Equity Market Reaction to Pay Dispersion: Evidence from CEO-Worker Pay Ratio Disclosure

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Abstract

Starting in 2018, U.S. public companies are required to disclose the ratio of CEO to median worker pay, providing the first opportunity to examine equity markets' reaction to within-firm pay dispersion. We find a negative market reaction to firms disclosing high pay ratios. Additional evidence suggests that equity markets "dislike" high pay dispersion independently of high CEO pay or low worker pay. In the cross-section, firms whose shareholders have stronger prosocial preferences experience a significantly more negative market response to high pay ratios. Consistent with investors' prosocial preferences moderating the initial market reaction, we find that during 2018 investors with stronger prosocial preferences rebalance their portfolios away from high pay ratio stocks relative to other investors. Overall, our results suggest that investors' prosocial preferences, in particular with respect to within-firm pay dispersion, is a channel through which high pay ratios negatively affect firm value.

Key words: CEO-worker pay ratio, income inequality, pay dispersion, pay disparity, prosocial preferences, corporate social responsibility, ESG, Dodd-Frank Act.

JEL classification: G13, G14, G41, G23, J31, L25, M52

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1. Introduction

In 2018, U.S. publicly traded companies for the first time had to disclose the ratio between CEO pay and median worker pay. The pay ratio disclosure requirement, which is mandated by the Dodd-Frank Wall Street Reform and Consumer Protection Act, comes into effect at a time of growing income inequality due to stagnant middle-class wages but rapidly increasing incomes by high earners (Acemoglu and Autor (2011), Piketty (2014)). While the public debate as well as some corporate leaders and institutional investors have expressed concern about the contribution of large within-firm pay dispersion to income inequality (e.g., Song et al. (2019)), it is largely unknown how financial markets assess the dispersion in pay between a firm's top executives and rank-and-file employees. The new pay ratio disclosure requirement therefore provides a unique opportunity to observe investors' responses to within-firm pay differences.

Consistent with public sentiment, markets might react negatively to firms' announcements of large pay ratios if investors expect adverse responses by inequality-averse customers, dissatisfied firm employees or local governments or regulators. Similarly, a negative market reaction could reflect the reluctance by at least some shareholders to invest in firms with large pay disparities. However, it is also possible that, contrary to some of the public statements by corporate leaders and institutional investors, income inequality is not an important concern of financial markets. Instead, markets might respond to news about CEO or worker productivity revealed through the newly disclosed pay information. If investors infer high productivity from high pay, a high pay ratio could be a positive or a negative signal about firm fundamentals, depending on whether news about CEO or median worker pay dominates the pay ratio disclosure. Finally, it is also possible that the market does not respond to the pay ratio disclosure in any significant way, possibly due to the lack of clarity around the disclosed compensation numbers or due to sufficiently detailed information about industry or firm pay practices that is available to market participants already before the new disclosure requirement.

How, then, did equity markets and investors respond as U.S. firms for the very first time disclosed the CEO-worker pay ratio in their 2018 proxy filings? To address this question, we examine the

short-term media and equity market reactions around the 2018 pay ratio disclosure as well as the portfolio rebalancing decisions of institutional investors over the course of 2018.

The average pay ratio across the approximately 2,300 U.S. firms that report their pay ratios in 2018 is 144. That is, on average a firm's total CEO compensation corresponds to 144 times its median worker compensation. However, there is substantial cross-sectional variation, partly related to firm size, composition of the workforce, and industry.

Judging by the news volume around firms' proxy filings in 2018 compared to the news volume in 2017, pay ratio disclosure has increased media attention to firms' compensation practices, in particular for firms with large pay ratios.

We find a significant equity market reaction to the new pay ratio information. Firms that report higher pay ratios experience significantly more negative market reactions. A one-standard-deviation increase in pay ratio decreases a firm's seven-day cumulative abnormal return by about 44bp, suggesting that high CEO pay relative to median worker pay leads to a downward revision of firm value by investors. The negative market reaction to pay ratio is observed only after the disclosure, not before. The reaction becomes even stronger in a longer event window. When decomposing the pay ratio into the two pay components, we find that the market response to median worker pay and to CEO pay are of opposite signs, negative to high CEO pay but positive to high median worker pay.

Importantly, we find a large and significantly negative reaction to high pay ratio even after controlling for CEO and worker pay, suggesting a negative market reaction to within-firm pay *disparity* that is independent of pay levels. We also find that the negative reaction to high CEO pay is absorbed by the negative reaction to high pay ratio, suggesting that the market does not "dislike" high CEO pay per se, but rather "dislikes" high within-firm pay disparity. Interestingly, we observe a positive response to high median worker pay independent of the market response to high pay ratios. This finding indicates that the market could be inferring good news about the firm's fundamentals from high levels of worker pay above and beyond the market's negative assessment of high within-firm pay disparity. Overall, our results

suggest that equity markets are concerned with income inequality and hence react negatively when learning about high within-firm pay dispersion.

The negative market reaction to high pay ratio may arise from concerns about adverse impact on the future cash flows of high-pay-ratio firms due to negative reactions by firms' stakeholders, such as employees, customers, and local government. It may also reflect the market's expectation that at least some investors are less likely to invest in firms with high pay ratios, thereby increasing those firms' cost of capital. We hypothesize that any response by shareholders or other stakeholders will be stronger, the more pronounced their prosocial preferences are, in particular in terms of their attitudes towards income inequality. While the preferences of shareholders and other stakeholders are not observable, they likely correlate with the social norms and policies with respect to worker pay and income inequality in the states, in which the firms' shareholders and stakeholders are located. Thus, we measure a firm's U.S. shareholders' prosocial preferences as the ownership-weighted average social norms and policies in shareholders' headquarters states. Similarly, we measure a firm's exposure to cash flow risk due to the prosocial preferences of its other stakeholders as the weighted average social norms and policies of states, in which the firm operates, using its branches, sales, and employees by state as weights.

Our results suggest that firms with stronger shareholder prosocial preferences experience a significantly more negative market response to high pay ratio. Prosocial shareholders respond negatively to CEO pay, but positively to median worker pay. Interestingly and maybe a bit surprisingly, firms' exposure to cash flow risk due to the prosocial preferences of other stakeholders does not play an independent role in explaining the cross-sectional variation in market reaction. In addition, consistent with the investor preferences interpretation of the results, prosocial investors seem to "dislike" high pay ratios, regardless of the implications of high pay ratio for portfolio firms' cash flows.

Put together, we find that pay ratio contains relevant information that impacts prices. The negative reaction to high pay ratio that is independent of pay levels, the opposite reaction to high CEO pay and to high worker pay, and the fact that investor prosocial preferences moderate the market response to high pay ratio suggest that investors do not simply infer higher skill or productivity from higher pay.

Instead, our findings suggest that investors' preferences with respect to within-firm pay disparity represent a channel, through which within-firm pay disparity affects firms' equity valuation.

Finally, we examine how institutional investors with weaker or stronger prosocial preferences rebalance their portfolios in 2018 in response to firms' pay ratios disclosure. As in the market reaction analysis, we infer an institutional investor's prosocial preferences using the social norms and policies with respect to worker pay and income inequality in the investor's headquarters state. We exclude the largest institutional investors such as Vanguard and BlackRock from this analysis, as their operations as well as their clientele are likely geographically dispersed. We find that in 2018 institutional investors with stronger prosocial preferences reduce their allocation to high-pay ratio stocks relative to institutional investors with weaker prosocial preferences. In contrast, we find no such pattern between the pay ratio disclosed in 2018 and investors' rebalancing decisions in 2017. This finding suggests that the rebalancing pattern observed in 2018 is unlikely driven by prosocial investors' preferences for other stock characteristics that are correlated with pay ratio but are already known before the disclosure. Further, the results become substantially stronger when we focus on smaller independent investment advisors, whose clientele is more likely local and whose preferences are therefore better proxied for by local prosocial norms. Investors' portfolio rebalancing behavior in response to the 2018 pay ratio disclosure is consistent with the variation of announcement returns as a function of shareholders' prosocial preferences.

A few prior papers have examined the relation between within-firm pay dispersion and firm performance. Faleye, Reis, and Venkateswaran (2013) analyze the CEO-employee pay ratio before the recent pay ratio disclosure requirement, using "staff expense" information from Compustat for a small subset of U.S. public firms, consisting of mostly banks and a few firms that voluntarily disclosed staff expenses. They find that high pay ratio is positively correlated with operating performance and firm value. Using confidential data for a large set of U.K. firms that is free of sample selection concerns, Mueller, Ouimet, and Simintzi (2017) also find that firms with larger pay dispersion between the top and the bottom levels of employees have better performance as well as higher equity returns. Different from these studies, we examine the market reaction to the mandated public disclosure of pay ratio by a large

number of public firms in the U.S. The overall negative market reaction to the disclosure of high pay ratios appears at odds with the above two studies. Our results suggest that possible positive signals about firm performance that investors could infer from high pay ratios might be overshadowed by concerns about large pay differences, particularly by prosocial investors.

In a more recent study, Rouen (2019) examines the ratio of CEO pay to average employee pay for 931 public U.S. companies, using confidential data from the Bureau of Labor and Statistics. He focuses on the relation between pay ratio and operating performance. When decomposing the pay ratio into an explained and an unexplained part, he finds a positive relation between explained pay disparity and future operating performance, but a negative relation for unexplained pay disparity. He interprets the unexplained pay disparity as a proxy for unfair pay practices perceived by the firm's employees, which in turn negatively affect operating performance. His interpretation is consistent with evidence by Edmans (2011) that employee satisfaction, which is likely affected by fairness of pay, is positively related to firm performance, although not fully priced by the market. Consistent with these two studies, our findings suggest that large pay disparity is viewed negatively by equity markets and by prosocial investors in particular.

Our results are consistent with investors' prosocial attitudes playing a role in the market response to news about firms' pay practices and may reflect the growing importance of socially responsible investing (e.g., Hartzmark and Sussman (2019), Krueger, Sautner, and Starks (2019)).[1] Our paper therefore also contributes to the still developing literature on how prosocial preferences might affect investors' allocation decisions and market prices (e.g., Heinkel, Kraus, and Zecchner (2001), Hong and Kacperczyk (2009), Hart and Zingales (2017), Riedl and Smeets (2017), Cao, Titman, Zhan, and Zhang (2019)). An important advantage of the 2018 pay ratio disclosure is the well-identified event, at which markets and investors learn about and respond to new information on firms' pay practices. We find that

[1] In 2006, 63 investment firms with USD 6.5 trillion in assets under management (AUM) signed a UN-backed commitment to incorporate ESG criteria into their investment decisions. By 2018, the number of signatories had grown to 1,715 firms with $81.7 trillion in AUM (Eccles and Klimenko (2019)).

this response in terms of announcement returns and portfolio holdings indeed is consistent with investors' prosocial preferences playing an important role in financial markets.

Finally, our study contributes to the corporate social responsibility literature, which shows that firms' practices with respect to social responsibility can affect firm value (see, e.g., Flammer (2015), Krueger (2015), Lins, Servaes, and Tamayo (2017), Albuquerque, Koskinen, and Zhang (2018)). Our study suggests that investor prosocial preferences are one channel, through which within-firm pay disparity can affect firm value.

2. CEO-worker pay ratio

Before analyzing the equity market response to the new CEO-worker pay ratio disclosure, we provide an overview over the disclosure rule as well as a brief description of the disclosed pay information and its main determinants.

2.1. CEO-worker pay ratio disclosure rule

Following the Great Recession, the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 imposes additional regulation on executive compensation, including shareholders' say-on-pay, independence of the compensation committee, and disclosure of the CEO-worker pay ratio. While the first two mandates were adopted relatively quickly, there was a lengthy and contentious rulemaking process for the pay ratio disclosure. In September 2013, the SEC proposed a new rule to implement Section 953(b) of the Dodd-Frank Act, the pay ratio disclosure rule, and on October 19, 2015, the final rule was announced.

The pay ratio disclosure rule requires most public companies listed in the U.S. to disclose pay ratio and median worker compensation for their first fiscal year that starts on or after January 1, 2017.[2] The SEC interpreted Congress' intention as to provide shareholders with a company-specific metric that can assist in their evaluation of a firm's executive compensation practices and in exercising their say-on-

[2] The rule exempts certain companies from the disclosure. For example, emerging growth companies (annual revenue below USD 1.07 billion) and smaller reporting companies (public float below USD 75 million) are excluded. See Appendix A for more details.

pay voting rights.[3] Under the rule, companies must disclose: i) the median of the annual total compensation of all employees (other than the CEO), ii) the annual total compensation of the CEO, and iii) the ratio between those two numbers.

An important new task for companies is therefore to identify the median worker pay. Companies are generally required to include non-U.S. employees in their calculation, unless doing so would violate applicable foreign data privacy laws or non-U.S. employees account for 5% or less of their total employees (*de minimis* exemption). Companies are allowed to make cost-of-living adjustments for the compensation of employees in countries other than the country in which the CEO resides. In this case, the company must briefly describe the cost-of-living adjustment and disclose the country, in which the median employee is located. The company also must provide a pay ratio calculated without the cost-of-living adjustment. Part-time, seasonal, and temporary employees should be included in the pay ratio calculation, and their compensation should not be annualized. Annualization is allowed, however, for full-time workers employed for a portion of a fiscal year. Independent contractors, "leased" workers, and other workers, who are employed by and receive compensation from a third party, may be excluded. Employees on leave of absence may also be excluded. Appendix A provides further details about the rulemaking process and the disclosure requirements.

We collect pay ratio data directly from proxy statements filed with the SEC in 2018 and identify 2,384 companies that disclose pay ratios and median worker compensation in 2018. We exclude firms headquartered in foreign countries and obtain a final sample of 2,283 firms. The detailed pay ratio disclosure data is collected in two ways. We first perform an automated textual analysis to collect information from the pay ratio section of the proxy filing and then employ workers through Amazon's Mechanical Turk platform to manually collect pay ratio information, including median worker and CEO compensation as well as other relevant details (see Appendix B for more information). When there is a discrepancy between the data collected using those two methods, we manually determine the correct information.

[3] The SEC Pay Ratio Disclosure Adopting Release, August 5, 2015.

Panel A of Table 1 provides detailed summary statistics of *Pay Ratio*, *CEO Pay*, and *Worker Pay*, i.e., median worker pay. *Pay Ratio* ranges from 0 to 5,908, with a mean of 144, a median of 66, and a standard deviation of 298. The variation in pay ratio reflects substantial variation in both CEO pay and the newly disclosed median worker pay, with pay at the 25th and 75th percentile equaling USD 2 million and USD 8.1 million for CEOs and USD 42,000 and USD 97,000 for median workers. The disclosure of median worker pay provides public information on worker compensation for a large cross-section of U.S. public firms for the first time. The median of *Worker Pay* in our sample (USD 61,760) is close to the median household income of USD 61,372 as reported by the Census Bureau for 2017.[4] The average of *Worker Pay* (USD 79,080) is quite a bit higher, reflecting the effect of a few small firms with particularly high median worker pay. To avoid the effect of outliers, most of our empirical analysis employs logarithms of pay ratio and its components. Specifically, we define *LN Pay Ratio* as ln(1+ *Pay Ratio*), *LN CEO Pay* as ln(1+*CEO Pay*), and *LN Worker Pay* as ln(*Worker Pay*). The last three rows in Panel A of Table 1 report the corresponding summary statistics. When dropping observations with pay ratios of zero and performing a variance decomposition of ln(*Pay Ratio*), we find that about 71% of the total variation in pay ratio reflects variation in CEO pay, while 38% is due variation of worker pay, with covariance between both components accounting for the difference of 9%.[5]

In the last two columns of Panel A, we report the *R-squared* from separate regressions of the different pay variables on (2-digit SIC) industry fixed effects as well as on (headquarters) state fixed effects. The industry effects on the pay variables are more pronounced than the geography effects, particularly for the pay ratio and the median worker pay.

Panel B of Table 1 lists the mean and median for *Pay Ratio*, *CEO Pay*, and *Worker Pay* for each (1-digit SIC) industry. Mining, construction, and financial industries have relatively low pay ratios, while

[4] https://www.census.gov/library/publications/2018/demo/p60-263.html

[5] Notice that here we use ln(*Pay Ratio*), not ln(1+*Pay Ratio*). Specifically, we carry out the following variance decomposition: Var [ln(*Pay Ratio*)] = Var [ln(*CEO Pay*)] + Var [ln(*Worker Pay*)] – 2*Cov [ln(*CEO Pay*), ln(*Worker Pay*)]. The covariance term is positive due the correlation of 8.6% between the two components.

service and retail trade industries have relatively high pay ratios. Figure 1 plots the (1-digit SIC) industry mean and median pay ratio. Figure 2 plots the cross-state variations in pay ratio.

Finally, in Panel C, we examine potentially important firm characteristics that are also disclosed in the pay ratio section, such as worker composition, that could substantially affect reported pay ratios or reflect firm choices in the calculation and presentation of the pay information. Definitions of all variables are provided in Appendix C.

Based on firms' own disclosure and supplemental information from Compustat segment data, about 52% of firms have foreign workers, with an average fraction of 10% of their workforce being outside the U.S. Only 24% of firms apply the "*de minimis*" exemption and exclude up to 5% of foreign workers when identifying the median worker, and only about 1% of firms make a cost-of-living adjustments when calculating their pay ratio.

About 3% of firms report that their median worker is a part-time worker, and more than 2/3 of these firms are in the retail sector. Part-time workers can substantially affect the pay ratio. For example, Sears Holdings states that their pay ratio for full-time employees is only 66 as opposed to 264 when part-time workers are included. However, the small fraction of firms with part-time workers as median worker suggests that these cases are unlikely influential in our analysis.

Finally, about 11% of firms report more than one pay ratio. For example, UPS, Inc. reports the ratio of the CEO and the median worker total compensation (274-to-1) and the ratio of their taxable wages (193-to-1). In all these cases, we use the highest one in the main analysis since it is usually the one that complies with all the SEC requirements.

2.2. Determinants of CEO-worker pay ratio

While the new disclosure requirement provides the first opportunity to study equity markets' and investors' reaction to the disclosure of worker pay relative to CEO pay for most public U.S. firms, several previous studies have examined the determinants of within-firm pay dispersion, using confidential data or data for a small subset of public firms with available pay information (e.g., Faleye, Reis, and Venkateswaran (2013) and Mueller, Ouimet, and Simintzi (2017)). For comparison purposes, we analyze

the main determinants of the newly disclosed CEO-worker pay ratios and the pay components. Panel A of Table 2 reports summary statistics for key explanatory variables.

First, we examine the relation between the details from the pay ratio disclosure regarding the composition of a firm's work force and the reported pay ratios. The results in Panel B of Table 2 suggest that firms with more foreign workers as well as part-time workers as median workers have significantly higher pay ratios (Column (1)) and lower median worker way (Column (5)), as do firms that report multiple pay ratios or take advantage of cost-of-living adjustments. Interestingly, these disclosure details alone explain about 22% of the variation in the reported pay ratio values, highlighting the importance of firm-specific factors in determining pay ratios.

Second, firm size, as a proxy for CEO skill, has been proposed as the most important determinant of within-firm pay dispersion. It is also the case in our sample. The logarithm of total assets, which captures the total resources under the CEO's control, is strongly positively correlated with the pay ratio and the CEO pay but not with worker pay. In untabulated tests, we find that firm size alone explains about 19% of the variation in the pay ratio, conditional on disclosure details mentioned above. We also examine the role of worker skill and productivity, which we proxy for with firm size per worker and R&D intensity. Firm size per worker is positively correlated with worker pay and negatively correlated with pay ratio, while R&D intensity does not have any significant association with the pay variables.

Finally, prior research has also shown a positive relation between within-firm pay disparity and *future* firm performance. While we cannot yet observe firms' performance after the 2018 pay ratio disclosure, the results in Table 2 Panel B suggest a positive association between pay ratio and (lagged) ROA.

Overall, the newly disclosed CEO-worker pay ratios of U.S. public companies are shaped by similar economic determinants as those shown by prior studies.

3. Short-term reactions to pay ratio disclosure

3.1. Media attention

Before analyzing the equity market reaction to the 2018 pay ratio disclosure, we examine the media attention to firms' pay practices around firms' proxy filings in 2018 and compare it to the media attention in 2017. While significant media attention does not imply a significant market reaction, it increases the probability that firms' investors and other stakeholders such as employees and customers are aware of the newly disclosed information.

To measure media attention, we use data provided by *TruValue Labs*. *TruValue Labs* tracks and analyzes the daily media coverage for 2,057 of our sample firms.[6] Every day, *TruValue Labs* identifies firm-specific news from a large number of online media sources and then assigns news items to one or multiple of 30 ESG-related categories based on the Sustainability Accounting Standards Board's (SASB) classification system.[7]

We focus on the "Compensation and Benefits" category as it is most closely related to the newly disclosed pay ratio information. We define the indicator variable *Pay and Benefits News* to be equals one if a firm is mentioned in the "Compensation and Benefits" news category on a given day and zero otherwise. Figure 3 plots the daily averages for the *Pay and Benefits News* indicator across all 2,057 firms 35 days before and after the proxy filings in 2017 (red circles) and 2018 (blue squares). As evident from Figure 3, the number of firms with compensation and benefits related news after the proxy filing date is larger in 2018 than in 2017. This increase in media attention is significant and robust in a regression setting with firm-fixed effects (see Appendix Table D1).

[6] *TruValue Labs* employs big data and artificial intelligence to capture and analyze unstructured data from a wide variety of sources (e.g. media, think tanks, industry analysts, government regulators, NGOs), excluding company self-reported data (e.g. press-releases, conference calls, official filings). *TruValue Labs* uses more than 140,000 world-wide sources and emphasizes that these sources are vetted, reputable and credible, therefore likely to generate new information and insights for investors. Some of the largest asset managers (e.g. State Street) use *TruValue Labs* data. For more details, see https://www.truvaluelabs.com/trends/esg-integration

[7] In November 2018, SASB published an updated set of standards that includes only 26 categories. However, *TruValue Labs* continues to use the old set of 30 categories during our sample period.

In Table 3, we examine how media attention relates to the disclosed pay ratio as well as its components, CEO and median worker pay. We consider an event window from one day before to five days after the earliest filing of a firm's preliminary or definitive proxy statement in 2018. We define the variable *Pay and Benefits News [-1, 5]*$_{2018}$ as an indicator variable that equals one if a firm has compensation-and-benefits-related news during the event window and zero otherwise. We regress *Pay and Benefits News [-1, 5]*$_{2018}$ on *LN Pay Ratio, LN CEO Pay* and *LN Worker Pay* and two control variables, *Total News [-1, 5]*$_{2017}$ and *Pay and Benefits News [-1, 5]*$_{2017}$, that capture a firm's overall media attention in terms of the total number of news across all SASB ESG categories and pay-related attention around the 2017 proxy filing,.

Column (1) of Table 3 reports a positive relation between pay-related media attention and firm pay ratio. A one-standard-deviation increase in *LN Pay Ratio* increases a firm's likelihood of having news related to "Compensation and Benefits" by 2.6 percentage points. This represent a 64% increase given the average of 4.1% for the *Pay and Benefits News [-1, 5]*$_{2018}$ indicator. Column (2) shows that media attention is positively related to CEO pay and negatively related to median worker pay. While Core, Guay, and Larcker (2008) document media attention to high CEO pay, our results suggest that for worker pay the media tends to focus on low rather than high median worker pay, consistent with high within-firm pay dispersion attracting media attention.

In Columns (3) and (4), we extend the event window until 25 days after the proxy filing and construct the corresponding *Pay and Benefits News [-1, 25]*$_{2018}$ indicator variable. The average value of *Pay and Benefits News [-1, 25]*$_{2018}$ is 7.3% and indicates a substantial increase in the number of firms with compensation-and-benefits-related news relative to the shorter event window. The regression results suggest that the relative importance of pay ratio and its components in explaining which firms are more or less likely to receive media attention remains unchanged. For example, a one-standard-deviation increase in *LN Pay Ratio* increases a firm's likelihood of having "Compensation and Benefits" news by 4.5 percentage points, which represents an increase of 62% relative to the average of 7.3%, similar to that for the shorter window.

Overall, we find that relative to 2017, firms' 2018 proxy filings, which for the first time include pay ratio and median worker pay information, attract significantly more compensation and benefit related news. Firms with high pay ratios seem particularly newsworthy. These findings suggest that the newly disclosed pay ratios likely contain new information about firms' pay practices.

3.2. Equity market reaction

While the pay ratio disclosure allows investors for the first time to compare a firm's CEO compensation to its median worker compensation, it is not clear how investors will respond to this new information. First, the market may not respond to the pay ratio disclosure in any significant way. This could be due to the lack of clarity around the disclosed compensation numbers or due to sufficiently detailed information about industry or firm pay practices that is available to market participants already before the new disclosure requirement.

Second, the market might react positively to high pay ratios. Firms with larger pay of CEOs and top-level employees relative to the pay of lower level employees have been found to be more profitable compared to firms with smaller pay differences, presumably due to talented CEOs or top executives (see, e.g., Faleye et al. (2013) and Mueller et al. (2017)). Investors might therefore update their assessment of firm profitability based on the pay ratio disclosure, leading to an increase in stock prices for firms with high pay ratios.

Lastly, the market may react negatively to high pay ratios for several reasons. First, the market could learn about worker productivity from the newly disclosed median worker pay. High pay ratios due to low worker pay could be correlated with low worker productivity. Given that firms have disclosed CEO pay before 2018, learning about worker productivity could dominate learning about CEO productivity and thus lead to a negative response to high pay ratios. Second, the market might be concerned about high within-firm pay dispersion, which may adversely affect firm performance through its impact on employee satisfaction and morale (see, e.g., Edmans (2011) and Breza, Kaur, and Shamdasani (2018)), and through increased pressure from workers, customers, or local governments to reduce pay inequality. The decision in 2018 by the City of Portland, Oregon, to impose a special business

tax on firms with pay ratios greater than 100 represents a specific example of such concerns. Finally, in addition to concerns that future cash flows of high-pay-ratio firms could be lower than previously expected, the market might expect that at least some investors decide to reduce their investment in firms with high pay ratios, thereby possibly increasing those firms' cost of capital and reducing their value (see, e.g., Heinkel, Kraus, and Zechner (2001) and Hong and Kacperczyk (2009)).

3.2.1. Abnormal returns around pay ratio disclosure

To examine the equity market response to the newly disclosed pay ratio, we examine firms' abnormal returns around their pay ratio disclosure in 2018. For each of our sample firms, we identify the earliest filing date in 2018 of either the preliminary or the definitive proxy statement and define it as day 0 in event time. For most of our results, we calculate cumulative abnormal returns between event days -1 and + 5 (*CAR[-1,+5]*), where days represent trading days and abnormal returns represent the difference in basis points between a firm's daily return and the value-weighted CRSP market return, with both returns excluding dividends.[8] The average (median) cumulative abnormal return around the pay ratio disclosure is 38.7bp (36.3bp) with a cross-sectional standard deviation of 406bp.

We perform cross-sectional regressions, relating firms' cumulative abnormal returns to the announced pay ratios, while controlling for equity market capitalization (*ln(MktCap)*) and book-to-market (*Book-to-Market*):

$$CAR[-1,+5]_i = a + b'Pay_i + c\ ln(MktCap)_i + d\ Book\text{-}to\text{-}Market_i + e_i, \quad (1)$$

where *Pay* represents the newly disclosed *LN Pay Ratio* or its components.

Table 4 reports our first result with respect to the equity market response to the 2018 pay ratio disclosure. Column (1) reveals a significantly negative relation between *LN Pay Ratio* and the cumulative abnormal return around its announcement. A one-standard-deviation increase in pay ratio decreases a firm's cumulative abnormal return by about 44bp. In Column (2), we include control variables related to details in the pay ratio disclosure from Table 2. The sensitivity of market reaction to *Ln Pay Ratio*

[8] To control for outliers, we eliminate daily abnormal returns that deviate by more than three standard deviations from the sample mean, where both mean and standard deviation of daily abnormal returns are calculated across all stocks in our sample across all days in 2018.

remains similar to that in Column (1). Among the disclosure details, only the variable indicating a cost-of-living adjustment of the median worker pay has a significant and negative effect on *CAR*. Overall, the information about the companies' workforce composition and complexity as reflected in the disclosure details does not appear to drive the market reaction. In Column (3), we further include the two important firm characteristics from Table 2, firm size (total assets) and industry fixed effects. The effect of *LN Pay Ratio* remains negative and statistically significant, although the magnitude of the effect decreases somewhat relative to that in Column (1).

In Columns (4) to (6) of Table 4, we examine the market response to the two components of pay ratio, CEO pay and worker pay. While higher CEO pay has a negative effect on announcement returns, its effect is statistically insignificant. Worker pay, which is a new element of the pay ratio disclosure requirement, has a positive and statistically significant effect on cumulative abnormal returns. While these results are consistent with a negative market reaction to pay ratio due to concerns about within-firm pay dispersion, they are also consistent with the market learning about median worker pay.[9]

Ideally, we could examine the market response to pay ratio while controlling for CEO and worker pay. Given the collinearity between these three variables, this is not possible in the current linear specification. In Table 5, we therefore use indicator variables for different terciles of pay ratio, CEO pay, and median worker pay. We begin by exploring the market response to the top two pay ratio terciles. We create an indicator variable *High Pay Ratio* that equals one if the firm's pay ratio is in the top tercile of the sample distribution and zero otherwise, as well as an indicator *Medium Pay Ratio* that equals one if the firm's pay ratio is in the middle tercile of the sample distribution and zero otherwise. The result in Column (1) of Table 5 suggests that there is a strong negative market reaction to high within-firm pay dispersion, especially concentrated in the top tercile of the pay ratio distribution. Dropping the *Medium Pay Ratio* indicator for a more parsimonious specification in Column (2), has little effect on the result that

[9] In Appendix Table D2, we split the sample into a small group of firms that reported staff expenses before 2018 and the remaining set of firms that did not. We find a significant market reaction to worker pay only in the latter group, for which worker pay represents new information.

firms in the top tercile of the pay ratio distribution experience a significant, 93.3bp more negative cumulative abnormal return relative to firms with lower pay ratios.

In Column (3) of Table 5, we examine the top and bottom terciles of the distribution in CEO pay and median worker pay. *High CEO Pay* indicates firms in the top tercile of the CEO pay distribution, while *Low CEO Pay* indicates firms in the bottom tercile of the CEO pay distribution. *High Worker Pay* and *Low Worker Pay* represent the corresponding indicator variables for median worker pay. Compared to firms with intermediate CEO pay, firms with high CEO pay experience a significantly more negative market reaction (-78.2bp). Compared to firms with intermediate worker pay, firms with high median worker pay have a significantly more positive market reaction (+64.9bp). Maybe surprisingly, we do not find a significant response for firms in the bottom tercile of the worker pay distribution.

In Columns (4) and (5) of Table 5, we examine the market response to pay ratio while controlling for CEO and worker pay. This allows us to address the question of whether the market reacts to pay ratio per se or to CEO pay and particularly to the newly disclosed median worker pay. The negative coefficient on *High Pay Ratio* is large in absolute terms and statistically significant in both specifications. Compared to firms with lower pay ratios, firms with high within-firm pay dispersion experience a 68 to 85bp lower cumulative abnormal return around the pay ratio disclosure even after we control for CEO pay and worker pay. Interestingly, after controlling for high pay ratio, the market reaction to high CEO pay becomes smaller and statistically insignificant, suggesting that the market does not "dislike" high CEO pay per se. Instead, the market "dislikes" high pay disparity.

The positive reaction to high median worker pay does not seem to be absorbed by pay ratio entirely, suggesting that it is not explained by the market's view of pay dispersion. This finding is consistent with the market positively updating about firms with high median worker pay and therefore possibly high worker productivity, above and beyond the market's negative reaction to high pay dispersion.

In Appendix Table D3, we show that our key results with respect to a negative market reaction to high pay ratio are robust to using shorter event windows, such as [-1, +1] and [-1, +3], as well as to using abnormal returns relative to the CAPM or the Carhart four-factor model.

Overall, the results in Tables 4 and 5 suggest that the negative market reaction to high pay ratio reflects concerns about high within-firm pay disparity rather than just about the levels of CEO or worker pay.

3.2.2. Abnormal returns before and around pay ratio disclosure

While the pay ratio disclosure constitutes a well-defined event for each firm, it is possible that the newly disclosed pay information is correlated with other firm characteristics that are associated with abnormal returns.

In Table 6, we therefore perform the regression analysis at the daily frequency and include all daily abnormal returns for a given firm in 2018 until the end of the event window. We interact all the explanatory variables in the baseline specification with an event indicator, which is one for the event window [-1, +5] and zero otherwise. In addition, all specifications include a lagged dependent variable to account for serial correlation in daily returns. This specification allows us to separately measure the relation between pay ratio and abnormal returns before the event window and during the event window. In Columns (1) and (2) of Table 6, we examine the interaction terms for the continuous variable *LN Pay Ratio* and the *High Pay Ratio* indicator before and during the event window [-1, +5]. The results suggest that there is no significant relation between pay ratio and abnormal returns before the event window. In contrast, coefficient estimates for pay ratio variables during the event window are statistically significant. Once multiplied by seven to account for the different frequency of the dependent variable, the point estimates suggest similar effect sizes as our baseline results in Table 4. These findings are consistent with the announcement returns indeed reflecting the market's response to the newly disclosed pay information as opposed to reflecting other pre-existing firm characteristics.

In Columns (3) and (4) of Table 6, we repeat the analysis, but extend the event window to include 25 trading days after the initial pay ratio disclosure. The extended event window allows us to account for

delayed market responses possibly due to investor inattention as might be the case for smaller firms. In Column (3) of Table 6, the coefficient estimate on the interaction term of *LN Pay Ratio* and *Event Time[-1,5]* is -2.0 but the statistical significance falls just short of the 10% level (*p*-value = 10.9%). However, in Column (4), the coefficient estimate on the interaction term of *High Pay Ratio* and *Event Time[-1,25]* is -7.5 and statistically significant. This suggests that the cumulative abnormal return during the 27 event days is -202.5bp (=-7.5*27), stronger than the reaction during the first 7 event days (84bp=-12*7). Thus, the results suggest that the market may have initially underreacted to high pay ratios.

Results in Table 6 also address possible concerns about the standard errors in our baseline results in Tables 4 and 5 due to overlapping event windows. In our baseline specification, standard errors are double-clustered by announcement date and by (SIC2) industry. Clustering by announcement date accounts for arbitrary correlation of the error terms across firms with the same filing date, while clustering by industry allows for correlation between error terms of all firms within the same industry. However, for firms with different announcement dates but overlapping event windows, our assumption of independent error terms, at least for firms in different industries, might understate the standard errors. By performing the regression analysis at the daily frequency and double-clustering standard errors by industry and by date, any contemporaneous correlation between error terms should be accounted for. Comparison of significance levels between Tables 4 and 5 and Table 6 does not suggest that standard errors in our baseline approach are biased downward.

3.3. Prosocial preferences of shareholders and other stakeholders

Overall, our results suggest that the market responds negatively to the announcement of high CEO-worker pay ratios independently of the levels of CEO pay or worker pay. The negative market reaction could be driven by investors' concerns about negative responses by firms' stakeholders such as employees, customers, and local government, causing negative consequences for the firms' future cash flows. It could also be driven by some investors' reluctance to invest in firms with high pay ratios, leading them to reduce their investment in these firms and thereby increasing those firms' cost of capital.

For both of these mechanisms, the market response to pay ratio should vary with the strength of the prosocial preferences of either shareholders or other stakeholders. For example, the risk of negative customer responses should increase if customers are more inequality averse. Similarly, shareholders with more pronounced prosocial preferences would be more likely to reduce their investment in firms with high pay ratios.

3.3.1 Measuring Prosocial Preferences

While the preferences of shareholders and other stakeholders are not observable, they are likely correlated with the social norms and policies with respect to worker pay and income inequality in the state, in which the firms' shareholders and other stakeholder are located. Prior research finds that decisions by individuals as well as firms reflect shared beliefs and values of local residents (see, e.g., Hilary and Hui (2009), McGuire et al. (2012), Deng et al. (2013), Di Giuli and Kostovetsky (2014), Shu et al. (2012), Hayes et al. (2019)).

We measure the prevalence of prosocial preferences in a state based on attitudes and existing state policies regarding the minimum wage, the progressiveness in state income taxes, as well as the political views of local residents. Specifically, we consider four state-level variables (see Appendix Table D4 for details): i) the fraction of residents in a given state that favors increasing the minimum wage to USD 15 per hour, based on a 2016 survey performed by *The Atlantic*; ii) a state's minimum wage per hour in 2017; iii) the difference between a state's maximum and minimum personal income tax rates as of 2017;[10] and iv) the support of the Democratic candidate in the 2016 presidential election, measured as the fraction of voters that voted for Hillary Clinton in a given state. While the local minimum wage provides an important floor for wages, views about the adequate level of the minimum wage as well as state income taxes and voting behavior in presidential elections broadly characterize local attitudes towards fair compensation and inequality.[11] These four variables are positively correlated with each other, with

[10] For the states with no income tax, the value of this proxy is set to zero.

[11] For recent studies that have documented a relation between political views and prosocial preferences, see, e.g., Hong and Kostovetsky (2012) and Di Giuli and Kostovetsky (2014).

correlation coefficients ranging from 0.14 to 0.64. Thus, we construct *Local Prosocial Culture* as the first principal component of the four variables.

To measure the exposure of a firm's cash flow to possible adverse reactions by employees, customers, or local governments, we construct a proxy of these stakeholders' prosocial preferences as the weighted average local prosocial culture in areas where the firm operates. To gauge the geographic distribution of a firm's operations, we use data from *Infogroup* as our main source. *Infogroup* compiles geographic location-related business data from various sources such as telephone white page directories, utility new connects, real estate property data, credit card billing statements, and public records. We first aggregate information on the number of branches, sales, and the number of employees in 2017 to the firm-state level and then calculate the fraction of a firm's branches, sales, and employees in a given state. Given the significant correlation between these three fractions (based on branches, sales, and employees), we employ their first principal component as the weight when calculating the weighted average of *Local Prosocial Culture* across all states a firm operates in. We call this operations-weighted average local prosocial norms *Exposure to CF Risk*. [12]

Similarly, we construct a proxy for a firm's shareholders' prosocial preferences, *Prosocial Pref. of Investors*, as the weighted average of prosocial norms in the headquarters states of a firm's U.S. shareholders. We distinguish between a firm's individual and institutional shareholders. We use Thomson Reuter's Institutional (13F) Holdings and Global Ownership databases to get headquarters location information for a firm's institutional investors and to assign our proxy for local norms, *Local Prosocial Culture*, to each institutional investor. Our assumption that the investment decisions of institutional investors reflect local norms, however, seems unlikely to hold for large national institutional investors such as Vanguard and BlackRock, whose clients and operations likely spread across many states. We thus exclude the eleven largest institutional investors with equity holdings exceeding USD 250 billion at the

[12] The first principal component has an eigenvalue of 2.10 and the second has an eigenvalue of 0.70.

end of 2017.[13] For individual investors, the literature on local biases of individual investors (see, e.g., Edmans, Garcia, and Norli (2007) and Chang, Chen, Chou, and Lin (2012)) suggests that they are likely local. We thus use the social norms and policies in the firm's headquarters state to proxy for the prosocial preferences of a firm's retail investors. Finally, we use investors' stock ownership at the end of year 2017 as weights to calculate the weighted average *Local Prosocial Culture* for a firm, leading to the variable *Prosocial Pref. of Investors*.[14]

For ease of interpretation, we standardize both *Exposure to CF Risk* and *Prosocial Pref. of Investors* to have a mean of zero and standard deviation of one within our sample.

3.3.2. Results

In Table 7, we test our hypotheses that the negative market reaction to high pay ratio at least in part reflects inequality concerns of shareholders, whose reluctance to invest in firms with high pay ratio could increase the cost of capital, or of other stakeholders, whose reaction could affect a firm's future cash flows. If either or both of these mechanisms are at work, we expect the market reaction to disclosed pay ratios to be stronger when firms' exposures to cash flow risk or shareholders' prosocial preferences are stronger. We therefore augment our return regression with interaction terms of *LN Pay Ratio* with *Exposure to CF Risk* and with *Prosocial Pref. of Investors*.

In Table 7, Panel A, Column (1), the interaction term of *LN Pay Ratio* and *Exposure to CF Risk* is negative but statistically insignificant. In Column (2), the interaction term of *LN Pay Ratio* and *Prosocial Pref. of Investors* is negative and strongly significant, suggesting a more negative market reaction to high pay ratio for firms with more prosocial shareholders.

Since *Exposure to CF Risk* and *Prosocial Pref. of Investors* have a significantly positive correlation of 0.58, we include both interactions terms in Column (3). This allows us to differentiate the

[13] We exclude the following institutional investors: Bank of America Merrill Lynch (US), BlackRock Institutional Trust Company, Capital Research Global Investors, Capital World Investors, Fidelity Management & Research Company, Geode Capital Management, JP Morgan Asset Management, State Street Global Advisors (US), T. Rowe Price Associates, The Vanguard Group, and Wellington Management Company.

[14] Specifically, we determine the fraction owned by individual investors as the difference between 100% and the fraction owned by all institutional investors, including the largest institutional investors. After dropping the largest institutional investors, we rescale the remaining ownership fractions to add up to 100%.

impact from prosocial preferences of stockholders versus other stakeholders. The interaction effect with *Exposure to CF Risk* changes signs but remains statistically insignificant and economically small, while the interaction effect with *Prosocial Pref. of Investors* is still statistically significant and economically very similar to that in Column (2). A one-standard deviation increase in shareholder prosocial preferences would increase the sensitivity of market reaction to pay ratio disclosure by 68%.

Next, in Column (4), we examine the market reaction to CEO pay and worker pay. The results suggest that shareholders' prosocial preferences significantly strengthen both the negative market reaction to high CEO pay and the positive market reaction to high worker pay, while exposures to cash flow risk due to other stakeholders' prosocial preferences do not significantly affect the market reaction to either of the two pay variables.

While investors likely share the local prosocial preferences in the areas where they reside, it is also possible that it is their expectations, rather than their preferences, that are influenced by local prosocial preferences. That is, investors located in more prosocial states may not necessarily have stronger prosocial preferences but might be more sensitive to cash flow risks arising from prosocial pressures. Such investors may perceive a higher cash flow risk and thus more negatively adjust their expectations for firms disclosing high pay ratios. As an attempt to distinguish between these two interpretations, we conjecture that expectations of an investor, whose beliefs are affected by local prosocial norms, should also vary with the exposure to cash flow risk of the firms she invests in. But an investor's disutility from investing in firms with high pay ratios should not depend on these firms' exposure to cash flow risk based on the locations of their operations. Thus, in Column (5), we examine whether the effect of investors' prosocial preferences varies as a function of firms' exposure to cash flow risk. The preferences interpretation implies an insignificant triple interaction effect, while the expectation interpretation implies a negative one. We find that the triple interaction effect with firms' *Exposure to CF Risk* is economically small and statistically insignificant, while the interaction between *Ln Pay Ratio* and *Prosocial Pref. of Investors* remains negative and significant. This result suggests that investors located in prosocial states "dislike" high pay ratios, regardless of the implications of high pay ratio for firms' cash

flow risk. This result is more consistent with the investor preferences interpretation than with the investor expectation interpretation.

Overall, the results in Panel A of Table 7 are consistent with the market responding negatively to high pay ratio at least partially due to investors' aversion to high within-firm pay dispersion. However and maybe surprisingly, firms' exposures to cash flow risk due to prosocial preferences of other stakeholders do not seem to affect the market reaction to pay ratio.

In Panel B of Table 7, we report results from several robustness tests. First, a potential bias against finding evidence for the effect of *Exposure to CF Risk* is that our sample includes large firms with geographically dispersed operations, such as Walmart and McDonald's. Including them decreases the cross-sectional variation in our geography-based proxy of other stakeholders' prosocial preferences. Thus, in the first robustness test of Panel B of Table 7, we exclude the largest firms, that is, firms with book assets in the top quartile of the sample distribution. In Column (1), we now indeed find a significant interaction effect between pay ratio and firms' exposures to cash flow risk. However, when controlling for shareholders' prosocial preferences in Column (2), the interaction effect with *Exposure to CF Risk* becomes statistically insignificant and economically small, while the negative interaction effect with *Prosocial Pref. of Investors* is large in absolute terms and statistically significant.

Next, we explore the possibility that a firm's most important stakeholders might be close to the firm's headquarters, as for example, in the case of the local government or labor unions. We thus construct a proxy for firms' exposures to cash flow risk by assigning 100% weight to their headquarters states and call it *Prosocial Pref. of HQ State*. In Column (3), we indeed again observe a significant interaction effect between pay ratio and this proxy for exposure to cash flow risk. However, the effect weakens and becomes insignificant in Column (4), once the interaction effect with shareholder prosocial preferences is controlled for. These results suggest that while local prosocial preferences of the headquarters state matter, they seem to matter mainly through the shareholder preferences channel instead of the cash flow risk channel.

Appendix Table D5 reports additional robustness tests. In Panel A, we show that our conclusions from Table 7 do not change when we employ alternative data sources to identify the geography of firms' operations. In Panel B, we use each of the four state-level proxies for prosocial preferences separately instead of their first principal component in the construction of shareholders' and other stakeholders' prosocial preferences. The results are similar to those in Table 7.

In summary, our results in Table 7 suggest that the prosocial preferences of a firm's shareholders affect the market reaction to the pay ratio disclosure, while a firm's exposure to cash flow risk due to prosocial preferences of other stakeholders, such as employees, customers, and local governments, does not appear to independently moderate the market response. Thus, the decline in the equity value of high-pay-ratio firms is unlikely due to investors' concern about negative cash flow consequences associated with high pay ratio, but more likely due to prosocial investors disinvesting from those firms and driving up their cost of capital.

3.4. Summary of the market reaction analysis

We find that equity markets react negatively to high pay ratios. While we find evidence of a positive response to high worker pay, controlling for pay levels does not explain the negative market reaction to within-firm pay dispersion. Our results, therefore, do not support the hypothesis that investors learn nothing new from the pay ratio disclosure or do not care about it. Our results are also inconsistent with the hypothesis that a high pay ratio reveals positive information about firm profitability or the view that markets care about worker pay only as a signal about worker productivity. Instead, our results support the hypothesis that markets view pay dispersion negatively and that investors discount firms with large within-firm pay dispersion. The finding that investors' prosocial preferences moderate the market response provides further support for the hypothesis that the negative market response to high pay ratio reflects investors' dislike of high pay dispersion.

4. Evidence from institutional investors' portfolio rebalancing

While the equity market's response to the pay ratio disclosure reflects the aggregate assessment of the market, the cross-sectional analysis in Section 3.3 suggests that different investors react differently to the newly disclosed pay ratio information as a function of their prosocial preferences. If so, the portfolio rebalancing in response to the 2018 pay ratio disclosure may also differ across investors with different preferences with respect to pay disparity. In this section, we therefore examine whether investors' portfolio allocation changes in response to the pay ratio disclosure are indeed related to their prosocial preferences.

We focus on U.S. institutional investors with at least USD 100 million in assets under management, whose equity holdings are observable due to their quarterly 13F filings. We obtain equity holdings as of the end of 2018 and 2017 for 1,862 institutional investors from Thomson Reuter's Institutional (13F) Holdings database. About 81.6% of these institutional investors are independent investment advisors, 7.7% are banks and insurance companies, with the remaining 10.7% split among investment companies, public and corporate pension funds, university and foundation endowments and non-defined categories. [15]

To measure institutional investors' prosocial preferences, we follow the same approach as in Section 3.3. and use social norms and policies with respect to worker pay and income inequality in investors' headquarters states as proxies. We interpret these preferences as the preferences of portfolio managers and financial advisors, but also as the preferences of their clients. We exclude the eleven largest institutional investors with equity assets under management of more than USD 250 billion at the end of 2017. The headquarters states for these investors are likely less informative for the location of their employees and in particular their clients (see footnote 13 for the list of the excluded institutional investors). For the ease of interpretation, *Prosocial Pref. of Inst. Investor* is standardized to have a mean of zero and a standard deviation of one within the institutional investor sample.

[15] We obtain investor types from Brian Bushee's website: http://acct.wharton.upenn.edu/faculty/bushee/IIclass.html

To quantify an investor's reaction to the pay ratio disclosure, we investigate the investor's portfolio rebalancing activity between December 31, 2017 (before the disclosure) and December 31, 2018 (after the disclosure). Specifically, for each institutional investor in our sample we compute the change in the portfolio weights in constant prices between December 31, 2018 and December 31, 2017:

$$\Delta\, Stock\ Weight_{ij} = Stock\ Weight_{ij}^{18} - Stock\ Weight_{ij}^{17} = \frac{m_{ij}^{18} p_j^{17}}{\sum m_{ij}^{18} p_j^{17}} - \frac{m_{ij}^{17} p_j^{17}}{\sum m_{ij}^{17} p_j^{17}}, \quad (2)$$

where $m_{ij}^{18}(m_{ij}^{17})$ is the number of stock *j* shares in the portfolio of institutional investor *i* on December 31, 2018 (2017). We use the end-of-2017 stock prices, p_j^{17} to compute the dollar value of portfolio holdings in both 2017 and 2018 so that changes in portfolio weights reflect active rebalancing decisions rather than simply changes in stock prices. The sample average for *Δ Stock Weight* $_{2018}$ is -0.034%, and the standard deviation is 0.333%. The sample average portfolio weight change is negative because we focus on stocks that are already in an investor's portfolio at the end of 2017, the pay ratio disclosure of which likely attracts more attention from the investor. Stocks that are added to the investor's portfolio during 2018 are excluded. In Appendix Table D6 we include stocks added during 2018 in the analysis. The sample average portfolio weight change becomes 0.008%.

We then estimate the following regression:

$$\Delta\, Stock\ Weight_{ij} = a + b' Pay_j \times Prosocial\ Pref.\ of\ Inst. Investor_i + \eta_i + \delta_j + \epsilon_{ij}, \quad (3)$$

where *Pay* represents the newly disclosed *LN Pay Ratio* or its components. For investor *i*, stock *j* is a stock that is in its portfolio as of December 31, 2017 and discloses pay ratio information in 2018. We include the institutional investor fixed effects η_i to control for any investor characteristics that may be correlated with its prosocial preferences. We also include the stock fixed effects δ_j to control for any firm characteristics that may be correlated with the firm's pay practices. The coefficient *b* estimates the difference in the portfolio weight change with respect to a given stock's level of pay (dispersion) between investors with stronger and weaker prosocial preferences. For the ease of interpretation, we scale *Δ Stock Weight* by the absolute value of the sample mean (0.034%) so that the coefficient estimate indicates the

effect as a percentage change relative to the sample mean. Finally, we double-cluster standard errors by investor and by stock.

The results are reported in Table 8, Panel A. In Column (1), we find that the interaction term of *LN Pay Ratio* and *Prosocial Pref. of Inst. Investor* is negative and statistically significant, suggesting that for the same high pay ratio stock institutional investors with stronger prosocial preferences rebalance away from it relative to those with weaker prosocial preferences in 2018. For a firm with the average value of *LN Pay Ratio* (4.18), a one-standard-deviation increase in *Prosocial Pref. of Inst. Investor* is associated with a reduction of the (rescaled) portfolio weight by 28.4 (=6.8*4.18) percentage points. In Column (2), we examine CEO pay and worker pay separately. The results suggest that relative to other institutional investors, more prosocial investors have a larger reduction in the allocations to stocks with higher CEO pay and a larger increase in stocks with higher worker pay in 2018.

Our geography-based proxy for the prosocial preferences of institutional investors should work better for institutional investors whose client base is more local. Therefore, in the rest of Panel A, we consider two subsamples of institutional investors, for which we expect a tighter link between our preferences proxy and the preferences of institutional investors' clients. In Columns (3) and (4), we include only institutional investors that are independent investment advisors, which are more likely to have a local clientele. In Columns (5) and (6), we focus on small independent investment advisors by including only independent investment advisors with less than USD 1 billion of equity holdings. For small independent investment advisors, the local prosocial culture should play a larger role in investment decisions because their clients are more likely to be located within the same state rather than in other states. Indeed, in Columns (3) to (6) the subsample results are all stronger than those in Columns (1) and (2). For small independent investment advisors, the interaction effect between investor prosocial preferences and stock's pay ratio is almost 2.5 larger than that for all institutional investors (Column (5) vs. (1)).

In Panel B, we conduct a placebo test, using the portfolio weight changes from December 31, 2016 to December 31, 2017 as the dependent variable. The interaction effects of firm pay practices and

institutional investor prosocial preferences become economically smaller and statistically insignificant. This suggests that there is no differential rebalancing pattern between prosocial investors and other investors with respect to portfolio firms' pay ratios before the pay ratio disclosure. Thus, the rebalancing decisions are unlikely driven by investors' prosocial preferences for other stock characteristics that are correlated with pay ratio but are already known before the pay ratio disclosure in 2018.

In Appendix Table D6 we repeat the analysis in Table 8 but include stocks added to investors' portfolios during 2018. In Appendix Table D7, we report separate results for the four state-level proxies for *Prosocial Pref. of Inst. Investor*. In both cases, the results are similar to those reported in Table 8.

Overall, the cross-sectional rebalancing evidence in response to the 2018 pay ratio disclosure is consistent with the cross-sectional variation in announcement returns as a function of the prosocial preferences of firms' investors.

5. Conclusion

In this study, we take advantage of a new disclosure rule, which is part of the Dodd-Frank Wall Street Reform and Consumer Protection Act and requires public firms in the U.S. to report the ratio of CEO pay to median worker pay from 2018 onwards. This new disclosure rule allows us to examine how equity markets view within-firm pay dispersion of U.S. public firms.

Using firms' filing data, we show that the disclosure of pay ratio attracts significant media attention and market reaction. Firms with high pay ratios tend to receive more media attention and a more negative market reaction around the disclosure. Shareholders' prosocial preferences seem to be an important driver of the negative reaction to high pay ratio, as firms whose shareholders have stronger prosocial preferences experience significantly more negative market reactions to high pay ratio. Interestingly and maybe a bit surprisingly, the prosocial preferences of other stakeholders (e.g., employees, customers, and local government), which might adversely affect high pay ratio firms' future cash flows, do not seem to drive the negative market reaction. Consistent with the cross-sectional variation in the initial market reaction, we find that institutional investors with stronger prosocial

preferences reduce their allocations to stocks with higher pay ratios and higher CEO pay, but increase their allocations to stocks with higher median worker pay, relative to less prosocial investors.

During the lengthy and controversial rule-making process, some suggested that the disclosure of pay ratio would be largely irrelevant to investors, while administratively costly for firms. However, and importantly for other countries, such as the United Kingdom, that plan or consider similar disclosure requirements, our study suggests that equity markets do care about the newly disclosed information. High within-firm pay dispersion is viewed unfavorably by the market, with shareholders' prosocial preferences playing a role in the market response.

Apart from a significant market reaction, some companies have experienced other real consequences. For example, in response to wide criticism, Amazon decided to raise the minimum wage for its employees to USD 15 an hour. Time will tell whether more firms will adjust their compensation practices in response to the pay ratio disclosure. Mas (2016) documents that mandated disclosure of top management pay in the 1930s spurred public aversion to extremely high executive pay but did not meaningfully curb managerial pay. However, differently from the 1930s, institutional investors have become increasingly active in shaping firms' ESG policies and practices in recent years (e.g., Chen, Hui, and Lin (2019), Dyck, Lins, Roth, and Wagner (2019), Gantchev, Giannetti, and Li (2019)). Furthermore, evidence from the public sector as well as on the gender pay gap suggests that more recent pay disclosure mandates have indeed led to intended changes in pay practices (see, e.g., Mas (2017) and Bennedsen, Simintzi, Tsoutsoura, and Wolfenzon (2019)).

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Table 1. Summary statistics

This table reports the summary statistics for pay ratio and its components in Panel A, pay ratio by (1-digit SIC) industry in Panel B, and details reported in the pay ratio section of 2018 definitive proxy statements in Panel C. All variables are defined in Appendix C. The last two columns in Panel A report the R-squared when regressing pay variables on (2-digit SIC) industry and (corporate headquarters) state fixed effects.

Panel A. Pay variables

Variable	N	Mean	S.D.	Min	25th pct	50th pct	75th pct	Max	R^2 Ind	R^2 State
Pay Ratio	2,283	144	298	0	29	66	143	5,908	0.21	0.02
CEO Pay (in thousands USD)	2,283	6,322	7,558	0	2,020	4,271	8,108	113,712	0.07	0.02
Worker Pay (in thousands USD)	2,283	79.08	64.63	1.88	42.19	61.76	96.61	964.01	0.31	0.10
LN Pay Ratio	2,283	4.18	1.25	0.00	3.40	4.20	4.97	8.68	0.21	0.05
LN CEO Pay	2,283	15.09	1.55	0.00	14.52	15.27	15.91	18.55	0.06	0.03
LN Worker Pay	2,283	11.01	0.78	7.54	10.65	11.03	11.48	13.78	0.42	0.09

Panel B. Pay ratio by industry

SIC1-Industry		Pay Ratio		CEO Pay		Worker Pay	
	N	Median	Mean	Median	Mean	Median	Mean
Finance, Insurance, Real Estate	580	42	74	3,255	5,318	62.55	83.65
Agriculture, Forestry, Fishing	4	50	399	2,134	3,523	38.07	32.38
Mining	98	51	67	5,063	6,865	114.80	113.58
Construction	37	55	75	4,407	5,320	75.55	74.36
Transportation & Public Utilities	188	65	103	4,695	7,440	81.67	89.45
Services	351	74	186	4,490	7,665	63.94	73.99
Manufacturing	808	75	144	4,579	6,327	61.45	83.90
Wholesale Trade	69	86	126	4,147	4,633	52.64	53.08
Retail Trade	148	252	435	4,591	6,389	19.38	25.47

Panel C. Disclosure details

Variable	N	Mean	Median	S.D.
Several PR	2,283	0.11	0.00	0.31
Mentioned Non-US	2,283	0.52	1.00	0.50
Fraction Non-US	2,283	0.10	0.00	0.22
De Minimis	2,283	0.24	0.00	0.43
Part-Time Worker	2,283	0.03	0.00	0.17
Cost-of-Living Adj	2,283	0.01	0.00	0.08

Table 2. Determinants of pay ratio

Panel A of this table provides summary statistics of firm characteristics that are potentially related to pay ratio. Variables labeled as "_lg" are measured as of the previous (fiscal) year, while other variables are measured as of the same fiscal year for reported pay ratios. Panel B reports the relation between pay variables and various firm characteristics, including those disclosed in the pay ratio section. Industry FE and state FE represent fixed effects based on firms' (2-digit SIC) industry and headquarters state. Standard errors are clustered at the industry level. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix C.

Panel A. Summary statistics of firm characteristics

Variables	N	Mean	Median	S.D.
ln(Total Assets)_lg	2,152	7.71	7.65	1.86
ln(MktCap)	2,154	7.66	7.61	1.77
ln(Total Assets/Emp)_lg	2,130	1.00	0.55	1.06
RD_lg	2,129	0.19	0.00	0.91
RD miss_lg	2,155	0.48	0.00	0.50
ROA_lg	2,018	6.12	9.20	46.52
RET_lg	2,114	0.24	0.17	0.70
ROA	2,020	6.27	9.64	35.29
RET	2,142	0.19	0.11	0.68
Leverage_lg	2,043	37.77	38.87	25.40
Book-to-Market_lg	2,051	0.54	0.44	0.51

Panel B. Determinants of pay variables

	LN Pay Ratio		LN CEO Pay		LN Worker Pay	
	(1)	(2)	(3)	(4)	(5)	(6)
Several PR	0.812***	0.610***	0.705***	0.586***	-0.204***	-0.126**
	(0.110)	(0.109)	(0.077)	(0.093)	(0.074)	(0.056)
Fraction Non-US	0.903***	0.475***	0.246	-0.025	-0.709***	-0.573***
	(0.171)	(0.107)	(0.185)	(0.141)	(0.127)	(0.073)
Part-Time Worker	1.900***	0.871***	0.240**	0.251	-1.745***	-0.695***
	(0.139)	(0.137)	(0.113)	(0.178)	(0.108)	(0.150)
De Minimis	0.597***	-0.023	0.588***	0.077	-0.049	0.094***
	(0.068)	(0.055)	(0.097)	(0.060)	(0.057)	(0.030)
Cost-of-Living Adj	0.771***	0.407**	0.229	0.032	-0.494**	-0.368*
	(0.207)	(0.197)	(0.187)	(0.127)	(0.232)	(0.217)
ln(Total Assets)_lg		0.403***		0.390***		0.005
		(0.024)		(0.052)		(0.015)
ln(Total Assets/Emp)_lg		-0.433***		-0.152		0.355***
		(0.052)		(0.121)		(0.052)
RD_lg		0.000		0.000		-0.000
		(0.000)		(0.000)		(0.000)
RD (miss)_lg		0.078		0.095		-0.124
		(0.103)		(0.097)		(0.090)
ROA_lg		0.003**		0.007		-0.005***
		(0.001)		(0.007)		(0.001)
RET_lg		-0.024		-0.143		0.012
		(0.040)		(0.141)		(0.015)
ROA		0.002		-0.004		-0.002***
		(0.003)		(0.006)		(0.000)
RET		0.077*		0.148***		0.050***
		(0.040)		(0.051)		(0.016)
Leverage_lg		0.000		0.002		-0.001
		(0.001)		(0.002)		(0.001)
Book-to-Market_lg		-0.122		-0.391*		-0.178***
		(0.080)		(0.208)		(0.044)
Ind FE and State FE		x		x		x
Observations	2,283	1,850	2,283	1,850	2,283	1,850
Adjusted R-squared	0.215	0.599	0.052	0.268	0.214	0.604

Table 3. Media attention to pay ratio disclosure

This table reports the relation between cumulative news volume during the event window [-1, 5] around the 2018 proxy filing dates and reported pay variables, controlling for cumulative news volume around the same firm's 2017 proxy filing dates. In Columns (1) and (2), the dependent variable is an indicator variable that equals one if a firm is mentioned the "Compensation and Benefits" SASB news category during a 7-day event window. In Columns (3) and (4), the dependent variable is similarly defined, during a 27-day event window. Standard errors are clustered by (SIC2) industry. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix C.

	Pay and Benefits News [-1, 5] $_{2018}$		Pay and Benefits News [-1, 25] $_{2018}$	
	(1)	(2)	(3)	(4)
LN Pay Ratio	0.021***		0.036***	
	(0.005)		(0.006)	
LN CEO Pay		0.012***		0.022***
		(0.004)		(0.006)
LN Worker Pay		-0.011*		-0.021***
		(0.006)		(0.007)
Pay and Benefits News [-1, 5] $_{2017}$	0.179**	0.185**		
	(0.076)	(0.076)		
Total News [-1, 5] $_{2017}$	0.007***	0.007***		
	(0.002)	(0.002)		
Pay and Benefits News [-1, 25] $_{2017}$			0.245***	0.254***
			(0.049)	(0.050)
Total News [-1, 25] $_{2017}$			0.003***	0.003***
			(0.001)	(0.001)
Observations	2,057	2,057	2,057	2,057
Adjusted R-squared	0.160	0.153	0.209	0.200

Table 4. Equity market reaction to pay ratio disclosure

This table reports the relation between cumulative abnormal returns during the event window [-1, 5] around the 2018 proxy filing dates and reported pay variables. CAR[-1, 5] measures 7-day cumulative abnormal returns. Standard errors are double-clustered by announcement date and by (SIC2) industry. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix C.

	CAR [-1, 5]					
	(1)	(2)	(3)	(4)	(5)	(6)
LN Pay Ratio	-35.3***	-37.7***	-27.2***			
	(9.4)	(10.5)	(9.4)			
LN CEO Pay				-16.5	-17.5	-12.9
				(11.7)	(11.4)	(11.4)
LN Worker Pay				39.5***	39.8***	35.2***
				(13.5)	(14.5)	(12.4)
Book-to-Market	-7.3	-8.0	-15.9	-10.1	-11.2	-13.3
	(31.9)	(31.6)	(32.2)	(32.7)	(32.7)	(33.7)
ln(MktCap)	8.6	8.4		0.6	0.2	
	(7.1)	(7.5)		(6.7)	(7.2)	
ln(Total Assets)			-4.1			-9.7
			(7.6)			(8.3)
Several PR		29.6	4.9		20.4	0.1
		(19.3)	(19.8)		(19.6)	(19.3)
Fraction Non-US		-31.5	-48.1		-33.0	-41.4
		(74.4)	(75.2)		(70.6)	(73.7)
Part-Time Worker		26.1	19.7		25.6	22.5
		(41.2)	(61.8)		(38.2)	(61.2)
De Minimis		27.3	41.0		24.1	39.5
		(28.8)	(28.2)		(28.8)	(28.0)
Cost-of-living Adj		-177.3*	-180.6*		-174.5	-177.0*
		(104.9)	(100.9)		(106.1)	(101.7)
Ind FE			x			x
Observations	1,889	1,889	1,889	1,889	1,889	1,889
Adjusted R-squared	0.007	0.007	0.027	0.006	0.006	0.028

Table 5. Pay disparity versus pay levels

This table reports the relation between cumulative abnormal returns during the event window [1, 5] around the 2018 proxy filing dates and top (high) or bottom (low) terciles of reported pay variables. CAR[-1, 5] measures 7-day cumulative abnormal returns. Standard errors are double-clustered by announcement date and by (SIC2) industry. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix C.

	CAR [-1, 5]				
	(1)	(2)	(3)	(4)	(5)
High Pay Ratio	-97.4***	-93.3***		-84.6**	-67.7**
	(26.7)	(23.3)		(42.0)	(33.9)
Medium Pay Ratio	-6.2			-17.4	
	(16.5)			(15.1)	
Low CEO Pay			-32.0	-53.1	-43.9
			(27.2)	(34.8)	(28.3)
High CEO Pay			-78.2***	-43.7	-45.7
			(27.8)	(34.6)	(35.0)
Low Worker Pay			-7.7	12.7	10.2
			(27.1)	(23.6)	(24.8)
High Worker Pay			64.9***	47.2**	51.5**
			(19.5)	(23.4)	(21.7)
ln(MktCap)	8.4	7.8	2.0	5.3	4.5
	(8.0)	(7.8)	(7.4)	(7.4)	(7.4)
Book-to-Market	-4.9	-5.1	-5.7	-4.2	-4.7
	(30.7)	(30.8)	(29.7)	(29.4)	(29.4)
Observations	1,889	1,889	1,889	1,889	1,889
Adjusted R-squared	0.007	0.008	0.009	0.011	0.011

Table 6. Pay ratio and daily abnormal returns before and during the event window

This table reports the relation between daily abnormal returns and pay ratio before and during the event window. We include all daily abnormal returns for a given firm in 2018 until the end of the event window. In Column (1), we interact *LN Pay Ratio* with an event indicator, *Event Time[-1, 5]* which is one for the event window [-1, +5] and zero otherwise. In Column (2), we interact an indicator for a firm's pay ratio being in the top tercile, *High Pay Ratio* with *Event Time[-1, 5]*. In Columns (3) and (4), we repeat the same exercises but replace the event indicator, which is now one for the event window [-1, +25] and zero otherwise. In all specifications controls include a lagged dependent variable, ln(*MktCap*) and *Book-to-Market*, as well as their interaction terms with *Event Time[-1,5] (Event Time[-1,25])*. The coefficient estimates for control variables are omitted for brevity. Standard errors are double-clustered by day and by (SIC2) industry. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix C.

	Daily Abnormal Return			
	(1)	(2)	(3)	(4)
LN Pay Ratio	-0.4		-0.4	
	(0.9)		(0.9)	
High Pay Ratio		-1.3		-1.3
		(2.1)		(2.1)
LN Pay Ratio x Event Time[-1,5]	-4.6**			
	(1.8)			
LN Pay Ratio x Event Time[-1,25]			-2.0	
			(1.2)	
High Pay Ratio x Event Time[-1,5]		-12.0***		
		(4.1)		
High Pay Ratio x Event Time[-1,25]				-7.5**
				(2.9)
Controls	x	x	x	x
Observations	145,835	145,835	180,863	180,863
Adjusted R-squared	0.003	0.003	0.002	0.002

Table 7. Cross-sectional variation in equity market reaction to ray ratio

This table presents the heterogeneous market reaction to pay ratio disclosure across firms with different *Exposure to CF Risk* and different *Prosocial Pref. of Investors*. Panel A reports the main results and Panel B presents various robustness checks. In particular, in Columns (1) and (2) in Panel B, we repeat the same exercise as in Columns (1) and (3) in Panel A, but exclude firms with total assets in the top quartile of the distribution (exceeding USD 8.27 billion). In Columns (3) and (4) in Panel B, we study the effect of *Prosocial Pref. of HQ State* (the prosocial norms in a firm's headquarters state) instead of *Exposure to CF Risk*. Exposure to CF Risk and the two Prosocial Pref. variables are standardized to have a mean of zero and standard deviation of one. Controls include ln(*MktCap*) and *Book-to-Market* and their coefficient estimates are omitted for brevity. Standard errors are double-clustered by announcement date and by (SIC2) industry. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix C.

Panel A. Exposure to cash flow risk versus prosocial preferences of investors

	CAR[-1,5]				
	(1)	(2)	(3)	(4)	(5)
LN Pay Ratio	-35.7***	-34.5***	-34.1***		-33.9***
	(8.9)	(9.1)	(8.8)		(9.8)
LN Pay Ratio x Exposure to CF Risk	-10.0		4.9		-5.7
	(6.4)		(6.4)		(8.1)
LN Pay Ratio x Prosocial Pref. of Investors		-20.4***	-23.2***		-12.8*
		(7.9)	(8.0)		(7.3)
LN CEO Pay				-8.2	
				(10.3)	
LN Worker Pay				40.1***	
				(13.5)	
LN CEO Pay x Exposure to CF Risk				-4.4	
				(7.9)	
LN Worker Pay x Exposure to CF Risk				1.0	
				(12.8)	
LN CEO Pay x Prosocial Pref. of Investors				-15.5**	
				(6.9)	
LN Worker Pay x Prosocial Pref. of Investors				27.2*	
				(16.4)	
LN Pay Ratio x Exposure to CF Risk x Prosocial Pref. of Investors					0.0
					(10.4)
Exposure to CF Risk x Prosocial Pref. of Investors					9.9
					(40.3)
Exposure to CF Risk	39.2		-17.6	58.0	20.5
	(28.7)		(36.2)	(200.7)	(36.2)
Prosocial Pref. of Investors		70.2**	80.2**	-85.6	50.3
		(30.3)	(34.8)	(217.3)	(31.0)
Controls	x	x	x	x	x
Observations	1,889	1,889	1,889	1,889	1,889
Adjusted R-squared	0.007	0.010	0.009	0.011	0.007

Panel B. Robustness checks

	CAR[-1,5]			
	Excl. Large Firms			
	(1)	(2)	(3)	(4)
LN Pay Ratio	-29.9***	-28.3***	-34.7***	-33.5***
	(10.9)	(10.7)	(9.0)	(9.1)
LN Pay Ratio x Exposure to CF Risk	-18.7**	-0.6		
	(7.7)	(6.5)		
Exposure to CF Risk	67.7*	2.2		
	(35.1)	(35.7)		
LN Pay Ratio x Prosocial Pref. of Investors		-31.0***		-18.1*
		(8.8)		(10.2)
Prosocial Pref. of Investors		100.6***		52.3
		(33.7)		(53.1)
LN Pay Ratio x Prosocial Pref. of HQ State			-16.3**	-3.9
			(8.2)	(12.6)
Prosocial Pref. of HQ State			67.1*	28.3
			(38.4)	(72.8)
Controls	x	x	x	x
Observations	1,416	1,416	1,889	1,889
Adjusted R-squared	0.006	0.010	0.008	0.010

Table 8. Institutional investors portfolio rebalancing and pay ratio

This table reports the relation between the portfolio rebalancing behavior of institutional investors and their prosocial preferences and firm pay ratios. In Panel A, the dependent variable *Δ Stock Weight* $_{2018}$ equals the difference between a stock weight in an institution's portfolio on December 31, 2018 and its weight on December 31, 2017, where both weights are in constant prices as of December 31, 2017. In Panel B, the dependent variable *Δ Stock Weight* $_{2017}$ is defined in a similar manner but for year 2017. In both Panels, in Columns (1) and (2), the sample includes all institutional investors, except those with equity holdings above USD 250 billion as of December 31, 2017. In Columns (3) and (4) we restrict the sample to independent investment advisors only and in Columns (5) and (6), we consider small independent investment advisors, with equity holdings below USD 1 billion. Standard errors are double-clustered by investor and stock. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix C.

Panel A. Rebalancing patterns in 2018

	Δ Stock Weight $_{2018}$					
	All Inst. Investors		Independent Investment Advisors		Small Independent Investment Advisors	
	(1)	(2)	(3)	(4)	(5)	(6)
LN Pay Ratio x Prosocial Pref. of Inst. Investor	-0.068***		-0.106***		-0.169***	
	(0.020)		(0.026)		(0.050)	
LN CEO Pay x Prosocial Pref. of Inst. Investor		-0.037***		-0.056***		-0.067**
		(0.014)		(0.017)		(0.032)
LN Worker Pay x Prosocial Pref. of Inst. Investor		0.064***		0.081**		0.120*
		(0.024)		(0.034)		(0.063)
Inst FE, Stock FE	x	x	x	x	x	x
Observations	368,780	368,780	263,846	263,846	117,439	117,439
Adjusted R-squared	0.096	0.096	0.093	0.093	0.108	0.107

Panel B. Rebalancing patterns in 2017

	Δ Stock Weight $_{2017}$					
	All Inst. Investors		Independent Investment Advisors		Small Independent Investment Advisors	
	(1)	(2)	(3)	(4)	(5)	(6)
LN Pay Ratio x Prosocial Pref. of Inst. Investor	-0.021		-0.025		-0.028	
	(0.016)		(0.021)		(0.040)	
LN CEO Pay x Prosocial Pref. of Inst. Investor		-0.011		-0.014		-0.020
		(0.010)		(0.013)		(0.017)
LN Worker Pay x Prosocial Pref. of Inst. Investor		0.015		0.006		0.012
		(0.025)		(0.034)		(0.069)
Inst FE, Stock FE	x	x	x	x	x	x
Observations	320,160	320,160	235,696	235,696	107,863	107,863
Adjusted R-squared	0.122	0.122	0.122	0.122	0.143	0.143

Figure 1. Pay ratio by industry

This figure plots the median and average pay ratio by (1-digit SIC) industry, which is also reported in Table 1, Panel B.

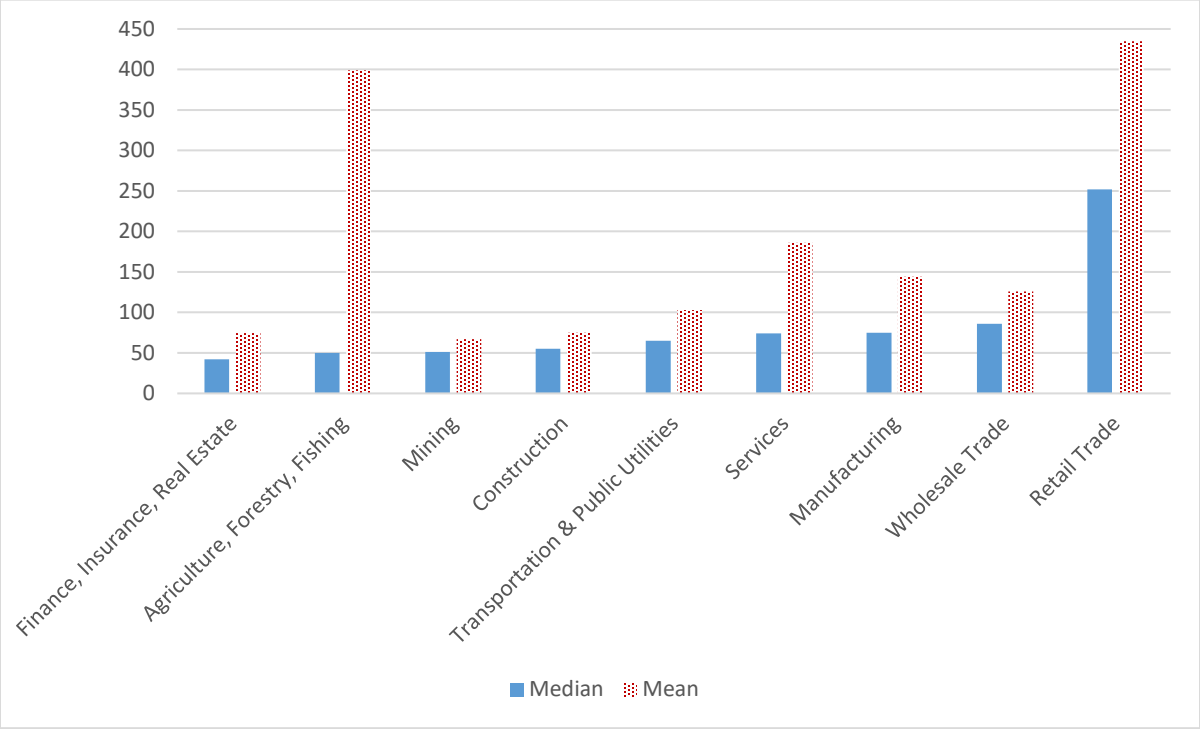


Figure 2. Pay ratio by state

This figure plots the median pay ratio by firms' headquarters state. The darker the green color, the higher the median pay ratio in a state. The color shades are based on quintiles of the pay ratio distribution.

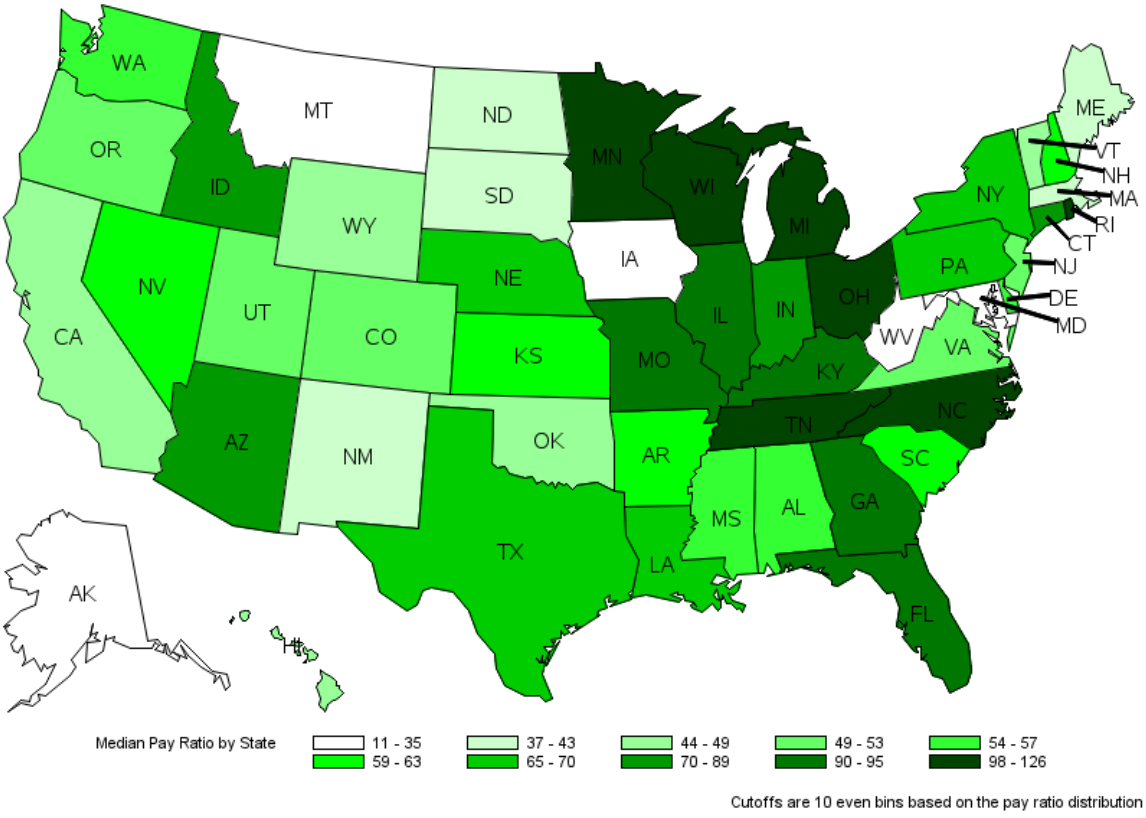
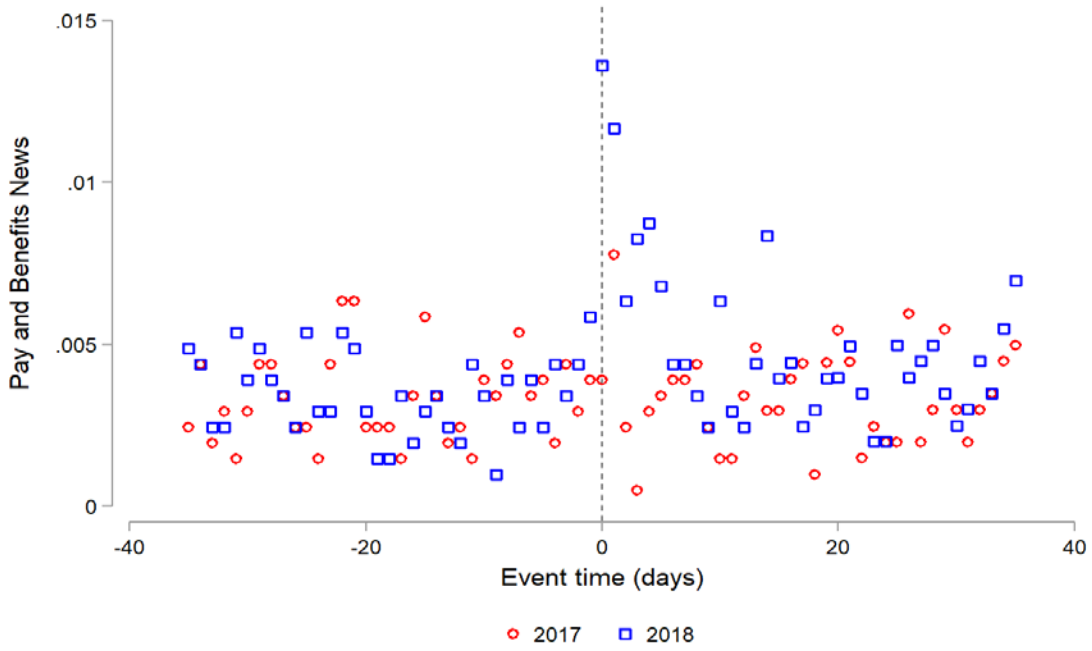


Figure 3. Compensation and benefits news around proxy filing dates

This figure plots the average number of firms in our sample with news related to the "Compensation and Benefits" SASB news category between 35 days before and after the proxy filing date (Event time=0) in 2017 (red circles) and 2018 (blue squares), based on the *TruValue Labs* data. The sample includes 2,057 firms.



Appendix A. Pay ratio disclosure rule

Rule-making process

The pay ratio rule was adopted by the U.S. Securities and Exchange Commission (SEC) in October 2015 as a part of implementing the Dodd-Frank Wall Street Reform and Consumer Protection Act (enacted July 21, 2010). The pay ratio rule implements a provision from Title IX (E) "Accountability and Executive Compensation" that have also yielded the rules relating to the shareholder vote on executive compensation disclosures (the so-called "say-on-pay") and the compensation committee independence provision.

The original version of the CEO pay ratio disclosure rule was proposed by the SEC in September, 2013. After two years of collecting comment letters from the public and re-working the rule, the SEC released the final version on October 19, 2015. The final rule became effective for the first fiscal year beginning on or after January 1, 2017.

Disclosure requirements

Section 953(b)(1) of the Dodd-Frank Wall Street Reform and Consumer Protection Act requires all publicly traded companies listed in the U.S. to disclose: (A) the median of the annual total compensation of all employees, except the chief executive officer ("CEO") (or any equivalent position); (B) the annual total compensation of the CEO (or any equivalent position); and (C) the ratio of the two. The U.S. Securities and Exchange Commission (SEC) adopted the pay ratio disclose rule in October 2015. The rule is effective for a fiscal year that starts on or after January 1, 2017.

Exempt companies

Emerging growth companies, smaller reporting companies, foreign private issuers, and U.S.-Canadian Multijurisdictional Disclosure System (MJDS) filers are exempt from this disclosure requirement:

- A company qualifies as an *emerging growth company* if during its most recently completed fiscal year, its total annual gross revenues are below USD 1.07 billion and, as of December 8, 2011, the company had not sold any common equity securities under a registration statement.

A company continues to be an emerging growth company for the first five fiscal years after it completes an IPO, unless one of the following occurs: its total annual gross revenues are USD 1.07 billion or more it has issued more than USD 1 billion in non-convertible debt in the past three years or it becomes a "large accelerated filer."

- A "*smaller reporting company*" is an issuer that had a public float of less than USD 75 million as of the last business day of its most recently completed second fiscal quarter or had annual revenues of less than USD 50 million during the most recently completed fiscal year for which audited financial statements are available. Effective September 10, 2018, the SEC increased those thresholds up to USD 250 million and USD 100 million, respectively.
- A "*foreign private issuer*" is any foreign issuer other than a foreign government, except for a registrant that, as of the last business day of its most recent fiscal year, has more than 50% of its outstanding voting securities held of record by United States residents and any of the following: a majority of its officers and directors are citizens or residents of the United States, more than 50% of its assets are located in the United States, or its business is principally administered in the United States.
- A *U.S.-Canadian Multijurisdictional Disclosure System* ("MJDS") filer is a registrant that files reports and registration statements with us in accordance with the requirements of the MJDS.

Employee definition

The SEC definition of "employee" includes the full-time, part-time, seasonal, and temporary employees employed by the firm or any of its consolidated subsidiaries. This definition includes non-U.S. employees but excludes independent contractors or "leased" workers who are employed and whose compensation is determined by an unaffiliated third party. Employees on leave of absence may be excluded.

Exemptions

Companies are allowed to omit the employees of a newly-acquired entity from their pay ratio calculation for the fiscal year in which the business combination or acquisition occurs.

Companies may exclude employees who reside in foreign jurisdictions where it would not be feasible to obtain salary information without violating local data privacy laws (*foreign data privacy* exemption). If a company excludes any non-U.S. employees in a jurisdiction under this exemption, it must exclude all non-U.S. employees in that jurisdiction, list the excluded jurisdictions, identify the specific data privacy law or regulation, explain how complying with the final rule violates such data privacy law and provide the approximate number of employees exempted from each jurisdiction. In addition, the company must obtain a legal opinion on the inability to obtain the necessary information without violating that jurisdiction's data privacy laws or regulations.

If a company's non-U.S. employees account for 5% or less of its total employees, it may exclude all of those employees. If a company's non-U.S. employees exceed 5% of its total employees, it may exclude up to 5% of its total employees who are non-U.S. employees (*de minimis* exemption). If a company excludes any non-U.S. employees in a particular jurisdiction, it must exclude all non-U.S. employees in that jurisdiction.[16] In addition, the company must disclose the jurisdictions from which its non-U.S. employees are being excluded, the approximate number of employees excluded from each jurisdiction, the total number of its U.S. and non-U.S. employees, and the total number of its U.S. and non-U.S. employees.

Compensation adjustments

Annualization: Annualization is allowed for full-time and part-time employees who did not work for a full fiscal year because they were newly hired, on leave or called for active military duty. Annualization is allowed for permanent workers but not for seasonal or temporary workers.

[16] If, for example, a company has 4%, 3%, and 7% of its employees in countries A, B and C outside the U.S. With 14% of its employees outside the U.S., the firm can exclude up to 5% of its foreign workers as long as it excludes all in a given country. For example, it can exclude all workers in country A (4%) or in country B (3%), but not both. Also it can't exclude 4% from country A and then 1% from country B or C, neither can the firm exclude 5% or 7% of its employees from country C.

Projecting the compensation of part-time workers (estimating what such a worker would have made if employed full-time) is prohibited.

Cost-of-living adjustments: Companies are allowed make cost-of-living adjustments for the compensation of employees in jurisdictions other than the jurisdiction in which the CEO resides. In this case, the company is required to briefly describe the cost-of-living adjustments and to disclose the country in which the median employee is located. The company also must provide a pay ratio calculated without the cost-of-living adjustments.

Determining the median employee

Companies should identify their median employee using total annual compensation or any other compensation measure that is consistently applied to all employees included in the calculation, such as information derived from tax and/or payroll records. Statistical sampling is allowed provided that firms disclose their methodology.

In determining the median employee, companies may select any date within the last three months of their fiscal year. Companies are permitted to identify the median employee once every three years, unless there is a change in its employee population or compensation arrangements that would result in a significant change in its ratio.

Appendix B. Data collection

We collect the pay ratio data directly from proxy statements filed with the SEC in 2018. We search for the phrase “pay ratio” in 5,878 proxy statements filed with the SEC in 2018 and identify 2,530 proxy filings that contain “pay ratio.” We then hire Amazon Mechanical Turk workers to collect pay ratio data and other disclosure details from each proxy filing. Workers are presented with an online link leading to a firm’s 2018 definitive proxy statement, assignment instructions, and a list of question about the pay ratio section. To ensure data quality, each proxy statement is assigned to two different workers. If data entries disagree between two workers, we manually resolve the disagreements. After discarding firms that mention “pay ratio” in their proxy statements but do not disclose any pay ratio numbers, we are able to collect the detailed pay ratio for 2,383 companies.

Below, we present the exact instructions and list of data collection questions as seen by the workers.

Website data collection – Instructions

This project is about collecting information on corporate compensation practices: information on how much companies pay to their CEOs and their workers, as well as additional information about company employees.

Instructions

- Click the link below. It opens a company proxy statement, a document containing information companies provide to shareholders before an annual shareholder meeting.
- Search for the CEO Pay Ratio section in the document (you can press "Control" + "F" and search for the phrase "pay ratio.")
- From the Pay Ratio section, collect the requested information if available.
- If needed, you can use other sections of the document. For example, sometimes details about CEO compensation are located in the Executive Compensation section.

Link to the Website: ${website_url}

Copy the text of the CEO Pay Ratio section here.

This section typically contains 3-5 paragraphs. It can be longer for large multinational companies.

_____

CEO and median worker compensation

Sometimes a company reports several values for the compensation of its chief executive officer (CEO). For example, it may report CEO compensation both with and without an annual bonus. Similarly, a company may report several compensation values for its median worker. If only one value is reported, fill in that value as the smallest and largest values.

Smallest CEO compensation value: _____

Largest CEO compensation value: _____

Smallest median worker compensation value: _____

Largest median worker compensation value: _____

Pay ratio

Pay ratio is the ratio between CEO pay and median worker pay. Typically, it's a number above 1, though there are exceptions. Example: "The 2017 annual total compensation of our median employee, other than our CEO, was $68,234; our CEO's total compensation was $692,471; the ratio of these amounts was 1:10." In this example the pay ratio is 10. Some companies report multiple pay ratios, based on different methodologies. If only one value is reported, fill in that value as the smallest and largest values.

Smallest pay ratio: _____

Largest pay ratio: _____

Company employees

Total number of employees, if reported: _____

Types of employees mentioned in the text (no matter how):

- □ Full-time
- □ Part-time
- □ Seasonal / Temporary
- □ Contractors / Outsourced / Service-providers / Employees of staffing agencies
- □ Non-U.S. based / Foreign workers / International workers / Global workers
- □ Other
- □ Not mentioned

Number of non-US based employees, if reported. Leave blank otherwise. _____

Percentage of non-US based employees, if reported. Leave blank otherwise. _____

Methodology

Please, carefully answer the questions about the methodology. Different companies use different methods to determine the "median employee." For example, companies can exclude non-U.S.-based workers if those represent less than 5% of the company labor force.

Date used to determine company's median employee: yyyy-mm-dd

Median employee compensation includes (check all applicable options):

- □ Wage / Salary
- □ Overtime pay
- □ Bonus / Performance-based commission / Incentive pay
- □ Cash compensation
- □ Stock / equity awards
- □ Options Pension / 401(K)
- □ Other
- □ Not mentioned / Not clear

Types of employees <u>excluded</u> from determining the median compensated employee (check all applicable options):

- □ Part-time
- □ Contractors / Outsourced / Service-providers / Employees of staffing agencies
- □ Non-U.S. based / Foreign workers / International workers / Global workers
- □ Other
- □ None of the above
- □ Not mentioned / Not clear

Does the company make any cost-of-living adjustments in pay ratio calculations?

- □ Yes
- □ No
- □ Not mentioned

<u>Comments</u>

You may leave any additional comments here.

Appendix C. Variable definitions

Book-to-market: Book-to-market ratio of equity.

CAR [-1,5]: Cumulative abnormal return between event days -1 and + 5, with an abnormal return representing the difference between a firm's daily return and the value-weighted CRSP market return, with both returns excluding dividends. Day 0 in event time is identified as the earliest filing date in 2018 of either the preliminary or the definitive proxy statement.

CEO Pay: The total annual CEO compensation as reported in the firm 2018 definitive proxy statement.

Cost-of-Living Adj: An indicator variable that equals one if in calculating the total annual compensation of its median employee a firm makes cost-of-living adjustments and zero otherwise.

Democrat Leaning: Support for Democratic candidate Clinton in the 2016 presidential election (i.e., the fraction of voters that voted for Hillary Clinton in a given state, in %).

De Minimis: An indicator variable that equals one if in the process of identifying its median employee a firm excludes some non-U.S. employees under the *de minimis* exemption and zero otherwise.

Event Time[-1,5] ([-1, 25]): An event indicator, which is one for the event window [-1, +5] ([-1, +25]) and zero otherwise. Day 0 in event time is identified as the earliest filing date in 2018 of either the preliminary or the definitive proxy statement.

Fraction Non-US: This variable is equal to the fraction of non-U.S. employees reported as reported in the firm 2018 definitive proxy statement. For companies that do not report this information, it is equal number of employees in foreign countries divided by the total number of employees if both numbers are available through Compustat and Compustat segment data. For all other companies, this variable is equal zero.

High CEO Pay: An indicator variable that equals one if a firm's total annual CEO compensation is in the top tercile of the sample distribution and zero otherwise.

High Pay Ratio: An indicator variable that equals one if a firm's pay ratio is in the top tercile of the sample distribution and zero otherwise.

High Worker Pay: An indicator variable that equals one if a firm's total annual median worker compensation is in the top tercile of the sample distribution and zero otherwise.

Leverage: Total book value of debt over total book value of assets.

LN CEO Pay: Logarithm of the total annual CEO compensation (in thousands USD) plus one, log (*CEO Pay* + 1).

LN Pay Ratio: Logarithm of pay ratio plus one, log (*Pay Ratio* + 1).

LN Worker Pay: Logarithm of the total annual median worker compensation (in thousands USD), log (*Worker Pay*).

ln(MktCap): Logarithm of the firm's market capitalization.

ln(Total Assets): Logarithm of the ratio of total assets (AT).

ln(Total Assets/EMP): Logarithm of the ratio of total assets (AT) over the total number of employees, obtained from the firm 2018 definitive proxy statements and supplemented with the Compustat measure of firm employees (EMP).

Low CEO Pay: An indicator variable that equals one if a firm's total CEO compensation is in the bottom tercile of the sample distribution and zero otherwise.

Low Worker Pay: An indicator variable that equals one if a firm's median worker compensation is in the bottom tercile of the sample distribution and zero otherwise.

Medium Pay Ratio: An indicator variable that equals one if a firm's pay ratio is in the middle tercile of the sample distribution and zero otherwise.

Mentioned Non-US: An indicator variable that equals one if a firm mentions non-U.S. employees in its 2018 definitive proxy statement and zero otherwise.

Minimum Wage: A state's minimum wage (in USD) per hour in 2017.

MinWage Attitude: The fraction of residents in a given state that favor increasing the minimum wage to USD 15 per hour, based on a 2016 survey performed by *The Atlantic.*

Part-Time Worker: An indicator variable that equals one if a firm's median employee is a part-time employee and zero otherwise, as reported in the firm 2018 definitive proxy statement.

Pay and Benefits News [-1, 5]$_{2018\ (2017)}$: An indicator variable that equals one if a firm is mentioned in the "Compensation and Benefits" SASB news category within the 7-day event window in 2018 (2017) and zero otherwise, based on *TruValue Labs* data.

Pay and Benefits News [-1, 25]$_{2018\ (2017)}$: An indicator variable that equals one if a firm is mentioned in the "Compensation and Benefits" SASB news category within the 27-day event window in 2018 (2017) and zero otherwise, based on *TruValue Labs* data.

Pay Ratio: The ratio between the total annual CEO compensation and the total annual median worker pay, as reported in the firm 2018 definitive proxy statement.

RD: R&D expenditure (XRD) over (lagged) sales.

RD (miss): An indicator variable that equals one if R&D expenditure is missing in Compustat and zero otherwise.

RET: Annual stock return.

ROA: EBITDA over lagged total assets.

Prosocial Pref. of HQ State: This variable equals *Local Prosocial Culture* in a firm's headquarters state and it is the first principal component of the following four state-level variables: *Minimum Wage*, *MinWage Attitude*, *State Tax Diff*, and *Democrat Leaning*.

Prosocial Pref. of Investors: The holdings-weighted average of state-based *Local Prosocial Culture* of institutional and retail investors. Institutional investors are assigned *Local Prosocial Culture* in their headquarters states and retail investors are assumed to be located in a firm's headquarters state and are assigned its *Local Prosocial Culture*. For a given firm, we include only US-based institutional investors with equity holdings below USD 250 billion and rescale the weights of the remaining US-based institutional investors and retail investors such that they add up to 1. This variable is standardized to have a mean of zero and a standard deviation of one within the sample.

Prosocial Pref. of Inst Investor: This variable is constructed as the *Local Prosocial Culture* in an institutional investor's headquarters state. It is standardized to have a mean of zero and a standard deviation of one within the institutional investors sample that excludes the largest institutions with equity holdings above USD 250 billion.

Exposure to CF Risk: The weighted average of *Local Prosocial Culture* across all states a firm operates in. The weights equal the first principal component of the fraction of a firm's branches, sales and employees in a given state based on the *Infogroup* data.

State Tax Diff: The difference between a state's maximum and minimum personal income tax rates as of 2017 (in %). For the states with no income tax, the value of this variable is set to zero.

Several PR: An indicator variable that equals one if a firm reports two or more values for pay ratio in its 2018 definitive proxy statement and zero otherwise.

Total News [-1,5]$_{2018\ (2017)}$: For a given firm, the total number of mentions across all SASB news categories within the 7-day event window in 2018 (2017), based on *TruValue Labs* data.

Total News [-1,25]$_{2018\ (2017)}$: For a given firm, the total number of mentions across all SASB news categories within the 27-day event window in 2018 (2017), based on *TruValue Labs* data.

Worker Pay: The total annual median worker compensation as reported in the firm 2018 definitive proxy statement.

Year 2018: An indicator variable for year 2018.

Δ Stock Weight$_{2018}$: For a given stock within an institution's portfolio, portfolio weight on December 31, 2018 minus portfolio weight on December 31, 2017, where both weights are computed (in %) using constant prices as of December 31, 2017.

Δ Stock Weight$_{2017}$: For a given stock within an institution's portfolio, portfolio weight on December 31, 2017 minus portfolio weight on December 21, 2016, where both weights are computed (in %) using constant prices as of December 31, 2016.

Appendix D. Additional analysis

This appendix reports various robustness checks mentioned in the text.

Appendix Table D1. Media attention around proxy filing dates

This table compares news related to compensation and benefits during vs. outside a 7-day (or 27-day) event window ([-1, 5] or [-1, 25]) around the 2017 and 2018 proxy filing dates. *Pay and Benefits News* is an indicator variable that equals one if a firm is mentioned in the "Compensation and Benefits" SASB news category on a given day, and zero otherwise. *Pay and Benefits News (%)* is the fraction of the news in this category out of all SASB news on a given day. *Event Time [-1, 5]* (*Event Time [-1, 25]*) is an indicator variable that equals one for days falling into this event window, and zero otherwise. *Year 2018* is an indicator variable that equals one for 2018, the first year of pay ratio disclosure, and zero for 2017. Standard errors are double-clustered by day and by (SIC2) industry. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

	Pay and Benefits News		Pay and Benefits News (%)	
	(1)	(2)	(3)	(4)
Year 2018 x Event Time [-1, 5]	0.006***		7.159***	
	(0.001)		(1.406)	
Year 2018 x Event Time [-1, 25]		0.002***		2.046***
		(0.000)		(0.454)
Event Time [-1, 5]	0.000		0.172	
	(0.000)		(0.507)	
Event Time [-1, 25]		-0.000		-0.118
		(0.000)		(0.248)
Year 2018	-0.000	-0.000	0.566***	0.556***
	(0.000)	(0.000)	(0.172)	(0.182)
Firm FE	x	x	x	x
Observations	1,501,610	1,501,610	64,403	64,403
Adjusted R-squared	0.076	0.076	0.125	0.122

Appendix Table D2. Prior disclosure of staff expense

This table splits our sample firms into a subsample that already reported total employee costs through the COMPUSTAT item "Staff Expense" before 2018 and the remaining set of firms that did not. Standard errors are double-clustered by announcement date and by (SIC2) industry. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

	CAR[-1,5]	
	Prior disclosure of staff expense	No Prior disclosure of staff expense
	(1)	(2)
LN CEO Pay	-35.7*	-13.4
	(19.1)	(11.3)
LN Worker Pay	21.2	45.5***
	(32.2)	(15.2)
ln(MktCap)	-27.8**	8.0
	(12.5)	(5.7)
Book-to-Market	-195.6***	19.5
	(66.5)	(30.3)
Observations	402	1,487
Adjusted R-squared	0.071	0.008

Appendix Table D3. Equity market reaction and different event windows and asset pricing models

This table reports the relation between cumulative abnormal returns during event windows around the 2018 proxy filing dates and reported pay variables. CAR[-1, 1] (CAR[-1, 3]) measures 3-day (5-day) cumulative abnormal returns. CAR_{CAPM}[-1,5] measures 7-day cumulative abnormal returns relative to CAPM predicted returns. $CAR_{Carhart}$[-1,5] measures 7-day cumulative abnormal returns relative to returns predicted by the Carhart (1997) four-factor model. Standard errors are double-clustered by announcement date and by (SIC2) industry. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

	CAR [-1,1]		CAR [-1,3]		CAR_{CAPM} [-1,5]		$CAR_{Carhart}$ [-1,5]	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LN Pay Ratio	-15.2**		-40.1***		-36.5***		-34.3***	
	(6.7)		(9.1)		(10.6)		(10.9)	
High Pay Ratio		-47.2*		-64.7**		-78.8**		-69.3*
		(25.4)		(31.1)		(33.9)		(36.1)
Low CEO Pay		-16.3		-25.8		-60.3*		-63.4*
		(26.5)		(23.2)		(33.3)		(32.4)
High CEO Pay		-1.7		-40.6		-39.1		-35.0
		(21.2)		(27.7)		(36.7)		(37.3)
Low Worker Pay		21.7		13.6		5.0		-3.7
		(16.2)		(22.7)		(24.9)		(25.5)
High Worker Pay		3.3		33.2**		47.4*		44.5
		(15.0)		(16.6)		(26.3)		(27.8)
ln(MktCap)	8.2	7.2	14.9**	11.2	10.7	3.9	17.8**	9.1
	(6.4)	(6.2)	(7.1)	(7.8)	(8.1)	(8.3)	(8.5)	(8.3)
Book-to-Market	2.7	4.5	-0.8	2.2	20.1	22.3	20.9	22.4
	(12.3)	(12.6)	(24.2)	(22.6)	(28.8)	(26.5)	(26.1)	(25.0)
Observations	1,889	1,889	1,889	1,889	1,886	1,886	1,886	1,886
Adjusted R-squared	0.002	0.001	0.012	0.009	0.007	0.013	0.006	0.011

Appendix Table D4. State policies and attitudes related to income inequality

This table reports state level variables that capture policies and attitudes related to income inequality. *MinWage Attitude* measures the fraction of residents in a given state that favor increasing the minimum wage to USD 15 per hour, based on a 2016 survey performed by *The Atlantic*. *MinWage* measures a state's minimum wage (in USD) per hour in 2017. *State Tax Diff* measures the difference between a state's maximum and minimum personal income tax rates as of 2017 (in %). *Democrat Leaning* measures support for Democratic candidate Clinton in the 2016 presidential election (i.e., the fraction of voters that voted for Hillary Clinton in a given state, in %).

State Name	MinWage Attitude	MinWage	State Tax Diff	Democrat Leaning
ALASKA	38.10	9.80	0.00	36.55
ALABAMA	50.00	7.25	3.00	34.36
ARKANSAS	56.52	8.50	6.00	33.65
ARIZONA	57.63	10.00	1.95	44.58
CALIFORNIA	69.40	10.50	12.30	61.48
COLORADO	41.51	9.30	1.37	48.16
CONNECTICUT	73.53	10.10	3.99	54.57
DISTRICT OF COLUMBIA	100.00	11.50	4.95	90.86
DELAWARE	75.00	8.25	6.60	53.09
FLORIDA	56.13	8.10	0.00	47.41
GEORGIA	57.14	7.25	5.00	45.35
HAWAII	83.33	9.25	6.85	62.22
IOWA	55.32	7.25	8.62	41.74
IDAHO	33.33	7.25	5.80	27.48
ILLINOIS	60.87	8.25	1.46	55.24
INDIANA	60.00	7.25	0.96	37.46
KANSAS	42.86	7.25	2.30	35.74
KENTUCKY	64.58	7.25	4.00	32.68
LOUISIANA	60.98	7.25	4.00	38.45
MASSACHUSETTS	59.72	11.00	0.00	60.01
MARYLAND	75.51	8.75	3.75	60.33
MAINE	69.23	8.90	1.35	47.83
MICHIGAN	46.34	8.90	1.25	47.03
MINNESOTA	56.82	9.50	4.50	46.44
MISSOURI	54.55	7.70	4.50	37.87
MISSISSIPPI	60.00	7.25	2.00	40.06
MONTANA	53.33	8.15	5.90	35.41
NORTH CAROLINA	59.63	7.25	0.00	46.17
NORTH DAKOTA	50.00	7.25	1.80	27.23
NEBRASKA	44.83	9.00	4.38	33.70
NEW HAMPSHIRE	44.44	7.25	0.00	46.83
NEW JERSEY	62.50	8.44	7.57	54.99
NEW MEXICO	78.95	7.50	3.20	48.26

NEVADA	54.55	8.25	0.00	47.92
NEW YORK	73.56	9.70	4.82	59.00
OHIO	50.81	8.15	4.50	43.24
OKLAHOMA	48.39	7.25	4.50	28.93
OREGON	57.89	9.75	4.90	50.07
PENNSYLVANIA	60.80	7.25	0.00	47.46
RHODE ISLAND	50.00	9.60	2.24	54.41
SOUTH CAROLINA	56.00	7.25	7.00	40.67
SOUTH DAKOTA	35.71	8.65	0.00	31.74
TENNESSEE	57.89	7.25	0.00	34.72
TEXAS	59.13	7.25	0.00	43.12
UTAH	38.71	7.25	0.00	27.17
VIRGINIA	58.82	7.25	3.75	49.75
VERMONT	75.00	10.00	5.40	56.68
WASHINGTON	64.62	11.00	0.00	52.54
WISCONSIN	72.41	7.25	3.65	46.45
WEST VIRGINIA	60.00	8.75	3.50	26.18
WYOMING	55.56	7.25	0.00	21.88

Appendix Table D5. Exposure to cash flow risk versus prosocial preferences of investors

This table presents robustness tests with respect to the results in Table 7 Panel A. In Panel A, we use alternative data sources to gauge a firm's distribution of operations across states in the construction of *Exposure to CF Risk*. In Column (1), we use the firm-state branch counts provided by the Orbis database to calculate the weight for each state. In Column (2) we follow Garcia and Norli (2012) and use the number of mentioning of a state in firms' 10-K filings in 2017 to calculate the state weights. In Column (3), *Exposure to CF Risk* is the first principal component of the measures in Columns (1) and (2), and the measure *Exposure to CF Risk* based on Infogroup data used in Table 7, Panel A. *Exposure to CF Risk* and *Prosocial Pref. of Investors* are both standardized to have a mean of zero and standard deviation of one. In Panel B, we use the individual measures for state policies and attitudes related to income inequality, listed in Appendix Table D4, instead of their first principal component, to construct firms' exposure to CF risk and prosocial preferences of their investors. Controls include ln(*MktCap*) and *Book-to-Market* and their coefficient estimates are omitted for brevity. Standard errors are double-clustered by announcement date and by (SIC2) industry. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

Panel A. Various data sources to capture the location of firms' operations

	CAR[-1,5]		
	(1)	(2)	(3)
LN Pay Ratio	-28.2***	-28.6***	-28.3***
	(9.4)	(9.5)	(9.3)
LN Pay Ratio x Exposure to CF Risk$_{orbis}$	-0.6		
	(9.5)		
Exposure to CF Risk$_{orbis}$	16.5		
	(53.7)		
LN Pay Ratio x Exposure to CF Risk$_{10K}$		4.7	
		(12.5)	
Exposure to CF Risk$_{10K}$		-1.0	
		(59.2)	
LN Pay Ratio x Exposure to CF Risk$_{pc}$			4.0
			(10.0)
Exposure to CF Risk$_{pc}$			-0.9
			(55.9)
LN Pay Ratio x Prosocial Pref. of Investors	-20.1*	-23.7**	-23.4**
	(10.5)	(10.3)	(10.2)
Prosocial Pref. of Investors	60.6	73.1*	72.8
	(44.5)	(43.7)	(45.7)
Controls	x	x	x
Observations	1,806	1,806	1,806
Adjusted R-squared	0.008	0.009	0.008

Panel B. State policies and attitudes related to income inequality

	CAR[-1,5]			
	(1)	(2)	(3)	(4)
LN Pay Ratio	-30.6***	-29.6***	-29.3***	-30.1***
	(9.5)	(9.6)	(9.2)	(9.4)
LN Pay Ratio x Exposure to CF Risk$_{\text{MW Attitude}}$	-6.8			
	(8.9)			
Exposure to CF Risk$_{\text{MW Attitude}}$	27.7			
	(41.9)			
LN Pay Ratio x Prosocial Pref. of Investors$_{\text{MW Attitude}}$	-11.1			
	(9.6)			
Prosocial Pref. of Investors$_{\text{MW Attitude}}$	35.9			
	(44.4)			
LN Pay Ratio x Exposure to CF Risk$_{\text{MinWage}}$		-2.4		
		(5.0)		
Exposure to CF Risk$_{\text{MinWage}}$		22.1		
		(14.9)		
LN Pay Ratio x Prosocial Pref. of Investors$_{\text{MinWage}}$		-17.8*		
		(9.1)		
Prosocial Pref. of Investors$_{\text{MinWage}}$		46.4		
		(33.3)		
LN Pay Ratio x Exposure to CF Risk$_{\text{State Tax Diff}}$			-1.9	
			(6.3)	
Exposure to CF Risk$_{\text{State Tax Diff}}$			22.0	
			(31.8)	
LN Pay Ratio x Prosocial Pref. of Investors$_{\text{State Tax Diff}}$			-21.8*	
			(12.3)	
Prosocial Pref. of Investors$_{\text{State Tax Diff}}$			76.2	
			(47.0)	
LN Pay Ratio x Exposure to CF Risk$_{\text{Democrat}}$				0.6
				(5.3)
Exposure to CF Risk$_{\text{Democrat}}$				14.0
				(17.3)
LN Pay Ratio x Prosocial Pref. of Investors$_{\text{Democrat}}$				-16.4**
				(6.7)
Prosocial Pref. of Investors$_{\text{Democrat}}$				50.9*
				(27.1)
Controls	x	x	x	x
Observations	1,806	1,806	1,806	1,806
Adjusted R-squared	0.005	0.008	0.009	0.006

Appendix Table D6. Portfolio rebalancing and extended sample

This table reports the results using the same model specifications as in Table 8. We extend the sample of institution-stock observations and include all the stocks held by institutional investors as of December 31, 2017 and of December 31, 2018. The sample in Table 8 includes stocks that were held by our sample investors as of December 31, 2017 and excludes stocks that reported pay ratios and were added to investors' portfolios during 2018. *Prosocial Pref. of Inst. Investor* is standardized to have a mean of zero and standard deviation of one. Standard errors are double-clustered by investor and stock. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix C.

Panel A. Rebalancing patterns in 2018

	Δ Stock Weight $_{2018}$					
	All Inst. Investors		Independent Investment Advisors		Small Independent Investment Advisors	
	(1)	(2)	(3)	(4)	(5)	(6)
LN Pay Ratio x Prosocial Pref. of Inst. Investor	-0.161*		-0.295**		-0.411*	
	(0.085)		(0.120)		(0.232)	
LN CEO Pay x Prosocial Pref. of Inst. Investor		-0.091		-0.174**		-0.200
		(0.064)		(0.082)		(0.133)
LN Worker Pay x Prosocial Pref. of Inst. Investor		0.304***		0.348**		0.507*
		(0.107)		(0.152)		(0.290)
Inst FE, Stock FE	x	x	x	x	x	x
Observations	442,568	442,568	322,458	322,458	148,885	148,885
Adjusted R-squared	0.021	0.021	0.019	0.019	0.021	0.021

Panel B. Rebalancing patterns in 2017

	Δ Stock Weight $_{2017}$					
	All Inst. Investors		Independent Investment Advisors		Small Independent Investment Advisors	
	(1)	(2)	(3)	(4)	(5)	(6)
LN Pay Ratio x Prosocial Pref. of Inst. Investors	-0.032		-0.047		0.060	
	(0.099)		(0.129)		(0.231)	
LN CEO Pay x Prosocial Pref. of Inst. Investor		0.001		-0.003		-0.011
		(0.067)		(0.085)		(0.106)
LN Worker Pay x Prosocial Pref. of Inst. Investor		0.007		0.018		-0.099
		(0.146)		(0.196)		(0.382)
Inst FE, Stock FE	x	x	x	x	x	x
Observations	395,640	395,640	297,770	297,770	142,975	142,975
Adjusted R-squared	0.019	0.019	0.017	0.017	0.021	0.021

Appendix Table D7. Portfolio rebalancing and individual measures of prosocial preferences

This table reports the results using the same specification as in Table 8, Panel A, Column (1). We use the individual measures for state policies and attitudes related to income inequality, listed in Appendix Table D4, instead of their first principal component, to construct the location-based measures for prosocial preferences of institutional investors. *MinWage Attitude*, *Minimum Wage*, *State Tax Diff*, and *Democrat Leaning* correspond to state policies and attitudes towards income inequality in the headquarters state of an institutional investor. Standard errors are double-clustered by investor and stock. ***, **, * denote significance at 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix C.

	Δ Stock Weight $_{2018}$			
	(1)	(2)	(3)	(4)
LN Pay Ratio x MinWage Attitude	-0.088***			
	(0.020)			
LN Pay Ratio x Minimum Wage		-0.030*		
		(0.017)		
LN Pay Ratio x State Tax Diff			-0.031	
			(0.020)	
LN Pay Ratio x Democrat Leaning				-0.074***
				(0.019)
Inst FE, Stock FE	x	x	x	x
Observations	368,780	368,780	368,780	368,780
Adjusted R-squared	0.096	0.096	0.096	0.096