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Do Equity Markets Care about Income Inequality? Evidence from Pay Ratio Disclosure

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ABSTRACT

We examine equity markets' reaction to the first-time disclosure of the CEO-worker pay ratio by U.S. public companies in 2018. We find that firms disclosing higher pay ratios experience significantly lower abnormal announcement returns. Firms whose shareholders are more inequality-averse experience a more negative market response to high pay ratios. Furthermore, during 2018 more inequality-averse investors rebalance their portfolios away from stocks with a high pay ratio relative to other investors. Our results suggest that equity markets are concerned about high within-firm pay dispersion, and investors' inequality aversion is a channel through which high pay ratios negatively affect firm value.

STAGNANT MIDDLE-CLASS WAGES BUT RAPIDLY increasing incomes by high earners have led to a growing debate about income inequality in the United States (Acemoglu and Autor (2011), Piketty (2014)). While the contribution of large within-firm pay dispersion to income inequality has been well documented (Song et al. (2019)), how U.S. financial markets and shareholders assess the dispersion in pay between a firm's top executives and rank-and-file

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employees is largely unknown. Understanding equity markets' assessment of income inequality is important because equity markets allocate capital and send valuation signals to firms, informing and possibly shaping corporate policies that contribute to or mitigate income inequality. This question is also timely given the large influx of capital into socially responsible investments (Hartzmark and Sussman (2019)),[1] while it's social and economic impact has yet to be understood. In this paper, we address this question, by exploiting a new rule that requires U.S. publicly traded companies to report the ratio between CEO pay and median worker pay for the first time in 2018. This event provides a unique opportunity to observe investors' responses to previously undisclosed within-firm pay differences.

While large income differences might be acceptable to some individuals, especially if they result from competitive labor markets, experimental and survey evidence suggests that many individuals are averse to pronounced income inequality. Aversion to inequality could be self-centered, as may be the case for employees who compare their compensation to that of the CEO or for politicians if they believe that increasing taxes on high earners could advance their careers. Inequality aversion could also reflect concerns about inequality affecting future economic growth or stability in the broader society, for example, through its impact on education levels or crime rates. Finally, for some individuals, high-income inequality could directly cause negative utility if it violates their views about the ideal allocation of resources or distributive justice, independent of its impact on their consumption levels. In this paper, we classify all such concerns about or opposition to income inequality as inequality aversion, but we are agnostic about the specific form or type of such preferences.

If financial markets recognize these concerns about income inequality, markets may respond negatively to high pay ratios. A negative response may operate through a cash flow channel due to expected adverse responses of inequality-averse employees, customers, or local governments, for example, in the form of decreased employee morale, customer boycotts, or increased regulatory and litigation risk (see Edmans (2011), Mohan et al. (2018), and Green and Zhou (2019)). If arbitrage is limited, a negative response may also operate through an investor demand channel, with inequality-averse shareholders investing less in firms with large pay disparities once the information becomes salient. If this investor response is sufficiently persistent and pronounced, firms with high pay ratios may face an increased cost of capital due to limited risk sharing (Merton (1987)).

It is possible, however, that financial markets do not recognize income inequality as an important concern. In this case, the market response to pay ratio disclosure would depend on what, if anything, markets infer from the newly disclosed pay ratios. On the one hand, the market may respond positively to

[1] In 2006, 63 investment firms with USD 6.5 trillion in assets under management (AUM) signed a United Nations-backed commitment to incorporate environmental, social, and governance (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)).

high within-firm pay disparity, as several studies document a positive association between pay disparity and firm performance, suggesting that a high pay ratio can be positive cash flow news (see, e.g., Mueller, Ouimet, and Simintzi (2017)). On the other hand, the market may react negatively to a high pay ratio if market participants learn primarily about the productivity of a firm's employees through the median worker's pay and hence the firm's pay ratio.

We collect the reported pay information for all firms directly from their proxy statements in 2018. The average pay ratio across the approximately 2,300 U.S. firms that report their pay ratios in 2018 is 145, while the median is 65. Analyzing the market reaction following the initial pay ratio disclosure, we find that firms reporting a higher pay ratio experience a significantly lower market reactions than firms reporting a lower pay ratio: A one-standard-deviation increase in pay ratio decreases a firm's seven-day cumulative abnormal return by about 42 basis points (bps), suggesting that high CEO pay relative to median worker pay leads to a downward revision of firm value. The negative market reaction appears to persist at least several months after the initial pay ratio disclosure and is largely unaffected by the inclusion of firm characteristics as well as proxies for investors' expectations of pay ratios, suggesting that the market reacts largely to the pay ratio numbers themselves once they become salient. Importantly, we further find that the significantly negative market reaction to a high pay ratio continues to hold after controlling for contemporaneously disclosed CEO or worker pay, suggesting that financial markets react to within-firm pay *disparity* independently of pay levels. Therefore, the negative market reaction is not a response to high CEO pay or low worker productivity.

To understand whether the negative market reaction that we document represents a cash flow effect, an investor demand effect, or a combination of these two effects, we examine the cross section of market reactions. If the cash flow channel is important, we expect the market response to be stronger for firms with more inequality-averse employees, customers, or local governments. Alternatively, if reduced demand due to shareholders' inequality aversion is driving the observed relation, we expect to see lower announcement returns for firms with more inequality-averse shareholders.

While shareholders' or other stakeholders' inequality aversion is not directly observable, we argue that it is likely correlated with local social norms and preferences with respect to income inequality (for a similar location-based approach, see Hilary and Hui (2009), Kumar, Page, and Spalt (2011), and Di Giuli and Kostovetsky (2014)). Furthermore, the literature documents a strong correlation between individuals' attitudes toward income inequality and their preferences for redistribution, which are correlated with voting behavior and policy choices (see, e.g., Alesina and Giuliano (2011), Luttmer and Singhal (2011), Bavetta, Donni, and Marino (2019)). Accordingly, we capture a firm's exposure to inequality-averse employees, customers, or local governments using the political leaning and the redistributive policies of the states in which the firm operates. Similarly, we capture the inequality aversion of a firm's investors using the political leaning and redistributive policies of the home states of a firm's shareholders. For institutional investors, we also construct

an alternative measure of investors' revealed social preferences as the value-weighted average MSCI KLD Social Index score of their 2017 portfolio stock holdings. We assume that investors who are more concerned about social issues in general are more likely to be concerned about pay dispersion and income inequality in particular.

We find that firms with more inequality-averse shareholders experience a significantly more negative market response to high pay dispersion. This result holds using both the location- and the holdings-based preferences measures. However, firms' exposure to cash flow risk because of other inequality-averse stakeholders (i.e., employees, customers, and local governments) does not seem to play a significant role in explaining the cross-sectional variation in market reactions.

We note that our proxies for investors' preferences toward income inequality may reflect investors' subjective beliefs about the cash flow risk associated with high pay ratios rather than their preferences per se. For example, investors residing in more progressive or Democratic leaning states may be more concerned about tax or regulatory consequences for firms with a high pay ratio than investors in more conservative states. We address this concern in two ways. First, we expect that if more inequality-averse investors are simply more concerned about adverse cash flow consequences of a high pay ratio than other investors, this concern should be more pronounced for firms whose cash flows are objectively more exposed. However, using the interaction between a firm's objective cash flow risk exposure and our proxy for investors' preferences, we find that inequality-averse investors appear to "dislike" a high pay ratio regardless of a firm's objective exposure to cash flow risk based on the location of its operations.

Second, we expect that regulatory and litigation risks disproportionately affect firms with a pay ratio beyond a certain threshold. For example, the city of Portland, Oregon has decided to impose a business tax on firms whose pay ratio is above 100. We find, however, that our measure of investor inequality aversion continues to have moderating effect on the approximately two-thirds of firms with a pay ratio below 100, suggesting that our preferences measure is unlikely to simply be a proxy for investors' subjective beliefs about a firm's exposure to regulatory or litigation risk.

Taken together, the negative market reaction to high pay ratios that is independent of pay levels and that is increasing in the degree of investor inequality aversion suggests that investors are concerned about income inequality and assess high within-firm pay dispersion negatively. Furthermore, our findings suggest that investors' inequality aversion is the dominant channel through which within-firm pay disparity affects firms' equity valuations. We acknowledge that distinguishing between investors' preferences and their subjective beliefs is imperfect. Notwithstanding, we believe that our findings remain interesting as they suggest that some investors are sufficiently concerned about inequality that their concerns affect stock prices and equity demand in a predictable way.

In our last set of analyses, we examine whether in 2018 the portfolio rebalancing of institutional investors with different degrees of inequality aversion varies with portfolio firms' reported pay ratios. As in the market reaction analysis, here we infer an institutional investor's inequality aversion using the political leaning and redistributive policies in an investor's home state as well as the average MSCI KLD Social Index score of an investor's portfolio holdings at the end of 2017. Controlling for investor and firm fixed effects, we find that in 2018 institutional investors with stronger inequality aversion reduce their allocation to high-pay-ratio stocks more than do other institutional investors. This result is even more pronounced when we focus on smaller independent investment advisers. Investors' portfolio rebalancing behavior in response to the newly disclosed pay ratios is consistent with the variation in announcement returns being a function of shareholders' inequality aversion. Interestingly, it is institutional investors' revealed social preferences, not their environmental or governance preferences, that explain cross-sectional differences in both the initial market reaction and the subsequent portfolio rebalancing response to the newly available pay ratios.

Previous studies document that firms associated with social or environmental concerns are not attractive to some investors and therefore have lower valuations and higher costs of capital (see, e.g., Hong and Kacperczyk (2009), Chava (2014)). An important advantage of our study is that the 2018 pay ratio disclosure represents a well-defined event that allows for clear identification of the market's response to firms' pay dispersion, the social concern of interest in this paper. Furthermore, our study provides evidence that investors' preferences could be a channel through which firms' practices with respect to social responsibility affect their equity valuation. This channel differs from the profitability channel that is highlighted by some corporate social responsibility studies (e.g., Fernando, Sharfman, and Uysal (2017), Lins, Servaes, and Tamayo (2017), Albuquerque, Koskinen, and Zhang (2019)).

Our findings are consistent with the growing importance of socially responsible investing (SRI) (see, e.g., Hartzmark and Sussman (2019), Krueger, Sautner, and Starks (2020)). The SRI literature documents the effect of investors' social preferences on their portfolio choices (e.g., Riedl and Smeets (2017), Barber, Morse, and Yasuda (2019)). We are able to observe firm-specific changes in investors' portfolios in response to firms' newly available pay ratios and find that the portfolio rebalancing results are in line with the valuation effects implied by the announcement returns. Taken together, our results suggest that concerns about income inequality could play an important role in financial markets.

Finally, our study contributes to research on inequality more broadly. Experimental research suggests that inequality aversion is a common concern and that individuals are willing to make sacrifices to reduce inequality (Fehr and Schmidt (1999), Dawes et al. (2007), Tricomi et al. (2010)). However, whether such attitudes are important among financial market participants is an open question. While survey-based evidence suggests that many Americans indicate a preference for less inequality than existing levels in the U.S. society (Norton

and Ariely (2011)), wealthy Americans, who are more likely to be equity investors, have been found to be more accepting of inequality than the rest of the population (Cohn et al. (2019)). Our study is consistent with the view that sufficiently many U.S. investors are concerned about income inequality and pay dispersion that these concerns affect equity prices. Consistent with evidence in the experimental literature on costly punishment for violations of social norms (Fehr and Fischerbach (2004)), such shareholders seem reluctant to invest in firms with high pay ratios even though prior research documents a positive correlation between within-firm pay dispersion and firm performance (Faleye, Reis, and Venkateswaran (2013) and Mueller, Ouimet, and Simintzi (2017)).[2] Our results suggest that investors, through their portfolio decisions and impact on firms' valuations, may affect corporate culture and policies (Heinkel, Kraus, and Zechner (2001), Hart and Zingales (2017)), and thus offer an alternative and possibly complementary mechanism to the political process to restrain inequality (Kuziemko et al. (2015), Nolan and Valenzuela (2019), Pastor and Veronesi (2021)).

The remainder of the paper is organized as follows. Section I describes the CEO-worker pay ratio data. Section II examines the short-term equity market reaction to the disclosure of pay ratios. Section III explores the role of shareholders' and other stakeholders' inequality aversion in explaining the cross-sectional variation in the market reaction to pay ratios. Section IV examines portfolio rebalancing after the pay ratio disclosure by institutional investors with different attitudes toward income inequality. Section V concludes.

I. CEO-Worker Pay Ratio

Since the Great Recession, the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 has imposed additional regulation on executive compensation, including shareholders' say-on-pay, independence of the compensation committee, and disclosure of the CEO-worker pay ratio.

The pay ratio disclosure rule requires most public companies listed in the United States to disclose their pay ratio starting the first fiscal year that begins on or after January 1, 2017.[3] Specifically, under the rule companies must disclose: (i) the median annual total compensation of all employees (other than the CEO), (ii) the annual total compensation of the CEO, and (iii) the ratio between these two numbers.

To identify median worker pay, the rule mandates that firms consider all full-time employees as well as part-time, seasonal, and temporary employees, without annualizing their compensation. Firms must also include their

[2] Using confidential U.S. Census data, Rouen (2020) decomposes the pay ratio into an explained component and an unexplained component and finds a positive relation between firm performance and the explained part but a negative relation between performance and the unexplained part.

[3] 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 Section I of the Internet Appendix for more details. The Internet Appendix may be found in the online version of this article.

non-U.S. employees, unless doing so violates applicable foreign data privacy laws or non-U.S. employees account for 5% or less of their total employees (de minimis exemption). Companies can make cost-of-living adjustments for the compensation of employees in countries other than the country of the CEO's residence, but they still must provide a pay ratio without any cost-of-living adjustments. Finally, independent contractors and workers who are employed by and receive compensation from a third party must be excluded. Section I of the Internet Appendix provides further details about the disclosure requirements and the rulemaking process.

Using proxy statements filed with the SEC in 2018, we identify 2,410 companies that disclose pay ratios in 2018. After excluding firms headquartered in foreign countries, we obtain a sample of 2,307 firms with pay ratio information as well as median worker and CEO compensation.[4]

Panel A of Table I provides summary statistics for *Pay Ratio*, *CEO Pay*, and *Worker Pay*. All variable definitions are provided in the Appendix. Internet Appendix Table IA.I lists pay ratio and its components for the 25 largest firms in our sample. We find that *Pay Ratio* ranges from 0 to 5,908, with a mean of 145, a median of 65, and a standard deviation of 303. The variation in the pay ratio reflects substantial variation in both CEO pay and median worker pay, with pay at the 25^{th} and 75^{th} percentiles equaling USD 2 million and USD 8.1 million for CEOs and USD 42,040 and USD 96,645 for median workers. To avoid the effect of outliers, most of our empirical analysis employs the logarithm of the 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 I report the corresponding summary statistics.

In the last two columns of Panel A, we report the R^2 from separate regressions of the different pay variables on (two-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 median worker pay. Panel B of Table I lists the mean and median for *Pay Ratio*, *CEO Pay*, and *Worker Pay* for each (one-digit SIC) industry. We find that the mining, construction, and financial industries have relatively low pay ratios, while the service and retail trade industries have relatively high pay ratios.

In Panel C of Table I, we report summary statistics for firm characteristics disclosed in the pay ratio section, such as worker composition, reporting more than one pay ratio, and using the de minimis exemption or cost-of-living adjustment. Taken together, these disclosure details explain about 22% of the variation of the pay ratio, largely because of their association with median worker pay (see Internet Appendix Table IA.II).

[4] We 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 extract pay ratio information, including median worker and CEO compensation as well as other relevant details. Section II of the Internet Appendix provides further details about our data collection process.

Table I
Summary Statistics

This table reports summary statistics for the pay ratio and its components in Panel A, the pay ratio by (one-digit SIC) industry in Panel B, and details reported in the pay ratio section of the 2018 definitive proxy statements in Panel C. The last two columns in Panel A report the R^2 when regressing pay variables on (two-digit SIC) industry and (corporate headquarters) state fixed effects. Panel D provides summary statistics for firm characteristics that are potentially related to the pay ratio for firms with positive book value of equity. The variables are measured as of the same fiscal year as the reported pay ratios. Panel E provides summary statistics for cumulative abnormal returns for our baseline model and various event windows as well as for the CAPM and the Carhart (1997) four-factor model. All variables are defined in the Appendix.

Panel A: Pay Variables

Variable	*N*	Mean	Median	*SD*	R^2 Ind	R^2 State
Pay Ratio	2,307	145	65	303	0.22	0.02
CEO Pay (in 1,000 USD)	2,307	6,317	4,271	7,540	0.08	0.03
Worker Pay (in 1,000 USD)	2,307	79.09	61.75	64.75	0.30	0.10
LN Pay Ratio	2,307	4.18	4.19	1.26	0.21	0.05
LN CEO Pay	2,307	15.09	15.27	1.55	0.06	0.03
LN Worker Pay	2,307	11.01	11.03	0.78	0.42	0.09

Panel B: Pay Ratio by Industry

		Pay Ratio		CEO Pay		Worker Pay	
SIC1-Industry	*N*	Median	Mean	Median	Mean	Median	Mean
Finance, Insurance, Real Estate	591	42	74	3,254	5,325	63	84
Agriculture, Forestry, Fishing	4	50	399	2,134	3,523	38	32
Mining	99	51	67	5,156	6,865	115	114
Construction	37	55	75	4,407	5,320	76	74
Transport & Utilities	190	64	102	4,695	7,428	82	90
Wholesale Trade	69	86	126	4,147	4,633	53	53
Services	352	74	186	4,465	7,647	64	74
Manufacturing	813	75	145	4,583	6,319	61	84
Retail Trade	152	256	450	4,591	6,418	19	25

Panel C: Disclosure Details

Variable	*N*	Mean	Median	*SD*
Several Pay Ratios	2,307	0.11	0.00	0.31
Mentioned Non-US	2,307	0.52	1.00	0.50
Fraction Non-US	2,307	0.09	0.00	0.22
De Minimis	2,307	0.24	0.00	0.43
Part-Time Worker	2,307	0.03	0.00	0.18
Cost-of-Living Adj.	2,307	0.01	0.00	0.09
LN Length PR Section	2,307	7.70	7.72	0.46

(*Continued*)

Table I—*Continued*

Panel D: Firm Characteristics				
Firm-Level Financial Variables	*N*	Mean	Median	*SD*
LN Total Assets	2,002	7.89	7.84	1.80
LN Assets / Employee	2,002	1.01	0.57	0.98
ln(MktCap)	2,002	7.76	7.72	1.73
R&D	2,002	0.09	0.00	0.29
R&D Missing	2,002	0.49	0.00	0.50
ROA	2,002	8.69	9.59	14.26
Stock Return	2,002	0.15	0.10	0.37
Leverage	2,002	37.33	39.00	24.31
Book-to-Market	2,002	0.50	0.45	0.35
Panel E: Cumulative Abnormal Returns (in basis points)				
	N	Mean	Median	*SD*
CAR [−1, +5] (baseline model)	2,007	39.89	38.08	408.19
CAR [−1, +5] (CAPM)	2,004	26.81	30.18	421.90
CAR [−1, +5] (Carhart four factor)	2,004	−2.14	−11.38	422.09
CAR [−1, +1] (baseline model)	2,007	4.51	9.83	279.03
CAR [−1, +3] (baseline model)	2,007	21.30	20.75	351.48

Finally, in Panel D of Table I we report summary statistics for other potentially important firm characteristics that could be correlated with the pay ratio and its components. Internet Appendix Table IA.II reports results on the relation between these firm characteristics and the pay ratio. Overall, the results on the firm characteristics are consistent with prior literature. For example, we find a positive relation between within-firm pay dispersion and firm size (Faleye, Reis, and Venkateswaran (2013), Mueller, Ouimet, and Simintzi (2017), Song et al. (2019)).

II. Equity Market Reaction to CEO-Worker Pay Ratio

The new pay ratio disclosure rule allows investors as well as other stakeholders for the first time to directly compare a firm's CEO compensation to its median worker compensation and thereby to at least partly assess income differences within a firm. If investors are concerned about pay dispersion and income inequality, they could react negatively to the disclosed high pay ratios in expectation of negative responses by inequality-averse employees, customers, or local governments. Alternatively, investors could be reluctant to invest in firms perceived to be socially irresponsible by contributing to the overall income inequality, reducing demand for shares of such firms.

To examine whether equity markets are concerned about income inequality and react to the first-time release of pay ratios, we first examine the market response around firms' pay ratio disclosure in 2018.

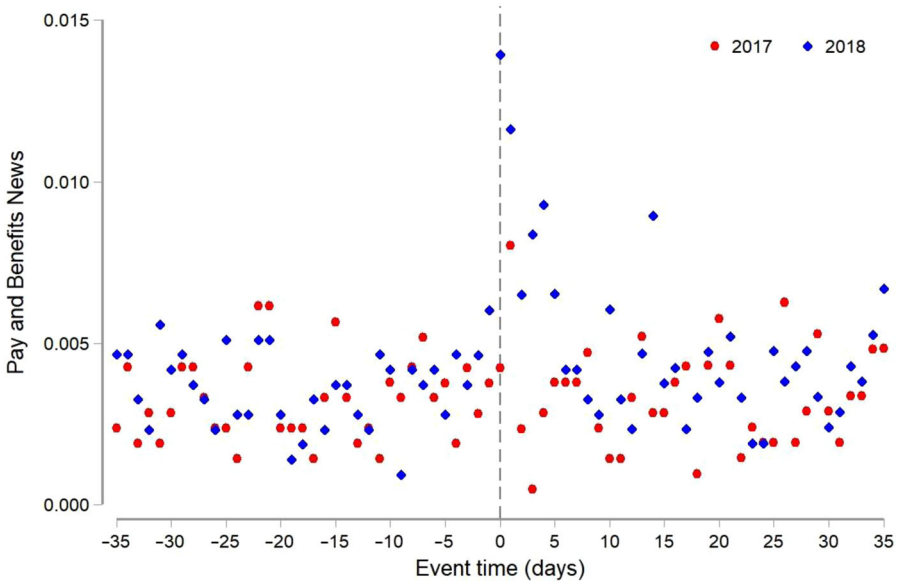

Figure 1. Compensation and benefits news around proxy filing dates. This figure plots the average fraction of firms in our sample with news related to the "Compensation and Benefits" SASB news category between 35 days before and after the proxy filing date (Event time = 0) in 2017 (red circles) and 2018 (blue squares), based on *TruValue Labs* data. The sample is based on all firms that could be matched to *TruValue Labs* news data and includes 2,154 firms. (Color figure can be viewed at wileyonlinelibrary.com)

A. Main Results

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. Before analyzing the market response directly, we examine news data from *TruValue Labs* around firms' proxy filings.[5] Figure 1 plots the daily probability of our sample firms having *Compensation and Benefits News* 35 days before and after their proxy filings in 2017 (circles) and 2018 (diamonds). The probability of firms having compensation and benefits-related news spikes right after their 2018 proxy filing dates, while it is much flatter during the same time window in 2017. This result suggests that a firm's pay ratio disclosure is a newsworthy component of its 2018 proxy filing and that the filing date is a reasonable event day.

To analyze the market response, we identify 2,135 firms in our sample with nonmissing daily returns over a seven-day event window, from one day before the pay ratio announcement to five days after the announcement, as well

[5] *TruValue Labs* (https://www.truvaluelabs.com/trends/esg-integration) employs big data and artificial intelligence to collect and analyze unstructured data from a wide variety of sources (e.g., media, think tanks, industry analysts, government regulators, and NGOs), excluding company self-reported data (e.g., press releases, conference calls, and official filings). *TruValue Labs* uses more than 140,000 worldwide sources that are vetted, reputable, and credible.

as nonmissing *Book-to-Market* data. We calculate abnormal returns between event days −1 and + 5 as the difference in bps between a firm's daily return and the value-weighted CRSP market return, with both returns excluding dividends. To control for outliers, we eliminate 128 firms with daily abnormal returns that deviate by more than three standard deviations from the sample mean, where both the mean and the standard deviation of daily abnormal returns are calculated across all stocks in our sample across all days in 2018. For the remaining 2,007 firms, we calculate cumulative abnormal returns between days −1 and +5, *CAR* [−1,+5]. Panel E of Table I reports summary statistics of *CAR* [−1,+5]. The average (median) cumulative abnormal return around the pay ratio announcement is 39.9 bps (38.1 bps) with a cross-sectional standard deviation of 408.2 bps. For robustness, we also calculate cumulative abnormal returns for shorter windows and cumulative abnormal returns based on the CAPM and the Carhart (1997) four-factor model. While both the average and the median *CAR* [−1,+5] are positive in our baseline specification, they are around zero when we use the Carhart four-factor model.

We next 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*:

$$CAR[-1,+5]_i = a + b\,LN\,Pay\,Ratio_i + c\,\ln\left(MktCap\right)_i + d\,Book\text{-}to\text{-}Market_i + e_i. \quad (1)$$

A.1. Baseline Results

Column (1) of Table II reports our baseline result with respect to the equity market's reaction to within-firm pay dispersion as captured by firms' newly disclosed 2018 pay ratios. We observe a significantly negative relation between *LN Pay Ratio* and the cumulative abnormal announcement return, that is, the market reaction is more negative for firms with a higher pay ratio relative to firms with a lower pay ratio. In particular, a one-standard-deviation increase in pay ratio decreases a firm's seven-day cumulative abnormal return by about 42 bps. In Internet Appendix Table IA.III, we show that our results are robust to using shorter event windows such as [−1, +1] and [−1, +3] trading days as well as to using abnormal returns relative to the CAPM or the Carhart (1997) four-factor model.

As we mentioned above, the City of Portland Oregon enacted a special business tax on firms with a pay ratio above 100. Other jurisdictions have considered to follow suit.[6] Thus, pay ratios of 100 or higher may attract particular attention from various stakeholders. In Figure 2, we plot the relation between

[6] See, for example, https://inequality.org/action/corporate-pay-equity/ for a list of state legislative proposals related to CEO-worker pay ratios. For instance, a 2020 proposal in San Francisco to increase business taxes on companies with a pay ratio above 100 was approved by 65% of San Francisco voters.

Table II
Equity Market Reaction to Pay Ratio

This table reports the relation between cumulative abnormal returns during the event window [−1, +5] days around the 2018 proxy filing dates (*CAR* [−1, +5]) and the reported pay ratios. II(*PR* ≥ 100) is an indicator variable equal to one if the reported pay ratio is at least 100. Standard errors are double-clustered by announcement date and (SIC2) industry. ***, **, and * denote significance at 1%, 5%, and 10% level, respectively. All variables are defined in the Appendix.

	CAR [−1, +5]		
	(1)	(2)	(3)
LN Pay Ratio	−33.4***	−21.3*	−34.2***
	(9.0)	(12.6)	(10.0)
II (*PR* ≥ 100)		−44.3	
		(29.7)	
ln(*MktCap*)	4.0	5.5	3.7
	(8.0)	(8.2)	(8.2)
Book-to-Market	−57.5	−56.2	−60.1
	(44.7)	(44.7)	(44.1)
Several Pay Ratios			35.5*
			(18.8)
Fraction Non-US			−38.8
			(65.6)
Part-Time Worker			14.5
			(52.4)
De Minimis			28.3
			(24.5)
Cost-of-Living Adj.			−98.1
			(75.6)
LN Length PR Section			−26.1
			(21.3)
Constant	179.0***	131.7	379.9**
	(65.2)	(80.6)	(186.1)
Observations	2,007	2,007	2,007
Adjusted R^2	0.008	0.009	0.008

CAR [−1, +5] (in bps, vertical axis) for different definitions of abnormal returns and different pay ratio intervals above and below 100 (horizontal axis).[7] While we observe an overall negative relationship between *CAR* [−1, +5] and the pay ratio, there appears to be a kink as pay ratios exceed 100. In column (2) of Table II, we augment our baseline model by an indicator variable that is equal to one for a pay ratio of 100 or larger and zero otherwise. While we find some support for a more pronounced market response to pay ratios above 100, the effect of high pay ratios is statistically insignificant. We therefore continue to use a linear specification as it provides a parsimonious approximation of the market reaction to *LN Pay Ratio*.

[7] This figure plots coefficient estimates associated with different pay ratio intervals, b_k, from the regression $CAR\ [-1, +5]_i = a + \Sigma_k\ b_k \times \text{II}\ (Pay\ Ratio_i \in Interval_k) + c\ \ln(MktCap)_i + d\ Book\text{-}to\text{-}Market_i + e_i$.

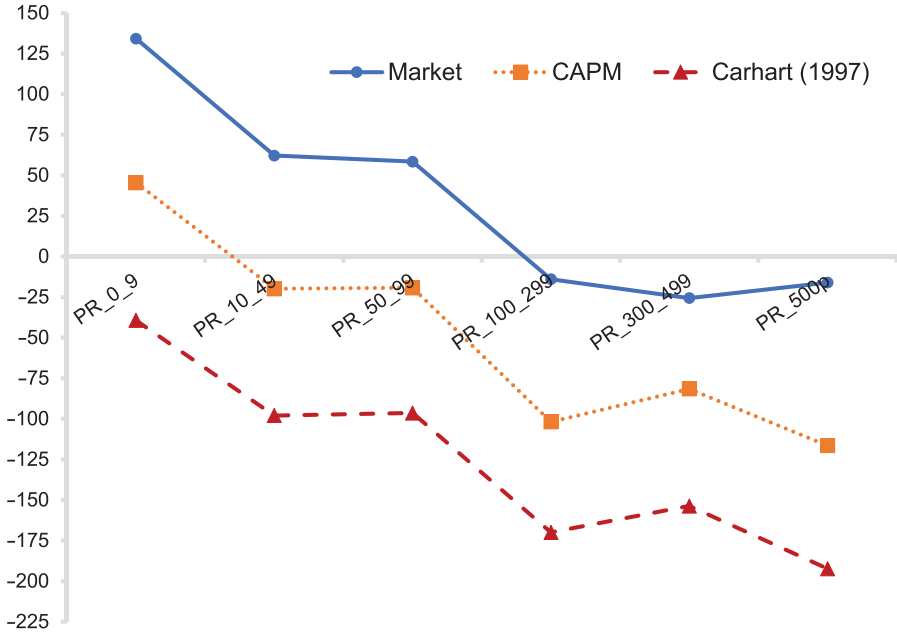

Figure 2. Equity market reaction and pay ratio intervals. This figure plots the relation between *CAR* [−1, +5] defined according to three asset pricing models (in basis points, vertical axis) and different pay ratio intervals (horizontal axis). For each line, we estimate the regression $CAR\ [-1, +5]_i = a + \Sigma\ b_k \times \text{II}(Pay\ Ratio_i \in Interval_k) + c\ ln(MktCap)_i + d\ Book\text{-}to\text{-}Market_i + e_i$., where II($Pay\ Ratio_i \in Interval_k$) is an indicator for a firm's pay ratio being in one of the following intervals: [0,10), [10, 50), [50, 100), [100, 300), [300, 500), or [500, ∞). The cumulative abnormal returns, *CAR* [−1, +5] are defined in three ways: relative to the overall market return as described in Section II.A (blue solid line with circles), relative to the CAPM (orange dotted line with squares), and relative to the Carhart (1997) four-factor model (red dashed line with triangles). (Color figure can be viewed at wileyonlinelibrary.com)

To ensure that the observed market reaction is indeed in response to the released pay ratio information, in column (3) we verify that additional information disclosed in the pay ratio section of the proxy statement or differences in firms' choices regarding the presentation of the pay ratio information do not change the sensitivity of the market reaction to *LN Pay Ratio*.

A.2. Pay Dispersion versus Pay Levels

While the results in Table II are consistent with a negative market reaction to high pay ratios due to concerns about within-firm pay dispersion, they are also consistent with the market responding to information about pay levels of CEOs or median workers. For example, high pay ratios due to low worker pay could be correlated with low worker productivity and thus lead to a negative response to high pay ratios. Given the collinearity between the pay ratio, CEO pay, and median worker pay, it is not possible to examine the market response

Table III
Pay Disparity versus Pay Levels

This table reports the relation between cumulative abnormal returns during the event window [−1, +5] days around the 2018 proxy filing dates (*CAR* [−1, +5]) and the reported pay ratios and pay levels. *LN Pay Ratio*, *LN CEO Pay*, and *LN Worker Pay* in the first three columns are defined in Section I. In columns (4) to (6), we drop firms with reported pay ratios equal to zero (five firms) and firms with discrepancies between the reported pay ratio and the ratio of the reported CEO pay and worker pay (103 firms). *ln*(*CEO Pay*/*Worker Pay*) and *ln*(*CEO Pay*) are logarithms of the calculated pay ratio and the reported CEO pay (without adding one to it), respectively. Significance of tests to reject various null hypotheses are reported at the bottom of the table. Standard errors are double-clustered by announcement date and (SIC2) industry. ***, **, and * denote significance at 1%, 5%, and 10% levels, respectively. All variables are defined in the Appendix.

	CAR [−1, +5]					
	(1)	(2)	(3)	(4)	(5)	(6)
LN Pay Ratio (α)	−33.3**	−30.8**				
	(13.9)	(15.4)				
ln(*CEO Pay*/*Worker Pay*) (a)				−35.0**	−30.8**	
				(16.4)	(13.4)	
LN CEO Pay (β)	−0.1		−17.1			
	(15.3)		(11.3)			
ln(*CEO Pay*) (b)				4.2		−30.8**
				(25.2)		(13.4)
LN Worker Pay (γ)		5.1	34.1**		4.2	35.0**
		(24.3)	(15.4)		(25.2)	(16.4)
ln(*MktCap*)	4.0	2.8	−2.8	4.1	4.1	4.1
	(7.9)	(8.2)	(7.8)	(8.3)	(8.3)	(8.3)
Book-to-Market	−57.5	−57.8	−59.7	−32.6	−32.6	−32.6
	(44.7)	(44.0)	(44.3)	(45.4)	(45.4)	(45.4)
Constant	180.4	121.6	−24.0	103.8	103.8	103.8
	(191.8)	(300.8)	(277.1)	(296.1)	(296.1)	(296.1)
Observations	2,007	2,007	2,007	1,899	1,899	1,899
Adjusted R^2	0.008	0.008	0.008	0.010	0.010	0.010
p-Value for the test: $\alpha + \beta = 0$	0.001					
p-Value for the test: $-\alpha + \gamma = 0$		0.0159				
p-Value for the test: $\beta + \gamma = 0$			0.457			
p-Value for the test: $\alpha + \beta = 0$				0.0217		
p-Value for the test: $-\alpha + \gamma = 0$					0.0336	
p-Value for the test: $\beta + \gamma = 0$						0.869

to the pay ratio while controlling for CEO pay and worker pay at the same time. We therefore include CEO and worker pay separately in our baseline specification to distinguish the market reaction to pay dispersion from that to pay levels.

The results in columns (1) and (2) of Table III suggest that the coefficient on the pay ratio is largely unaffected by the inclusion of pay levels, while the coefficients on CEO pay and worker pay are small and insignificant. Therefore, the market reaction to the pay ratio is not explained by either of the pay levels

alone. In column (3), we examine the market response to the two components of the pay ratio—CEO pay and median worker pay. Specifically, we find that the market has opposite reactions to the two components. While the market reaction to worker pay is positive and significant, it is negative for CEO pay, suggesting that the market does not view pay as simply reflecting worker skill or productivity.

Note that we construct *LN Pay Ratio* as the logarithm of one plus the reported pay ratio, for two reasons. First, doing so allows us to include a few firms that reported a pay ratio of zero (due to CEO pay of zero) in the analysis. Second, occasionally the reported pay ratio deviates from the ratio of the two pay variables reported in the same section. As a robustness check, we drop five observations with CEO pay equal to zero and 103 observations with (mostly small) discrepancies between the reported pay ratio and the ratio of the reported CEO pay and worker pay. We then construct an alternative pay ratio, *ln*(*CEO Pay*/*Worker Pay*), using the reported pay levels and repeat the analysis in columns (1) to (3). The results in columns (4) to (6) are similar to those in the first three columns. They also make it easy to see that due to perfect collinearity between *ln*(*CEO Pay*/*Worker Pay*) and the logarithms of the two pay components, the three tests in columns (4) to (6) are in fact identical.

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

A.3. Investor's Expectations about Pay Ratio

So far we treat the raw pay ratio as the relevant quantity that markets learn about and respond to. However, investors may anticipate some differences in pay ratios across firms due to, for example, firm size or previously disclosed CEO compensation. Investors may also update their prediction of firms' pay ratios after observing the disclosure of industry peers. We address these issues in Table IV.

Column (1) of Table IV reports results from our baseline regression augmented by a large number of firm characteristics, including firm size and industry association, as well as past CEO pay. While disclosed pay ratios vary predictably with these pay ratio determinants (see Internet Appendix Table IA.II), the effect of *LN Pay Ratio* remains essentially unchanged relative to the baseline specification in column (1) of Table II.[8]

In columns (2) and (3), we contrast the market reaction to the 2018 pay ratio disclosure between a subset of 429 firms that reported total staff expenses and hence *average* worker pay before 2018, either voluntarily or due to Federal Deposit Insurance Corporation (FDIC) regulation in the case of commercial

[8] In column (1), information on past CEO pay or past returns is missing for five firms, leading to a sample size of 2,002 instead of 2,007. The baseline estimate for the coefficient on *LN Pay Ratio* for this sample is −31.6.

Table IV

Investors' Expectations about Pay Ratios

This table reports the relation between cumulative abnormal returns and the reported pay ratios, controlling for various firm characteristics (column (1)) and subsamples (columns (2), (3), (5), and (6)). In columns (2) and (3), we split the sample into a subsample that already reported total employee costs (COMPUSTAT item "Staff Expense") before 2018 and the remaining firms. In column (4), we decompose pay ratio into an expected and a surprise component, as explained in Section II.C. Finally, in columns (5) and (6) we split the sample based on whether the firm is among the first 10 filers in its industry. Standard errors are double-clustered by announcement date and (SIC2) industry. ***, **, and * denote significance at 1%, 5%, and 10% level, respectively.

	CAR [−1, +5]					
		Prior Disclosure of Staff Expense	No Prior Disclosure		First 10 Filers within Industry	Not First 10 Filers
	(1)	(2)	(3)	(4)	(5)	(6)
LN Pay Ratio	−32.1***	−33.8*	−35.6***		−33.8*	−34.2***
	(6.1)	(18.6)	(9.0)		(17.6)	(12.6)
$LN\ Pay\ Ratio_{Surprise}$				−37.8***		
				(8.0)		
$LN\ Pay\ Ratio_{Expected}$				−34.5**		
				(17.0)		
ln(*MktCap*)	8.5	−23.5**	12.0	8.0	−7.1	7.8
	(28.9)	(11.5)	(7.5)	(10.2)	(14.4)	(9.2)
Book-to-Market	−68.3	−131.7***	−24.0	−47.3	−45.2	−61.8
	(55.0)	(47.9)	(51.6)	(48.8)	(66.2)	(49.9)
LN Past CEO Pay	7.2					
	(8.6)					
LN Total Assets	−12.1					
	(27.6)					
LN Assets/Employee	8.1					
	(19.0)					
R&D	−101.2**					
	(48.4)					
R&D Missing	−88.4***					
	(30.4)					
ROA	−1.2					
	(1.7)					
Ann. Stock Return	6.2					
	(25.9)					
Leverage	−0.4					
	(0.6)					
Constant	244.4***	389.3***	120.3*	148.2**	271.3**	152.3**
	(51.2)	(68.1)	(66.5)	(59.8)	(129.6)	(73.9)
Ind. and State FE	x					
Observations	2,002	429	1,578	1,779	536	1,471
Adjusted R^2	0.028	0.042	0.007	0.008	0.009	0.008

banks, and the remaining firms. These reported only CEO pay up to 2018. We find a very similar market reaction to pay ratios for both sets of firms.

We next examine pay ratios in a dynamic way to approximate how investors may have updated their expectations throughout 2018. Specifically, for a given firm, we regress the pay ratio of all firms with announcement dates up to one week before the firm's own announcement on the most important determinants of the pay ratio.[9] We then use these coefficient estimates to predict the firm's pay ratio and to decompose the firm's disclosed pay ratio into a predicted and possibly expected component versus a residual and possibly surprise component. The results in column (4) reveal a significantly negative market reaction to both the surprise and the expected component, consistent with markets responding to the raw pay ratio numbers at the time of their disclosure. We also try to capture markets' expectations in a nonparametric way by dividing the sample into early and late reporting firms, that is, the first 10 firms per industry to report their pay ratio in 2018 and the remaining firms in the industry. The results in columns (5) and (6) of Table IV indicate that markets react similarly to the pay ratios of these two groups, suggesting little updating of pay ratio expectations over time.[10]

Possible explanations for this seeming informational inefficiency include the cost of information processing and the salience of the pay ratio numbers due to their newly mandated disclosure. Blankespoor, deHaan, and Marinovic (2020) highlight the importance of processing costs and suggest that investor learning from public data such as financial statements is not an automatic action but rather an active economic choice. Our results suggest that the ex ante costs of acquiring and processing information about pay ratios may have been too high relative to the expected benefits. The 2018 public disclosure of pay ratios may also have directed the attention of a large number of investors to significant pay dispersion within U.S. firms for the first time. Similar to our setting, Hartzmark and Sussman (2019) find that mutual fund investors respond to an increase in the salience of funds' ESG ratings, even though all necessary information was already available.

B. Robustness

B.1. Other Events or Omitted Firm Characteristics

While the pay ratio disclosure constitutes a well-defined event for each firm, it is possible that the pay ratio announcement is confounded by other important news during the event windows. Similarly, it is possible that the newly disclosed pay information is correlated with other firm characteristics

[9] We employ lagged *LN CEO Pay*, *LN Total Assets*, and industry (SIC 2) fixed effects as predictors. To ensure sufficiently accurate estimates, we exclude approximately 230 firms announcing before March 15, 2018. Finally, for firms without prior-year CEO pay, we estimate prior-year CEO pay using firm size and industry averages.

[10] In Internet Appendix Table IA.IV, the results are also unchanged when we include weekly, monthly, or quarterly time fixed effects to account for a potentially time-varying benchmark.

that are associated with abnormal returns. We address these concerns in Internet Appendix Table IA.V, Panel A. In column (1), we exclude firms with original or amended 10-K or 10-Q filings (108 firms), earnings calls as identified by Capital IQ (376 firms) or 8-K filings of unscheduled material events or corporate leadership changes (397 firms) during our event window. With a total of 750 firms being excluded, our baseline result remains unchanged.

In columns (2) and (3) of Internet Appendix Table IA.V, Panel A, we show that markets react to pay ratios when they are disclosed in the 2018 proxy statements, but not around the 2017 proxy filings, suggesting that the announcement returns reflect the market's response to the newly available pay ratio as opposed to other preexisting firm characteristics. This finding is confirmed in regression analysis reported in Panel B of Internet Appendix Table IA.V that uses all daily abnormal returns for a given firm in 2018 until the end of the event window. The coefficient estimate on the pay ratio is negative and significant only during the event window, not before.[11] The daily frequency analysis also allows for clustering of standard errors by calendar day and by industry to account for any contemporaneous correlations between error terms. The results suggest that the standard errors in our baseline results are not biased downward.

B.2. Short-Term Reversal

Our baseline regression results document a significantly negative market reaction to the pay ratio around the time when firms' pay ratios are initially announced. The market response could represent either a persistent change in firm valuations or a price pressure effect that reverses within a short period. To shed light on the persistence of the documented effect, in Figure 3 we consider a longer time horizon of up to 60 trading days and report compounded abnormal returns for equally weighted portfolios of stocks in the bottom and top terciles of the pay ratio distribution. The figure suggests no evidence of a quick reversal in the market reaction to pay ratios. Thus, the newly mandated disclosure of within-firm pay dispersion could have led to a persistent reassessment by investors of the implications of pay dispersion and income inequality for firm valuations.

III. The Role of Shareholders' and Other Stakeholders' Inequality Aversion

Overall, our results above suggest that the market responds negatively to the announcement of a high CEO-worker pay ratio independent of CEO or worker pay levels. The negative market reaction could be driven by investor concerns about negative responses from other stakeholders such as employees,

[11] When we multiply the coefficient estimate during the event window by seven to account for the different frequency of the dependent variable, the effect size is similar to the one in column (1) of Table II ($-4.9 \times 7 = -34.3$ versus -33.4).

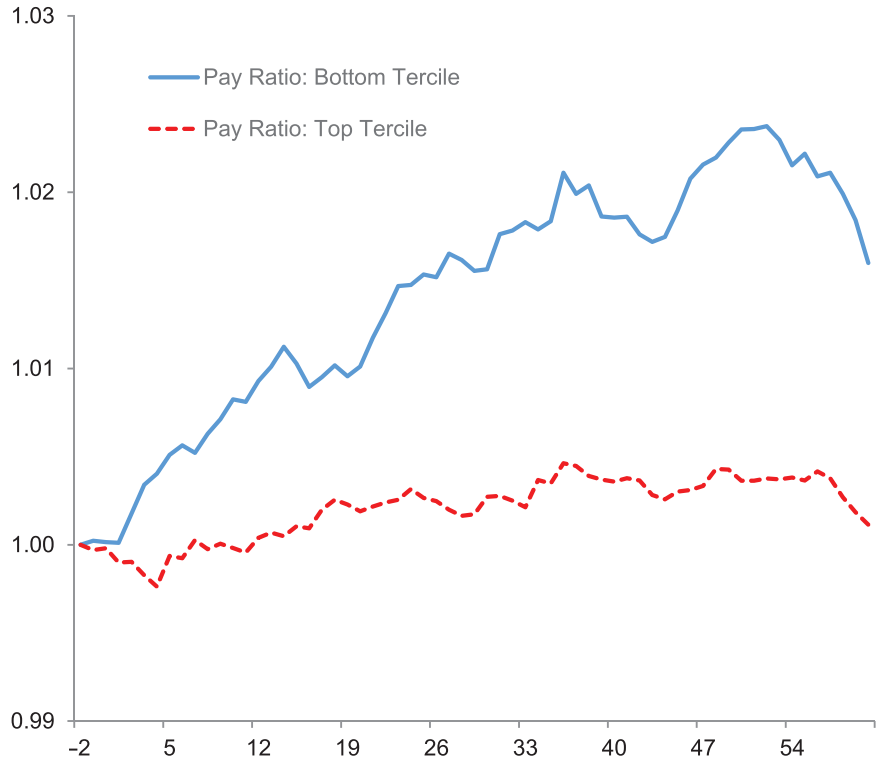

Figure 3. Compounded abnormal returns over 60 trading days. This figure plots 1 + abnormal returns compounded over a period of up to 60 trading days, starting one day before the pay ratio announcement date for the equally weighted portfolios of stocks with pay ratios in the bottom (solid blue line) and top (red dashed line) terciles of the pay ratio distribution. (Color figure can be viewed at wileyonlinelibrary.com)

customers, and local governments reducing firms' future cash flows. It could also be driven by reduced investor demand for the stocks of firms with a high pay ratio because inequality-averse investors are reluctant to invest in firms that contribute to income inequality and are perceived as socially irresponsible. In the latter case, firms with a high pay ratio would experience a reduction in their investor base, which would likely depress their equity price and increase their cost of capital (see Merton (1987) and Heinkel, Kraus, and Zechner (2001)).

The two mechanisms above are not mutually exclusive and the market response to a firm's pay ratio should vary with the strength of the inequality aversion of the firms' other stakeholders as well as its existing shareholders. For example, firms with inequality-adverse customers that disclose a high pay ratio are likely to experience more negative cash flow consequences than similar firms whose customers are less concerned about income inequality.

Although firms may be able to change their customer base, such changes are likely to be costly and slow.

Similarly, a firm's current investor composition could affect the market reaction to the firm's pay ratio announcement as existing shareholders are more likely to pay attention to news about the firms they own (Hartzmark, Hirshman, and Imas (2019)) and the universe of current investors tends to be persistent, that is, changes in demand are more likely due to current or recent owners (Koijen and Yogo (2019)).[12] In addition, even if we ignore short-selling constraints, it is unlikely that inequality-averse investors would short-sell firms with a high pay ratio to express concerns about pay dispersion. We therefore expect high-pay-ratio firms with more inequality-adverse investors to experience a more negative demand shock and, due to downward-sloping demand curves, a more negative price impact than high-pay-ratio firms with more inequality-neutral investors.

To better understand the observed market reaction to the announcement of pay ratio, in this section we analyze the extent to which variation in the inequality aversion of firms' shareholders and other stakeholders across firms can explain cross-sectional variation in observed pay ratio announcement returns.

A. Measuring Inequality Aversion of Shareholders and Other Stakeholders

While the inequality aversion of shareholders and other stakeholders is not observable, we assume that it is correlated with the social norms and attitudes with respect to income inequality in the states in which a firm's shareholders and other stakeholders are located. Prior research documents that decisions by individuals reflect local cultural norms, that is, beliefs and values shared by local residents (see, e.g., Hilary and Hui (2009), Kumar, Page, and Spalt (2011), Di Giuli and Kostovetsky (2014), Shu, Suleaman, and Yeung (2012), Hoi, Wu, and Zhang (2019), and Hayes, Jiang, and Pan (2021)).

We therefore use local attitudes toward income inequality to capture the inequality aversion of shareholders and other stakeholders in each state. Individuals' attitudes toward income inequality are generally reflected in their preferences for redistribution. Inequality aversion is therefore likely correlated with political views (see, e.g., Alesina and Giuliano (2011), Luttmer and Singhal (2011), and Bavetta, Donni, and Marino (2019)). In the United States, the Democratic Party seems to be closer to a "Rawlsian" view that redistribution will increase social justice, while the Republican Party seems to be closer to a "libertarian" view that market outcomes are generally fair. Accordingly, we use the degree of support for the Democratic candidate in the 2016 U.S. presidential elections in a state as a proxy for the revealed inequality aversion in the state. Recent literature also suggests that inequality aversion is correlated

[12] Koijen and Yogo (2019) show that for institutional investors the set of stocks that likely constitute an investor's investment universe does not change much over time. Similarly, the set of retail investors for a given firm is likely persistent due to local or home bias among retail investors.

with support for redistributive policies that are intended to reduce income inequality resulting from labor market transactions, for example, through progressive taxation or minimum wages (see Epper, Fehr, and Senn (2020), Kerschbamer and Müller (2020)). We therefore consider the progressivity of state income taxes, that is, the difference between the maximum and minimum individual income tax rates in a state,[13] as well as a state's minimum wage as additional proxies for the revealed inequality aversion of local residents.

These three measures of local attitudes toward income inequality are positively correlated with each other, with correlation coefficients ranging from 0.14 to 0.64. To aggregate the information in these measures, we construct their first principal component as our main measure of inequality aversion.[14] In Internet Appendix Table IA.VI, we further validate this measure by showing that it is significantly and positively correlated with the fraction of respondents in a state that consider income inequality an important economic issue, based on a PEW survey in 2016.[15]

To capture the exposure of a firm's cash flow to possible adverse reactions by employees, customers, or local governments, we proxy for these stakeholders' inequality aversion using the weighted average inequality aversion in the states in which the firm operates. To gauge the geographic distribution of a firm's operations, we use location-related business data from *Infogroup*.[16] Specifically, we calculate the fraction of a firm's branches, employees, and sales in each state in 2017. Given the significant correlation between these three fractions (based on the number of branches, employees, and sales), we use their first principal component as the weight when calculating the weighted average inequality aversion across all states in which a firm operates.[17] We refer to the resulting measure as "*Inequality Aversion: Operations*."

Similarly, we capture the inequality aversion of a firm's shareholders, "*Inequality Aversion: Investors*," by using the weighted average inequality aversion across the states in which a firm's U.S. shareholders reside. For institutional investors, we use Thomson Reuter's Institutional (13F) Holdings and Global Ownership databases to obtain information on a firm's institutional investors, their percentage ownership at the end of 2017, and their headquarters location. We note that our assumption that the investment decisions of institutional investors reflect local norms seems unlikely to hold for large national institutional investors such as Vanguard and BlackRock, whose clients and operations likely spread across many states, and we thus exclude the 11 largest institutional investors with equity holdings exceeding

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

[14] The first principal component has an eigenvalue of 1.73 and the second principal component has an eigenvalue of 0.92.

[15] We use the PEW survey data in a robustness test in Internet Appendix Table IA.VII (Panel C), with the caveat that only 20 states have 20 or more respondents.

[16] Infogroup compiles data from various sources such as telephone white page directories, utility new connects, real estate property data, credit card billing statements, and public records.

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

USD 250 billion at the end of 2017.[18] We also exclude firms with institutional ownership exceeding 100%, as these observations could reflect data errors (e.g., reporting delay) or large short-selling positions, leading to unreliable weights to reflect investor preferences.

For individual investors, the literature on home bias (see Edmans, Garcia, and Norli (2007) and Chang et al. (2012)) suggests that they tend to be local. We thus use the degree of inequality aversion in the firm's headquarters state to proxy for the inequality aversion of its retail investors. The weight assigned to individual investors is one minus total institutional ownership in the firm (including ownership by the largest domestic institutional investors and all foreign institutional investors).[19] For ease of interpretation, we standardize both *Inequality Aversion: Operations* and *Inequality Aversion: Investors* to have a mean of zero and a standard deviation of one within our sample.

The strength of the location-based measure is that it provides a unified way to capture both shareholders' and other stakeholders' attitudes toward income inequality based on their locations. Specifically, the location-based approach allows us to potentially differentiate between the impact of shareholders and that of other stakeholders as long as firms' shareholders and operations (that is, employees and customers) are not identically distributed across the United States. A shortcoming of the location-based measure is that it is relatively coarse and assumes that all investors and other stakeholders at the same location have the same preferences.

For robustness, we construct an alternative measure of institutional investors' revealed social preferences based on their portfolio holdings. For each institutional investor, we first calculate the value-weighted average of the size-adjusted MSCI KLD Social Index score of the investor's portfolio firms, using the portfolio weights at the end of 2017.[20] For each firm in our sample, we then average across its institutional investors' revealed social preferences, that is, across its investors' average MSCI KLD Social Index scores, using the institutional investors' ownership fractions in the firm as weights. We refer to this alternative preference measure as "*KLD Social: Inst. Investors*."

An advantage of this alternative measure is that it may better capture relevant heterogeneity across investors as it uses the strengths and weaknesses of an investor's existing portfolio with respect to social issues rather than state-level proxies associated with an investor's location. A disadvantage of

[18] Specifically, we exclude the following institutional investors: BlackRock Institutional Trust Company, Capital Research Global Investors, Capital World Investors, Fidelity Management & Research Company, Geode Capital Management, JP Morgan Chase & Company, Melon Bank, State Street Corporation, T. Rowe Price Associates, The Vanguard Group, and Wellington Management Company.

[19] After excluding the largest domestic and all foreign institutional investors, we rescale the remaining ownership fractions such that they add up to 100%.

[20] A portfolio firm's MSCI KLD Social Index score is the difference between the number of strengths and concerns across all MSCI KLD Social Index categories. The size adjustment to a firm's raw KLD social score removes systematic differences in the KLD scores between smaller and larger firms (see, e.g., Berg Kölbel, and Rigobon (2019)) and mitigates the concern that investors hold a high social score portfolio for other reasons such as a preference for large-cap stocks.

this measure is that it captures an investor's revealed attitudes toward social issues beyond just income inequality. However, studies in economics and sociology document that inequality aversion is correlated with other social preferences (see, e.g., Fehr and Schmidt (2006), Chapman et al. (2019)), and thus it is reasonable to assume that investors concerned with social issues in general are likely to be concerned with pay dispersion and income inequality in particular.

B. Evidence from the Location-Based Measure of Inequality Aversion

In Table V, we provide evidence on the possible mechanism behind the market reaction to the pay ratio. Specifically, Table V provides evidence on whether the market reaction reflects inequality aversion of firms' shareholders, other stakeholders, or both. To do so, we augment our event return regression in equation (1) with the interaction terms of *LN Pay Ratio* × *Inequality Aversion: Investors* and *LN Pay Ratio* × *Inequality Aversion: Operations*.

In Table V, Panel A, the coefficient on the interaction of *LN Pay Ratio* × *Inequality Aversion: Operations* is negative but statistically insignificant in column (1), while that on the interaction of *LN Pay Ratio* × *Inequality Aversion: Investors* is negative and statistically significant in column (2), suggesting a more negative market reaction to high pay ratios for firms with more inequality-averse shareholders.

Since *Inequality Aversion: Operations* and *Inequality Aversion: Investors* have a significantly positive correlation of 0.65, we include both interaction terms in column (3) to differentiate between the effects of stockholders versus other stakeholders. The interaction effect with *Inequality Aversion: Operations* changes signs but remains statistically insignificant and economically small. In contrast, the interaction effect with *Inequality Aversion: Investors* remains statistically significant and similar in magnitude to that in column (2). A one-standard-deviation increase in shareholders' inequality aversion increases the sensitivity of the market reaction to pay ratios by 72% (= 27.6/38.3). In Panel A of Internet Appendix Table IA.VII, we repeat the analysis employing each component of our inequality aversion proxy separately and find similar results for each component.

So far we find that the negative market reaction to high pay ratios is more pronounced for firms with shareholders located in states with higher inequality aversion, but not for firms with more operations or sales in such states. To the extent that *Inequality Aversion: Operations* captures the exposure of firms' cash flows to inequality-averse stakeholders such as customers, employees, and local governments, our results suggest that the negative market reaction to high pay ratios is more likely due to a decrease in equity demand by inequality-averse investors rather than to a decrease in expected cash flows.

We note, however, that it is difficult to perfectly disentangle investors' preferences from their subjective expectations. In particular, investors who reside in states with stronger inequality aversion may view high pay dispersion as more of a risk for firms' cash flows than investors who reside in states with weaker inequality aversion. To address this concern, we first conjecture that

Table V

Cross-Sectional Variation in Equity Market Reaction to Pay Ratio

This table presents the heterogeneous market reaction to pay ratio disclosure across firms with different *Inequality Aversion: Operations* and different *Inequality Aversion: Investors*. Panel A reports the main results and Panel B presents various robustness checks. In columns (5) and (6) of Panel A, we use the subsample of firms with a pay ratio less than 100. In columns (1) and (2) of Panel B, we repeat the same exercise as in columns (1) and (3) of Panel A, but exclude firms with total assets in the top quartile of the distribution. In columns (3) and (4) of Panel B, we exclude firms with foreign segments. In Panel C, we study the effect of *Inequality Aversion: HQ State* instead of *Inequality Aversion: Operations*, and we consider institutional investors (column (3)) in additional to all investors (column (2)). The inequality aversion measures are all standardized to have a mean of zero and a standard deviation of one. Standard errors are double-clustered by announcement date and the firm's headquarters state. ***, **, and * denote significance at 1%, 5%, and 10% level, respectively. All variables are defined in the Appendix.

Panel A: Exposure to Cash Flow Risk versus Inequality-Averse Investors

	CAR [−1, +5]					
					Pay Ratio < 100	
	(1)	(2)	(3)	(4)	(5)	(6)
LN Pay Ratio	−39.8***	−38.6***	−38.3***	−38.9***	−33.7*	−31.5**
	(12.1)	(10.4)	(10.4.)	(11.3)	(18.0)	(14.2)
LN Pay Ratio × *Inequality Aversion: Operations*	−8.9		8.0	7.8	−4.4	
	(5.7)		(7.6)	(7.9)	(5.8)	
LN Pay Ratio × *Inequality Aversion: Investors*		−22.6***	−27.6***	−27.3***		−30.9***
		(6.0)	(6.3)	(6.3)		(10.0)
LN Pay Ratio × *Inequality Aversion: Operations* × *Inequality Aversion: Investors*				1.4		
				(3.5)		
Inequality Aversion: Operations × *Inequality Aversion: Investors*				−2.7		
				(7.4)		
Inequality Aversion: Operations	25.3		−31.3	−31.1	12.5	
	(26.4)		(47.7)	(47.7)	(22.6)	
Inequality Aversion: Investors		65.3***	84.3**	83.8**		92.2***
		(19.0)	(32.9)	(33.1)		(27.8)
ln(*MktCap*)	4.7	4.1	3.7	3.8	11.1	9.8
	(9.2)	(8.9)	(9.1)	(9.2)	(10.4)	(10.0)
Book-to-Market	−80.0*	−83.0*	−83.2*	−83.5*	−72.3	−74.0
	(41.2)	(43.2)	(42.7)	(42.9)	(60.1)	(61.2)
Constant	199.8***	200.7***	203.2***	203.2***	136.2	137.7
	(70.2)	(70.8)	(69.4)	(67.7)	(115.6)	(112.1)
Observations	1,667	1,667	1,667	1,667	1,080	1,080
Adjusted R^2	0.013	0.018	0.017	0.016	0.004	0.009

(*Continued*)

an investor's subjective beliefs about firms' cash flow risk should vary with the objective cash flow risk of the firms she invests in, while an investor's disutility from investing in firms that contribute to income inequality should not depend on her portfolio firms' exposure to cash flow risk based on the locations of the firms' operations. In column (4) of Table V, Panel A, we include the triple interaction term *LN Pay Ratio* × *Inequality Aversion: Operations* × *Inequality Aversion: Investors* to examine whether the effect of investors' inequality

Table V—*Continued*

Panel B: Subsample Analysis

	CAR [−1, +5]			
	Excl. Large Firms		Excl. Firms with Foreign Operations	
	(1)	(2)	(3)	(4)
LN Pay Ratio	−34.2**	−33.1**	−44.3*	−43.7**
	(16.5)	(13.7)	(23.8)	(21.1)
LN Pay Ratio × *Inequality Aversion: Operations*	−18.0**	3.8	−17.5	5.2
	(9.1)	(8.7)	(12.6)	(7.8)
Inequality Aversion: Operations	52.0	−21.9	55.9	−14.4
	(36.2)	(43.1)	(38.7)	(41.7)
LN Pay Ratio × *Inequality Aversion: Investors*		−35.6***		−36.4***
		(0.2)		(7.7)
Inequality Aversion: Investors		110.0***		105.7**
		(18.9)		(42.9)
ln(*MktCap*)	0.7	−0.6	12.8	11.6
	(15.6)	(15.2)	(17.9)	(17.3)
Book-to-Market	−110.5**	−116.3**	−74.0	−81.9*
	(48.0)	(47.9)	(45.1)	(43.5)
Constant	220.6**	229.7**	160.3	170.1*
	(99.3)	(99.8)	(102.0)	(106.1)
Observations	1,251	1,251	851	851
Adjusted R^2	0.014	0.019	0.010	0.015

Panel C: Headquarters State and Institutional Investors

	CAR [−1, +5]		
	(1)	(2)	(3)
LN Pay Ratio	−39.6***	−39.2***	−39.8***
	(10.5)	(10.5)	(10.6)
LN Pay Ratio × *Inequality Aversion: HQ State*	−14.9**	4.3	−9.1
	(5.8)	(17.7)	(6.9)
Inequality Aversion: *HQ State*	43.9*	−22.5	18.8
	(23.7)	(96.9)	(28.1)
LN Pay Ratio × *Inequality Aversion: Investors*		−25.7*	
		(15.5)	
Inequality Aversion: Investors		81.8	
		(78.8)	
LN Pay Ratio × *Inequality Aversion: Inst. Investors*			−22.3***
			(7.8)
Inequality Aversion: Inst. Investors			82.6***
			(30.9)
ln(*MktCap*)	4.8	4.0	4.2
	(9.0)	(9.1)	(9.1)
Book-to-Market	−82.0**	−83.4**	−75.7*
	(41.1)	(41.5)	(40.1)
Constant	198.2***	204.4***	200.1***
	(69.9)	(69.5)	(70.1)
Observations	1,667	1,667	1,667
Adjusted R^2	0.015	0.017	0.018

aversion on the market reaction to pay ratios varies with firms' objective exposure to cash flow risk. To the extent that the cash flow risk associated with high pay ratios arises from responses by local stakeholders, the preferences interpretation implies an insignificant triple interaction effect, while the subjective beliefs interpretation implies a negative and significant one. We find that the triple interaction effect is positive, economically small, and statistically insignificant, while the interaction effect between *LN Pay Ratio* and *Inequality Aversion: Investors* remains negative and significant. These results suggest that investors located in states with stronger inequality aversion "dislike" high pay ratios regardless of the objective implications of high pay ratios for firms' cash flow risk. This finding is more consistent with the investor preferences interpretation than with the investor subjective expectations interpretation.

We acknowledge that the above test cannot fully differentiate between investors' preferences and risk expectations if the perceived cash flow risk associated with high pay ratios arises mainly at the national level, for example, due to potential federal regulations rather than the local level. So far all of the (proposed or implemented) regulations related to firms' pay ratios are local rather than federal. Nevertheless, to further mitigate this concern we provide a second analysis that does not rely on local variation in cash flow risk.

Figure 2 suggests that the market response to pay ratios displays a kink around the value of 100. While several factors can lead to this kink, under a cash flow risk channel, regulatory and litigation risk are likely to be nonlinear in firms' pay ratios, disproportionately affecting pay ratios that exceed a certain absolute threshold. The increased business tax on firms with a pay ratio above 100 in Portland, Oregon, is an example of such cash flow risk. This perspective would suggest that firms with a pay ratio less than 100 are less exposed to this type of cash flow risk. If our proxy for investors' inequality aversion captures investors' subjective beliefs about firms' regulatory or litigation risk, then we would expect its effect to weaken among the subset of firms with a pay ratio less than 100. However, the results in columns (5) and (6) of Table V, Panel A, suggest that the effect of *Inequality Aversion: Investors* remains similar to that in the full sample.

Overall, the results in Panel A of Table V are consistent with the interpretation that the negative market reaction to high pay ratios is more related to investors' aversion to high within-firm pay dispersion than to firms' exposures to cash flow risk due to the inequality aversion of other stakeholders.

In Table V, Panel B, we examine subsamples of firms for which we expect a stronger effect from stakeholder preferences. First, we exclude large firms with operations in most U.S. states as they could lower the cross-sectional variation in *Inequality Aversion: Operations*. Second, we exclude firms with foreign operations (based on Compustat segment data) that are left out in the construction of *Inequality Aversion: Operations*. The results in columns (1) through (4) reveal that excluding large firms, that is, firms with book assets in the top quartile of the sample distribution, or firms with foreign operations does not alter our finding that *Inequality Aversion: Investors* dominates the

effect of *Inequality Aversion: Operations* in explaining the cross section of announcement returns.

In Panel C of Table V, we examine the role played by a firm's headquarters state, which likely represents a substantial fraction of firms' investors, particularly retail investors, as well as other stakeholders, such as state or local governments that could impose taxes or other regulations on firms with a high pay ratio. In column (1), we only include the interaction between the inequality aversion of a firm's headquarters state, *Inequality Aversion: HQ State*, and the firm's pay ratio. We observe a significantly negative interaction effect. However, column (2) shows that the effect of inequality aversion in the headquarters state is dominated by the effect of shareholders' inequality aversion, suggesting that while local preferences of the headquarters state matter, they matter mainly through the shareholder preferences channel.

We also examine the role of institutional investors by constructing *Inequality Aversion: Inst. Investors* based on a firm's U.S. institutional investors only. Column (3) suggests that the inequality aversion of institutional investors helps explain the market reaction to pay ratios.

The results using the location-based measures of shareholders' and other stakeholders' inequality aversion consistently point to the importance of shareholders', particularly institutional investors', concerns about income inequality. Internet Appendix Table IA.VII provides further evidence in support of this view using data from Orbis and firms' 10-Ks instead of *Infogroup* to measure firms' operational footprint across U.S. states (Panel B) as well as data from a PEW survey (Panel C) on the importance of income inequality to construct an alternative proxy for the inequality aversion of a firm's shareholders and other stakeholders.

C. Evidence from the Holdings-Based Measure of Investor Preferences

In Table VI, we report results using the alternative measure of institutional investors' social preferences, *KLD Social: Inst. Holdings*, described in Section III.A. Since this measure does not depend on an investor's location, it can be applied to all institutional investors, including the large national institutional investors such as Vanguard and BlackRock. We report results both including (columns (1) and (2)) and excluding (columns (3) and (4)) the largest national institutional investors in the construction of institutional investors' preferences. In both cases, we find that the holdings-based preferences measure moderates the market reaction to pay ratios in a similar way as our location-based preferences measures, controlling for *Inequality Aversion: Operations*.

In columns (2) and (4), we again use triple interaction terms, as in Table VI, Panel A, to examine whether the effect of the holding-based investor preferences measure on the market reaction to pay ratios varies with firms' objective exposure to cash flow risk. As before, we find that this is not the case.

While we believe it is reasonable to assume that investors' concerns over a broad range of social issues are correlated with their concerns about pay dispersion and income inequality, social concerns are likely distinct from

Table VI
Holdings-Based Social Preference Measure

This table uses the holdings-based measure of institutional investors' social preferences. Panel A uses size-adjusted MSCI KLD Social Index scores for the portfolio firms of institutional investors, along with institution-specific portfolio weights, measured as of the end of 2017, as a revealed social preferences measure. Panel B also considers size-adjusted MSCI KLD Environmental and Governance Index scores. The preferences measures are standardized to have a mean of zero and standard deviation of one. Standard errors are double-clustered by announcement date and firm's headquarters state. ***, **, and * denote significance at 1%, 5%, and 10% levels, respectively. All variables are defined in the Appendix.

Panel A: Social Scores

	CAR [−1, +5]			
	(1)	(2)	(3)	(4)
LN Pay Ratio	−40.3***	−39.9***	−40.4***	−40.6***
	(12.3)	(12.4)	(12.3)	(12.5)
LN Pay Ratio × *Inequality Aversion: Operations*	−7.9	−7.8	−7.9	−8.0
	(6.0)	(6.2)	(6.2)	(6.2)
LN Pay Ratio × *KLD Social: All Inst. Holdings*	−9.1**	−8.3**		
	(4.4)	(3.9)		
LN Pay Ratio × *KLD Social: Inst. Holdings*			−8.1*	−8.1*
			(4.6)	(4.2)
LN Pay Ratio × *KLD Social: All Inst. Holdings* × *Inequality Aversion: Operations*		−1.5		
		(7.5)		
LN Pay Ratio × *KLD Social: Inst. Holdings* × *Inequality Aversion: Operations*				2.6
				(6.1)
KLD Social: All Inst. Holdings × *Inequality Aversion: Operations*		12.1		
		(20.9)		
KLD Social: Inst. Holdings × *Inequality Aversion: Operations*				−7.0
				(14.7)
Inequality Aversion: Operations	21.0	20.3	20.9	21.3
	(27.8)	(27.9)	(28.7)	(28.4)
KLD Social: All Inst. Holdings	36.7**	33.3**		
	(15.6)	(16.7)		
KLD Social: Inst. Holdings			34.1*	34.4*
			(18.3)	(18.7)
ln(*MktCap*)	5.8	5.7	5.7	5.7
	(9.6)	(9.6)	(9.6)	(9.6)
Book-to-Market	−75.7*	−74.7*	−75.8*	−75.5*
	(40.5)	(41.3)	(41.3)	(42.6)
Constant	191.0***	188.7***	192.1***	192.4***
	(71.2)	(71.7)	(71.9)	(72.7)
Observations	1,667	1,667	1,667	1,667
Adjusted R^2	0.013	0.012	0.012	0.011

(*Continued*)

environmental or governance concerns. As a robustness test on the validity of the holdings-based measure of investors' social preferences, we construct *KLD Environment: Inst. Holdings* and *KLD Governance: Inst. Holdings* as the value-weighted average MSCI KLD size-adjusted net scores of their portfolio holdings in the environmental and governance categories, respectively. The

Table VI—*Continued*

Panel B: Social Scores versus Environmental and Governance Scores

	CAR [−1, +5]			
	(1)	(2)	(3)	(4)
LN Pay Ratio	−39.6***	−38.0***	−39.6***	−38.9***
	(14.0)	(14.1)	(14.0)	(14.2)
LN Pay Ratio × KLD Social: Inst. Holdings	−8.9**			−9.9*
	(4.1)			(5.6)
KLD Social: Inst. Holdings	36.1**			40.1*
	(16.3)			(20.5)
LN Pay Ratio × KLD Environment: Inst. Holdings		3.9		6.2
		(6.8)		(7.6)
KLD Environment: Inst. Holdings		−21.5		−30.9
		(27.1)		(28.1)
LN Pay Ratio × KLD Governance: Inst. Holdings			−3.4	−1.9
			(13.2)	(13.5)
KLD Governance: Inst. Holdings			11.2	4.4
			(55.3)	(57.0)
ln(MktCap)	5.4	4.1	4.3	4.8
	(9.6)	(9.8)	(9.2)	(9.9)
Book-to-Market	−74.2*	−76.6*	−78.1*	−71.1*
	(42.3)	(44.0)	(41.8)	(42.0)
Constant	191.1***	194.9**	200.8***	189.7**
	(73.7)	(79.5)	(75.5)	(80.2)
Observations	1,667	1,667	1,667	1,667
Adjusted R^2	0.012	0.012	0.011	0.011

results in Panel B of Table VI suggest that only the preferences measure based on the social scores explains the cross-sectional patterns in the market reaction to pay ratios, while measures based on the environment or the governance scores do not.

D. Summary of the Market Reaction Analysis

In summary, we find a significant and robust negative market reaction to high within-firm pay dispersion that is independent of CEOs or median worker pay levels. Our results support the view that equity markets assess high pay dispersion negatively and discount firms with large within-firm pay dispersion.[21]

Our results further suggest that the inequality aversion of a firm's shareholders is likely a channel through which high pay ratios negatively affect firm value. We acknowledge that we cannot entirely rule out the possibility that our measures of investor inequality aversion also capture investors' subjective beliefs about firms' pay-ratio-related cash flow risks. However, we believe that our findings are interesting as they suggest that some investors

[21] See Dittmann, Montone, and Zhu (2021) for evidence that in Germany investors with a preference for low pay-inequality seem to bid up the prices of low-pay-ratio stocks.

are sufficiently concerned about pay dispersion that their concerns affect stock prices and equity demand in a predictable way.

IV. Evidence from Institutional Investors' Portfolio Rebalancing

Since investors' attitudes toward income inequality appear to be an important determinant of the market's reaction to the pay ratio, we expect investors with weaker or stronger inequality aversion to adjust their portfolios differently based on a firm's pay ratio. In this section, we examine whether investors' inequality aversion predicts changes in their existing portfolios in response to the newly available data on the pay ratios of their portfolio firms. We focus on stocks that are already in investors' portfolios at the end of 2017, as the information on the pay ratio of these stocks likely attracts more attention from existing investors (Hartzmark, Hirshman, and Imas (2019)). This focus also allows us to test whether high-pay-ratio stocks with different investor compositions do indeed experience different demand shocks, as suggested by the results in Section III.

We focus on U.S. institutional investors with at least USD 100 million in AUM, since their equity holdings are observable due to quarterly 13F filings. We obtain equity holdings at 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 advisers, 7.7% are banks and insurance companies, the remaining 10.7% are split among investment companies, public and corporate pension funds, university and foundation endowments, and nondefined categories.[22]

As proxies for institutional investors' attitudes toward income inequality, we follow the approach of Section III.A and use both local social norms and policies with respect to income inequality in investors' headquarters states, *Investor Inequality Aversion*, and the value-weighted average size-adjusted KLD Social Index net score of their portfolio holdings at the end of 2017, *Investor KLD Social*. We interpret both measures as proxies for the preferences of portfolio managers and financial advisers, and also for the preferences of their clients. As in Section III.A, we exclude the 11 largest institutional investors with equity AUM of more than USD 250 billion at the end of 2017. The headquarters states for these institutional investors are likely less informative for the location of their managers or their clients (see Footnote 17 for the list of the excluded institutional investors). For the ease of interpretation, both *Investor Inequality Aversion* and *Investor KLD Social* are standardized to have a mean of zero and a standard deviation of one within the institutional investor sample.

To quantify an investor's portfolio adjustments to the new pay ratio information, we investigate the investor's portfolio rebalancing activity between December 31, 2017 and December 31, 2018. Specifically, for each stock in each institutional investor's portfolio in our sample we compute the change in the

[22] Information about investor types comes from the website http://acct.wharton.upenn.edu/faculty/bushee/IIclass.html.

portfolio weight in constant prices between December 31, 2018 and December 31, 2017,

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

where $n_{ij}^{18}(n_{ij}^{17})$ is the number of stock j shares in the portfolio of institutional investor i on December 31, 2018 (2017). We use end-of-2017 stock prices, p_j^{17}, to compute the dollar value of portfolio holdings in both 2017 and 2018. Changes in portfolio weights therefore reflect active rebalancing decisions rather than simply changes in stock prices. The sample average for Δ *Stock Weight*$_{2018}$ is -0.039% and the standard deviation is 0.348%. The change in the sample average portfolio weight is negative because we focus on stocks that are already in an investor's portfolio at the end of 2017.

We next estimate the following regression:

$$\Delta\, Stock\, Weight_{ij} = a + b\, LN\, Pay\, Ratio_j \times Investor\, Inequality\, Aversion_i + \eta_i + \delta_j + \epsilon_{ij}. \quad (3)$$

We include institutional investor fixed effects, η_i, to control for investor characteristics that may be correlated with their attitudes toward income inequality. We also include stock fixed effects, δ_j, to control for 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 inequality aversion. For ease of interpretation, we scale Δ *Stock Weight* by the absolute value of the sample mean (0.039%), so the coefficient estimate represents the effect as a percentage change relative to the sample mean. Finally, we double-cluster standard errors by investor state and stock. The estimation results are reported in Table VII, Panel A.

In column (1), we find that the coefficient on the interaction term *LN Pay Ratio* $\times$ *Investor Inequality Aversion* is negative and statistically significant, suggesting that in 2018, for the same high-pay-ratio stock, institutional investors located in states with stronger inequality aversion rebalance away from the stock more in comparison to those in states with weaker inequality aversion. For a firm with the average value of *LN Pay Ratio* (4.18), a one-standard-deviation increase in *Investor Inequality Aversion* is associated with a reduction in the (rescaled) portfolio weight of 20.1% ($= 4.8 \times 4.18$) relative to the average change in the portfolio weight.

Our location-based proxy for the income inequality attitudes of institutional investors should be more meaningful for institutional investors whose client base is more local. Therefore, in columns (2) and (3) 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 column (2), we include only institutional investors who are independent investment advisers, which are more likely to have a local clientele.

Table VII

Institutional Investor Inequality Aversion and Portfolio Rebalancing

This table reports the relation between the portfolio rebalancing behavior of institutional investors and their inequality aversion as captured by our location-based measure, *Investor Inequality Aversion*, and firm pay ratios. In Panel A, the dependent variable Δ *Stock Weight*$_{2018}$ equals the difference between a stock's weight in an institution's portfolio on December 31, 2018 and its weight on December 31, 2017, where both weights are calculated using constant stock prices as of December 31, 2017. In Panel B, the dependent variable Δ *Stock Weight*$_{2017}$ is defined similarly but for 2017. In both panels, in column (1) the sample includes all institutional investors except those with equity holdings above USD 250 billion as of December 31, 2017. In columns (2) and (3), we restrict the sample further to independent investment advisors and small independent investment advisors with equity holdings below USD 1 billion. Standard errors are double-clustered by investor state and stock. ***, **, and * denote significance at 1%, 5%, and 10% level, respectively. All variables are defined in the Appendix.

Panel A: Institutional Rebalancing in 2018

	Δ *Stock Weight*$_{2018}$		
	Institutional Investors (AUM $\leq$ \$0.25 Tr.) (1)	Independent Investment Advisors (2)	Small Independent Investment Advisors (3)
LN Pay Ratio × *Investor Inequality Aversion*	−0.048*	−0.083**	−0.125***
	(0.024)	(0.031)	(0.045)
Inst. FE, stock FE	x	x	x
Observations	390,286	278,977	123,433
Adjusted R^2	0.111	0.109	0.121

Panel B: Institutional Rebalancing in 2017

	Δ *Stock Weight*$_{2017}$		
	Institutional Investors (AUM $\leq$ \$0.25 Tri.) (1)	Independent Investment Advisors (2)	Small Independent Investment Advisors (3)
LN Pay Ratio × *Investor Inequality Aversion*	−0.021	−0.025	−0.017
	(0.014)	(0.022)	(0.033)
Inst. FE, stock FE	x	x	x
Observations	367,405	262,063	118,173
Adjusted R^2	0.122	0.122	0.134

In column (3), we focus on small independent investment advisers with less than USD 1 billion of equity holdings. For small independent investment advisers, local norms and attitudes 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. In addition, Koijen and Yogo (2019) suggest that smaller institutional investors are much more important in explaining

the cross-sectional variation in asset demand and asset prices because the largest institutions tend to be diversified buy-and-hold investors.

The subsample results in columns (2) to (3) are indeed stronger. For example, for small independent investment advisers, the interaction effect between investor inequality aversion and a firm's pay ratio is 2.6 times larger compared to that for all institutional investors (column (3) versus (1)). Since variation in *Investor Inequality Aversion* is larger in the subsample of small independent investment advisers than in the full sample, the difference in the interaction effects between these two columns is even larger.

In Panel B of Table VII, 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 a firm's pay ratio and institutional investors' income inequality attitudes are economically smaller and statistically insignificant. This suggests that there is no differential rebalancing pattern between more inequality-averse investors and other investors with respect to portfolio firms' pay ratios before the pay ratio disclosure. Thus, the rebalancing decisions are not likely driven by investors' preferences and beliefs about other stock characteristics that are correlated with the pay ratio but are already known before the pay ratio disclosure in 2018.

In Table VIII, we employ *Investor KLD Social* as an alternative proxy for institutional investors' attitudes toward broad social issues. Panel A of Table VIII shows that the holdings-based preference proxy yields results that are similar to those in Panel A of Table VII using the location-based proxy. According to the results in column (1), for a firm with the average value of *LN Pay Ratio* (4.18), a one-standard-deviation increase in *Investor KLD Social* is associated with a reduction of the (rescaled) portfolio weight of 29.3% (=7.0 $\times$ 4.18) relative to the average change in the portfolio weight. In columns (2) and (3), we use the same subsamples of institutional investors as in Panel A of Table VII and again find similar results. For example, for small independent investment advisers, the interaction effect between an investor's portfolio social score and a firm's pay ratio is 2.3 times larger compared to that for all institutional investors (column (3) versus (1)).

In Panel B of Table VIII, we investigate the effects of other components of the KLD ESG Index score on investors' rebalancing patterns in response to the pay ratio disclosure. In particular, for each institutional investor, we compute a value-weighted average size-adjusted KLD Governance Index net score and Environmental Index net score across its portfolio firms based on its portfolio holdings as of December 31, 2017. In columns (1) and (2) of Table VIII, Panel B, we include interaction terms *LN Pay Ratio* $\times$ *Investor KLD Governance* and *LN Pay Ratio* $\times$ *Investor KLD Environment*, respectively. In both cases, we find that institutional investors' attitudes toward a firm's governance and environmental practices are unrelated to their rebalancing behavior in response to the pay ratio disclosure. In column (3), we include the three different components of the KLD ESG measure and confirm that it is indeed investors' social preferences and beliefs that drive their rebalancing behavior. The interaction term between *LN Pay Ratio* and *Investor KLD Social*

Table VIII

Institutional Investor Holdings-Based Preferences and Portfolio Rebalancing

This table reports the relation between the portfolio rebalancing behavior of institutional investors and the social component of their holdings-based preferences captured by *Investor KLD Social* (Panel A), other components of their holdings-based preferences, *Investor KLD Governance* and *Investor KLD Environment* (Panel B), and firm pay ratios. The dependent variable Δ *Stock Weight*$_{2018}$ equals the difference between a stock's weight in an institution's portfolio on December 31, 2018 and its weight on December 31, 2017, where both weights are calculated using constant stock prices as of December 31, 2017. In column (1) of Panel A and columns (1) to (3) of Panel B, the sample includes all institutional investors, except those with equity holdings above USD 250 billion as of December 31, 2017. In column (2), we restrict the sample further to independent investment advisors and in column (3) of Panel A and columns (4) to (6) of Panel B, we consider small independent investment advisors, with equity holdings below USD 1 billion. Standard errors are double-clustered by investor state and stock. ***, **, * and denote significance at 1%, 5%, and 10% level, respectively. All variables are defined in the Appendix.

Panel A: Institutional Rebalancing and Social Preferences

	Δ *Stock Weight*$_{2018}$		
	Institutional Investors (AUM $\leq$ \$0.25 Tri.) (1)	Independent Investment Advisors (2)	Small Independent Investment Advisors (3)
LN Pay Ratio $\times$ *Investor KLD Social*	−0.070**	−0.131**	−0.160**
	(0.033)	(0.052)	(0.077)
Inst. FE, stock FE	x	x	x
Observations	390,286	278,977	123,433
Adjusted R^2	0.111	0.109	0.121

Panel B: Institutional Rebalancing and Other Preferences Components

	Δ *Stock Weight*$_{2018}$					
	Institutional Investors (AUM $\leq$ \$0.25 Tri.)			Small Independent Investment Advisors		
	(1)	(2)	(3)	(4)	(5)	(6)
LN Pay Ratio $\times$ *Investor KLD Social*			−0.074*			−0.175*
			(0.038)			(0.088)
LN Pay Ratio $\times$ *Investor KLD Governance*	−0.041		−0.022	−0.065		−0.026
	(0.036)		(0.037)	(0.071)		(0.070)
LN Pay Ratio $\times$ *Investor KLD Environment*		0.079	0.086		0.099	0.125
		(0.070)	(0.072)		(0.080)	(0.086)
Inst. FE, stock FE	x	x	x	x	x	x
Observations	390,286	390,286	390,286	123,433	123,433	123,433
Adjusted R^2	0.111	0.111	0.111	0.121	0.121	0.121

is negative and significant, while the other two interaction terms are not. In columns (4) to (6), we repeat these analyses for small independent investment advisers and find the same patterns.

In sum, we find that inequality-averse institutional investors rebalance away from high-pay-ratio stocks more than other investors, with this pattern being most pronounced for small and likely local independent investment advisers. Assuming that investors are more likely to trade stocks they are familiar with and that inequality-averse investors are unlikely to short high-pay-ratio stocks to express their views, our findings suggest that high-pay-ratio firms with more inequality-averse shareholders experience a more negative demand shock due to the pay ratio disclosure than do high-pay-ratio firms with less inequality-averse shareholders, consistent with the findings in Section III. More generally, the finding that investors' inequality aversion affects their portfolio decisions supports the view that the investor demand channel contributes at least in part to the market reaction to the pay ratio.

V. Conclusion

In this study, we examine how equity markets view income inequality by assessing the market's response to within-firm pay dispersion. To do so, we exploit a new disclosure rule that as of 2018 requires public firms in the United States to report the ratio of the annual total compensation of a firm's CEO to the median compensation of all other employees at the firm.

We find that the equity market reacts negatively to high pay ratios. Importantly, the market reaction remains negative and significant when we control for CEO and worker pay, suggesting that financial markets react to within-firm pay disparity independent of pay levels. When we explore two potential mechanisms behind the negative market reaction—shareholders' inequality aversion and concerns about potential negative cash flow consequences due to reactions of other inequality-averse stakeholders, such as customers, employees, and local governments—we find that shareholders' inequality aversion is an important determinant of the negative reaction to high pay ratios. In particular, firms whose shareholders are inequality-averse experience significantly more negative market reactions to a high pay ratio. Moreover, consistent with shareholders' inequality aversion moderating the initial market response to the pay ratio, we find that more inequality-averse institutional investors reduce their allocations to stocks with a higher pay ratio relative to other institutional investors.

Our results suggest that the growing presence of investors concerned about pay disparity and income inequality, through their portfolio decisions and impact on firms' valuations, could eventually lead to changes in corporate culture and policies that help restrain inequality. Alternatively, investors may directly pressure firms to decrease the extent of pay inequality through voting or other governance mechanisms (Boone, Starkweather, and White (2020), Chang et al. (2020), Crawford, Nelson, and Rountree (2020), and Knust and Oesch (2020)). Time will tell whether capital markets and shareholders can

be alternative and possibly complementary forces to the political process in addressing income inequality in the United States

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Appendix: Variable Definitions

II ($PR \geq 100$): Indicator variable equal one if the reported pay ratio is at least 100 and zero otherwise.

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

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: Total annual CEO compensation as reported in the firm's 2018 definitive proxy statement.

Cost-of-Living Adj.: Indicator variable equal to 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 (that is, the fraction of voters that voted for Hillary Clinton in a given state, in %).

De Minimis: Indicator variable equal to 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]: Event indicator, equal to one for the event window [−1, +5] 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: Equal to the fraction of non-U.S. employees as reported in the firm's 2018 definitive proxy statement. For companies that do not report this information, it is equal to 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 to zero.

Inequality Aversion: First principal component of the following three state-level variables: *Minimum Wage, State Tax Diff*, and *Democrat Leaning*.

Inequality Aversion: HQ State: The level of *Inequality Aversion* in a firm's headquarters state.

Inequality Aversion: Investors: The holdings-weighted average of state-based *Inequality Aversion* of institutional and retail investors, as of the end of 2017. Institutional investors are assigned *Inequality Aversion* in their headquarters states, where retail investors are assumed to be located in a firm's headquarters state and are assigned its *Inequality Aversion*. For a given firm, we include only U.S.-based institutional investors with equity holdings below USD

250 billion and rescale the weights of the remaining U.S.-based institutional investors and retail investors such that they add up to one. This variable is standardized to have a mean of zero and a standard deviation of one within the sample.

Inequality Aversion: Inst. Investors: This variable is constructed similarly to *Inequality Aversion: Investors*, but it excludes retail investors.

Inequality Aversion: Operations: The weighted average of *Inequality Aversion* across all states a firm operates in. The weights equal the first principal component of the fraction of a firm's branches, employees, and sales (as of 2017) in a given state based on *Infogroup* data.

Investor Inequality Aversion: The level of *Inequality Aversion* in an institutional investor's headquarters state.

Investor KLD Environment: For a given institution, the value-weighted average of the institution's portfolio holdings' size-adjusted MSCI KLD Index net scores (that is, strengths minus concerns) in the environment categories.

Investor KLD Governance: For a given institution, the value-weighted average of the institution's portfolio holdings' size-adjusted MSCI KLD Index net scores (that is, strengths minus concerns) in the governance categories.

Investor KLD Social: For a given institution, the value-weighted average of the institution's portfolio holdings' size-adjusted MSCI KLD Index net scores (that is, strengths minus concerns) in the social categories.

KLD Environment: Inst. Holdings: For a given stock, the weighted-average *Investor KLD Environment* across the U.S.-based institutional investors with equity holdings below USD 250 billion, where the weights are the number of shares held by the investors as of December 31, 2017.

KLD Governance: Inst. Holdings: For a given stock, the weighted-average *Investor KLD Governance* across the U.S.-based institutional investors with equity holdings below USD 250 billion, where the weights are the number of shares held by the investors as of December 31, 2017.

KLD Social: All Inst. Holdings: For a given stock, the weighted-average *Investor KLD Social* across all U.S. institutional investors, where the weights are the number of shares held by the investors as of December 31, 2017.

KLD Social: Inst. Holdings: For a given stock, the weighted-average *Investor KLD Social* across the U.S.-based institutional investors with equity holdings below USD 250 billion, where the weights are the number of shares held by the investors as of December 31, 2017.

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

LN Assets/Employee: The logarithm of the ratio of total assets (AT) over the total number of employees plus one, log(AT/EMP+1), obtained from the firm's 2018 definitive proxy statements and supplemented with the Compustat measure of firm employees (EMP).

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

ln(*CEO Pay*): The logarithm of the reported CEO pay, log(*CEO Pay*), for the firms reporting nonzero CEO compensation.

ln(*CEO Pay*/*Worker Pay*): The logarithm of the reported CEO pay over reported median worker pay, log(*CEO Pay*/*Worker Pay*).

LN Length PR Section: The logarithm of the length (number of characters) of the pay ratio section in the proxy statement plus one, log(length PR section in characters + 1).

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

LN Pay Ratio$_{Expected}$: The predicted component for the following regression. For a given firm, we regress of *LN Pay Ratio* on lagged *LN CEO Pay*, firm size, and industry (SIC 2) fixed effects, including all firms with announcement dates up to one week before the firm's own announcement.

LN Pay Ratio$_{Surprise}$: The residual component from the regression described above.

LN Total Assets: The logarithm of total assets (AT) plus one, log(AT+1).

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

ln(*MktCap*): The logarithm of the firm's market capitalization, log(Market Capitalization).

Mentioned Non-US: Indicator variable equal to 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.

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

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

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

R&D Missing: Indicator variable equal to one if R&D expenditure is missing in Compustat and zero otherwise.

Ann. Stock Return: Annual stock return.

ROA: EBITDA over lagged total assets.

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 Pay Ratios: Indicator variable equal to one if a firm reports two or more values for pay ratio in its 2018 definitive proxy statement and zero otherwise.

Δ *Stock Weight*$_{2018}$: For a given stock in an institution's portfolio, the portfolio weight on December 31, 2018 minus the 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 in an institution's portfolio, the portfolio weight on December 31, 2017 minus the portfolio weight on December 21, 2016, where both weights are computed (in %) using constant prices as of December 31, 2016.

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Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's website:

Appendix S1: Internet Appendix.
Replication Code.