0.004)
Stock return	0.038	0.050	-0.001	-0.010
	(0.027)	(0.067)	(0.042)	(0.095)
Std. of stock return	-2.338	-5.091	-1.233	-5.005
	(1.463)	(3.469)	(2.185)	(4.310)
Ind. adj. ROA	-0.121	-0.220	0.108	-0.178
	(0.116)	(0.277)	(0.224)	(0.427)
Leverage	-0.159***	-0.175	-0.172**	-0.081
	(0.057)	(0.143)	(0.084)	(0.203)
S&P 1500	-0.035	0.006		
	(0.026)	(0.065)		
CEO pay	0.021	0.021	0.013	0.045
	(0.015)	(0.039)	(0.021)	(0.055)
Inst. block holding	0.032	0.023	-0.065	0.273
	(0.080)	(0.203)	(0.131)	(0.304)
Board size			-0.010	-0.028
			(0.008)	(0.019)
Outside directors			0.252	0.404
			(0.154)	(0.345)
CEO duality			-0.015	0.050
			(0.034)	(0.082)
CEO tenure			0.040*	0.033
			(0.022)	(0.053)
CEO stock ownership			-0.117	-0.642
			(0.294)	(0.588)
YR_{2018}	-0.006	-0.004	-0.011	-0.014
	(0.022)	(0.055)	(0.029)	(0.068)
Constant	2.390***	0.986*	2.102***	-0.246
	(0.193)	(0.517)	(0.299)	(0.785)
Industry FE	Yes	Yes	Yes	Yes
Obs	4,318	4,318	2,428	2,428
Adj R^2	0.085	0.053	0.098	0.061

Panel B. Union coverage

Dependent variable:	Complexity rank	Complexity index	Complexity rank	Complexity index
	(1)	(2)	(3)	(4)
Union coverage	0.643***	1.510***	0.793***	2.232***
	(0.193)	(0.513)	(0.251)	(0.621)
Firm characteristics	Yes	Yes	Yes	Yes
CEO and governance variables	No	No	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs	4,318	4,318	2,428	2,428
Adj R2	0.082	0.053	0.090	0.056

Panel C. HQ state w/ pay ratio surtax

Dependent variable:	Complexity rank	Complexity index	Complexity rank	Complexity index
	(1)	(2)	(3)	(4)
HQ state w/ pay ratio surtax	0.058**	0.109*	0.087**	0.259***
	(0.025)	(0.063)	(0.034)	(0.081)
Firm characteristics	Yes	Yes	Yes	Yes
CEO and governance variables	No	No	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Obs	4,318	4,318	2,428	2,428
Adj R2	0.080	0.051	0.089	0.055

Notes: Table 4 reports the regression results of the relation between the CACM complexity and firms' HQ state inequality aversion scores. The sample includes all firm-year observations in 2017 and 2018. The dependent variable in columns 1 and 3 is a categorical variable ranging from 1 to 4, 1 being lowest, based on the complexity of the CACMs. The dependent variable in columns 2 and 4 is the standardized first component from the PCA analysis of six pay elements- *salary only*, *cash compensation*, *equity fair value*, *retirement benefits*, *other benefits*, and *total compensation*. *HQ state inequality aversion score* (Panel A) is the standardized first principal component of state-level *minimum wage*, *state tax differential* and *democratic leaning* percentage, following Pan et al. (2022). *Union coverage* (Panel B) is the yearly fraction of wage and salary workers in a HQ state that are both union members and who report no union affiliation but whose jobs are covered by a union. *HQ state w/ pay ratio surtax* (Panel C) is an indicator equal to 1 if the HQ state has proposed a business surtax when the pay ratio of a firm doing business in those states exceeds a certain threshold. All control variables are measured as of the immediately preceding fiscal-year-end. Appendix C provides variable definitions. We report robust standard errors in parentheses. *, ** and *** denote statistical significance at 10%, 5%, and 1%, respectively.

Table 5. Compensation Design or. Firm Decision? Subsamples and Additional Controls

Dependent variable:	Complexity rank (1)	Complexity index (2)	Complexity rank (3)	Complexity index (4)
Panel A: Excluding financial firms				
HQ state inequality aversion score	0.051***	0.079***	0.058***	0.100***
	(0.010)	(0.024)	(0.013)	(0.029)
Adj R^2	0.090	0.065	0.080	0.062
Obs	3,207	3,207	1,862	1,862
Panel B: Excluding high-tech and biotech firms				
HQ state inequality aversion score	0.043***	0.081***	0.066***	0.157***
	(0.010)	(0.027)	(0.013)	(0.035)
Adj R^2	0.083	0.046	0.109	0.059
Obs	3,270	3,270	1,919	1,919
Panel C: Excluding financial, high-tech and biotech firms				
HQ state inequality aversion score	0.058***	0.113***	0.064***	0.124***
	(0.012)	(0.030)	(0.016)	(0.040)
Adj R^2	0.060	0.039	0.073	0.041
Obs	2,159	2,159	1,353	1,353
Panel D: Excluding firms with foreign employees				
HQ state inequality aversion score	0.025*	0.058	0.055***	0.173***
	(0.013)	(0.039)	(0.020)	(0.055)
Adj R^2	0.057	0.041	0.036	0.042
Obs	1,615	1,615	780	780
Panel E: Controlling for no. of operating and business segments				
HQ state inequality aversion score	0.050***	0.091***	0.060***	0.132***
	(0.009)	(0.022)	(0.012)	(0.029)
No. of segments	-0.018***	-0.029**	-0.014*	-0.007
	(0.006)	(0.015)	(0.008)	(0.020)
Adj R^2	0.096	0.065	0.107	0.071
No. of segments	3,852	3,852	2,244	2,244
Panel F: Controlling for median employee pay				
HQ state inequality aversion score	0.033***	0.049**	0.051***	0.116***
	(0.008)	(0.022)	(0.011)	(0.028)
Median employee pay	0.173***	0.323***	0.170***	0.270***
	(0.020)	(0.045)	(0.025)	(0.053)
Adj R^2	0.105	0.064	0.119	0.071
Obs	4,318	4,318	2,428	2,428
Panel G: Controlling for CEO's equity pay (%)				
HQ state inequality aversion score	0.057***	0.118***	0.060***	0.131***
	(0.010)	(0.026)	(0.011)	(0.028)
CEO's equity pay (%)	0.143**	0.382**	0.185**	0.438**
	(0.069)	(0.161)	(0.079)	(0.180)
Adj R^2	0.097	0.064	0.100	0.063
Obs	2,853	2,853	2,428	2,428
Firm characteristics	Yes	Yes	Yes	Yes
CEO and governance variables	No	No	Yes	Yes

Notes: Table 5 shows the influence of compensation design on the relation between CACM complexity and inequality aversion. Each cell displays a selected coefficient estimate from one regression with an associated standard error in parentheses. Panels A-C report the results of a subsample of firms excluding the financial firms (SIC codes 6000-6799), the high-tech and biotech firms (3-digit SIC codes 283, 357, 366, 367, 382, 384, 737, 873, 481 482, 489), and both types of firms, respectively. Panel D reports the result of excluding firms with foreign employees. Panel E reports the result of controlling for a firm's complexity of operation measured by its no. of segments. Panels F and G report the results with the additional control for a firm's median employee pay and CEO's equity pay, respectively. All regressions include the same set of control variables and industry fixed effect (based on Fama and French 48 industries) as in Table 4. *, ** and *** denote statistical significance at 10%, 5%, and 1%, respectively.

Table 6. Compensation Design or. Firm Decision? Subsample of Firms with Employee Equity Compensation

Dependent variable:	Complexity rank	Complexity index	Complexity rank	Complexity index
	(1)	(2)	(3)	(4)
Panel A: Subsample of firms that grant equity compensation for rank-and-file employees (exclude top 5 executives)				
HQ state inequality aversion score	0.079***	0.113***	0.070***	0.122**
	(0.018)	(0.044)	(0.020)	(0.047)
Adj R^2	0.116	0.038	0.119	0.032
Obs	953	953	825	825
Panel B: Subsample of firms that grant equity compensation for rank-and-file employees (exclude top 20 executives)				
HQ state inequality aversion score	0.081***	0.177***	0.071***	0.171***
	(0.019)	(0.049)	(0.020)	(0.052)
Adj R^2	0.086	0.068	0.081	0.039
Obs	957	957	800	800
Firm characteristics	Yes	Yes	Yes	Yes
CEO and governance variables	No	No	Yes	Yes

Panel C: Subsample of Panel A firms that voluntarily disclose equity compensation for the median employee		
Dependent variable:	Equity fair value (1/0)	
	(1)	(2)
HQ state inequality aversion score	0.063***	0.064***
	(0.017)	(0.020)
Adj R^2	0.202	0.251
Obs	203	177
Firm characteristics	Yes	Yes
CEO and governance variables	No	Yes

Notes: Table 6 shows the relation between inequality aversion and CACM complexity within subsamples of firms that grant equity compensation to rank and file employees. Each cell displays a selected coefficient estimate from one regression along with an associated standard error in parentheses. Panels A and B subsamples include firms with implied employee equity compensation in the top tercile of the sample. Implied employee equity compensation equals the total value of equity compensation minuses the value of equity compensation for the top 5 (Panel A) or top 20 executives (Panel B) in the firm, scaled by the total value of equity compensation. Panel C is based on the subsample of firms in Panel A that voluntarily disclose in the pay ratio disclosure that they award equity compensation to the median employee. The dependent variable in Panel C takes a value of 1(0) if the firm uses equity fair value (vested). All models include the same set of control variables as in Table 4. For ease of exposition, we only report the coefficient of *HQ state inequality aversion score*. Appendix C provides definitions for other variables. All regressions include the same set of control variables and industry fixed effect (based on Fama and French 48 industries) as in Table 4. *, ** and *** denote statistical significance at 10%, 5%, and 1%, respectively.

Table 7. Inequality Aversion and the CACM Complexity: The moderating role of CEO pay and CEO age

Dependent variable:	Complexity rank (1)	Complexity index (2)	Complexity rank (3)	Complexity index (4)
HQ state inequality aversion score	0.073***	0.174***	0.068***	0.133***
	(0.011)	(0.028)	(0.011)	(0.028)
HQ state inequality aversion score × CEO pay in bottom quartile	-0.054**	-0.198***		
	(0.021)	(0.053)		
CEO pay in bottom quartile	0.024	0.078		
	(0.037)	(0.093)		
HQ state inequality aversion score × CEO at retirement age			-0.050***	-0.133***
			(0.016)	(0.039)
CEO at retirement age			-0.009	0.002
			(0.028)	(0.068)
CEO pay			0.022	0.025
			(0.015)	(0.039)
Foreign employee	-0.054	0.020	-0.029	0.099
	(0.034)	(0.084)	(0.027)	(0.071)
Total asset	-0.034***	-0.068**	-0.056***	-0.159***
	(0.012)	(0.028)	(0.011)	(0.028)
Market-to- book	0.005**	0.006*	0.003*	0.002
	(0.002)	(0.004)	(0.002)	(0.003)
Stock return	0.016	0.032	0.038	0.051
	(0.034)	(0.082)	(0.027)	(0.067)
Std. of stock return	0.247	-1.700	-2.303	-4.926
	(1.778)	(4.029)	(1.462)	(3.459)
Ind. adj. ROA	-0.052	-0.387	-0.163	-0.324
	(0.185)	(0.454)	(0.117)	(0.281)
Leverage	-0.137*	-0.139	-0.156***	-0.165
	(0.072)	(0.171)	(0.057)	(0.144)
S&P 1500	0.031	0.230***	-0.040	0.009
	(0.038)	(0.086)	(0.031)	(0.075)
Inst. block holding	-0.080	0.292	0.035	0.035
	(0.104)	(0.241)	(0.080)	(0.202)
YR_{2018}	-0.007	-0.005	-0.006	-0.006
	(0.026)	(0.061)	(0.022)	(0.055)
Constant	2.449***	0.181	2.387***	0.942*
	(0.127)	(0.285)	(0.197)	(0.522)
Industry FE	Yes	Yes	Yes	Yes
Obs	2,853	2,853	4,318	4,318
Adj R^2	0.098	0.068	0.087	0.055

Notes: Table 7 reports the regression results of the relation between the CACM complexity and inequality aversion. Columns 1 and 2 (3 and 4) present the moderating effect of CEO pay (CEO age) on the CACM-inequality aversion relation. The sample includes all firm-year observations in 2017 and 2018. *CEO at retirement age* is an indicator variable that equals one if the age of the CEO is 63 or higher, and zero otherwise. The dependent variable in columns 1 and 3 is a categorical variable ranging from 1 to 4, 1 being lowest, based on the complexity of the CACMs. The dependent variable in columns 2 and 4 is the standardized first component from the PCA analysis of six pay elements-*salary only*, *cash compensation*, *equity fair value*, *retirement benefits*, *other benefits* and *total compensation*. *HQ state inequality aversion score* is the standardized first principal component of state-level *minimum wage*, *state tax differential*, and *democratic leaning* percentage, following Pan et al. (2022). All control variables are measured as of the immediately preceding fiscal-year-end. Appendix C provides variable definitions. We report robust standard errors in parentheses. *, ** and *** denote statistical significance at 10%, 5%, and 1%, respectively.

Table 8. Other Actions to Lower the Pay Ratio?

				HQ state inequality aversion score			
	Year	Obs.	Mean	Obs	Mean	Obs	Mean
					Low score		High score
Panel A: Trend in labor force							
	2015	2,310	16,528.48	1,123	18,208.05	1,087	14,447.79
No. of employees	2016	2,342	16,470.49	1,146	17,802.86	1,092	14,661.78
	2017	1,926	16,897.65	956	19,369.08	891	14,361.49
	2018	2,384	17,196.05	1,169	18,375.45	1,109	15,566.84
Panel B: Trend in total CEO pay							
	2015	1,566	7,219,001.79	782	6,362,918.12	734	7,729,638.79
CEO's reported pay ($)	2016	1,575	7,341,917.78	789	6,610,933.31	734	7,885,113.26
	2017	1,298	8,242,561.86	663	7,678,828.48	594	8,776,623.88
	2018	1,578	9,947,101.76	791	7,505,418.53	734	12,502,672.56
Panel C: Other disclosure statistics							
De Minimis exclusion (%)	2017	2,132	23.29	1,093	22.51	1,039	23.10
	2018	2,279	24.23	1,170	24.27	1,109	23.26
M&A exclusion (%)	2017	2,132	8.07	1,093	8.97	1,039	7.12
	2018	2,279	8.51	1,170	8.80	1,109	8.21
Supplemental ratio (%)	2017	2,132	9.62	1,093	9.24	1,039	10.01
	2018	2,279	9.30	1,170	10.34	1,109	8.21
Statistical Sampling (%)	2017	2,132	3.71	1,093	4.58	1,039	2.79
	2018	2,279	3.64	1,170	4.62	1,109	2.61

Notes: Table 8 Panel A examines the trend in labor force from 2015 to 2018 for the firms that report pay ratio and the firms with high/low HQ state inequality aversion score. *No. of employees* is the reported number of employees in Compustat. Panel B reports the trend in the disclosed CEO pay to the SEC. Panel C reports the proportions of the sample firms that use De Minimis exclusion, M&A exclusion, and statistical sampling in identifying the median employee and prepare supplemental ratios. High (low) score indicates whether the HQ inequality aversion score is greater than or equal to (lower than) the sample median. Appendix C provides variable definitions.

Table 9. Additional Robustness Checks I

Dependent variable:	Complexity rank (1)	Complexity index (2)	Complexity rank (3)	Complexity index (4)
Panel A: Controlling for Say-on-Pay voting outcomes prior to the pay ratio disclosure				
HQ state inequality aversion score	0.043***	0.067***	0.059***	0.126***
	(0.009)	(0.022)	(0.011)	(0.027)
% voted for Say-on-Pay	-0.025**	-0.079***	-0.015	-0.069*
	(0.011)	(0.027)	(0.015)	(0.037)
Adj R^2	0.084	0.051	0.097	0.060
Obs.	4,152	4,152	2,405	2,405
Panel B: Controlling for the CEO-VP pay ratio				
HQ state inequality aversion score	0.057***	0.118***	0.061***	0.133***
	(0.010)	(0.025)	(0.011)	(0.028)
CEO-VP pay ratio	0.005***	0.016**	0.004***	0.010
	(0.002)	(0.008)	(0.002)	(0.007)
Adj R^2	0.099	0.067	0.100	0.062
Obs.	2,853	2,853	2,428	2,428
Panel C: Controlling for firms with prior disclosure of staff expense				
HQ state inequality aversion score	0.043***	0.068***	0.060***	0.130***
	(0.008)	(0.022)	(0.011)	(0.028)
Staff expense disclosure	0.071	0.049	0.007	-0.127
	(0.043)	(0.117)	(0.058)	(0.155)
Adj R^2	0.086	0.053	0.098	0.061
Obs.	4318	4318	2428	2428
Panel D: Regressions with compensation consultant fixed effect				
HQ state inequality aversion score	0.079***	0.168***	0.072***	0.193***
	(0.017)	(0.042)	(0.021)	(0.056)
Comp. consultant fixed effects	Yes	Yes	Yes	Yes
Adj R^2	0.237	0.190	0.283	0.241
Obs.	1,584	1,584	1,202	1,202
Firm characteristics	Yes	Yes	Yes	Yes
CEO and governance variables	No	No	Yes	Yes

*Notes***:** Table 9 shows the results of robustness tests of the additional determinants of the firm's CACM choices based on CACM complexity regressions in Table 4. Each panel displays the coefficient estimates of *HQ state inequality aversion score* and the additional control along with the associated robust standard errors in parentheses. *% voted for Say-on-Pay* is the quartile rank of the percentage voted "yes" for the Say-on-pay vote, 1 being lowest quartile. *CEO-VP pay ratio* is measured as the ratio of the total pay of the CEO to the total pay of the median VP. *Staff expense disclosure* is an indicator variable that equals one if the firm reports staff expense (Compustat Item XLR) prior to the pay ratio disclosure rule, i.e., in the fiscal year 2016; zero otherwise. Panel D reports the results with compensation consultant fixed effects for the subsamples of firms in the ISS Incentive Lab database. For ease of exposition, we only report the coefficient of *HQ state inequality aversion score.* Appendix C provides definitions for other variables. All regressions include the same set of control variables and industry fixed effect (based on Fama and French 48 industries) as in Table 4. *, ** and *** denote statistical significance at 10%, 5%, and 1%, respectively.

Table 10. Additional Robustness Checks II

Dependent variable:	Complexity rank (1)	Complexity index (2)	Complexity rank (3)	Complexity index (4)
Panel A: Excluding firms in HQ states with pay ratio surtax				
HQ state inequality aversion score	0.040***	0.072**	0.053***	0.137***
	(0.013)	(0.036)	(0.018)	(0.047)
Adj R^2	0.088	0.055	0.095	0.058
Obs.	2,935	2,935	1,659	1,659
Panel B: Use # of employees to measure firm size				
HQ state inequality aversion score	0.034***	0.049**	0.051***	0.118***
	(0.008)	(0.022)	(0.011)	(0.028)
Adj R^2	0.101	0.062	0.115	0.065
Obs.	4,317	4,317	2,428	2,428
Firm characteristics	Yes	Yes	Yes	Yes
CEO and governance variables	No	No	Yes	Yes
Dependent Variable:	Ln(1+ Pay ratio) (1)	Ln(1+ Pay ratio) (2)	Ln(1+ Pay ratio) (3)	Ln(1+ Pay ratio) (4)
Panel C: Pay ratio by complexity rank				
Complexity rank 2	-0.219***	-0.089*	-0.076***	-0.122**
	(0.050)	(0.037)	(0.037)	(0.043)
Complexity rank 3	-0.426***	-0.243***	-0.226***	-0.276***
	(0.058)	(0.045)	(0.045)	(0.057)
Complexity rank 4	-0.762***	-0.317***	-0.287***	-0.345***
	(0.077)	(0.060)	(0.059)	(0.087)
Obs.	4,609	4,510	4,510	2,491
Adj R^2	0.230	0.534	0.553	0.490
Additional disclosure controls	No	No	Yes	Yes
Firm characteristics	No	Yes	Yes	Yes
CEO and governance variables	No	No	No	Yes

Notes: Table 10 reports the results of additional robustness checks. Panel A reports the results of a subsample of firms that are not headquartered in the states with pay ratio surtax. Panel B reports the results replacing firm size (*Total asset*) by the number of employees reported in the pay ratio disclosure. The dependent variable in Panel A and B is either *complexity rank* or *complexity index*. Panel C reports the relation between pay ratio and the individual rank of the CACM complexity, a categorical variable ranging from 1 (lowest complexity) to 4. The base category is *complexity rank 1*. Columns 1, 2, 3 and 4 of Panel C correspond to columns 1, 3, 5 and 7, respectively, of Table 3. Appendix C provides definitions for other variables. All regressions include the same set of control variables and industry fixed effect (based on Fama and French 48 industries) as in Table 4 (for Panel A and B) and Table 3 (for Panel C). We report robust standard errors in parentheses. *, ** and *** denote statistical significance at 10%, 5%, and 1%, respectively.