Corporate governance and corporate social responsibility

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DOI:
10.33612/diss.135926510

Chapter 3. Institutional Investor Influence on Executive-to-Worker Pay Dispersion after the Financial Crisis: A Replication and Extension of Connelly, Haynes, Tihanyi, Gamache, and Devers [14]

"Given the growing income inequality in the country, we see increased reputational risk arising from the high quantum of pay to C-Suite executives."

State Street Global Advisors

3.1 Introduction

Institutional investor influence is of great interest to both researchers and practitioners due to its critical implications for corporate strategies and governance practices (Connelly, Shi, Hoskisson, & Koka, 2018; Connelly, Tihanyi, Certo, & Hitt, 2010; David, Bloom, & Hillman, 2007; David, Hitt, & Gimeno, 2001; Humphery-Jenner, Sautner, & Suchard, 2017; Shi, Connelly, & Hoskisson, 2017). As defined by the Securities and Exchange Commission (SEC) in rule 13-F, institutional investors are a class of equity holders such as mutual funds, hedge funds, pension funds, banks, insurance companies, foundations, and endowments that manage more than $100 million in equity and must disclose all their holdings in excess of 10,000 shares or $200,000. According to agency theory, institutional investor monitoring is part of the governance mechanisms that shape firm activities to mitigate the problems inherent in the separation of ownership and control (Boyd & Solarino, 2016; Connelly, Hoskisson, Tihanyi, & Certo, 2010; Jensen & Meckling, 1976; Johnson, Schnatterly, Johnson, & Chiu, 2010). Research shows that one particularly important governance issue institutional investors

[14] This paper is a joint work of Shili Chen, Niels Hermes, and Reggy Hooghiemstra. It has been presented at the 19th Annual Meeting of the European Academy of Management and the 79th Annual Meeting of the Academy of Management. It obtained the "Best Paper Award" from the Corporate Governance SIG of the European Academy of Management in 2019.

focus on is executive compensation (McCahery, Sautner, & Starks, 2016). Whereas most prior studies focus on the role of institutional investors in limiting excessive CEO pay and ensuring that CEO pay is linked to firm performance (e.g. Bell & Van Reenen, 2013; David, Kochhar, & Levitas, 1998; Dharwadkar, Goranova, Brandes, & Khan, 2008; Krause, Whitler, & Semadeni, 2014; Sauerwald, Lin, & Peng, 2016; Shin & Seo, 2011), a recent study by Connelly, Haynes, Tihanyi, Gamache, and Devers (2016; henceforth CHTGD) examines the influence of institutional investors on executive-to-worker pay dispersion.

CHTGD's work is valuable because on the one hand, the literature has recognized that the pay gap between executives and rank and file employees has an important impact on employee behavior, firm performance, and social outcomes (Bloom, 1999; Cowherd & Levine, 1992; Kaplan, 2013; Shaw, 2014; TenhiäLä & Laamanen, 2018; Tsui et al., 2018; Wade, O'Reilly, & Pollock, 2006). On the other hand, with few exceptions (e.g. Greckhamer, 2016; Shin, 2014; Tosi & Greckhamer, 2004), little attention has been paid to the antecedents of executive-to-worker pay dispersion (Tsui et al., 2018). Being the first to investigate how institutional investors affect executive-to-worker pay dispersion, CHTGD serve as a pivotal reference for research on both the governance implications of institutional investor influence and the determinants of executive-to-worker pay dispersion (Connelly, Lee, Tihanyi, Certo, & Johnson, 2018; Tsui et al., 2018). CHTGD's study has significant practical implications as well. In particular, their findings about institutional investor influence on executive-to-worker pay dispersion may motivate regulatory bodies to establish public policies that encourage institutional investor commitment to reducing executive-to-worker pay dispersion in firms they own.

By theorizing and empirically showing that high executive-to-worker pay dispersion generates short-term benefits while undermining long-term firm performance, CHTGD argue and find that (1) transient institutional investors, who have short investment time horizons and

equity stakes in a wide range of firms, positively affect executive-to-worker pay dispersion, and (2) dedicated institutional investors, who have longer investment time horizon and maintain concentrated holding in a small number of firms, negatively influence executive-to-worker pay dispersion.

We suggest that a reexamination of CHTGD's findings of institutional investor influence over executive-to-worker pay dispersion may offer important new insights to management research for two reasons. First, CHTGD's sampling period is 1996 to 2006. Yet, a financial crisis took place right after 2006, stimulating a series of events that have significantly changed the corporate governance landscape in the US (Kaplan, 2013). As stated by Whetten (1989: 492), "theorists should be encouraged to think about whether their theoretical effects vary over time, either because other time-dependent variables are theoretically important or because the theoretical effect is unstable for some reason." Following this insight, we consider examining whether the relationships between different types of institutional ownership and executive-to-worker pay dispersion remain consistent after the financial crisis. To do so, we replicate the research design described in CHTGD to perform separate analyses for three samples: the original CHTGD sample (1996-2006), the post-CHTGD sample (2007-2017), and the full sample (1996-2017) (Bettis, Ethiraj, Gambardella, Helfat, & Mitchell, 2016; Gupta, Mortal, & Guo, 2018; Howard, Withers, Carnes, & Hillman, 2016).

The second reason why reexamining CHTGD's work adds value is that CHTGD exclude a key component of institutional investors—quasi indexers—from their study. Similar to dedicated institutional investors, quasi-indexers are long-term oriented, trading infrequently. Unlike dedicated institutional investors, quasi-indexers hold highly diversified portfolios and employ a strategy of indexing in investing (i.e. closely mimic an index) (Bushee, 1998). The impact of quasi-indexers on firm outcomes has consistently been

overlooked in the management literature as these investors lack a traditional governance tool to influence firms—the ability to accumulate or exit positions in individual firms. However, financial scholars have demonstrated that, via proxy votes and direct engagement with management, quasi-indexers can and do affect corporate governance practices such as board independence, disclosure level, anti-takeover provisions, and dividend payout policies (Appel, Gormley, & Keim, 2016; Boone & White, 2015; Bushee, Carter, & Gerakos, 2014; Chen, Huang, Li, & Shevlin, 2019; Crane, Michenaud, & Weston, 2016). Anecdotal evidence also suggests that quasi-indexers are concerned with executive-to-worker pay dispersion in their portfolio firms.[15] Therefore, we think it is crucial not to overlook the role of quasi-indexers in shaping executive-to-worker pay dispersion.

Our direct replication of CHTGD in the time frame of 1996-2006 yields findings similar to the original study. That is, transient institutional ownership increases executive-to-worker pay dispersion, while dedicated institutional ownership reduces executive-to-worker pay dispersion. Yet, we do observe some important difference during 2007-2017 as compared to the previous period. Specifically, the effect of transient institutional ownership on executive-to-worker pay dispersion has shifted from positive to negative. Moreover, the negative relationship between dedicated institutional ownership and executive-to-worker pay dispersion becomes insignificant. Lastly, quasi-indexers function as a key force in reducing executive-to-worker pay dispersion during 2007-2017, though their impact is insignificant before this period.[16]

[15] For example, State Street Global Advisors recently filed a report on the reputational risks arising from excessive executive pay versus low employee wages: https://www.ssga.com/investment-topics/general-investing/2016/Guidelines-for-Mitigating-Reputational-Risk-in-C-Suite-Pay.pdf, Accessed January 2, 2019.
[16] In addition to institutional investor influence on executive-to-worker pay dispersion, CHTGD examine the effect of executive-to-worker pay dispersion on short- and long-term firm performance. They show that executive-to-worker pay dispersion increases short-term performance but reduces long-term performance. We are able to reproduce their findings with all our samples. The complete replication results are available from us.

Our paper makes several contributions to the literature. First, by replicating and extending the original work, we provide additional empirical evidence to elucidate the impact of institutional ownership on executive-to-worker pay dispersion. This is important given the prominent role institutional investors play in the capital market (Boyd & Solarino, 2016; Goranova & Ryan, 2014) and the critical economic and social implications of executive-to-worker pay dispersion (Tsui et al., 2018). Second, doubling the sample period to 22 years introduces temporal contextualization to CHTGD's findings. We show that institutional investor influences over executive-to-worker pay dispersion are different between the pre-crisis (i.e. 1996-2006) and post-crisis (i.e. 2007-2017) periods, thus enriching research on the contingency role time plays. Finally, by demonstrating that quasi-indexer ownership is negatively associated with executive-to-worker pay dispersion during 2007-2017, our study contributes to research on quasi-indexer influence over corporate governance outcomes. As quasi-indexers' stock ownership has grown dramatically over the past two decades and they are fast becoming the largest institutional investors in the US economy (Appel et al., 2016; Bogle, 2018; Chen et al., 2018; Tu, Adeyemi, Karambelas, Callagy, & Pinto, 2017), understanding the implications of quasi-indexer ownership have become increasingly important.

3.2 CHTGD Summary

3.2.1 Executive-to-Worker Pay Dispersion and Firm Performance: A Temporal Perspective

The question whether vertical pay dispersion, including executive-to-worker pay dispersion, is beneficial or detrimental to firm performance has spurred theoretical disagreement among researchers. On the one hand, tournament theorists suggest that a large spread of pay across corporate hierarchical levels motivates employees to compete for promotion and higher pay

by putting in more efforts, which translates into higher firm performance (DeVaro, 2006; Lazear & Rosen, 1981; Wade et al., 2006). On the other hand, equity theorists argue that large pay dispersion may cause feelings of inequity and relative deprivation among lower-level employees, reducing their efforts, cooperation, productivity, commitment to organizational goals, and retention, ultimately resulting in poor firm performance (Bloom, 1999; Siegel & Hambrick, 2005). Both perspectives have gained empirical support in the literature (Cowherd & Levine, 1992; Henderson & Fredrickson, 2001; Messersmith, Kim, & Patel, 2018). To the extent that the literature does not provide a well-defined conceptual or observed empirical relationship between vertical pay dispersion and firm performance, Shaw (2014) concludes that the impact of executive-to-worker pay dispersion on firm performance is difficult to predict in advance.

To resolve the above theoretical and empirical inconsistencies, CHTGD introduce a time dimension to the executive-to-worker pay dispersion—firm performance relationship by distinguishing between short- and long-term performance. On the one hand, CHTGD suggest a positive relationship between executive-to-worker pay dispersion and short-term firm performance as research on tournament theory shows that pay dispersion encourages a sharp focus on short-term outcomes. That is, since promotion decisions are often made on the basis of short-term outputs, pay dispersion may motivate employees to engage in things that offer relatively fast paybacks to enhance their potential for promotion. On the other hand, CHTGD argue that executive-to-worker pay dispersion is negatively associated with long-term firm performance because wide executive-to-worker pay gaps can result in employee commitment to activities that increase short-term benefits at the expense of the firm's long-term growth capability. Moreover, large executive-to-worker pay dispersion can lead to employee shirking, uncooperativeness, and turnover, whose negative impacts may not be observable immediately but will take hold over time.

3.2.2 Institutional Investor Time Horizons and Executive-to-Worker Pay Dispersion

Grounded on the idea that executive-to-worker pay dispersion is positively (negatively) related with short-term (long-term) firm performance, CHTGD developed a theory about institutional investors with different investment time horizons and their varied influence on executive-to-worker pay dispersion.

It has been established in the literature that not all institutional investors are alike, nor do they have similar effects on firms (Borochin & Yang, 2017; Boyd & Solarino, 2016; Connelly et al., 2010; Goranova & Ryan, 2014). A common approach to distinguish institutional investors is Porter's (1992) classification, which assigns institutional investors into three categories – transient, dedicated, and quasi-index – based on two fundamental characteristics of their trading behavior (i.e. portfolio turnover and holdings concentration).

Transient institutional investors are characterized by fragmented holdings in numerous firms and high portfolio turnover (Porter, 1992). These investors favor stock value gains resulting from short-term performance improvements, trading frequently in and out of stocks based on the firm's short-term earnings expectations (Bushee, 2001). Dedicated institutional investors seek for long-term appreciation in firms they own, maintaining concentrated holdings in a small number of firms for a long time (Bushee, 1998). Quasi-indexers make buy-and-hold investments in a broad set of firms (Bushee, 2004). The investment objective of such investors is to deliver the return of a market index (e.g. S&P 500) with minimal costs, and their investment decisions follow broad indexes regardless of the strategies adopted by particular firms within those indexes (Appel et al., 2016).

CHTGD theorize that transient institutional investors are less concerned about the long-term risks associated with executive-to-worker pay dispersion because these risks are mitigated by their diversified and fast-moving holdings. Meanwhile, the high likelihood that transient institutional investors will sell a firm's stock in the event of near-term earnings

disappointment creates pressures on firms to adopt strategies that yield short-term benefits, including greater executive-to-worker pay dispersion. Hence, transient institutional ownership is positively related executive-to-worker pay dispersion. CHTGD also theorize that dedicated institutional investors are more susceptible to the negative long-term consequence of high executive-to-worker pay dispersion given their long-term and concentrated holdings. As a result, dedicated institutional investors are more likely to engage in lowering executive-to-worker pay dispersion in firms they own.[17] CHTGD do not include quasi-indexers in their theory considering that these investors are less likely to make trading decisions based on specific firm actions.

CHTGD find general support for their theory using a sample of S&P 1500 firms throughout 1996 and 2006. Their results showed that transient institutional ownership is positively related to executive-to-worker pay dispersion (*β=25.79, one-tailed p<0.05, two-tailed p<0.05*),[18] while dedicated institutional ownership negatively affects executive-to-worker pay dispersion (*β=-31.88, one-tailed p<0.05. two-tailed p<0.1*).

3.3 Reexamining CHTGD

Institutional theory suggests that shareholder influence over corporate governance practices should be understood by considering the formal and informal institutional environment in which the shareholder and the firm are embedded (North, 1991; Schnatterly & Johnson, 2014). In light of this embeddedness perspective, CHTGD's sample context (i.e. 1996-2006) may reflect temporal boundary conditions that may directly affect how different types of institutional investors influence executive-to-worker pay dispersion. Importantly, the

[17] In addition to the threat of exit, dedicated institutional investors often use more sophisticated tactics to influence a firm's compensation policies, including private meetings with management, voting during shareholder meetings, submitting shareholder proposals, organizing and supporting hostile media campaigns, and launching proxy contests.

[18] We report both one- and two-tail p-values because the original study present results using one-tail p-values.

landscape of corporate governance has seen dramatic change since the 2007-2008 financial crisis. For example, although executive compensation and its relation to that of lower level employees has long been a hot-button topic, it is only since the 2007-2008 financial crisis that the regulatory body and the public have intensified their scrutiny on executive-to-worker pay dispersion (Wowak, Gomez-Mejia, & Steinbach, 2017). The financial crisis prompted the passage, in 2010, of the Dodd-Frank Wall Street Reform and Consumer Protection Act, which includes a requirement for listed firms to disclose the ratio of their CEO pay to median worker pay (Kaplan, 2013). In 2013, SEC proposed amendments to Item 402 of Regulation S-K to implement this requirement, and the final rule was adopted in 2015, stipulating that listed firms must disclose this ratio since 2017.[19] In addition to the enhanced legislative supervision, the financial crisis has increased public attention to the issue of executive-to-worker pay dispersion, with more intensive media coverage,[20] NGO monitoring, and protests against firms with large pay gaps between executives and average employees (Leana & Meuris, 2015; Shin, 2014). Given the above changes concerning the formal and informal institutions in the US, it is useful to replicate CHTGD using an extended sampling time frame to see whether the relationships between different types of institutional ownership and executive-to-worker pay dispersion remain consistent over time.

CHTGD explore two types of institutional investors, transient and dedicated, which are clearly differentiated in their trading behavior. Extending their study to include the "middle" group—quasi-indexers—may add value because these investors are growing to be the largest institutional investors in the US and they are increasingly taking an active role in monitoring firm practices (Appel et al., 2016; Chen et al., 2018). According to research firm Morningstar Inc., assets under management by passive index funds is rapidly expanding over

[19] https://www.sec.gov/spotlight/dodd-frank-section.shtml#953, Accessed January 2, 2019.
[20] We search all articles about executive-to-worker pay dispersion in major US newspapers from LexisNexis database and find that there are only 15 articles during 1996-2006 as compared to 276 articles during 2007-2017.

the past two decades and have exceeded those managed by active funds in August 2019.[21] Quasi-indexers that offer these funds, like Vanguard, Blackrock, and State Street Global, are now often the largest shareholders of US firms (Kempf, Manconi, & Spalt, 2016). The huge stakes held by quasi-indexers in individual firms not only render them greater voting power, but also incentivize them to actively monitor firm actions to avoid investment risks. Indeed, a growing number of studies show that quasi-indexers influence a firm's governance choices (Appel et al., 2016; Boone & White, 2015; Bushee et al., 2014; Chen et al., 2018; Crane et al., 2016). This stream of research finds quasi-indexers to be active monitors despite their indexing strategy—although being unable to "vote with their feet", quasi-indexers can influence firm practices through multiple channels, such as proxy voting and direct engagement with the management.

In sum, we extend CHTGD's study in two ways: first, we reexamine CHTGD's findings across a broader temporal context; and second, we incorporate quasi-indexers into the analyses.

3.4 Methods

3.4.1 Sample and Data Sources

Our reexamination takes a sequential approach (Bettis et al., 2016; Gupta et al., 2018; Howard et al., 2016). In the first step, we focus on the same time period as CHTGD (that is 1996-2006, we call it the "restricted sample"). Then we conduct the same tests for a sample from the period after CHTGD (2007-2017, we call it the "post-CHTGD sample"). Finally, we redo the analyses for a sample spanning the beginning of CHTGD's observation window through the end of our data collection (1996-2017, we call it the "full sample"). For each sample, we perform two regressions: one with and the other without quasi-indexer ownership.

[21] https://www.wsj.com/articles/index-funds-are-the-new-kings-of-wall-street-11568799004, The Wall Street Journal: Index Funds Are the New Kings of Wall Street, Accessed September 18, 2019.

We follow the original work as closely as possible with respect to all assumptions and aspects of data structure. Following CHTGD, we collect executive compensation data from ExecuComp database, firm-level characteristics and industry-level trends from Compustat Fundamentals Annual database, product and geographic diversification data from Compustat Segments database, institutional ownership from Thomson Reuters Institutional (13F) Holdings database,[22] and shares outstanding from CRSP. We rely on Bushee's Institutional Investor Classification Data to assign institutional investors into transient, dedicated, and quasi-index institutional investors.[23] Using the same approach as CHTGD, we adopt Bushee's non-permanent classification,[24] which categorizes institutional investors annually to capture changes in their trading behavior over time.

After omitting observations with missing data, our restricted sample (1996-2006) includes 2,278 firm-year observations from 403 unique firms. The number of firm-year observations is slightly lower than CHTGD's sample of 2,292 firm-year observations. Our post-CHTGD sample (2007-2017) consists of 2,949 firm-year observations from 380 unique firms. In total, our full sample (1996-2017) covers 5,227 firm-year observations from 595 unique firms.

3.4.2 Measures

We follow CHTGD in constructing our variables. The dependent variable executive-to-worker pay dispersion is measured as the ratio of average TMT compensation to average employee compensation. Average employee compensation is calculated by dividing the total labor expenses (excluding total TMT compensation) by the number of employees. We

[22] These databases cover the S&P 1500 firms plus actively traded firms that were once part of the S&P 1500 but have since been removed, and a few other large publicly traded firms that were added to the databases by client request.
[23] http://acct.wharton.upenn.edu/faculty/bushee/IIclass.html, Accessed January 2, 2019.
[24] The results are qualitatively consistent if we use Bushee's permanent classification of institutional investors.

winsorize executive-to-worker pay dispersion at the top and bottom 1% by the restricted and post-CHTGD sample separately to reduce the effect of outliers, and more importantly, to yield similar standard deviations as CHTGD's.[25]

The independent variables—transient institutional ownership, dedicated institutional ownership, and quasi-indexer ownership—are operationalized as the number of shares owned by dedicated/transient/quasi-index institutional investors in a given firm divided by the total number of shares outstanding of that firm. Consistent with CHTGD, we apply a 1% cut-off criterion to remove owners with marginal equity positions. This approach yields transient institutional ownership ranging from 0% to 68.62% and dedicated institutional ownership ranging from 0% to 66.49% for our restricted sample (1996-2006), which is a bit different from CHTGD's data (0%-62.57% for transient and 0%-74.71% for dedicated institutional ownership).

We include the same set of control variables as CHTGD's. Prior year executive-to-worker pay dispersion is the one-year lag of executive-to-worker pay dispersion. Return on assets (ROA) is measured as the ratio of net income to total assets. Product and international diversification are operationalized with the inverse Herfindahl indices, namely one minus the sum of squares of the proportion of total sales from each business or geographic segment in which the firm operates.[26] Industry munificence is calculated as the slope of the regression of industry sales over time[27] divided by mean industry sales, using a 5-year window (Time t-5 to Time t). Industry dynamism is the standard error of the slope of the prior regression divided by mean industry sales. Industry complexity is measured as the Herfindahl index calculated as the sum of squares of market shares of all firms in each four-digit SIC category. Year

[25] The results are qualitatively consistent if we winsorize all firm-level continuous variables.
[26] We replace missing values in product and international diversification with zeros if the firm has sales data in Compustat Fundamentals Annual database, because the number of firm-year observations will drop by a half if we don't do this. The results remain consistent if we exclude these two variables from the regressions.
[27] Dependent variable is industry sales, and independent variable is time.

dummies are included to control for temporal effects. Appendix 3.1 details the sources used to calculate our variables and how we merge different databases.

3.5 Results

3.5.1 Main Results

In line with CHTGD, we estimate the models using fixed effects regression with robust standard errors. All the right-hand-side variables are lagged by one year except for industry conditions, which are in the same year as the dependent variable. Table 3.1 presents summary statistics.[28] As shown in Table 3.1, the CHTGD sample and our restricted sample are similar in most variables, but we do note some differences in the means of product diversification, dedicated institutional ownership, and transient institutional ownership. The differences in institutional ownership may be attributed to the fact that Thomson Reuters Institutional (13F) Holdings database and Bushee's Institutional Investor Classification database keep refining their data.

We also observe substantive differences between the restricted and post-CHTGD samples. Specifically, executive-to-worker pay dispersion is smaller (i.e. 41.62 versus 52.46) in the post-CHTGD sample (i.e. 2007-2017) as compared to that in the restricted sample (i.e. 1996-2006); ROA is also lower (i.e. 2.77 versus 3.82); industry munificence, which reflects the capability of an industry to support sustained growth, decreases (i.e. 0.02 versus 0.09); and quasi-indexer ownership amplifies (i.e. 33.56 versus 22.27). To visualize these differences, we plot the trend of our variables over time in Figure 3.1-3.3. These differences are consistent with the idea of a dynamic institutional environment, its interplay with firm strategic actions

[28] We note that the number of observations in Table 1 is slightly larger than those in the regressions. This is because CHTGD's summary statistics reflect observations in the regressions of short-term firm performance over executive-to-worker pay dispersion, and we take the same approach to obtain the samples for summary statistics to allow for direct comparison. Specifically, different from how we yield the samples for regressions, we do not exclude observations with missing data in prior year institutional ownership when producing the summary statistics.

Table 3. 1 Summary statistics for CHTGD's sample and our samples

		CHTGD's Sample (1996-2006)		Ristricted Sample (1996-2006)		Post-CHTGD Sample (2007-2017)		Full Sample (1996-2017)	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
1	Executive-Worker Pay Dispersion	49.45	69.07	52.46	62.16	41.62	59.25	46.34	60.77
2	Return on Assets[a]	3.60	6.76	3.82	8.05	2.77	7.54	3.23	7.79
3	Product Diversification	0.23	0.28	0.13	0.23	0.10	0.20	0.12	0.21
4	International Diversification	0.10	0.20	0.08	0.16	0.08	0.17	0.08	0.16
5	Complexity	0.14	0.15	0.14	0.14	0.14	0.15	0.14	0.15
6	Dynamism	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02
7	Munificence	0.09	0.08	0.09	0.08	0.02	0.08	0.05	0.09
8	Dedicated Ownership[a]	6.13	8.57	7.11	8.56	5.84	8.05	6.39	8.30
9	Transient Ownership[a]	5.97	8.21	7.31	8.47	9.52	8.21	8.56	8.40
10	Quasi-indexer Ownership[a]			22.27	14.78	33.56	15.33	28.65	16.09
11	TMT Size	5.87		6.06	1.37	5.48	1.03	5.73	1.22
12	Observations[b]	2,410		2,299		2,982		5,282	
13	Max Dedicated Ownership[a]	74.71		66.49		64.34		66.49	
14	Max Transient Ownership[a]	62.57		68.62		58.11		68.62	
15	Max Quasi-indexer Ownership[a]			93.91		90.11		93.91	

[a] Expressed as a percentage.

[b] More observations than those in the regressions, see page 14 for explanations.

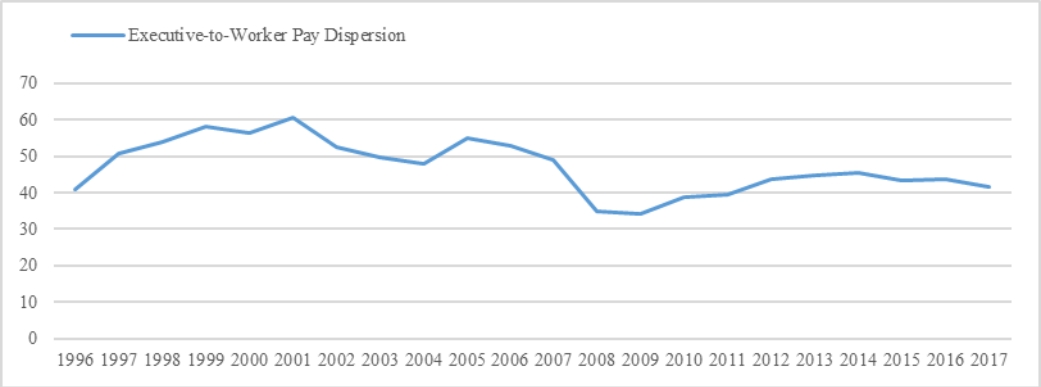

Figure 3. 1 Average executive-to-worker pay dispersion of our sample firms

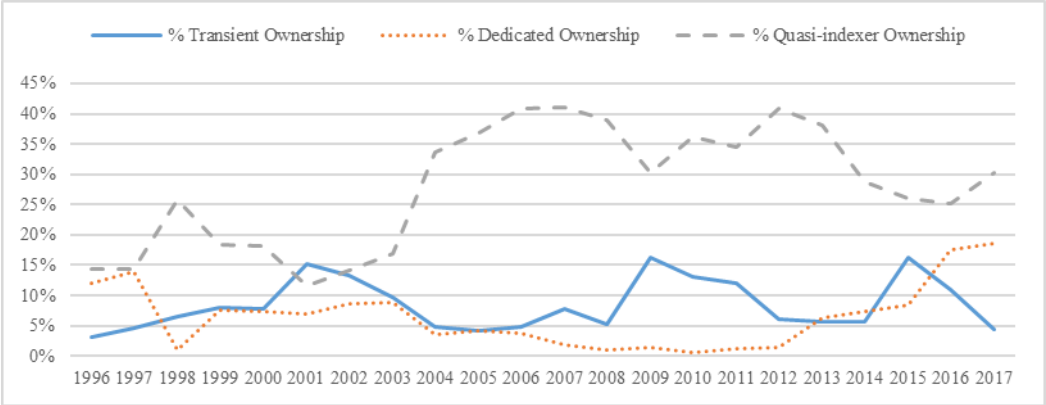

Figure 3. 2 Average percentage of transient/dedicated/quasi-indexer ownership of our sample firms

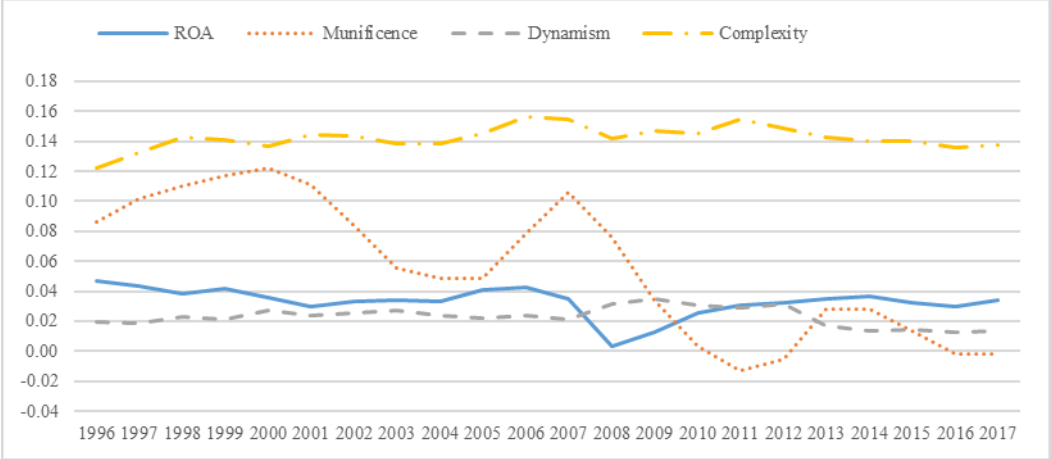

Figure 3. 3 Average ROA, complexity, dynamism, and munificence of our sample firms

Table 3. 2 Fixed effects panel regression of executive-to-worker pay dispersion over institutional ownership

Dependent variable = Exe-to-Worker Pay Dispersion $_t$							
		Restricted Sample 1996-2006		Post-CHTGD Sample 2007-2017		Full Sample 1996-2017	
Variables	CHTGD	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-2702.03*	24.83***	24.69***	31.73***	40.92***	26.46***	29.70***
	(p<0.05)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Control variables							
Exe-Worker Pay Dispersion $_{t-1}$	-0.04	0.11+	0.11+	0.15*	0.15*	0.19***	0.19***
	(p>0.1)	(0.062)	(0.062)	(0.022)	(0.021)	(0.000)	(0.000)
ROA $_{t-1}$	57.31*	30.09*	30.08*	8.64	9.57	20.04*	20.35*
	(p<0.05)	(0.039)	(0.039)	(0.392)	(0.346)	(0.031)	(0.028)
Product Diversification $_{t-1}$	-17.33*	-2.27	-2.24	-10.78+	-10.39+	-4.85	-5.07
	(p<0.05)	(0.788)	(0.791)	(0.068)	(0.081)	(0.354)	(0.330)
Geographic Diversification $_{t-1}$	-9.10	-23.58	-23.64	5.69	4.46	3.43	3.29
	(p>0.1)	(0.204)	(0.201)	(0.410)	(0.510)	(0.616)	(0.630)
Complexity	60.54	76.03*	76.02*	21.56	21.02	28.90*	28.07*
	(P>0.1)	(0.050)	(0.050)	(0.132)	(0.142)	(0.031)	(0.036)
Dynamism	-22.11	-92.25	-92.18	24.21	6.65	-17.92	-23.56
	(p>0.1)	(0.154)	(0.154)	(0.566)	(0.882)	(0.513)	(0.398)
Munificence	19.76	34.01*	34.03*	24.70*	21.48*	13.81+	12.46
	(p>0.1)	(0.033)	(0.033)	(0.040)	(0.050)	(0.080)	(0.101)
Year (effects coded)	Included	Included	Included	Included	Included	Included	Included
Independent variables							
Transient Ownership $_{t-1}$	25.79*	23.68+	23.91	-22.11+	-24.32+	-7.49	-9.91
	(p<0.05)	(0.092)	(0.107)	(0.086)	(0.070)	(0.404)	(0.300)
Dedicated Ownership $_{t-1}$	-31.88+	-16.38	-16.07	5.02	-2.40	-7.61	-12.58
	(p<0.1)	(0.151)	(0.202)	(0.731)	(0.880)	(0.338)	(0.152)
Quasi-indexer Ownership $_{t-1}$			0.64		-20.73*		-14.21+
			(0.950)		(0.044)		(0.068)
Observations	2,292	2,278	2,278	2,949	2,949	5,227	5,227
Number of firmID		403	403	380	380	595	595
Adjusted R-squared		0.05	0.05	0.05	0.06	0.07	0.07

Note: Two-tailed p-values calculated based on robust standard errors are in the parentheses, *** p<0.001, ** p<0.01, * p<0.05, + p<0.1.

and outcomes, and the need to examine whether a relationship varies over time (Adams, 2016; Gupta et al., 2018; Hambrick et al., 2008; Howard et al., 2016; Whetten, 1989). Notably, as shown in Figure 3.2, which illustrates the average transient/dedicated/quasi-indexer ownership of our sample firms over time, quasi-indexer ownership is much larger than transient or dedicated institutional ownership and it is growing rapidly, suggesting that it is indeed important to consider quasi-indexers' role in shaping executive-to-worker pay dispersion.

Table 3.2 reports the regression results. The first column (shaded grey) presents results as reported by CHTGD for comparison. Regressions (1)-(2) contain results for our restricted sample, regression (3)-(4) for our post-CHTGD sample, and regression (5)-(6) for the full sample. Regressions (2), (4), and (6) are different from regressions (1), (3), and (5) in that quasi-indexer ownership is included in the analyses. Our restricted sample produces results that are qualitatively consistent with CHTGD's findings: transient ownership is positively associated with executive-to-worker pay dispersion (*β=23.91, one-tailed p<0.1, two-tailed p=0.107*); dedicated ownership is negatively linked to executive-to-worker pay dispersion (*β=-16.07, one-tailed p=0.101, two-tailed p=0.202*). Our results also demonstrate that quasi-indexer ownership is not related to executive-to-worker pay dispersion during 1996-2006 (*β=0.64, one-tailed p=0.475, two-tailed p=0.950*). The results of the direct replication provide evidence that we are indeed following a similar empirical approach to CHTGD's.

Yet, the effects of transient/dedicated/quasi-indexer ownership on executive-to-worker pay dispersion change during the post-CHTGD period. The relationship between transient ownership and executive-to-worker pay dispersion turns negative (*β=-24.32, one-tailed p<0.05, two-tailed p<0.1*); the relationship between dedicated ownership and executive-to-worker pay dispersion becomes insignificant (*β=-2.40, one-tailed p=0.440, two-tailed*

p=0.880); and the relationship between quasi-indexer ownership and executive-to-worker pay dispersion becomes negatively significant (*β=-20.73, one-tailed p<0.05, two-tailed p<0.05*).

Results of the full sample reflect the inconsistent findings between our restricted and post-CHTGD samples: the coefficient of transient ownership is insignificant (*β=-9.91, one-tailed p=0.150, two-tailed p=0.300*); the coefficient of dedicated ownership is negative (*β=-12.58, one-tailed p<0.1, two-tailed p=0.152*); the coefficient of quasi-indexer ownership is negative (*β=-14.21, one-tailed p<0.05, two-tailed p<0.1*).

Overall, our direct replication reaffirms the original findings of CHTGD within the 1996-2006 time frame. Our replication in a later and broader time frame suggests that temporal effects appear to change how different types of institutional ownership shape a firm's executive-to-worker pay dispersion. Specifically, quasi-indexer ownership, rather than dedicated ownership, have become more important in reducing executive-to-worker pay dispersion since the 2007-2008 financial crisis. Moreover, the effect of transient institutional ownership on executive-to-worker pay dispersion has switched from positive to negative during 2007-2017.

3.5.2 Robustness Check Using a Regression Model with Interaction Terms

In the above analyses, we do not test whether the different results generated from the restricted sample and the post-CHTGD sample are empirically significant as it is impossible to perform coefficient difference tests using STATA command *suest* for fixed effects regression models. In this section, we construct a regression model with interaction terms to empirically test the changes in institutional investor influence. This model is tested using the full sample (i.e. 1996-2017). We create a dummy variable Post-CHTGD, which equals to 1 from the year 2007 to 2017 and 0 otherwise, and examine the moderating effect of Post-CHTGD on the relationships between transient/dedicated/quasi-indexer ownership and

Table 3. 3 Robustness check: The moderating role of Post-CHTGD

Dependent variable = Exe-to-Worker Pay Dispersion $_t$			
	(1)	(2)	(3)
Constant	34.98***	40.10***	38.39***
	(0.000)	(0.000)	(0.000)
Control variables			
Exe-Worker Pay Dispersion $_{t-1}$	0.20***	0.20***	0.20***
	(0.000)	(0.000)	(0.000)
ROA $_{t-1}$	21.67*	22.29*	21.73*
	(0.020)	(0.016)	(0.017)
Product Diversification $_{t-1}$	-1.08	-1.46	-1.93
	(0.837)	(0.779)	(0.713)
Geographic Diversification $_{t-1}$	5.76	5.51	4.79
	(0.395)	(0.413)	(0.480)
Complexity	32.54*	31.78*	30.59*
	(0.014)	(0.016)	(0.019)
Dynamism	-57.69*	-64.72*	-56.52*
	(0.017)	(0.012)	(0.033)
Munificence	8.57	6.28	8.22
	(0.210)	(0.328)	(0.201)
Post-CHTGD	-4.96**	-3.80*	-0.28
	(0.001)	(0.047)	(0.946)
Independent variables			
Transient Ownership $_{t-1}$		-10.47	-11.95
		(0.216)	(0.313)
Dedicated Ownership $_{t-1}$		-16.83*	-23.27*
		(0.045)	(0.012)
Quasi-indexer Ownership $_{t-1}$		-12.23+	-1.41
		(0.071)	(0.842)
Transient Ownership $_{t-1}$ × Post-CHTGD			3.14
			(0.807)
Dedicated Ownership $_{t-1}$ × Post-CHTGD			16.26
			(0.226)
Quasi-indexer Ownership $_{t-1}$ × Post-CHTGD			-17.01+
			(0.054)
Observations	5,227	5,227	5,227
Number of firmID	595	595	595
Adjusted R-squared	0.06	0.06	0.06

Note: Two-tailed p-values calculated based on robust standard errors are in the parentheses, *** p<0.001, ** p<0.01, * p<0.05, + p<0.1.

executive-to-worker pay dispersion. In this set of regressions, we exclude year dummies to avoid multicollinearity problems. Table 3.3 presents the regression results. The coefficients of both the interaction terms “Transient Ownership × Post-CHTGD” and “Dedicated Ownership × Post-CHTGD” are insignificant, suggesting that there may not be significant changes in the relationships between transient/dedicated ownership and executive-to-worker pay dispersion. Consistent with the results in Table 2, Post-CHTGD negatively moderates the effect of quasi-indexers on executive-to-worker pay dispersion, indicating that quasi-indexers have become more active in reducing executive-to-worker pay dispersion in their portfolio firms since the 2007-2008 financial crisis.

3.5.3 Robustness Check on the Role of Position in the Industry

If the changes in institutional investor influence on executive-to-worker pay dispersion are caused by the heightened regulatory and public attention to executive-to-worker pay dispersion, the extent to which these investors will pressure a firm to lower its executive-to-worker pay dispersion may depend on the firm's position within the industry. Specifically, when a firm's executive-to-worker pay dispersion is higher than average firms in its industry, it is more likely that this firm will experience negative publicity and shares plunges. Hence, institutional investors are more likely to demand this firm to narrow its executive-to-worker pay dispersion. Conversely, firms with a below average level of executive-to-worker pay dispersion will be less likely to go through negative outcomes, and thus institutional investors will be less concerned about executive-to-worker pay dispersion in such firms. To test these ideas, we first construct a dummy variable High Dispersion, which equals to 1 if the firm's executive-to-worker pay dispersion is greater than the industry average in a given year, and 0 otherwise. Then, we examine how High Dispersion moderates the relationships between transient/dedicated/quasi-index ownership and executive-to-worker pay dispersion. The regression results are illustrated in Table 3.4. As predicted, the coefficients of all the three the interaction terms are negatively significant in the Post-CHTGD sample (2007-2017), but they are not significant in the restricted sample (1996-2006). These findings may suggest that institutional investors, no matter what their types are, tend to prefer lower executive-to-worker pay dispersion since the 2007-2008 financial crisis.

3.6 Discussion

Using a similarly constructed sample of S&P 1500 firms, but across a longer time period, we replicate CHTGD's work on institutional investor influence over executive-to-worker pay dispersion. The results of our direct replication of CHTGD in the time frame of 1996-2006

Table 3. 4 Robustness check: The moderating role of position in the industry

Dependent variable = Exe-to-Worker Pay Dispersion $_t$						
	Restricted Sample 1996-2006		Post-CHTGD Sample 2007-2017		Full Sample 1996-2017	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Constant	25.84***	27.26***	29.61***	35.36***	26.28***	27.82***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Control variables						
Exe-Worker Pay Dispersion $_{t-1}$	0.13*	0.13*	0.14*	0.14*	0.20***	0.20***
	(0.049)	(0.047)	(0.044)	(0.040)	(0.000)	(0.000)
ROA $_{t-1}$	30.05*	30.32*	10.26	10.95	20.43*	20.73*
	(0.037)	(0.038)	(0.309)	(0.285)	(0.028)	(0.025)
Product Diversification $_{t-1}$	-2.04	-1.54	-10.75+	-10.95+	-4.54	-5.30
	(0.810)	(0.857)	(0.066)	(0.070)	(0.388)	(0.308)
Geographic Diversification $_{t-1}$	-23.47	-23.13	7.67	4.77	3.31	2.64
	(0.205)	(0.212)	(0.296)	(0.497)	(0.630)	(0.701)
Complexity	76.16*	75.74*	20.68	19.72	28.62*	27.43*
	(0.046)	(0.045)	(0.144)	(0.169)	(0.033)	(0.043)
Dynamism	-92.08	-88.76	28.72	6.45	-17.91	-24.28
	(0.157)	(0.171)	(0.490)	(0.882)	(0.515)	(0.379)
Munificence	33.88*	34.00*	25.32*	20.30+	13.29+	11.38
	(0.033)	(0.033)	(0.039)	(0.058)	(0.095)	(0.127)
High Dispersion $_{t-1}$	-5.37	-10.71+	7.78*	24.14*	-0.06	6.67
	(0.240)	(0.083)	(0.041)	(0.022)	(0.983)	(0.246)
Year (effects coded)	Included	Included	Included	Included	Included	Included
Independent variables						
Transient Ownership $_{t-1}$	22.06+	21.54	-12.60	-14.85	-5.00	-7.81
	(0.094)	(0.116)	(0.254)	(0.198)	(0.536)	(0.358)
Transient Ownership $_{t-1}$ × High Dispersion $_{t-1}$	7.70	11.61	-47.77+	-51.19*	-10.78	-11.84
	(0.775)	(0.663)	(0.057)	(0.039)	(0.530)	(0.499)
Dedicated Ownership $_{t-1}$	-17.67	-19.15	15.84	12.85	-2.46	-4.98
	(0.148)	(0.145)	(0.273)	(0.402)	(0.777)	(0.589)
Dedicated Ownership $_{t-1}$ × High Dispersion $_{t-1}$	3.29	11.38	-42.36*	-67.98**	-16.81	-28.93
	(0.896)	(0.662)	(0.010)	(0.006)	(0.254)	(0.115)
Quasi-indexer Ownership $_{t-1}$		-5.48		-10.03		-9.04
		(0.599)		(0.163)		(0.158)
Quasi-indexer Ownership $_{t-1}$ × High Dispersion $_{t-1}$		21.28		-42.35*		-20.47+
		(0.173)		(0.047)		(0.092)
Observations	2,278	2,278	2,949	2,949	5,227	5,227
Number of firmID	403	403	380	380	595	595
Adjusted R-squared	0.05	0.05	0.05	0.07	0.07	0.07

Note: Two-tailed p-values calculated based on robust standard errors are in the parentheses, *** p<0.001, ** p<0.01, * p<0.05, + p<0.1.

match closely with the original findings, however, our analyses across a longer sampling period produce different results. Overall, CHTGD propose that transient ownership is positively related to executive-to-worker pay dispersion, while dedicated ownership negatively affects executive-to-worker pay dispersion. Our replication finds that, during the post-CHTGD period (i.e. 2007-2017), the relationship between transient ownership and executive-to-worker pay dispersion turns negative, and the effect of dedicated ownership on executive-to-worker pay dispersion becomes less negative. We also examine the impact of quasi-indexer ownership on executive-to-worker pay dispersion, though CHTGD expect quasi-indexers to have less influence on firm outcomes. Our results suggest an insignificant relationship between quasi-indexer ownership and executive-to-worker pay dispersion in the time frame of the original study (i.e. 1996-2006), providing evidence to corroborate CHTGD's statement about quasi-indexers within that sample time period. Interestingly, quasi-indexer ownership has a significant negative effect on executive-to-worker pay dispersion in the 2007-2017 time frame, indicating that quasi-indexers may have become more active in monitoring firm compensation policies over the past decade.

Recent research suggests that the landscape of corporate governance in the US has changed dramatically since the financial crisis, with the issue of executive-to-worker pay dispersion attracting heightened Congressional and public scrutiny (Kaplan, 2013; Wowak et al., 2017) and the market share of quasi-indexers expanding rapidly (Appel et al., 2016; Chen et al., 2018). Our findings imply that, under such circumstance, transient institutional investors and quasi-indexers are more likely to engage in reducing executive-to-worker pay dispersion in firms they own, especially in those with above industry level pay dispersion. Our findings may be due to several potential reasons. First, with the issue of executive-to-worker pay dispersion being increasingly salient to the regulatory bodies and the public, transient institutional investors and quasi-indexers may be warier of the potential shares

plunge in their portfolio firms caused by high executive-to-worker pay dispersion, as well as the potential reputational risk associated with investing in irresponsible firms. Second, consistent with research showing that institutional investors increasingly find CSR important in fulfilling client demands, attracting fund flows, and reducing investment risks (Chen, Dong, & Lin, 2019), it is possible that institutional investors also increasingly find a large pay gap between executives and employees unsustainable. This change in institutional investors' perceptions may be more profound for quasi indexers as they are long-term universal owners, which makes them expose to risks from corporate negative externalities inevitably.

3.6.1 Theoretical Implications

Our replication study suggests that temporal settings may be an important boundary condition to understand how institutional investors affect executive-to-worker pay dispersion. It is recognized in the literature that institutional investor behaviors and preferences can change over time, which in turn may affect their impact on firm practices (Bushee, 1998; Connelly et al., 2010). Research also shows that institutional investors make decisions within the formal and informal institutional constraints in a given institutional framework (Schnatterly & Johnson, 2014). We draw on these insights to show that along with the stricter supervision from the legislative body and the public over executive-to-worker pay dispersion after the financial crisis, transient institutional investors and quasi-indexers have become more likely to engage in reducing executive-to-worker pay dispersion in their portfolio firms. Future research on institutional investor influence may attach more importance to the temporal context of their theory.

Our findings also demonstrate that quasi-indexers do influence corporate governance outcomes under certain circumstance. Quasi-indexers have long been overlooked in the management literature as the indexing strategy largely attenuates their ability to "vote with

their feet" and their diversified holdings make firm-specific information gathering costly. Nevertheless, quasi-indexers may be interested in promoting the "best" corporate governance practices proposed by the regulatory body in their portfolio firms to reduce investment risks and monitoring costs (Appel et al., 2016). With their rapid expanding market shares, quasi-indexers also become more capable of enforcing their demands through voice such as private discussions and proxy votes. Future research should pay more attention to this fast-growing group of institutional investors.

3.6.2 Practical Implications

CHTGD state that their findings about institutional investor influence on executive-to-worker pay dispersion may motivate regulatory bodies to develop policies that force influential investors to support lower executive-to-worker pay dispersion. Changes in the impact of transient institutional ownership and quasi-indexer ownership on executive-to-worker pay dispersion during 2007-2017 may lend support to CHTGD's idea that the regulatory bodies can, via public policies, mobilize institutional investors to engage in reducing executive-to-worker pay dispersion.

CHTGD also suggest executives to consider what kind of owners they wish to attract when developing compensation policies based on their findings about the heterogeneous institutional investor preferences of executive-to-worker pay dispersion. Our replication study provides additional insights for executives by showing that institutional investor preferences change over time. In order to track and respond quickly to investor concerns and preferences, executives may need to communicate regularly with their important investors.

3.6.3 Limitations, Future Research, and Conclusion

In this replication study, we show that compared to the period of 1996-2006, the relationship between transient institutional ownership and executive-to-worker pay dispersion has changed from positive to negative during 2007-2017, and similarly, the relationship between quasi-index ownership and executive-to-worker pay dispersion has changed from insignificant to negative. We propose that these changes may be a result of the increased regulatory and public scrutiny on executive-to-worker pay dispersion since the financial crisis. However, we do not empirically prove this argument. Future work on institutional investor influence on firm outcomes may look for ways to examine the moderating effects of institutional-level factors. Delving into this type of question may require researchers to find adequate proxies for these institutional-level factors. For example, using content analysis of newspapers, one can measure the extent to which the issue of executive-to-worker pay dispersion is salient to the public in a given time.

In conclusion, through our replication and extension of CHTGD's work on institutional investor influence on executive-to-worker pay dispersion, we highlight that temporal settings may represent an important boundary condition in this relationship. Moreover, we provide evidence that quasi-indexers, despite their indexing strategy, may actively monitor corporate governance practices. Given that the economic power of institutional investors, especially quasi-indexers, has risen rapidly (Chen et al., 2018; Connelly et al., 2018), and that executive-to-worker pay dispersion could have important long-term implications on firm performance and societal-level income equality (Tsui et al., 2018), our findings offers insights for policymakers and managers about how to manage institutional investors to promote corporate responsibility and sustainable growth.

Appendix 3. 1 Details on our measures

Panel A. Variable Description

	Variable	Measure	Data Item and Source
1	Executive-to-worker pay dispersion	average TMT compensation/average employee compensation	*tdc1* from Execucomp for executive compensation; *xlr* and *emp* from Compustat for labor expenses and total number of employees
2	Dedicated/Transient/Quasi-indexer Ownership[a]	the number of shares owned by each type of institutional investors at the end of the year/the total number of shares outstanding at the end of the year	*shares* from Thomson Reuters Institutional (13F) Holdings for shares owned by institutional investors; *shrout* from CRSP for shares outstanding; *Transient/Quasi-indexer/Dedicated classification ($3.)* from Bushee's Institutional Investor Classification for categorizing institutional investors
3	ROA	net income / total assets	*ni* and *at* from Compustat Fundamental for net income and total assets
4	Complexity	the sum of squares of the market shares of all firms in each four-digit SIC category	*sale* and *sic* from Compustat Fundamental for sales and industry
5	Munificence	the slope of the regression of industry sales over time divided by mean industry sales (5-year window with the focal year as the last year)	*sale* and *sic* from Compustat Fundamental for sales and industry
6	Dynamism	standard error of the prior regression divided by mean industry sales	*sale* and *sic* from Compustat Fundamental for sales and industry
7	Product Diversification[a]	1 - the sum of squares of the proportion of total sales from each business section	*sales* and *sid* from Compustat Segments for sales and business sections
8	International Diversification[a]	1 - the sum of squares of the proportion of total sales from each geographic section	*sales* and *geotp* from Compustat Segments for sales and geographic sections

[a] We follow the guidelines in WRDS to deal with duplicate observations.

Panel B. Matching Criteria

	Matching Criteria
1	Execucomp and Compustat Fundamental are matched based on GVKEY
2	Thomson Reuters Institutional (13f) Holdings and Bushee's Institutional Investor Classification are matched based on mgrno
3	Thomson Reuters Institutional (13f) Holding and CRSP are matched based on cusip from the former and ncusip from the later
4	CRSP and Compustat Fundamental are matched based on cusip
5	Compustat Segments and Compustat Fundamental are matched base on GVKEY