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Research note: Investor perceptions of comparable-to-industry versus higher-than-industry pay ratio disclosures

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ABSTRACT

The usefulness of the CEO-to-employee pay ratio disclosure to investors is subject to significant debate. Our experiment examines participant responses to higher-than-industry and comparable-to-industry pay ratio disclosures in a company. A prior experiment by Kelly and Seow (2016) (hereafter KS) found that incrementally disclosing a higher-than-industry pay ratio on top of higher-than-industry CEO pay had indirect negative effects on the company's perceived investment potential, via negative perceptions about the fairness of the CEO pay and workplace climate. We find that the negative indirect effects of pay ratio disclosures on perceived investment potential in KS are replicable in our study, and for a less extreme comparable-to-industry pay ratio. We do not find evidence that the effects of incremental pay ratio disclosure on investor perceptions are stronger when the pay ratio is higher-than-industry than when it is comparable-to-industry. Our study suggests that the ability of pay ratio disclosures to impact investor perceptions extends across a range of pay ratios.

1. Introduction

The U.S. Securities and Exchange Commission (SEC) recently finalized the pay ratio disclosure rule under Section 953 (b) of the Dodd-Frank Act, which stipulates that companies must disclose the pay of the median employee and the ratio between the pay of the CEO and that of the median employee (hereafter, pay ratio) with effect from 2017 (SEC, 2015). However, the usefulness of pay ratio disclosures to investors is subject to substantial debate (e.g., American Benefits Council, 2012; Trumka, 2010; Warren, 2010; Wartzman, 2011). Some argue that it is not clear how pay ratio disclosures would be useful to investors because “the ratio will inevitably vary widely across industries or businesses without any relevance to the financial performance of a company” (American Benefits Council, 2012). Therefore, to better understand the usefulness of pay ratio disclosures to investors, it is important to examine how investors process pay ratio variations that reveal different degrees of pay inequity between the CEO and the median employee.

Kelly and Seow (2016) (hereafter KS) use an experiment with Singapore MBA students acting as investors and find that incremental higher-than-industry pay ratio disclosure (versus higher-than-industry CEO pay disclosure only) has indirect negative effects on perceived investment potential through perceived CEO pay fairness and perceived workplace climate.¹ This research note extends KS by examining investor responses to pay ratio variations.² Specifically, we test whether the effects in KS for a higher-than-industry pay ratio are also observable for a less extreme comparable-to-industry pay ratio and whether the effects are stronger for a higher-than-industry pay ratio disclosure than a comparable-to-industry pay ratio disclosure.³

We find that incremental disclosure of pay ratio, regardless of whether it is comparable-to-industry or higher-than-industry, has indirect negative effects on perceived investment potential through perceived workplace climate and perceived CEO pay fairness. We find no evidence to support our hypotheses that the effects of incremental pay ratio disclosure on investor perceptions are stronger when the pay ratio

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¹ Using the full sample of participants, KS reports a significant indirect negative effect via perceived CEO pay fairness and an insignificant indirect negative effect via perceived workplace climate. However, using a smaller sample of participants who passed the manipulation checks, KS reports in their Footnote 22 a marginally significant indirect negative effect via perceived CEO pay fairness and a significant indirect negative effect via perceived workplace climate. Regardless of the sample KS uses, the overall inference is that there are indirect negative effects on perceived investment potential from an incremental higher-than-industry pay ratio disclosure.

² We set our experiment in a restaurant industry, different from the semiconductor industry in KS to increase the likelihood that investors would respond to pay ratio variations as a result of perceived CEO pay fairness and perceived workplace climate. The restaurant industry that we use presents a setting where rank and file employees have direct contact with customers and personalized customer service is important for the business strategy, which may heighten the effects of perceived CEO pay fairness and workplace climate.

³ We do not examine how participant perceptions are affected by the disclosure of a lower-than-industry pay ratio.

is higher-than-industry than when it is comparable-to-industry.

Given that companies care about the ramifications arising from negative perceptions of investors and the public when pay ratio disclosures are made (Greene, 2014), our study suggest that pay ratio disclosures could help restrain CEO pay by highlighting how much more the CEO is paid relative to the average employee (Aguilar, 2013; Menendez et al., 2014). Our results indicate that even disclosing a comparable-to-industry pay ratio has similar negative effects on investor perceptions as disclosing a higher-than-industry pay ratio, which suggest that these negative effects are driven by the comparison of the CEO pay to the median employee pay, regardless of whether the pay ratio is comparable-to-industry or higher-than-industry. Hence, the need for companies to manage investor perceptions is not limited to those disclosing pay ratios that are higher than industry norms, but extends even to those disclosing pay ratios that are in line with industry norms. Our findings complement the survey results in Larcker et al. (2016) which suggest that actual pay ratios and CEO pay are much higher than what the majority of their respondents believe them to be. As such, even a comparable-to-industry pay ratio may still violate people's expectations of what would be fair and appropriate. The negative investor perceptions associated with pay ratio disclosure, even when the pay ratio is comparable-to-industry, may discourage companies from continually increasing their CEO pay to keep up with industry benchmarks of CEO pay.

We organize the rest of this research note in the following manner. We first discuss the hypotheses. We then describe the design of the experiment, followed by the results. Lastly, our study's findings and limitations are discussed in the conclusion.

2. Theory and hypothesis development

We argue that incremental disclosure of pay ratio, whether it is comparable-to-industry or higher-than-industry, would have indirect negative effects on perceived investment potential through both perceived CEO pay fairness and perceived workplace climate. KS finds support for similar hypotheses for incremental higher-than-industry pay ratio disclosure. We further argue that these indirect negative effects are stronger under a higher-than-industry pay ratio than a comparable-to-industry pay ratio. We develop our hypotheses, depicted in Fig. 1 Panel A, as follows.

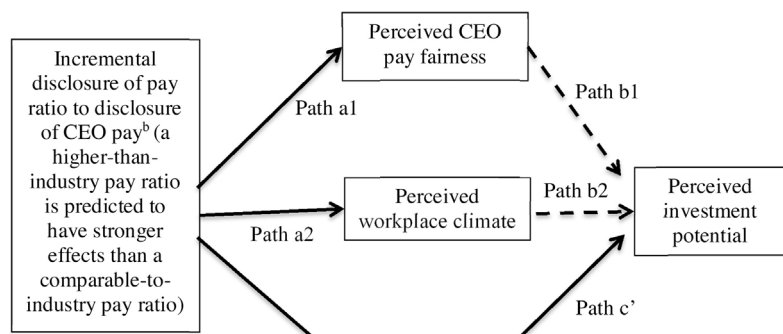
First, Hypothesis 1a predicts that incremental disclosure of pay ratio, whether it is comparable-to-industry or higher-than-industry,

negatively impacts perceived CEO pay fairness. Hypothesis 1a is based on equity theory (Adams, 1965) and social norms that people hold about fair allocation of resources (Elster, 1989; Kahneman et al., 1986). Under equity theory, the fairness of a person's pay is evaluated by comparing that person's pay outcomes and work inputs with those of other persons, and a ratio of outcomes to inputs that is comparatively larger than that of others is then deemed as unfair (Adams, 1965). Prior research suggests people may perceive inequity when there is large vertical pay dispersion between lower-level employees and higher-level employees (e.g., Cowherd and Levine, 1992). A pay ratio that makes salient that the CEO is paid substantially more than the median employee in the company may lead investors to perceive that the CEO is receiving a higher ratio of outcomes to inputs than would be fair.

There is reason to believe that there may be a stronger negative effect on perceived CEO pay fairness when the pay ratio is higher-than-industry than when it is comparable-to-industry (Hypothesis 1b). People naturally expect a CEO to be better paid than a median employee because the CEO provides more inputs, and thus a pay differential between the two is not necessarily perceived as unfair unless the differential is large enough (Becker, 1961; Gupta et al., 2012). The larger the pay differential, the greater the likelihood that the pay differential would be unexpected and hence perceived as unfair. Prior research indicates that fairness perceptions are influenced by external comparisons of pay in an organization with pay in other organizations (Shore et al., 2006). Thus, people may make an external comparison of the pay differential in one organization with that of peer organizations to benchmark their expectations. Investors may respond more negatively to a higher-than-industry pay ratio disclosure than a comparable-to-industry pay ratio disclosure because the former reveals a greater pay disparity that is more likely to be out of line with investors' expectations. However, the current public perception surrounding the pay disparity between CEOs and average employees is very negative (Larcker et al., 2016). In a survey of 1202 individuals across the U.S., Larcker et al. (2016) find that 74% of respondents believe that CEO pay relative to the average worker's pay is inappropriate, and 62% believe that CEO pay should be capped at a mean of 17.6 times of the average worker's pay, which is much lower than current pay multiples of about 210. As such, even a comparable-to-industry pay ratio disclosure making salient that the CEO is paid multiples of what the median employee earns may be sufficient to trigger perceptions of inequity as long as the pay ratio is higher than investors' expectation of a fair pay multiple.

Panel A: Effects of Incremental Disclosure of Pay Ratio on Perceived Investment Potential^a

Fig. 1. Panel A: Effects of Incremental Disclosure of Pay Ratio on Perceived Investment Potential^a. Panel B: Experimental conditions, associated labels, and manipulations^b.



^a We test our hypotheses using mediation models in Tables 2 and 3. Path a1 (H1a) and Path a2 (H2a) represent the predicted negative effects of incremental pay ratio disclosure on each mediator. Path b1 and Path b2 represent the expected positive effects of each mediator on perceived investment potential and are represented with a dashed line in the figure to indicate that the effects had previously been tested in KS. Path a1*Path b1 (H3a) and Path a2*Path b2 (H3b) represent the predicted indirect negative effects of incremental pay ratio disclosure on perceived investment potential through each mediator. Path c' is the effect of incremental pay ratio disclosure on perceived investment potential after controlling for the mediators in the mediation models. We further predict that the effects in H1a, H2a, H3a, and H4a are stronger for a higher-than-industry pay ratio than a comparable-to-industry pay ratio in H1b, H2b, H3b, and H4b, respectively.

	Pay ratio disclosure absent with only CEO pay disclosure (<i>RATIOAbsent</i>)	Pay ratio disclosure present, with CEO pay disclosure plus pay ratio disclosure (<i>RATIOPresent</i>)
Higher-than-industry CEO pay that leads to higher-than-industry pay ratio in the <i>RATIOPresent</i> condition (<i>HighCEO</i>)	<i>HighCEO-RATIOAbsent (same as KS)</i> - Company CEO pay was at the 75 th percentile of comparison group, and manipulated as higher-than-industry (\$7,365,124 vs. \$4,216,350)	<i>HighCEO-RATIOPresent (same as KS)</i> - Company CEO pay was at the 75 th percentile of comparison group, and manipulated as higher-than-industry (\$7,365,124 vs. \$4,216,350) - Company pay ratio was manipulated as higher-than-industry (161.91 vs. 95.55) - Company median employee pay was automatically derived as comparable-to-industry (\$45,490 vs. \$44,125)
Comparable-to-industry CEO pay that leads to comparable-to-industry pay ratio in the <i>RATIOPresent</i> condition (<i>CompCEO</i>)	<i>CompCEO-RATIOAbsent (same as KS)</i> - Company CEO pay was at the 55 th percentile of comparison group, and manipulated as comparable-to-industry (\$4,346,753 vs. \$4,216,350)	<i>CompCEO-RATIOPresent (new condition in our study)</i> - Company CEO pay was at the 55 th percentile of comparison group, and manipulated as comparable-to-industry (\$4,346,753 vs. \$4,216,350) - Company pay ratio was manipulated as comparable-to-industry (95.55 vs. 95.55) - Company median employee pay was automatically derived as comparable-to-industry (\$45,490 vs. \$44,125)

Based on our discussion above, our first set of hypotheses is as follows.

Hypothesis 1. Incrementally disclosing a pay ratio, given CEO pay that is already disclosed, (a) decreases investor perception of the fairness of CEO pay and (b) this negative effect is stronger when the pay ratio is higher-than-industry than when it is comparable-to-industry.

Second, Hypothesis 2a predicts that incremental pay ratio disclosure, whether the pay ratio is comparable-to-industry or higher-than-industry, negatively impacts perceived workplace climate. Poor workplace climate arises when employees perceive inequity when they contrast their pay outcomes and work inputs to those of others, including others who are at higher hierarchical levels (Adams, 1965; Carrell and Dittrich, 1978; Cowherd and Levine, 1992). H2a is based on investors believing that rank-and-file employees perceive inequity when the pay ratio makes salient a substantial pay differential between their CEO and the median employee in their company.⁴ Similar to the reasoning behind H1b, the negative effect on perceived workplace climate may be stronger when the pay ratio is higher-than-industry than when it is comparable-to-industry (Hypothesis 2b). Investors may expect employees to respond more negatively to a higher-than-industry pay ratio disclosure than a comparable-to-industry pay ratio disclosure because the former is more out of line with employees' expectation of a

fair pay multiple based on an external comparison with pay differentials in peer organizations (Becker, 1961; Shore et al., 2006). Our second set of hypotheses is as follows.

Hypothesis 2. Incrementally disclosing a pay ratio, given CEO pay that is already disclosed, (a) decreases investor perception of workplace climate and (b) this negative effect is stronger when the pay ratio is higher-than-industry than when it is comparable-to-industry.

Tournament theory provides tension to H1a/b and H2a/b which predict negative effects of incremental pay ratio disclosure on perceived CEO pay fairness and perceived workplace climate. A larger differential between the pay of top executives and lower-level employees provides more competitive incentives for the CEO and lower-level employees to exert more effort (Green and Stokey, 1983). Indeed, although Faley et al. (2013) find no significant relationship between relative CEO-employee pay and employee productivity (revenue per employee) for the average firm, they find a significant positive relationship for firms where tournament incentives are likely to be more powerful (e.g., firms with fewer and non-unionized employees).

KS predicts and finds positive effects of perceived CEO pay fairness and perceived workplace climate on perceived investment potential. The positive link between perceived CEO pay fairness and perceived investment potential is based on investors shunning companies that violate fairness norms and investors believing that customers will also shun such companies (Gopalan, 2007; Trudel and Cotte, 2009). The positive link between perceived workplace climate and perceived investment potential is based on investors believing that poor workplace climate impairs the company's performance because of its negative impact on employee effort and employee retention (Bloom and Michel, 2002; Cowherd and Levine, 1992; Pritchard et al., 1972; Pfeffer and Langton, 1993; Shin et al., 2015; Wade et al., 2006). Our study also ascertains whether we obtain the same results

⁴ Perceived CEO pay fairness in H1a and H1b refers to investors' perceived CEO pay fairness. Investors' perceived workplace climate in H2a and H2b is based on investors believing that workplace climate is a function of employees' perceived CEO pay fairness. By having investors' perceived workplace climate as a mediator variable that is not tied to investors' perceived CEO pay fairness, we allow for the possibility that investors' own perceived CEO pay fairness may deviate from what these investors believe to be employees' perceived CEO pay fairness.

<p>Section 1</p> <p>1) Participants were given information on a potential medium to long-term investment:</p> <ol style="list-style-type: none"> Company description 3-year financial data Note disclosure on CEO compensation comprising: <ol style="list-style-type: none"> Company and comparison group CEO pay (in all conditions) Median employee pay (only in <i>RATIOPresent</i>) CEO-to-median employee pay ratio (only in <i>RATIOPresent</i>) <p>2) Participants made investment potential judgments</p>
<p>Section 2</p> <p>1) Participants were given the same company's financial data and note disclosure on CEO compensation as in Section 1</p> <p>2) Participants answered post-experimental questionnaire</p>
<p>Section 3</p> <p>1) Participants answered manipulation check questions.</p> <p>2) Participants answered demographic questions and ethical sensitivity instrument</p>

Fig. 2. Order of experimental materials.

as in KS for these links between perceived CEO pay fairness/workplace climate and perceived investment potential.

Finally, we predict negative indirect effects of incremental pay ratio disclosure, whether the pay ratio is comparable-to-industry or higher-than-industry, on perceived investment potential via perceived CEO pay fairness (Hypothesis 3a); and via perceived workplace climate (Hypothesis 4a). Further, based on H1b and H2b which predict that the negative effects of incremental pay ratio disclosure on perceived CEO pay fairness and perceived workplace climate are stronger when the pay ratio is higher-than-industry than when it is comparable-to-industry, we also expect that the indirect negative effects hypothesized in H3a and H4a will be stronger when the pay ratio is higher-than-industry than when it is comparable-to-industry (Hypothesis 3b and Hypothesis 4b, respectively).

Hypothesis 3. Incrementally disclosing a pay ratio, given CEO pay that is already disclosed, (a) has an indirect negative effect on investor perception of a company's investment potential through investor perception of the fairness of CEO pay, and (b) this indirect negative effect is stronger when the pay ratio is higher-than-industry than when it is comparable-to-industry.

Hypothesis 4. Incrementally disclosing a pay ratio, given CEO pay that is already disclosed, (a) has an indirect negative effect on investor perception of a company's investment potential through investor perception of perceived workplace climate, and (b) this indirect negative effect is stronger when the pay ratio is higher-than-industry than when it is comparable-to-industry.

3. Method

3.1. Design of experiment

Our experiment uses a 2 (comparable-to-industry versus higher-than-industry CEO pay: *CompCEO* versus *HighCEO*) \times 2 (pay ratio disclosure absent versus present: *RATIOAbsent* versus *RATIOPresent*) between-subjects design (see Fig. 1 Panel B).⁵ In the two *CompCEO* conditions, the company's CEO pay is comparable to its comparison group's mean CEO pay (\$4,346,753 versus \$4,216,350) and is noted as being at the 55th percentile of its comparison group. In the two *HighCEO* conditions, the company's CEO pay is much higher than its comparison group's mean CEO pay (\$7,365,124 versus \$4,216,350) and is noted as being at the 75th percentile. The company's comparison group refers to 17 publicly-traded companies in the same industry.

⁵ We replicate the first three conditions (*CompCEO-RATIOAbsent*, *HighCEO-RATIOAbsent* and *HighCEO-RATIOPresent*) from KS. We then add a fourth new condition that discloses a comparable-to-industry pay ratio in addition to a comparable-to-industry CEO pay (*CompCEO-RATIOPresent*).

The two *RATIOAbsent* conditions only disclose the company's CEO pay and its comparison group's mean CEO pay, but do not disclose pay ratio. The two *RATIOPresent* conditions additionally disclose the company's pay ratio and its comparison group's mean pay ratio while holding constant the associated CEO pay. Therefore, *HighCEO-RATIOPresent* is identical to *HighCEO-RATIOAbsent* except that it additionally shows that the company's pay ratio of 161.91 is larger than its comparison group's mean pay ratio of 95.55, and *CompCEO-RATIOPresent* is identical to *CompCEO-RATIOAbsent* except that it additionally discloses the company's pay ratio of 95.55 as comparable to its comparison group's mean pay ratio of 95.55. In both *HighCEO-RATIOPresent* and *CompCEO-RATIOPresent*, given the respective CEO pay and pay ratio, the company's median employee pay is derived as comparable to its comparison group's mean median employee pay at \$45,490 versus \$44,125.⁶ Thus, a higher-than-industry CEO pay, and not a lower-than-industry median employee pay, contributes to the higher-than-industry pay ratio in *HighCEO-RATIOPresent*. The comparable-to-industry pay ratio in *CompCEO-RATIOPresent* is attributed to comparable-to-industry CEO pay and comparable-to-industry median employee pay.

3.2. Experimental procedures

We use the same experimental procedures and the same experimental instrument (with adaptations for the different industry) as in KS.⁷ Participants are randomly assigned to one of the experimental conditions. Each participant sequentially completes a package of case materials with three sections. Each section is in a separate envelope. Participants return each section's materials to its envelope before continuing to the next section. Fig. 2 shows the order of experimental materials.

The first section begins with asking participants to assume that they work in the investment department of a firm. They are tasked with assessing a company's investment potential to help their firm make the decision of whether to make a medium to long-term investment in the company. Our design choice of not having participants assess the company for their own investment purposes has been used by prior studies and is aimed at reducing the likelihood of participants' personal investment preferences affecting their judgment (e.g. Elliot et al., 2012). The case states that the company is in the restaurant industry, which is "a mature and labor-intensive" industry, and that the company "owns and operates multiple chains of upscale casual dining restaurants under different brand names, with freshly prepared and innovative food, flavorful recipes with creative presentations, and personalized service". The case provides the company's financial data (e.g., revenues; net income; working capital; property, plant, and equipment; long-term debt) and a note disclosure on CEO compensation. All participants then answer questions on the company's investment potential.

The second section first provides participants with the same information from Section 1 on the company's financial data and note disclosure on CEO compensation. Then, questions are asked on participants' perceptions of the fairness of CEO compensation, rank-and-file employee morale, rank-and-file employee job satisfaction, and rank-

⁶ The median employee pay in the restaurant industry is lower (Bureau of Labor Statistics, 2010 median pay in the restaurant industry is \$18,970). However, a post-experimental question asks participants in *HighCEO-RATIOPresent* (mean = 1.12) and *CompCEO-RATIOPresent* (mean = 0.96) (conditions wherein median employee pay information is provided) what they thought about the level of the median employee pay on a scale of -7 (too high), 0 (just right), +7 (too low). There is no significant difference in perceived median employee pay level between these two conditions (two-tailed $p = 0.805$), and our participants tend to perceive that the median employee pay is too low (overall mean for the two conditions = 1.04 > 0, two-tailed $p = 0.002$). These results suggest that setting the company's median employee pay at \$45,490 did not result in our participants perceiving that the median employee pay is too high.

⁷ All financial figures are the same as in KS (e.g. CEO compensation, median employee pay, and the company's financial data except that we replace research and development expenses with selling, general, and administrative expenses because of the different industry).

Table 1
Means (standard deviations) of participant perceptions.

Condition ^a	N	CEO pay fairness ^b (s.d.)	Workplace climate ^c (s.d.)	Investment potential ^d (s.d.)
<i>CompCEO-RATIOAbsent</i>	19	0.95 (2.93)	2.07 (2.26)	3.04 (1.99)
<i>CompCEO-RATIOPresent</i>	22	-1.14 (2.88)	0.38 (2.80)	3.30 (1.71)
<i>HighCEO-RATIOAbsent</i>	18	-0.50 (3.52)	1.72 (2.82)	3.67 (2.18)
<i>HighCEO-RATIOPresent</i>	22	-1.82 (2.65)	1.02 (2.12)	3.03 (1.74)

^a *RATIOAbsent* (*RATIOPresent*) conditions disclose the CEO pay (CEO pay, median employee pay, and pay ratio of those two amounts). The company's pay ratio of 161.91 (95.55) in *HighCEO-RATIOPresent* (*CompCEO-RATIOPresent*) is higher than (comparable to) the comparison group's pay ratio of 95.55. The comparison group comprises companies in the same industry. The company's CEO pay is at the 55th (75th) percentile of its comparison group and the amount of \$4,346,753 (\$7,365,124) is comparable to (higher than) the comparison group's amount of \$4,216,350 in the *CompCEO* (*HighCEO*) conditions. The company's median employee pay is automatically set at \$45,490 and is comparable to the comparison group's amount of \$44,125 in both *RATIOPresent* conditions.

^b Participants rate the fairness of the CEO compensation (on a scale of -7 to 7).

^c Workplace climate is the average of responses to three questions on participant perceptions of rank-and-file employee morale, rank-and-file employee job satisfaction, and rank-and-file employee productivity (on scales of -7 to 7). One observation is missing from the *CompCEO-RATIOAbsent* condition, and another is missing from the *HighCEO-RATIOPresent* condition.

^d Investment potential is the average of responses to three questions on the stock's attractiveness as a medium to long-term investment, potential for stock price appreciation, and the company's earnings potential (on scales of -7 to 7).

and-file employee productivity.

The third section contains a post-experiment questionnaire with manipulation checks, demographic questions, and a 5-item Equity Sensitivity Instrument (Huseman et al., 1985), with no information from the prior two sections.⁸ Participants indicate that they took about an average of 15 minutes to complete the experiment.

3.3. Participants

We recruited 100 participants for the four experimental conditions from the same Singapore MBA program as in KS.⁹ Singapore investors are familiar with the issues surrounding pay ratio disclosures as they are among the largest foreign investors in the U.S. stock markets and they have similar concerns regarding pay disparity between CEOs and rank-and-file employees (Feinsmith and Gokul-Srinath, 2011; Chan, 2013). Participants complete the experiment during breaks in their class schedule and receive SGD\$25 for doing so.¹⁰ Participants report an average of 4.51 years of working experience and about 44% work in accounting and finance-related fields (i.e., auditing, tax, accounting, finance, banking, or investing). On a scale of 0 ("never") to 14 ("with high frequency"), participants indicate an average of 6.49 (s.d. = 3.35) when asked how frequently they invest in the stock market. Investors do not need to have expert skills or knowledge to understand the theoretical links between pay ratio, perceived CEO pay fairness, perceived workplace climate, and investment potential. As such, we do not expect participants with more investment experience to respond differently from our hypotheses. They also indicate an average of 7.17 (s.d. = 2.80) for their level of accounting knowledge on a scale of 0 ("no accounting knowledge") to 14 ("high

⁸ The equity sensitivity measure sums the values a participant assigns to each of the five items and it can theoretically range between 0 and 50, with a larger value indicating that an individual prefers his/her outcome to be more than his/her input to a greater degree (Huseman et al., 1985). Our participants have an average equity sensitivity of 23.48 (s.d. = 6.99), similar to the equity sensitivities found in some U.S. samples (e.g., Mueller and Clarke, 1998). Equity sensitivity does not differ significantly across conditions ($F = 0.32$, two-tailed $p = 0.811$), and the inferences from all our results are similar when we control for equity sensitivity in our analyses.

⁹ The authors were not instructors of the participants. The experiment has received the applicable university ethics approval.

¹⁰ The exchange rate was approximately SGD\$1.40: USD\$1 during the data collection.

accounting knowledge"). The inferences from all our results are similar when we control for these demographic variables in our analyses.

3.4. Dependent variables

The two mediating investor perceptions are participants' perceived CEO pay fairness and perceived workplace climate in the company. For perceived workplace climate, we average a participant's responses to three questions on rank-and-file employee morale, rank-and-file employee job satisfaction, and rank-and-file employee productivity (Cronbach's alpha = 0.88).¹¹ For our ultimate dependent variable of perceived investment potential, we average a participant's responses to three questions on the attractiveness of the stock as a medium to long-term investment, the stock's potential for price appreciation over the next three years, and the company's earnings potential over the next three years (Kelly et al., 2012) (Cronbach's alpha = 0.83). We use -7 to +7 scales for all questions used to capture investor perceptions.¹²

4. Results

4.1. Manipulation checks

We verify our manipulation of comparable-to-industry versus higher-than-industry CEO pay by checking if participants correctly indicate that the CEO pay is "about the same as its comparison group" in the two *CompCEO* conditions, or that it is "a lot higher than its comparison group" in the two *HighCEO* conditions. 93 of 100 participants responded correctly with no significant differences in incorrect responses across the four conditions (Wald $\chi^2 = 1.57$, two-tailed $p = 0.667$).¹³ With respect to the pay ratio disclosure absent/present manipulation check, 83 of 100 participants correctly indicate that the pay ratio is not provided in the two *RATIOAbsent* conditions, or that it is "a lot higher than its comparison group" in *HighCEO-RATIOPresent*, or that it is "about the same as its comparison group" in *CompCEO-RATIOPresent*. There are no significant differences in incorrect responses for this question across the four conditions (Wald $\chi^2 = 5.31$, two-tailed $p = 0.151$).

We exclude from our tests of hypotheses participants who failed the manipulation check on whether the CEO pay is higher-than-industry or comparable-to-industry, and the manipulation check on whether the pay ratio is not provided, higher-than-industry, or comparable-to-industry. Including participants who fail the manipulation checks leads to largely similar inferences from our results (i.e., significant results stay significant and insignificant results stay insignificant), with one exception which we highlight in Footnote 18 in the "Hypotheses Tests" sub-section.

¹¹ To shorten the experimental instrument, we do not ask two additional questions on quality of teamwork among rank-and-file employees and quality of relationship between rank-and-file employees and top management that were in KS's workplace climate variable. We obtain data from KS and rerun their analyses using a workplace climate variable that comprises only the three questions used in our study, and the inferences from the results are similar to those reported in KS that used the workplace climate variable with five questions. As such, using either three questions or five questions in the workplace climate variable appears to capture the same underlying construct.

¹² We conduct a factor analysis of all the investor perception questions (three questions on investment potential, three questions on workplace climate, and one question on CEO pay fairness) and two factors with eigenvalues greater than 1 emerged. The three questions on investment potential loaded on one factor with absolute loadings greater than 0.73. The three questions on workplace climate loaded on the other factor with absolute loadings greater than 0.69. The question on CEO pay fairness does not load on either factor, with absolute loadings of 0.29 on the investment potential factor and 0.18 on the workplace climate factor. These results indicate that we have captured three distinct constructs and support averaging the three questions on investment potential and the three questions on workplace climate. Our hypotheses tests yield similar inferences when we use factor scores rather than average responses (for the three items in each variable) to represent workplace climate and investment potential.

¹³ We also check if participants correctly indicate that the median employee pay is not provided in the two *RATIOAbsent* conditions, or that it is "more or less the same as its comparison group" in the two *RATIOPresent* conditions. 89 of 100 participants responded correctly with no significant differences in incorrect responses across the four conditions (Wald $\chi^2 = 2.46$, two-tailed $p = 0.482$).

Table 2
Moderated Mediation Analyses (Preacher, Rucker, and Hayes Approach) for Pay Ratio Disclosure with Higher-than-Industry CEO Pay as Moderator^a (N = 79^b).

Panel A: Regressions of the effect of pay ratio disclosure (versus no pay ratio disclosure) on each mediator (Path a1 and Path a2)							
Dependent Variable	Predicted sign	Coefficient estimate	t	p ^c	95% lower confidence interval	95% upper confidence interval	
<i>CEO pay fairness</i>							
Intercept		0.94	1.35	0.181	-0.45	2.34	
Pay ratio (vs no pay ratio) ^c	H1a: -	-2.08	-2.21	0.015*	-3.96	-0.20	
Higher-than-industry (vs comparable-to-industry) CEO pay ^c	-	-1.44	-1.46	0.148	-3.41	0.52	
Pay ratio x Higher-than-industry CEO pay	H1b: -	1.01	0.75	0.454^d	-1.66	3.68	
R ² = 9.50%							
<i>Workplace climate</i>							
Intercept		2.02	3.40	0.001	0.83	3.20	
Pay ratio (vs no pay ratio) ^c	H2a: -	-1.64	-2.05	0.022*	-3.24	-0.04	
Higher-than-industry (vs comparable-to-industry) CEO pay ^c	-	-0.30	-0.35	0.725	-1.97	1.38	
Pay ratio x Higher-than-industry CEO pay	H2b: -	0.93	0.82	0.415^d	-1.34	3.20	
R ² = 6.38%							
Panel B: Regression of the effects of mediators on perceived investment potential (Path b1 and Path b2).							
Mediators as independent variables	Predicted sign	Coefficient estimate	t	p ^c	95% lower confidence interval	95% upper confidence interval	
Intercept		2.54	5.67	< 0.001	1.65	3.43	
CEO pay fairness	+ (per KS)	0.16	2.34	0.011*	0.02	0.30	
Workplace climate	+ (per KS)	0.21	2.61	0.005*	0.05	0.38	
Pay ratio (vs no pay ratio)	Path c'	0.87	1.48	0.144	-0.30	2.04	
Higher-than-industry (vs comparable-to-industry) CEO pay	Path c'	0.84	1.42	0.161	-0.34	2.03	
Pay ratio x Higher-than-industry CEO pay	-	-1.08	-1.35	0.180	-2.68	0.51	
R ² = 17.55%							
Panel C: Index of moderated mediation testing if indirect effects of pay ratio disclosure (versus no pay ratio disclosure) on perceived investment potential (Path a1*Path b1 and Path a2*Path b2) is moderated by higher-than-industry (versus comparable-to-industry) CEO pay							
Mediator	Index	Boot SE	95% lower confidence interval ^f		95% upper confidence interval ^f		
H3b: CEO pay fairness	0.16	0.24	-0.19		0.89		
H4b: Workplace climate	0.20	0.26	-0.19		0.92		

^a See Table 1 for definitions of participant perception variables (perceived CEO pay fairness, workplace climate, and investment potential).

^b Of the 81 observations that passed the two manipulation checks, two are dropped from the moderated mediation analysis because there are missing values for the perceived workplace climate variable.

^c All p-values are one-tailed for hypothesized relationships and indicated with *. All other p values are two-tailed.

^d Two-tailed p-values are presented when the direction of the effects is contrary to that hypothesized.

^e The pay ratio variable is coded "1" for *RATIOPresent* and "0" for *RATIOAbsent*. The higher-than-industry CEO pay variable is coded "1" for *HighCEO* and "0" for *CompCEO*.

^f Percentile bootstrap confidence intervals are based on 5000 bootstrap samples.

4.2. Hypotheses tests

We report the descriptive statistics for the perceptions of CEO pay fairness, workplace climate, and investment potential for participants who pass the manipulation checks in Table 1. There are no significant differences in perceived investment potential between *HighCEO-RATIOPresent* and *HighCEO-RATIOAbsent* (3.03 versus 3.67, $t = -1.06$, one-tailed $p = 0.147$), and between *CompCEO-RATIOPresent* and *CompCEO-RATIOAbsent* (3.30 versus 3.04, $t = 0.44$, two-tailed $p = 0.664$, opposite direction to expectation).¹⁴

Given that our hypotheses predict that both the direct and indirect

¹⁴ Although our independent variable of pay ratio disclosure does not have a significant overall effect on the dependent variable of perceived investment potential, recent research on mediation analyses notes that this does not preclude indirect effects of pay ratio disclosure on perceived investment potential via mediators (Kenny et al., 1998; Shrout and Bolger, 2002; MacKinnon et al., 2007). The overall effect of pay ratio disclosure on perceived investment potential is the "sum of many different paths of influence, direct and indirect, not all of which may be part of a formal model" (Hayes, 2009, p. 414). There may be counteracting positive effects of pay ratio disclosure on perceived investment potential that our study does not examine.

effects of incremental pay ratio disclosure are moderated by whether the pay ratio is higher-than-industry or comparable-to-industry, we first conduct tests of moderated mediation use the bootstrapping method and the Sobel test (Hayes, 2013; Preacher et al., 2007).^{15,16} The bootstrapping method uses 5000 bootstrap samples to calculate a 95% bias-corrected confidence interval for an indirect effect, which is deemed as significant if zero is not within the bootstrap confidence intervals. The results for the moderated mediation model are reported in Table 2.

For Hypothesis 1b and Hypothesis 2b, Table 2, Panel A indicates that both the interaction effects between the moderator variable and pay ratio disclosure (both two-tailed p values > 0.415) are not significant in the regressions used to generate the Path a1 and Path a2 coefficients for the

¹⁵ The Sobel test assumes a normal sampling distribution for the indirect effect, whereas the bootstrap confidence intervals test approximates the sampling distribution of the indirect effect using bootstrap samples and it may have more power than the Sobel test (Hayes, 2013).

¹⁶ By design, the higher-than-industry pay ratio is driven by a higher-than-industry CEO pay (coupled with a comparable-to-industry median employee pay) and the comparable-to-industry pay ratio is driven by a comparable-to-industry CEO pay (coupled with a comparable-to-industry median employee pay).

Table 3
Mediation Analyses (Preacher, Rucker, and Hayes Approach) for Pay Ratio Disclosure^a (N = 79^b).

Panel A: Regressions of the effect of pay ratio disclosure (versus no pay ratio disclosure) on each mediator (Path a1 and Path a2)								
Dependent Variable	Predicted sign	Coefficient estimate	t	p ^c	95% lower confidence interval	95% upper confidence interval		
<i>CEO pay fairness</i>								
Intercept		0.67	1.13	0.263	-0.51	1.85		
Pay ratio (vs no pay ratio) ^d	H1a: -	-1.58	-2.37	0.010*	-2.91	-0.25		
Higher-than-industry (vs comparable-to-industry) CEO pay ^d	-	-0.90	-1.35	0.183	-2.22	0.43		
R ² = 8.81%								
<i>Workplace climate</i>								
Intercept		1.76	3.49	< 0.001	0.76	2.77		
Pay ratio (vs no pay ratio) ^d	H2a: -	-1.18	-2.07	0.021*	-2.31	-0.05		
Higher-than-industry (vs comparable-to-industry) CEO pay ^d	-	0.21	0.37	0.710	-0.92	1.34		
R ² = 5.54%								
Panel B: Regression of the effects of mediators on perceived investment potential (Path b1 and Path b2)								
Mediators as independent variables	Predicted sign	Coefficient estimate	t	p ^c	95% lower confidence interval	95% upper confidence interval		
Intercept		2.85	7.43	< 0.001	2.09	3.62		
CEO pay fairness	+ (per KS)	0.16	2.23	0.014*	0.02	0.29		
Workplace climate	+ (per KS)	0.20	2.50	0.007*	0.04	0.37		
Pay ratio (vs no pay ratio)	Path c'	0.31	0.74	0.464	-0.53	1.15		
Higher-than-industry (vs comparable-to-industry) CEO pay	Path c'	0.25	0.62	0.540	-0.56	1.05		
R ² = 15.48%								
Panel C: Indirect effects of pay ratio disclosure (versus no pay ratio disclosure) on perceived investment potential through mediators (Path a1*Path b1 and Path a2*Path b2)								
Sobel test						95% Confidence Interval Limits ^e		
Mediator	Indirect effect Path a coefficient*Path b coefficient	SE	Z	p	Boot SE	Lower	Upper	
H3a: CEO pay fairness	-1.58*0.16 = -0.25	0.16	-1.55	0.060*	0.16	-0.72	-0.03	
H4a: Workplace climate	-1.18*0.20 = -0.24	0.16	-1.52	0.064*	0.18	-0.75	-0.01	

^a See Table 1 for definitions of participant perception variables (perceived CEO pay fairness, workplace climate, and investment potential).

^b Of the 81 observations that passed the manipulation checks, two are dropped from the mediation analysis because there are missing values for the perceived workplace climate variable.

^c All p-values are one-tailed for hypothesized relationships and indicated with *. All other p values are two-tailed.

^d The pay ratio variable is coded "1" for *RATIOPresent* and "0" for *RATIOAbsent*. The higher-than-industry CEO pay variable is coded "1" for *HighCEO* and "0" for *CompCEO*.

^e Percentile bootstrap confidence intervals are based on 5000 bootstrap samples.

effects of pay ratio disclosure on each mediating investor perception.¹⁷ For Hypothesis 3b and Hypothesis 4b, Table 2, Panel C indicates that all the indirect effects of pay ratio disclosure on perceived investment potential via each mediating investor perception are not significantly different whether the pay ratio/CEO pay is higher-than-industry or comparable-to-industry (both confidence intervals include zero in the interval). There is no evidence to support our hypotheses that the effects of incremental pay ratio disclosure on perceived CEO pay fairness and perceived workplace climate, and the associated indirect effects on perceived investment potential, are moderated by whether the pay ratio is higher-than-industry or comparable-to-industry.

Given the results for moderated mediation in Table 2, we remove all interaction effects and use a mediation model to test the indirect effects of pay ratio disclosure, while still controlling for whether the pay ratio/CEO pay is comparable-to-industry or higher-than-industry. Table 3 reports our analyses. In Table 3, Panel A, the effects of pay ratio disclosure on perceived CEO pay fairness in Hypothesis 1a (one-tailed p = 0.010) and perceived workplace climate in Hypothesis 2a (one-

tailed p = 0.021) are supported. In Table 3, Panel B, the significant and positive effects of perceived CEO pay fairness (one-tailed p = 0.014) and perceived workplace climate (one-tailed p = 0.007) on perceived investment potential are consistent with those reported in KS. In Table 3, Panel C, we find support for the indirect negative effects of pay ratio disclosure on perceived investment potential via perceived CEO pay fairness (Hypothesis 3a, indirect effect Path a1*Path b1 = -0.25, confidence interval of -0.72 to -0.03 excludes zero, Sobel test p value = 0.060) and via perceived workplace climate (Hypothesis 4a, indirect effect Path a2*Path b2 = -0.24, confidence interval of -0.75 to -0.01 excludes zero, Sobel test p value = 0.064).¹⁸

5. Conclusion

Our study contributes to the limited extant literature on pay ratio disclosure and its effects (e.g., Bu et al., 2016; Kelly and Seow, 2016; Faleye et al., 2013; Shin et al., 2015). Our experiment finds that

¹⁷ Table 2, Panel B indicates that the moderator variable (two-tailed p = 0.161) and the interaction effect between the moderator variable and pay ratio disclosure (two-tailed p = 0.180) are not significant in the regression used to generate the Path b coefficients for the effects of each mediating investor perception and the Path c' coefficient for the direct effect of the pay ratio disclosure on perceived investment potential.

¹⁸ Using the full sample that includes participants who fail the manipulation checks, the inferences from our results for the mediation model tested in Table 3 are largely similar (n = 100), except that the indirect effect via perceived CEO pay fairness is not significant using the confidence interval test (H3a, indirect effect = -0.18, confidence interval of -0.52-0.003 includes zero) but it is marginally significant using the Sobel test (p value = 0.082).

incremental pay ratio disclosure in a company has significant negative indirect effects on perceived investment potential via perceived CEO pay fairness and perceived workplace climate, consistent with KS. However, we find no evidence that these effects of incremental pay ratio disclosure are moderated by whether the pay ratio is comparable-to-industry or higher-than-industry. To the extent that companies are concerned about curbing negative perceptions of their compensation practices and their investment potential, regulation on pay ratio disclosures may be effective in restraining excessive CEO pay. Furthermore, our results suggest that the need to manage investor perception applies not only when companies disclose pay ratios that are higher than industry norms, but also when pay ratios are in line with industry norms.

Our study is subject to the limitations of using an experiment. Our findings notwithstanding, investor responses to pay ratio disclosures may differ across other industries, varying financial performance, and investors with varying sensitivity to inequity in compensation practices. As more data on different industries and different pay ratio levels become available in the near future, future research would benefit from cross validation using different research methodologies.

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