

**Does Disclosure affect CEO Pay Setting?  
Evidence from the Passage of the 1934 Securities and Exchange Act \***

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**Abstract**

Using newly digitized data from the Federal Trade Commission, I examine the evolution of executive compensation during the Great Depression, before and after mandated pay disclosure in 1934. I find that disclosure did not achieve the intended effect of broadly lowering CEO compensation. If anything, and in spite of popular outrage against compensation practices, average CEO compensation increased following disclosure relative to the upper quantiles of the non-CEO labor income distribution. Pay disclosure coincided with compression of the CEO earnings distribution. Following disclosure there was a pronounced drop in the residual variance of earnings—computed with size and industry controls—that accounts for almost the entire drop in the unconditional variance. The evidence suggests an upward “ratcheting” effect whereby lower paid CEOs given the size and industry of their firm experienced relative gains while well paid CEOs conditional on these characteristics were not penalized. The exception is at the extreme right tail of the CEO distribution, which fell precipitously, suggesting that disclosure may only have restrained only the most salient and visible wages.

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Mandated pay disclosure has received considerable attention as a low cost policy that can improve corporate governance and rein in soaring executive compensation. Pay transparency may compel boards to restrain compensation in response to political pressure and public antagonism towards top management pay packages. Disclosure may also improve accountability and correct situations where CEOs are paid more than what is warranted by the performance of their firm (Djankov et al. (2008)). But transparency may have unintended consequences and raise CEO pay for a number of reasons. CEOs could capture the pay process—as in Bertrand and Mullainathan (2001)—and use newly disclosed information to set favorable peer benchmarks, their performance could be negatively affected by horizontal pay comparisons, transparency could aggravate agency problems (Hermalin and Weisbach 2012), or firms could use CEO pay as a signal of a firm’s performance (Hayes and Schaefer 2009).

In addition to its effects on pay levels, transparency may affect pay dispersion. A standard result in models of costly information acquisition is that when information is costly, agents are unable to arbitrage optimally resulting in excess price dispersion (e.g. Jensen 2007). In the labor context, as informational frictions are reduced wage dispersion for workers with the same characteristics should decline (Mortenson 2005). With perfect information, and absent firm-specific rents, compensating differentials or other frictions, the law of one price should hold so that workers with the same characteristics receive the same wage.

There is evidence from the public sector that pay transparency can lead to public pressure to lower the salaries of top managers (Mas 2015). Card et al. (2012) provide

experimental evidence that workers care about relative pay and Mas (2006) documents that being paid below a reference point negatively affects performance. In the private sector Faulkender and Yang (2013) find evidence that CEOs use favorable peer comparisons to elevate pay. Gartenberg and Wulf (2014) provide evidence that horizontal wage considerations affect wage setting for managers. Shue (2013) documents that there are peer effects within MBA cohorts in compensation levels.<sup>2</sup>

While there are a number of studies that have sought to understand the implications of disclosure, no study has examined the effects on compensation following the 1934 Securities Exchange Act that established the legal and regulatory framework for mandated pay disclosure of listed companies. The lack of evidence from this period is unfortunate since this was arguably the most important shift in pay disclosure policy in the United States—subsequent regulatory changes were incremental—and the act represents a watershed moment in the history of corporate governance regulation.<sup>3</sup>

A challenge for analyzing the effects of the 1934 act is the lack of pre-disclosure compensation data, since compensation data is typically only available after it has been disclosed. This paper takes advantage of (in the recent era) unexploited executive pay records to circumvent this challenge and analyze the act's effect on CEO compensation. In 1933, Congress requested that the Federal Trade Commission (FTC) collect schedules of salaries and bonuses of corporate officers for the years 1928-1932 for companies listed

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<sup>2</sup> See also Vafeas and Afxentiou (1998); Craighead et al. (2004); Shue and Townsend (2015); and Gipper (2016)

<sup>3</sup> A number of studies have sought to estimate the effects of other reporting requirements on measures of firm and security prices. These include Stigler (1964), Benston (1973), Simon (1989), and Mahoney and Mei (2006). Greenstone et al. (2006) study the 1964 amendment of the act on securities prices.

on the New York Stock Exchange or New York Curb Exchange with assets greater than one million dollars (Senate Resolution 75, 1933). Summaries of these data were the source of some of the earliest studies of CEO compensation (Baker 1939), but the data have not been analyzed in the modern era.<sup>4</sup> I digitized these FTC records for this study and linked them to digitized records from the Survey of American Listed Corporations (SALC) for years 1934-1940 as well as data from the Center for Research in Security Prices (CRSP). The result is a longitudinal record of compensation for the three highest paid executives and firm characteristics for more than 350 firms, spanning the Great Depression period, both before and after mandated pay disclosure.<sup>5</sup> Through this data collection the paper contributes to documenting and understanding the historical evolution of executive pay, building on the work of Frydman (2014), Frydman and Malloy (2012), and Frydman and Saks (2010).

To partially account for other changes in the economy, and changes in legislation that affected high-income earners broadly, I compare CEO compensation to the upper-tail of the labor income distribution (excluding capital gains) using the Piketty and Saez (2003) tax data. I also control for the market capitalization of firms to account for the impact of economic shocks on firms from the Great Depression as well as other policies that affected firm size. I examine broader trends in pay dispersion across firms using plant-level earnings data from 19 industries in the Census of Manufacturing for years 1929, 1931 and 1935.

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<sup>4</sup> I use the term CEO for the highest paid executive in a firm.

<sup>5</sup> Data from the Survey of American Listed Corporations were previously analyzed by Jensen and Murphy (1990).

I find little support for the intended outcome of the transparency policy, which was to reign in compensation. If anything, average CEO compensation rose over the 1932-1934 period in relation to broad top U.S. taxpayer income levels when disclosure requirements were enacted. This conclusion is only stronger when controlling for firm size. This finding is surprising given the toxic environment for CEOs over the period, and the harsh reactions from the press and politicians after learning true compensation levels (for example, Senator Burton Wheeler of Montana stated after the first release of compensation records that “for Captains of industry to be drawing down large salaries is unconscionable and unpatriotic” (quoted in Leff 1984)).

The more striking finding, however, is pronounced compression in the earnings distribution, driven largely by a sharp reduction in the variance of residual compensation, the latter quantity derived by computing the residual of log compensation after controlling for firms’ lagged log market capitalization and 2-digit SIC industry. Correspondingly, the R-squared in a regression of log CEO compensation on lagged log market capitalization and 2-digit industry increased by 10 percentage points over the same period. I also find that the pay-to-performance sensitivity declined. These findings suggest that firms may have responded to a lower cost of information on peer earnings by shifting compensation towards observable benchmarks. Consistent with this conclusion, I document that firms with more negative residual compensation (again computed using firm size and industry) experienced larger compensation gains between 1932 and 1934 than in other years while I find no such relationship between unadjusted compensation levels and the subsequent change in compensation. In other words, firms did not cut pay

for highly compensated CEOs or increase pay for low paid CEOs, in general, rather they adjusted compensation when the CEO was out of line with predicted compensation based on firm size and industry.

Was compression due to relatively low paid CEOs gaining or relatively highly paid CEOs losing ground? Estimating conditional quantile models I show that disclosure coincided with compensation gains in the lower percentiles of the conditional compensation distribution, controlling for size and industry, whereas higher percentiles did not change significantly relative to non-CEO high-earners. The evidence is more consistent with a “ratcheting” effect whereby disclosure led firms that were paying their CEOs lower levels than would be predicted by size and industry to raise compensation. By contrast, more generous firms conditional on size and industry did not generally cut pay relative to top U.S. taxpayer income levels following disclosure. These findings provide little support for the role of disclosure of salaries in restraining CEO pay, and suggest that it may have had the opposite effect.

The exception to this conclusion is in the far right tail of the unconditional CEO distribution. CEO compensation at the top of the distribution, above the 98<sup>th</sup> percentile, declined precipitously after disclosure, by approximately 80 percent at the very top of the distribution. These reductions are still present after controlling for firm characteristics. If public attention was focused on the extreme end of the distribution, disclosure and the ensuing popular reaction may have led to a shift in the right tail due to the visibility and salience of these salaries while not negatively affecting lower paid CEOs.

While one must be careful in attributing these changes in CEO compensation over the period to any single factor, as this was undoubtedly a turbulent period, the evidence is suggestive that disclosure led to these changes since disclosure was the primary policy over that period targeted at corporate executives, and other policies over the period, such as increasing marginal tax rates, do not easily account for this particular pattern of changes in the structure of compensation, particularly changes in the *residual* distribution. Unlike CEOs, there is no evidence of compression after the disclosure requirements in the earnings of hourly workers across plants, both unconditionally and conditional on industry and size, in the Census of Manufacturers. The pattern of change in the distribution of CEO compensation appears distinct from broader trends in the labor market.

## **Section I. Background**

Prior to 1933, executive compensation was almost never disclosed and was considered sensitive information by companies. According to Wells (2010), “before the 1930s, the most important fact about executive compensation is that it was not public knowledge.” As Murphy (2012) describes, “most [compensation] reports at the time were speculative, based on vague descriptions of company-wide bonus formulas that would allow estimates of aggregate but not individual bonuses” and there were few legal means to compel disclosure.

Momentum for executive pay disclosure built in the early 1930s as a result of anti-corporate sentiment propagated by the Depression and scandals that arose after exorbitant compensation packages at Bethlehem Steel and American Tobacco were

leaked from lawsuits involving the companies. In the 1930 Bethlehem case, it was revealed as a result of a lawsuit on a proposed merger that the president of the company had received \$1,600,000 in compensation in 1929, a significantly high amount at the time (“Inquiry Into High Salaries Pressed By The Government,” *New York Times*, October 29, 1933), while American Tobacco’s CEO received almost \$2,000,000 (Wells 2010; Girous 2015). According to Wells (2010), “the Bethlehem Steel and American Tobacco revelations, combined...with a Depression-generated disgust with corporate management, fueled public perceptions that executive compensation was both excessive and the product of self-dealing.”

The outcry led to congressional hearings focused on compensation (the 1932-33 Pecora hearings) and the first broad undertaking by the U.S. government to collect salaries and bonuses of corporate officers (Stock Exchange Practices 1933). On May 5, 1933 the Senate issued a resolution (Senate Resolution 75, 1933) requesting a report from the FTC showing the salary schedules of executive officers of corporations listed in the New York Stock Exchange with more than a million dollars in assets (“2,000 Concerns Hit By Salary Inquiry,” *New York Times*, October 19, 1933; “President Studies High Salary Curb,” *New York Times*, October 20, 1933). The FTC collected schedules for 877 companies for years 1928-1932 and submitted their report to Congress and to the public on Feb 27, 1934. These records represented the first comprehensive disclosure of executive pay, and the release of this report dates the beginning of mandatory pay disclosure. Details of the records were described in the press as the report was submitted to Congress (“Pay and Bonuses of Business Heads Listed for Senate,” *New York Times*,

February 27, 1934)) and the disclosures fueled further disgust with executive pay levels. The data collected in the FTC report were also the source of several early academic studies on the topic, notably Baker (1939), and the basis for the analysis in this paper. Crucially, the report was retrospective and included pay records that pre-date disclosure.

The Securities and Exchanges Acts (SEA) of 1933 and 1934 provided the legal and regulatory foundation for compensation disclosure of executives of listed firms. The acts established the Securities and Exchange Commission (SEC), which required the disclosure of compensation for the three highest paid officers on the 10-K form (Securities Exchange Act 1934). The combination of the SEA and the FTC survey meant that executive pay was in the public domain by February 1934.

There were a number of other legislative, executive and judicial actions aimed at restraining CEO pay over the period, but they are viewed as largely ineffective. There was particular distaste for high-salaried CEOs of companies receiving aid from the government via the Reconstruction Finance Corporation (RFC), a government corporation that provided financial support in the form of loans to certain at-risk businesses. Senator Hugo Black attempted to write into the terms of RFC aid that the RFC was banned from lending to companies whose CEOs were compensated in excess of \$15,000, but it was rejected by Congress (“Senators Vote Salary Limit on R.F.C. Borrowers.” *Chicago Daily Tribune*, May 5 1933). A number of similar attempts were made before the Pecora hearings, all unsuccessful. However, transportation coordinator Joseph Eastman was able to pressure railroad companies to limit executive compensation to \$60,000 (this represented a significant drop for some executives, several of whom had

salaries larger than \$100,000 previously) (Lokey 1934).<sup>6</sup> RFC pay regulations were the high water mark for efforts to cap corporate pay directly. These cases were isolated, though, and the limits imposed on railroad salaries did not translate to other industries receiving RFC funds. No further meaningful legislative or executive actions were taken until World War II (Leff 1984).

While pay levels of corporate executives were used to justify higher tax rates, tax policy was targeted broadly to all high-income earners rather than being focused on executives. In 1931, the top marginal tax rate was 25% (on incomes greater than \$100,000). In 1932, the marginal tax rate on income over \$100,000 leapt up to 56%, while a new tax rate of 63% was instituted on incomes over \$1,000,000. In 1936, this new top marginal tax rate was increased further to 79%, and eventually peaked at 94% in 1944. Corporations, but not executives, were specifically targeted in the Revenue Act of 1936, which introduced tax penalties for corporations retaining profits rather than distributing them as dividends (Revenue Act of 1936, 74<sup>th</sup> Cong. Sess. 2 CHS. 690, June 22 1936). There were legislative proposals to add surtaxes on corporate compensation including proposed amendments to the 1932 and 1934 Revenue Acts, as well as 1935 legislation proposed by Senator Burton Wheeler, Senator Henry Ashurst, and Representative William McFarlane, but their proposals did not gain traction (Wells 2010).

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<sup>6</sup> While salary caps for all RFC-loan beneficiaries never went into practice, salaries for airmail carriers were capped at \$17,500 in 1933 (Wells 2010). None of the data used in the analysis comes from railroad companies, so this unusual instance of a successful salary cap will not influence the results.

There were also numerous legal challenges to corporate pay practices in the period, the most important one being the Supreme Court *Rogers v. Hill* (1933) ruling on compensation at American Tobacco. The ruling stated that even though the compensation plan had been approved by shareholders, “if a bonus payment has no relation to the value of services for which it is given, it is in reality a gift in part, and the majority stockholders have no power to give away corporate property against the protest of the minority” (Rogers v. Hill 1933). The ruling was interpreted as threatening judicial oversight over executive compensation in cases where compensation could be considered “waste.” The *Rogers v. Hill* ruling was tested in several instances, for example in *Gallin v. National City Bank* (1935) in which the New York Supreme Court concluded that the contested pay package was not wasteful, but the ruling is seen as having almost no impact. One complication with the application of *Rogers v. Hill* was that it was very difficult to assess compensation in relation to services rendered, since compensation levels alone were not sufficient to establish waste. Wells (2010) writes that the “cases concerning executive compensation at public corporations decided over the latter half of the 1930s slowly retreated from the expansive approach suggested in *Hill*. Courts still engaged in limited scrutiny of enormous compensation packages, but no court was willing to pursue *Hill* to its logical conclusion and hold that an executive compensation package, at least one not tainted by fraud or self-dealing, was wasteful.”

To summarize, in spite of the desire by large segments of the public and politicians’ efforts to restrain executive pay, executive, legislative and judicial efforts

were largely rhetorical and symbolic.<sup>7</sup> While Congress and the courts were willing to identify excessive compensation in general as an issue, the lack of a reasonable measure to gauge executive pay levels resulted in little more than harsh denunciations. As Wells (2011) writes of these actions, “the most popular and effective response...turned on disclosure.”<sup>8</sup>

Disclosure was seen as a less intrusive measure that would allow public scrutiny to curb CEO pay. The idea was that firms would respond to disclosure requirements by voluntarily reducing executive pay to more reasonable level out of fear of shareholder and public backlash. Rather than requiring the government to intervene, mandated disclosure requirements were seen as a less disruptive way to address the issue of excessive compensation. The government and courts also felt they had a firmer legal standing to mandate disclosure compared to other, heavy-handed policy proposals, and the idea was preferred by President Roosevelt (Benston 1973).

As shown, the policies over this period, as well as the statements of politicians and regulators, were aimed to push compensation of corporate executives downward. At the time, records reveal that many corporations and executives opposed government inquiries of their salaries and legislation such as the Securities and Exchange Acts (“Industries Resent Salary Publicity,” *New York Times*, October 18 1933; “Bankers Urge

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<sup>7</sup> President Roosevelt had criticized executive pay in his 1933 presidential campaign but once in office he favored disclosure over pay ceilings. The Roosevelt Administration opposed the RFC pay limits of \$17,500 in favor of a higher amount, and did not support wage controls until 1942. The exception to this stance was symbolic. The salaries in the motion picture industry were of particular concern to President Roosevelt, who “pressured the NRA to include in its motion picture industry code a fine of up to \$10,000 for any movie studio offering” excessive pay. After a formal inquiry, the fine was never implemented. (Wells 2010)

<sup>8</sup> Wells (2011) page 44.

Changes in Securities Act,” *The Wall Street Journal*, October 31 1933). These policies interacted with the broader economic forces, including declining market values, leading to what would seem to any casual observer to be a toxic environment for corporate executives.

## **Section II. Data**

A contribution of this paper is the digitization of executive compensation data over the period 1928-1940, allowing a full account of executive pay trends over the Great Depression, both before and after mandated disclosure.

The compensation data for 1928-1932 come from the FTC report on compensation schedules. As discussed above, Congress requested that the FTC collect compensation schedules of “executive officers and directors of corporations engaged in interstate commerce (other than public utilities corporations) having capital and assets of more than a million dollars, whose securities were listed on the New York Stock Exchange or the New York Curb Exchange.” (Senate Resolution 75, 73<sup>rd</sup> Cong. 1<sup>st</sup> Sess. 1933). Importantly, the request was for total compensation, including “any compensation, fee, bonus, commission, or other payments, direct or indirect, in money or otherwise, for personal services.” I located these records at the FTC library in Washington, DC and digitized them for this study.<sup>9</sup> There are 877 unique company records in the FTC data. While the records include salaries for 1933, bonuses are not included in the 1933 total so I exclude this year from the subsequent analyses.

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<sup>9</sup> A research assistant photographed every page of the records in the FTC archive. We then sent the photos to a data entry firm that entered them into spreadsheets. A second research assistant verified that the data were correctly entered by comparing random samples of the digitized records to the original source.

Data for years 1934-1940 come from the Survey of American Listed Corporations (SALC) which was part of a Works Project Administration (WPA) project aimed at gathering detailed information on publicly traded companies, including executive compensation. Extracting information from firms' annual reports on S.E.C. form 10-K, the records contain data on total remuneration (including bonuses) separately for each of the three highest paid executives of firms for years 1934-1940 (Kaysen 1943). I obtained SALC records on 748 firms, 394 of which were listed on the New York Stock Exchange. The survey mostly covers manufacturing, mining, and chain distribution trades industries. The volumes were obtained from the Princeton University archives and then digitized for the study.<sup>10</sup>

While both the FTC and SALC records explicitly request that bonuses be included in remuneration totals, neither source is explicit about whether stock options were included. The language of the requests suggests that they should have been included in the totals, but this alternative form of compensation was quite rare at the time in any case. Available evidence suggests that the majority of executive compensation was purely in the form of salaries until the 1920s, in contrast to the structure of compensation in Europe (Taussig and Barker 1925).<sup>11</sup> In the 1920s, bonus plans became popular, and a survey of industrial companies in 1928 found that 64% of these companies paid executives salaries and annual bonuses tied to firm performance (Wells 2010). Among the firms, bonuses ranged from less 1% of managerial compensation to over 96% (Wells 2010). Stock

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<sup>10</sup> As with the FTC records, a research assistant photographed every page, and the photographs were then sent to a data entry firm. The data were then checked by a second research assistant. The SALC records contain remuneration information for the three highest paid officers but not their identities.

<sup>11</sup> An exception is the bonus plan adopted by Bethlehem Steel in 1902.

options, however, were much less popular and only became widely adopted after 1950, with less than 2.5% of firms' top-three executives reporting being offered stock options before 1940 (Frydman and Saks 2010). In addition, a study of bonus plans by Baker (1938) revealed that out of 59 large industrial firms surveyed only three offered manager stock options. In the Frydman and Saks (2010) sample, which includes value of options held, no compensation package included stock options in 1936-1937 and 1939, only one company reported options in 1938, and two in 1940.

Using company names, I matched the companies in the FTC and the SALC data to companies in the CRSP database, and assigned them the CRSP permno id. I then linked the FTC and SALC data using the permno, and then merged the resulting dataset to the CRSP data from 1928-1940. In the main analysis I only include firms that appear in both the FTC and SALC records. The final working dataset consists of 369 firms with permnos that overlapped between the two sources.<sup>12</sup> There are 750 firms without the restriction that the firms appear in both samples. I show some specifications for the full sample in the appendix.

I use data from Piketty and Saez (2003) to examine the role of policies and economic forces that broadly impacted pay at the top of the distribution, including CEO pay. I use the 99.5th percentile of the wage income (excluding capital gains) distribution as the comparison benchmark. The 99.5<sup>th</sup> percentile (hereafter P99.5) is lower than

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<sup>12</sup> While I limit the sample to firms that appear both in FTC and SALC data, not every firm appears in the sample in every year. Compensation data is missing in some years, and there is firm entry and exit. Exit and entry does not pose a major problem since changes over the middle of the sample (1932-1934) are of interest, when all firms are operating. The conclusions presented are robust to a variety of alternative samples and specifications, including choosing firms that have no missing values over spans of years (e.g. 1928-1938), estimation with firm fixed-effects, using all firms without the restriction that they both be in the FTC and SALC samples, and linearly interpolating missing values.

almost all of the CEOs in the sample (only 1.4 percent of CEOs were compensated below P99.5 in 1931) thereby allowing me to make comparisons to high income earners while avoiding problems of contamination in the comparison group since CEO pay should have a negligible effect on this measure.<sup>13</sup> To examine economy-wide trends in between-plant wage dispersion I use plant-level earnings data for 19 industries from the Census of Manufacturers. I describe these data in additional detail in Section 3.

Summary statistics can be found on Table 1. Average nominal annual CEO compensation in the sample was \$83,827 (approximately \$1.2 million in 2015 dollars) over the 1928-1932 period and \$63,706 (approximately \$1 million in 2015 dollars) over the 1934-1940 period. CEO compensation is about an order of magnitude larger than the 99.5th percentile of the labor income distribution. 86 percent of firms in the sample are in manufacturing. The top 3 industries are transportation equipment (13.3 percent of the sample), primary metal industries (12.5 percent) and industrial and commercial machinery (10.1 percent).

### **Section III. Results**

#### *CEO Compensation Growth*

I begin by examining the evolution of CEO compensation levels, in 2012 dollars, in relation to P99.5, and controlling for firm size. Figure 1 presents the growth of CEO compensation in 2012 dollars between 1928 and 1940. To construct the figure, I regress

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<sup>13</sup> Piketty and Saez (2003) also report series for incomes of corporate officers. However, this series is not well suited for analyzing disclosure because the series corresponds to both private and publicly traded firms, the and the former was not affected by disclosure regulations. Additionally, there were likely changes over time in the number of firm employees who were classified as officers, complicating comparisons over time.

real log CEO compensation on dummies for years 1928-1931 and 1934-1941 (1932 is normalized to 0, and total compensation for 1933 is unavailable) with firm fixed-effects.<sup>14</sup> The figure shows that CEO compensation increased from 1928-1930, fell from 1930-1932, and exhibits an upward trend from 1934-1940. There is no evidence of a decline in CEO compensation around the time of disclosure. This conclusion holds when comparing CEO compensation to the 99.5th percentile. Figure 2 plots the log ratio of CEO compensation to P99.5, using the same specification of Figure 1. The figure reveals that CEO compensation was relatively more sensitive to the boom and bust period of 1928-1932, and that CEO pay increased discretely by approximately 6 percent between 1932 and 1934 relative to P99.5.

To examine how changes in firm size affected relative CEO compensation I estimate:

$$(1) \quad \ln(y_{it}) = \alpha_i + \sum_{k=1928}^{1931} \theta_k 1(k = t) + \sum_{k=1934}^{1940} \theta_k 1(k = t) + \beta \ln(mv_{it-1}) + \varepsilon_{it},$$

where  $y_{it}$  is the ratio of CEO compensation in firm  $i$  and year  $t$  ( $CEO_{it}$ ) and the 99.5th percentile of the Piketty-Saez labor income distribution in year  $t$  (P99.5 <sub>$t$</sub> ),  $\alpha_i$  is a firm fixed-effect, and  $\ln(mv_{it-1})$  is the log lagged market capitalization of the firm. Figure 3 plots the estimated  $\theta_k$  coefficients, which are expressed relative to 1932. For reference, the estimated  $\beta$  coefficient is 0.215 (s.e. = 0.025) (Table 2). The figure shows that 1928-

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<sup>14</sup> See Table 2 for estimates without fixed-effects.

1932 fluctuation in  $\ln(y_{it})$  is largely accounted for by changes in the size of firms, while the increase in  $\ln(y_{it})$  between 1932 and 1934 persists and even grows in magnitude.

Table 2 reports the point estimates and standard estimates underlying Figures 1-3 and alternative specifications. There is no evidence that average CEO pay levels declined and, if anything, when taking into account the time pattern of other high income earners and market values CEO compensation appears to have risen following the disclosure mandate.

#### *Pay-to-Performance and Firm Size Relationships*

To estimate pay-to-performance sensitivities I follow Jensen and Murphy (1990), Murphy (1999) and Frydman and Saks (2010) and estimate the dollar change in CEO compensation per dollar change in a firm's market value. Overall, during 1928-1940 the estimated coefficient on the OLS regression of change in cash compensation (in \$ thousands) on change in market capitalization (in \$ millions) including year dummies is 0.26 (s.e. = 0.12) (Column (1) of Table 3).<sup>15</sup> This relationship is somewhat larger than Jensen and Murphy's estimate over the 1934-1938 period of 0.175. Column (2) shows that this relationship fell after disclosure. The coefficient is 0.34 over 1928-32 and only 0.061 over 1934-40. This change is significant at conventional levels.

Columns (3) and (4) of Table 3 also show the relationship between log CEO compensation and log market capitalization in  $t-1$  in specifications that include year effects to absorb aggregate factors that affect both compensation and size. The relationship may reflect pay-to-performance but also takes into account competitive

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<sup>15</sup> As in Jensen and Murphy (1990), I also included specifications with lagged change in market value but the lags were small and insignificant, adding little to the pay-to-performance relationship.

forces in the CEO labor market that gives a premium to CEOs in larger firms (Tervio 2008). Interestingly, the estimated relationship between log CEO compensation and log market capitalization in  $t-1$  of 0.29 is almost identical to the modern-era estimates from Gabaix and Landier (2008) who estimate an elasticity of 0.30 using data from 1992-2004. This relationship is somewhat smaller in the post-disclosure period than the pre-disclosure period, by about 3.1 percentage points, but this difference is only at the margins of significance.

#### *CEO Pay Dispersion*

If peer comparisons and benchmarking became increasingly important after disclosure due to a lower cost of acquiring information, we would expect to see compression in the earnings distribution. (Compression will have an ambiguous impact on mean earnings depending on whether firms or CEOs can better use this information to their advantage.) More precisely, we expect wage compression between firms with similar characteristics, such as industry and size, since these are likely the relevant peer groups for any pay comparison.

Compression in the overall earnings distribution can be seen in Figure 4 Panel A, which plots the coefficient of variation by year, Panel B, which plots variance, and Panel C which plots the interquartile range. The advantage of the coefficient of variation is that, unlike the variance, it is unaffected by changes in mean compensation. All three figures show a sharp drop in dispersion between 1932-1934. There is a 12 percent drop in the coefficient of variation between 1932 and 1934, a 23 percent drop in the variance, and a 17 percent drop in the interquartile range. Column (2) of Table 4 shows that the drop in

the variance is statistically significant. The reported p-value corresponds to the test that the variance in each year is equal to the variance in 1934. I reject equality of the 1934 variance and the variances for all years pre-disclosure but not for any post-disclosure year.

To compute the change in residual dispersion I first estimate:

$$(2) \quad \ln(y_{it}) = c + ind_i + \beta \ln(mv_{t-1}) + \varepsilon_{it},$$

where  $y_{it}$  is CEO compensation in firm  $i$  and in year  $t$ ,  $ind_i$  is a dummy for the 2-digit industry of firm  $i$  and, as before,  $mv_{t-1}$  is the lagged market capitalization of the firm. I fit this model separately for each year between 1928 and 1940 (except 1933 where there is no data) and compute residuals for all observations in that year. Figure 5 plots the variance of these residuals by year. The figure shows that the residual variance declined markedly between 1932 and 1934. Column (4) in Table 4 shows that this shift in the residual variance is also statistically significant.<sup>16</sup>

Figure 6 plots the R-squared from the regression of log compensation on lagged market capitalization and industry by year. Not surprisingly, given the observed declines in the residual standard deviation, these variables become more predictive of compensation after 1932, with the R-squared increasing by approximately 10 percentage points between 1932 and 1934.

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<sup>16</sup> Appendix Figure 1 shows the figure over the full sample without imposing the restriction that firms appear in both samples. This larger sample has the disadvantage of changing composition of firms (which is less of a problem for comparisons of residual variance than the overall variance) but yields a more representative sample. The figure shows an almost identical pattern as Figure 5.

Columns (1) and (3) of Table 4 presents estimates of variances and residual variances by year, computed for the main sample. Comparing columns (1) and (3) we see that the fall in residual compensation between 1932-1934 is 77 percent as large as the overall variance reduction. If we constrain the sample to be balanced over the 1928-1938 period (5 years before and after disclosure), thus allowing for an exact decomposition of the change in the variance into changes in the residual versus between, the change in the residual variance accounts for 85 percent of the change in the overall variance (columns (6) and (8) of Table 4).<sup>17</sup> Appendix Figure 2 displays the coefficient of variation, variance and residual variance for this constrained sample and the patterns of dispersion look similar to those derived from the main sample.

That the observed compression is largely due to changes conditional on firm characteristics is consistent with peer comparisons and benchmarking reducing pay dispersion. Another test of this mechanism is to ask whether firms that had negative residuals in 1932, the year prior to disclosure, experienced relatively larger compensation gains between 1932-1934 following disclosure than firms with a larger residual. To analyze pay dynamics as a function of firms' positions in the residual pay distribution I estimate variants of the following model:

$$(3) \quad \Delta_2 \ln(y_{it}) = v1(t = 1934) + \rho r_{i,t-2} + \delta \ln(y_{it-2}) \\ + \phi r_{i,t-2} * 1(t = 1934) + \tau \ln(y_{i,t-2}) * 1(t = 1934) + \gamma \Delta_2 \ln(mkt_t) + \varepsilon_{it}$$

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<sup>17</sup> Recall that the main sample requires firms to be present both pre-1932 and post-1932 but does not require firms to be present in all years.

for  $t = 1930, 1932, 1934, 1936, 1938,$  and  $1940$ . Here  $y_{it}$  is the log ratio of  $CEO_{it}$  and P99.5,  $r_{i,t-2}$  is the firm's residual in period  $t-2$  computed separately for each year, and the  $\Delta_2$  denotes two year changes. The coefficient  $\rho$  captures the typical relationship between the initial residual in  $t$  and the change in log compensation between  $t-2$  and  $t$ , while the  $\phi$  coefficient captures the differential effect of this relationship between 1932 and 1934. The model is set up as a "horse race" between the effect of lagged residuals and lagged salary levels on the change in compensation. The differential effect of lagged compensation levels on the change in compensation between 1932 and 1934 is given by parameter  $\tau$ .

Column (1) of Table 5 presents the parameter estimates. Consistent with the changes in the residual variance we observed in Figure 5, we see that the growth rate in CEO compensation between 1932 and 1934 is significantly larger for firms with a smaller (more negative) residual relative to other years. The estimated  $\phi$  coefficient is  $-0.19$  (s.e. =  $0.09$ ). By contrast, there is no significant relationship between lagged log compensation levels and the change in compensation; the estimated  $\tau$  coefficient is  $0.040$  (s.e. =  $0.057$ ). Column (2) presents a second model where I use three rather than two year lags (and accordingly, limit the sample to  $t = 1931, 1934, 1937,$  and  $1940$ ) to verify that the results in column (1) are not driven by unusual behavior in 1932. The estimated  $\phi$  and  $\tau$  coefficients are stable with this change. This analysis confirms that the shifts in compensation observed between 1932 and 1934 were driven by firms' prior compensation levels relative to their predicted levels, given their size and industry, rather than just compensation levels.

I explore the changes in the residual distribution in detail by estimating conditional quantile models (Koenker and Bassett 1978). For every quantile  $\nu$  (from the 5th to the 95th percentile in increments of 5) I estimate:

$$(4) \quad Q_\nu(\ln(y_{it}) | ind_i, \ln(mv_{t-1})) = \sum_{k=1928}^{1931} \theta_{\nu k} 1(k = t) + \sum_{k=1934}^{1940} \theta_{\nu k} 1(k = t) + ind_i + \beta \ln(mv_{t-1}),$$

where  $y_{it} = CEO_{it}/P99.5_t$ ,  $Q_\nu$  denotes the  $\nu$ th conditional quantile. Estimates of  $\theta_{\nu k}$  give the  $\nu$ th percentile “effect” of compensation in year  $k$  relative to 1932 conditional on industry and size.

Figure 7 summarizes these estimates. Each panel corresponds to a year (1928-1940, excluding 1932 and 1933), and plots the estimated  $\theta$  values for that year by percentile.<sup>18</sup> A noteworthy feature of the estimates is the tilting pattern by percentile observed from 1934-1940. This pattern implies that over this period the lower percentiles of the CEO compensation distribution increased relative to P99.5 conditional on firm size and industry. It is also the case that in 1934 the estimates for the lower percentiles are positive and significant, while higher percentiles are insignificant and close to 0. The figure suggests that behind the fall in residual dispersion are driven gains by lower percentile firms rather than compensation declines of higher percentile firms, conditional on firm size and industry.

Figure 8 summarizes the tilting pattern observed in Figure 7. For every year I regress the estimated  $\theta$  coefficient against the percentile, weighting the sample by the inverse of the squared standard error of  $\theta$ . These slope estimates are plotted by year. The figure clearly shows the shift in the “tilting” pattern after 1933, and that the change is significant.

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<sup>18</sup> The figure excludes 1932 and 1933 because all estimates are normalized to 1932, and CEO data is missing for 1933.

Figure 9 displays the shifts in the conditional wage distribution in a different way. I estimate conditional quantile models for dependent variable  $\ln(CEO_{it}/P99.5_t)$  against a dummy for the post-disclosure period and a linear time trend. The models are estimated for percentiles ranging from 1 through 99.5 in increments of 0.5 and the estimated post-disclosure coefficients are plotted against the quantile in Figure 9. This figure also shows that the post-disclosure period was associated with gains in CEO compensation relative to P99.5 controlling for firm size and industry, and that these gains were larger for lower quantiles of the CEO distribution. There is, however, an intriguing decline in relative CEO compensation at the right-tail of the distribution, roughly after the 98th percentile. I explore this change at the right-tail in more detail below.

#### *Changes in the Right-Tail of the CEO Pay Distribution*

While most of the changes in CEO pay are observed at the bottom of the conditional CEO pay distribution, an exception to this pattern can be found at the extreme top end of the CEO distribution. The analysis summarized in Figure 9 hints at movements in the right-tail in a quantile regression model, but the pattern can be seen more clearly in an unconditional framework. I estimate the post-disclosure “effect” on unconditional quantiles of compensation using the recentered influence function regression approach of Firpo, Fortin and Lemiux (2009). While the conditional quantile estimate gives the effect of disclosure conditional on firm characteristics, the unconditional estimate is interpretable as the effect of disclosure on the unconditional quantiles, controlling for the effect of the other covariates on the unconditional quantiles.<sup>19</sup> I estimate the unconditional quantile partial effect of disclosure

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<sup>19</sup> Loosely speaking, conditional quantile regression answers the question “what is the effect of disclosure on the 25th percentile of the residual compensation distribution” while the unconditional quantile regression estimates “what is the effect of disclosure on the 25th percentile of the compensation

regressing recentered influence functions for each quantile of CEO compensation relative to P99.5, ranging from the 1st percentile to the 99.5th percentile in increments of 0.5, against a post-disclosure dummy and a linear time trend. The estimated coefficients on the post-disclosure dummy are plotted against the quantiles in Figure 10.

In the figure it can be seen that the post-disclosure increases in relative compensation at the lower quantiles are less apparent here than in the conditional quantile model. This is to be expected since the changes in the CEO pay distribution are related more to residual pay than pay levels; a low residual firm can be anywhere in the unconditional pay distribution. The noteworthy feature of the figure is the dramatic decline in compensation in the upper quantiles, after the 98th percentile. The declines are very large: the 99.5th percentile of the CEO pay distribution fell by 78 percent relative to P99.5. A similar pattern is observed when looking at changes in the raw percentiles of  $\ln(\text{CEO}/\text{P99.5})$ , specifically regressing the  $v$ th annual percentile of  $\ln(\text{CEO}/\text{P99.5})$  on a post-disclosure dummy and a linear time trend (Appendix Figure 3).

To further illustrate the changes at the top of the CEO distribution, Figure 11 plots maximum log CEO compensation in 2012 prices by year for the sample of firms present in both the FTC and SALC datasets. Maximum compensation declined between 1928-1932, but then declined dramatically—by approximately 50 percent—between 1932 and 1934. In the figure I also plot a second series that makes a crude adjustment for firm size. Specifically, I net out 0.29 (from Table 3 column (3)) times log market capitalization from the maximum compensation and express the resulting series relative to the 1932 value. This adjustment shows a similar pattern as the unadjusted version, and shows that the fluctuations prior to

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distribution.” Note that the 25th percentile of the residual distribution is unlikely to be the same as the 25th percentile of the overall distribution.

1933 in the maximum can be explained by changes in firm size while the reduction between 1932 and 1934 cannot.

*Between-Plant Wage Dispersion in the Census of Manufacturing*

Were there larger economy-wide shifts in between-firm earnings inequality at the time of the disclosure mandate? If this was the case the lower variance in CEO compensation might reflect broader forces affecting firm pay structure and not the effects of the mandate. I investigate this hypothesis using historical plant-level data from 19 industries in the Census of Manufacturers (CoM) covering the Great Depression period.<sup>20</sup> The CoM is a useful data source for this analysis since the CEO sample is concentrated in manufacturing and CoM data are available for 1929, 1931, and 1935 providing plant-level earnings information for both before and after CEO pay disclosure.<sup>21</sup>

I compute four measures of between-plant earnings dispersion: the variance in average log annual wages, the coefficient of variation, the within-industry coefficient of variation (i.e. the average coefficient of variation across industries), and the residual variance. For all measures the earnings measure is the log of the average annual earnings per employee in a plant.<sup>22</sup> Residual variance is computed by regressing this measure on industry dummies and a measure of plant size (log number of employees) each year and

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<sup>20</sup> I thank Nicolas L. Ziebarth for providing me with the bulk of these data.

<sup>21</sup> The industries used in the analysis are ice, macaroni, malt, cane sugar, sugar refining, cork, timber, bone black, soap, petroleum refining, cement, concrete, glass, blast furnaces, steel works, agricultural implements, cigars and cigarettes, automobiles, and radio. The concrete data are from Morin (2015), the cement data from Chicu et al. (2013), the automobile data from (Raff et al. 2015) and Bresnahan and Raff (1991), and the macaroni data are from Vickers and Ziebarth (2014). See Ziebarth (2015) for background information on the Census of Manufacturers in the Great Depression period. There was also a census in 1933 that I do not use since the CEO data are unavailable for this year and because of the ambiguity about whether CEO pay was or was not already disclosed at that time.

<sup>22</sup> Specifically, for each plant-year I divide the total wage bill by the total number of hourly workers in the plant in the year. Because there are some extreme outliers I Winsorize the earnings variable at the 2nd and 98th percentiles, but all results hold without this step. I limit the sample to industries with wage data in all three years.

computing the variance of the residuals. The specification used to computing the residuals approximates the one used to compute the residual variances in the CEO sample, which also included industry codes and a size measure, although the size measures differ.

Figure 12 plots these dispersion measures by year. Panel A plots the coefficient of variation. For reference, the corresponding coefficient of variation in the CEO sample is overlaid. As we have already seen, the CEO series shows a clear shift post-1933. However, there is no evidence in the CoM data of a corresponding decline in between-plant inequality over the same period. The CoM series shows an increase in dispersion over the entire period and with no downward break between 1931 and 1935. A similar conclusion is reached for the within-industry coefficient of variation in Panel B, variance in Panel C and residual variance in Panel D. These findings suggest that there were not widespread shifts that led to less wage dispersion across firms both for rank-and-file workers and CEOs.

#### **Section 4. Discussion and Conclusion**

Between 1932 and 1934 CEO compensation compressed, and firm size and industry became substantially more predictive of CEO compensation. One must be careful in how to interpret these changes as they took place during the height of the Great Depression, following Roosevelt's election, along with the implementation of the New Deal as well as other regulations of the Securities and Exchange Act. However, mandated pay disclosure is a prime candidate for understanding these changes since it was the primary policy aimed specifically at executive compensation. Other events do not easily explain the observed patterns. Importantly, the finding that compression primarily worked through changes in

*residual* compensation helps distinguish the disclosure explanation from alternatives. For example, rising tax rates may have differentially affected higher and lower paid CEOs, but it is unclear why it should have differentially affected higher and lower paid CEOs within industry and conditional on firm size.

The evidence presented suggests that the introduction of mandated disclosure was associated with increases in the lower portions of the residual distribution, while keeping upper parts of the distribution largely unchanged. This evidence is consistent with increasing importance of peer comparisons. That pay rose for lower residual firms suggests that disclosure revealed this fact, and in turn these lower paid CEOs were able to raise their compensation toward their higher paid peers. The change in the pay-to-performance sensitivity is also consistent with the disclosure explanation and the role of benchmarking since with more information on CEO pay, the market for CEOs becomes more relevant. As a result the optimal contract may put relatively more weight on aggregate market or peer group performance than individual firm performance.

This perverse response to disclosure is interesting to consider in contrast to Mas (2015) who finds that an unintended consequence of public sector disclosure was to reduce pay in a situation where pay was already compressed. The common thread linking both studies is the effect on top end compensation. I find that maximum CEO compensation declined markedly over the period, even if other CEOs weren't negatively unaffected. Consistent with the public sector case and previous studies on CEOs that have found a link between CEO pay and public opinion (Kuhnen and Niessen (2012); Core et al. (2007)), the finding suggests that if the policy succeeded in reigning in pay anywhere it is for the most visible and salient compensation packages. In fact, the historical record

suggests that the outcry over executive compensation was aimed at extreme salaries, as the expression “no man can be worth \$1,000,000 a year” was a popular expression at the time (Markham 2015). While a small number of CEOs did make more than one million dollars a year in the late 1920’s and early 1930’s, after disclosure this was no longer the case.

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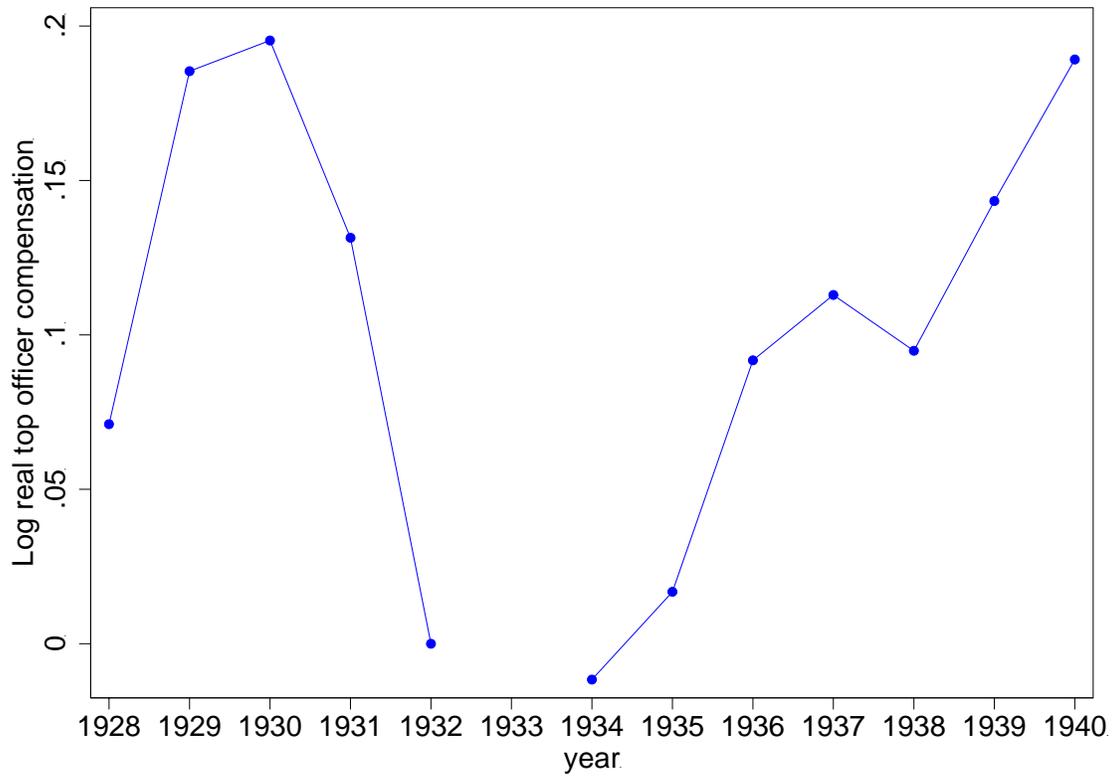
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**Figure 1. Evolution of CEO Compensation, 1928-1940**



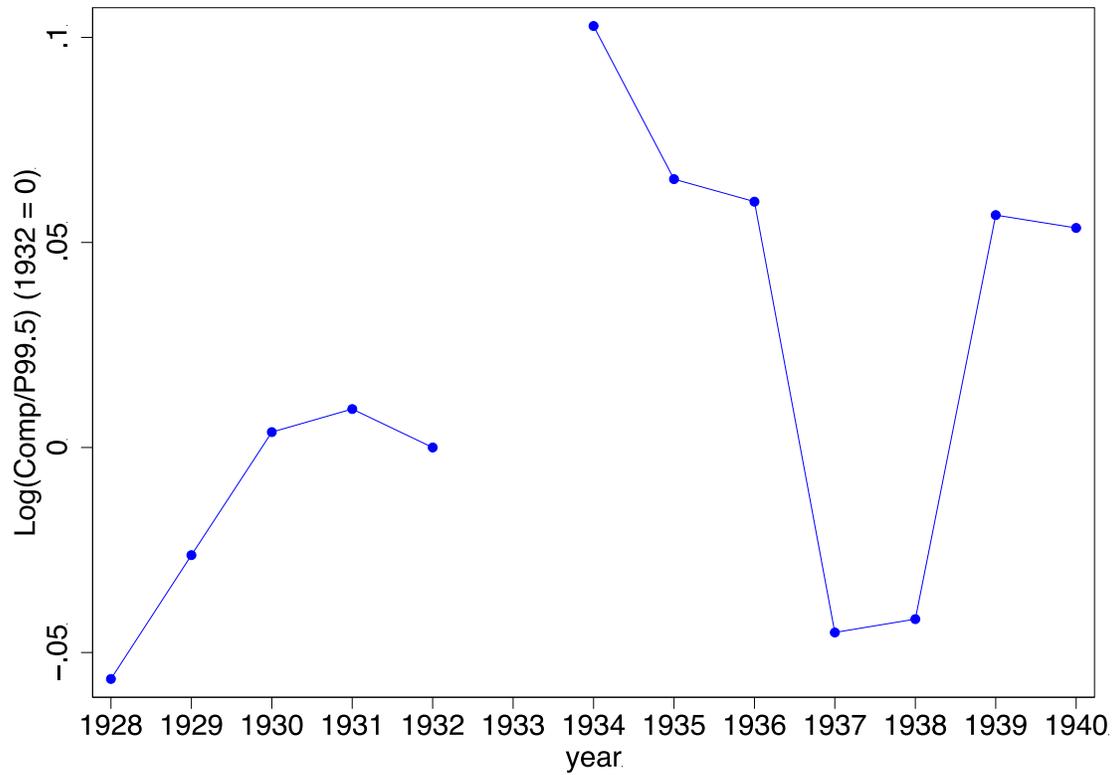
Notes: Figure plots the natural log of CEO compensation in 2012 dollars relative to 1932.

**Figure 2. Evolution of CEO Pay in Relation to the 99.5th Percentile of the Labor Income Distribution.**



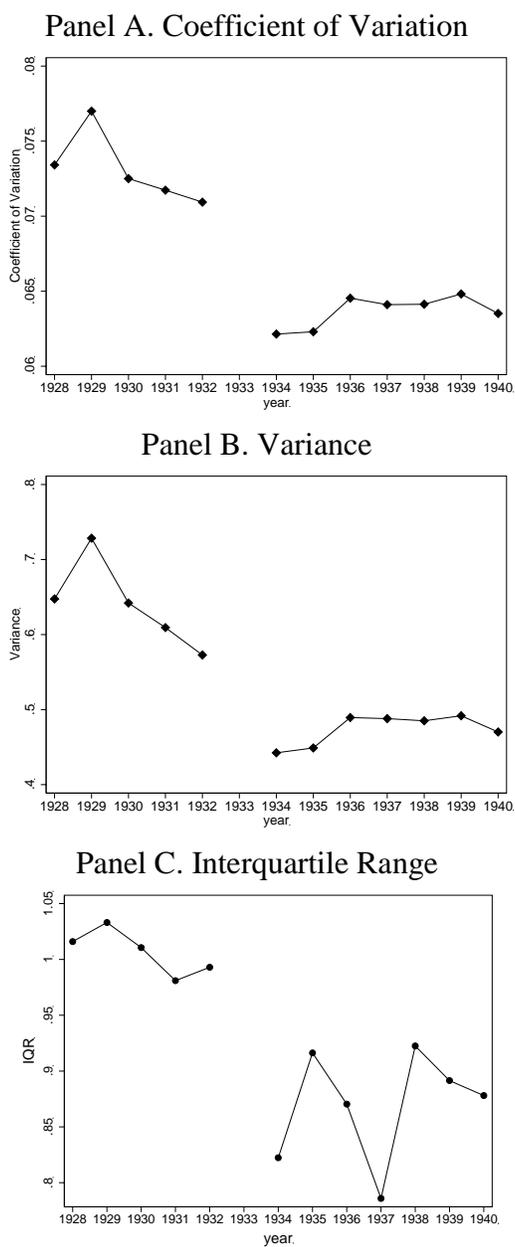
Notes: The figure plots the natural log of the ratio of CEO compensation to the 99.5th percentile of the labor income distribution (excluding capital gains) relative to 1932.

**Figure 3. Evolution of CEO Pay in Relation to the 99.5th Percentile of the Labor Income Distribution; Controlling for Firm Size**



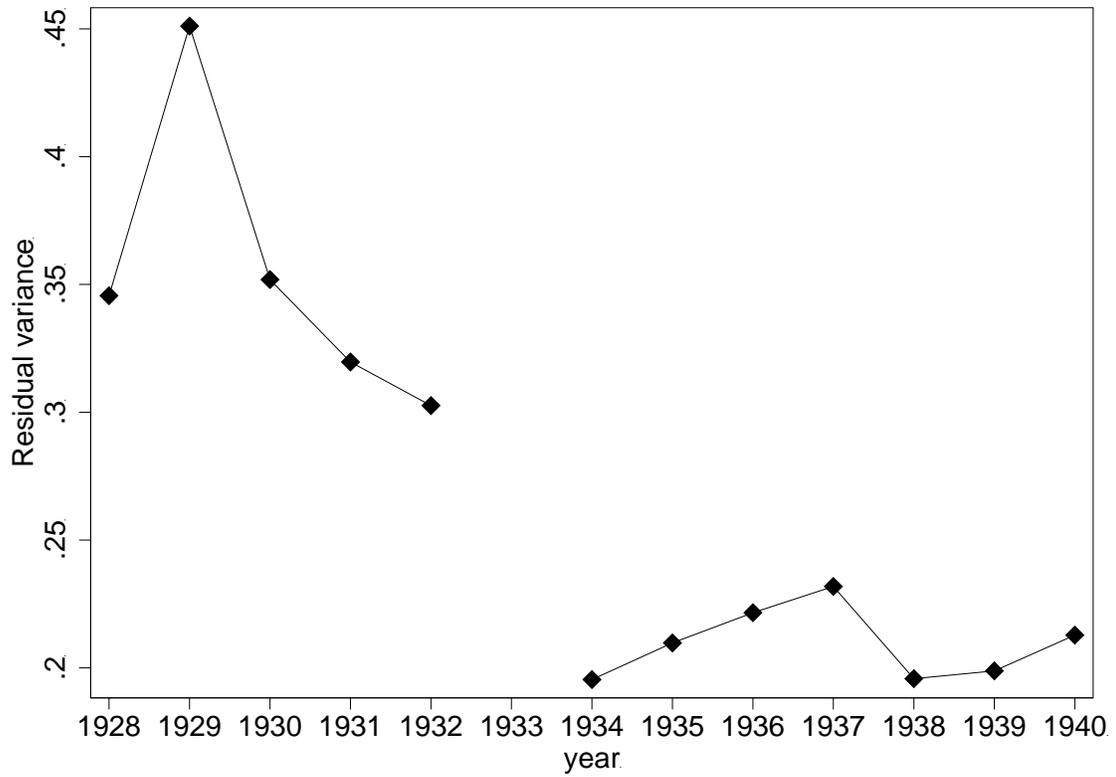
Notes: The figure plots the natural log of the ratio of CEO compensation to the 99.5th percentile of the labor income distribution (excluding capital gains) relative to 1932, controlling for  $\ln(\text{market capitalization})$  in  $t-1$ . See equation (1).

**Figure 4. Dispersion of CEO Compensation by Year**



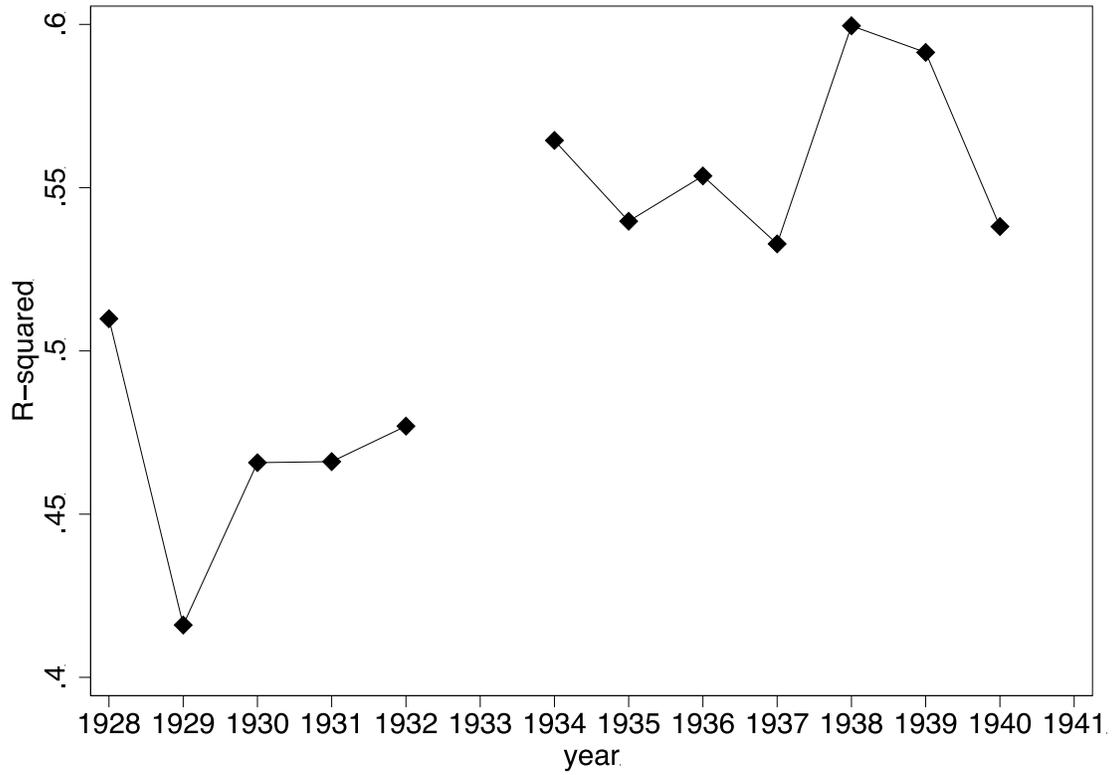
Notes: Panel A plots the coefficient of variation for log CEO pay, Panel B plots the variance and Panel C plots the interquartile range.

**Figure 5. Residual Variance of log CEO Compensation**



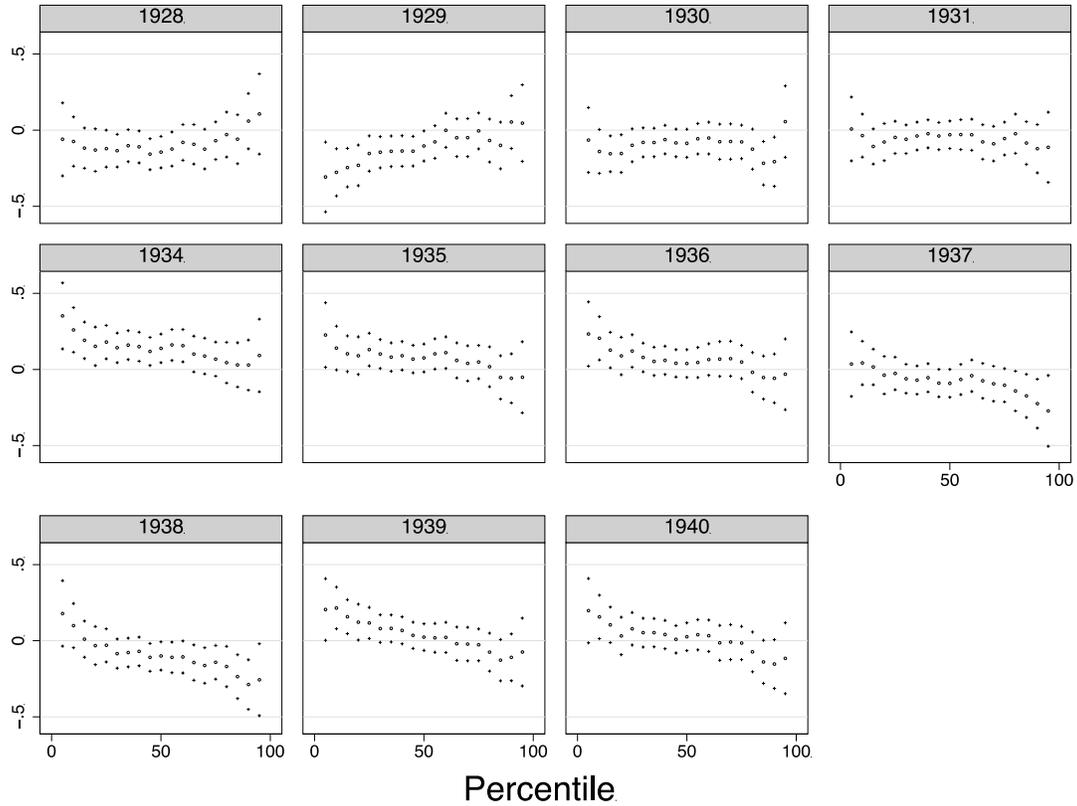
Notes: The figure plots the residual standard deviation of log CEO compensation. Residuals are computed by regressing log CEO compensation log market value in t-1 and 2-digit SIC dummies (equation 2).

**Figure 6. R-squared by Year**



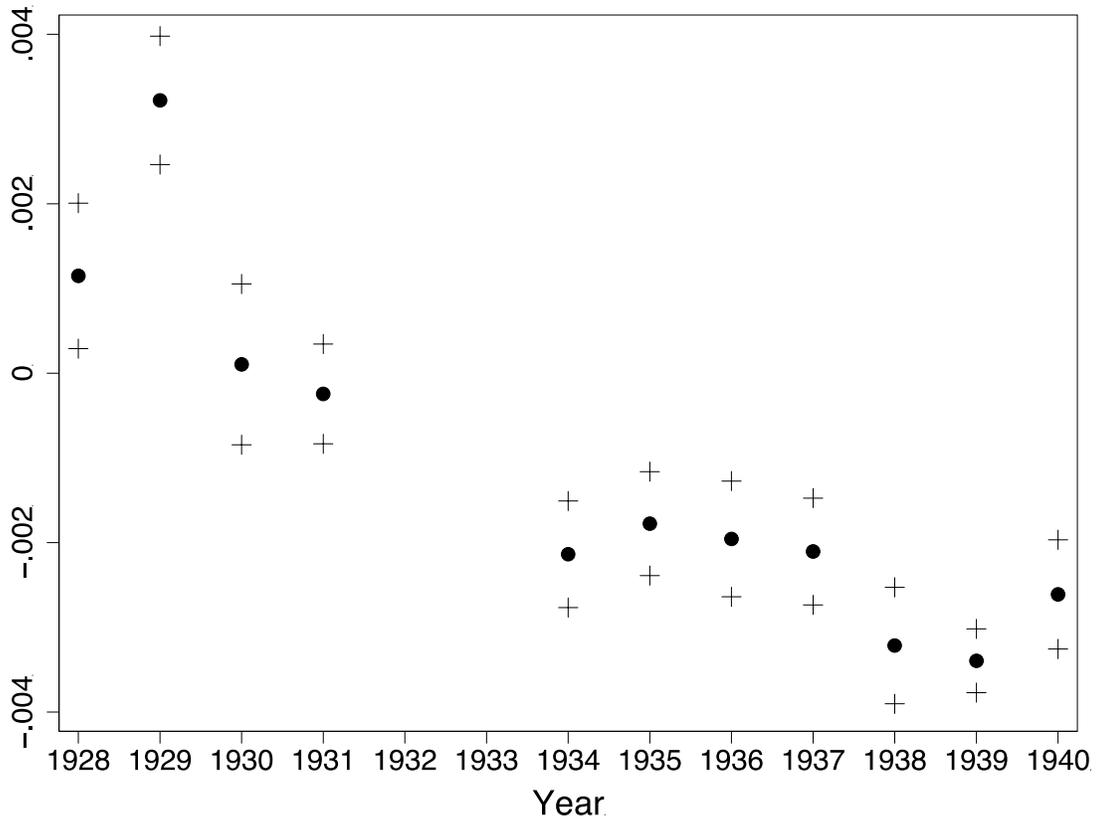
Notes: Each point is the R-squared from estimating equation (2) by year. Controls are log market capitalization in t-1 and 2-digit industry.

**Figure 7. Conditional Quantile Year Estimates Controlling for Firm Size and Industry; Estimates are in Relation to the Quantile Response in 1932**



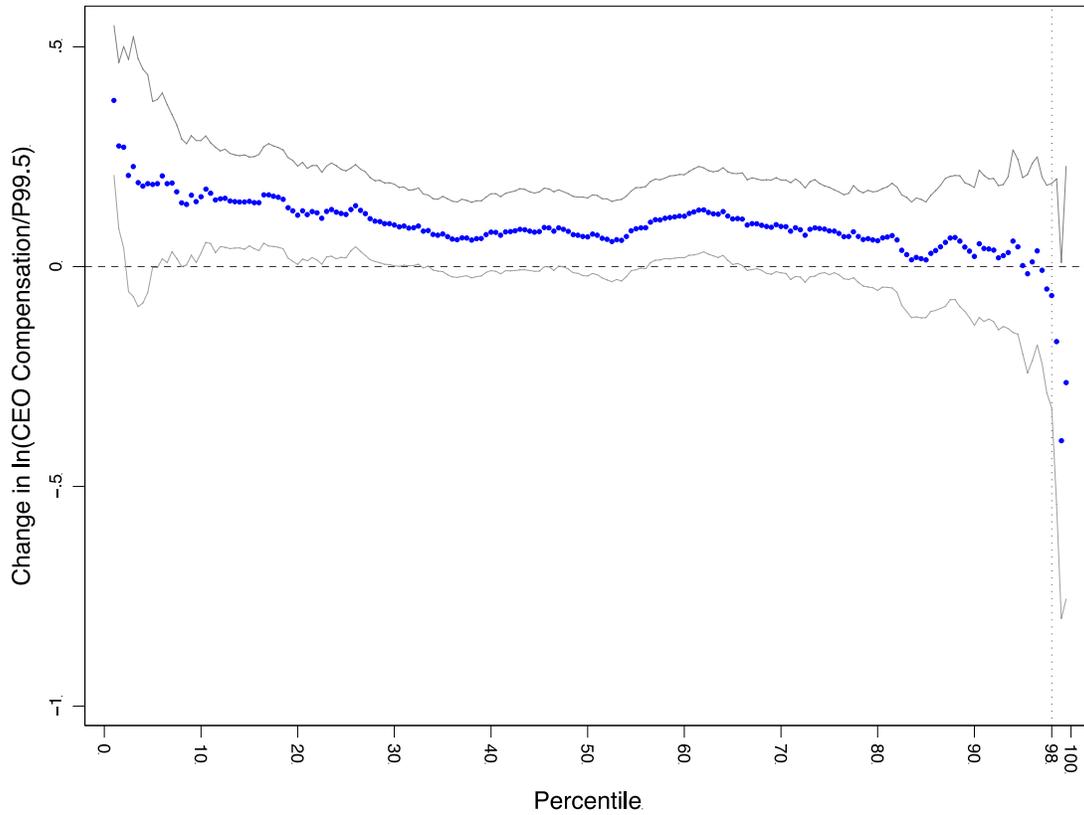
Notes: This figure reports conditional quantile estimates for dependent variable  $\log(\text{CEO}_{it}/\text{P99.5}_t)$  and log market capitalization in t-1 and 2-digit industry controls. Estimates (circles) are from equation (4) for the 5<sup>th</sup> to the 95<sup>th</sup> percentiles in intervals of 5. The outer markers are the 95% confidence interval. The point estimates are the relative difference in the given percentile of  $\log(\text{CEO}_{it}/\text{P99.5}_t)$  for the indicated year and the percentile in 1932.

**Figure 8. Conditional Quantile Regression Compression Index**



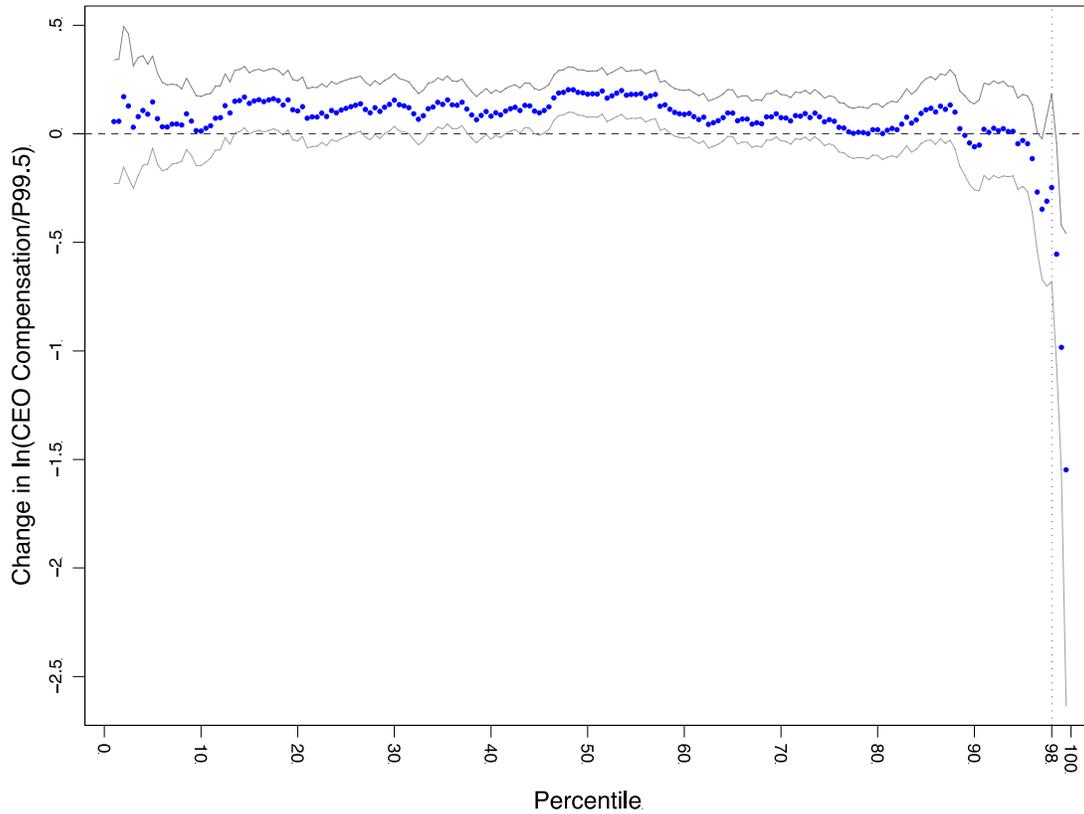
Notes: Each point is the slope of the points in the panels (for a given year) in Figure 7 estimated by OLS, weighted by the inverse variance of the estimates. The outer markers are the 95% confidence interval.

**Figure 9. Post-Disclosure Change in  $\ln(\text{CEO Compensation}/P99.5)$  by Percentile of the Conditional CEO Earnings Distribution**



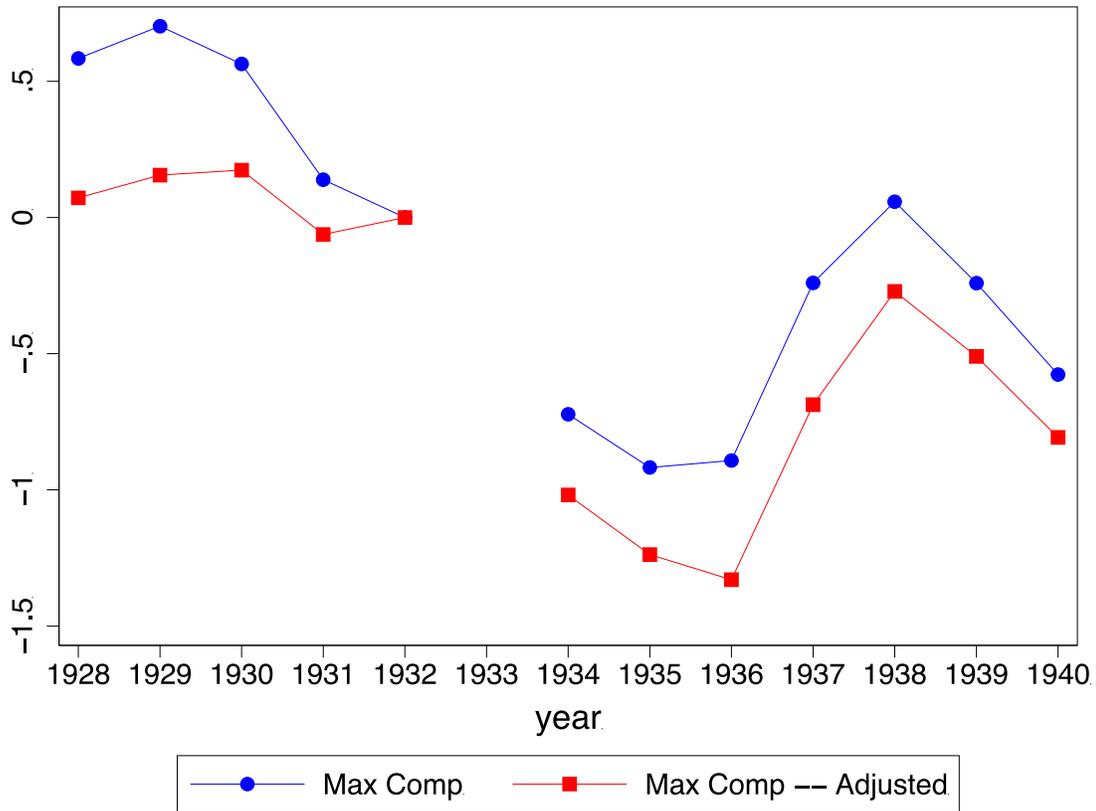
Notes: This figure shows estimates of a post-disclosure dummy in quantile regressions (Koenker and Bassett 1978) of  $\log(\text{CEO}/P99.5)$  on log lagged market capitalization, two-digit industry dummies, a linear time trend and the post disclosure dummy for quantiles ranging from the 1st percentile to the 99.5th percentile in increments of 0.5. The coefficients on the post disclosure dummies are plotted by percentile. The vertical dotted line denotes the 98th percentile, for reference.

**Figure 10. Post-Disclosure Change in  $\ln(\text{CEO Compensation}/P99.5)$  by Percentile of the Unconditional CEO Earnings Distribution**



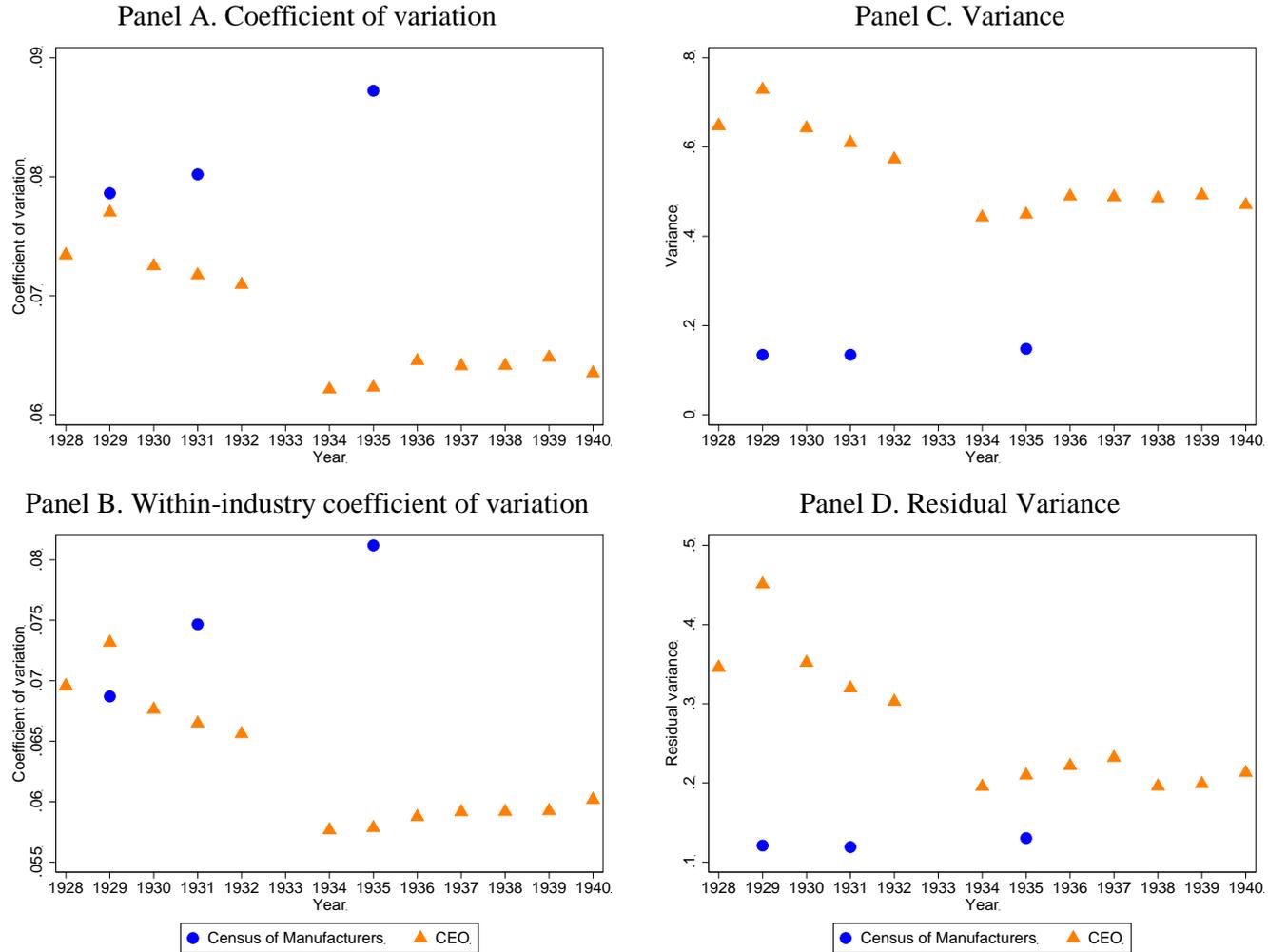
Notes: This figure plots estimates of the coefficients on a post-disclosure dummy from a recentered influence function regression (Firpo et al. 2009) of the unconditional quantile of  $\ln(\text{CEO}/P99.5)$  on log lagged market capitalization, two-digit industry dummies, a linear time trend and the post-disclosure dummy for quantiles ranging from the 1<sup>st</sup> percentile to the 99.5th percentile in increments of 0.5. The coefficients on the post disclosure dummies are plotted by percentile. The vertical dotted line denotes the 98th percentile, for reference.

**Figure 11. Evolution of Maximum Compensation**



Notes: Max Comp is the log of the maximum compensation relative to 1932. Max Comp – Adjusted is Log maximum CEO compensation adjusted for firm size. To adjust for firm size I subtract  $0.29 * \log$  market capitalization from maximum compensation and express the resulting series relative to 1932.

**Figure 12. Between-plant Dispersion of Log Earnings; Census of Manufacturers**



Notes: Data are from the Census of Manufacturing (circles) and the CEO sample (triangles). See text for details on samples. Panel B is the average coefficient of variation across industries. Residual variance in Panel C is computed by regressing log average annual wage earnings on 19 industry dummies and log number of employees by year and computing the variance of the residuals.

**Table 1. Descriptive Statistics**

	(1)	(2)
	1928-1932	1934-1940
CEO compensation	83827	63706
	[128937]	[57793]
Market capitalization	68.7	47.1
	[176.1]	[135.2]
99.5 <sup>th</sup> labor income percentile	8444	7380
	[789]	[527]
<u>Percent of firms in:</u>		
Metal Mining	0.3	0.3
Coal Mining	3.5	3.5
Food and Kindred Products	7.9	7.9
Tobacco Products	1.4	1.4
Textile Mill Products	3.8	3.8
Apparel, Finished Products from Fabrics	1.9	1.9
Lumber and Wood Products, except Furniture	0.3	0.3
Paper and Allied Products	2.7	2.7
Printing, Publishing and Allied Industries	1.9	1.9
Chemicals and Allied Products	7.6	7.6
Petroleum Refining and Related Industries	5.7	5.7
Rubber and Miscellaneous Plastic Products	1.6	1.6
Leather and Leather Products	1.4	1.4
Stone, Clay, Glass, and Concrete Products	3.5	3.5
Primary Metal Industries	12.5	12.5
Fabricated Metal Products, Machinery and Transportation Equipment	3.8	3.8
Industrial and Commercial Machinery	10.1	10.1
Electronic, Electrical Equipment	4.1	4.1
Transportation Equipment	13.3	13.3
Control Instruments – Photo/Med/Opt Goods Watches/Clocks	1.4	1.4
Miscellaneous Manufacturing Industries	0.8	0.8
Communications	0.3	0.3
Wholesale Trade - Durable Goods	0.8	0.8
General Merchandise Stores	6.0	6.0
Food Stores	1.6	1.6
Eating and Drinking Places	0.3	0.3
Holding and Other Investment Offices	0.3	0.3
Motion Pictures	1.4	1.4
Observations	1588	2110

Notes: Standard deviations in brackets. Compensation and market capitalization are expressed in nominal terms.

**Table 2. Evolution of CEO Compensation (1932 = 0)**

	ln(Real CEO Compensation)			ln(CEO Compensation/P99.5)		
	(1)	(2)	(3)	(4)	(5)	(6)
t=1928	0.070 (0.043)	0.071 (0.039)	-0.046 (0.048)	0.059 (0.043)	0.060 (0.039)	-0.056 (0.048)
t=1929	0.194 (0.041)	0.185 (0.040)	-0.022 (0.050)	0.190 (0.041)	0.181 (0.040)	-0.026 (0.050)
t=1930	0.185 (0.034)	0.195 (0.033)	-0.013 (0.042)	0.202 (0.034)	0.212 (0.033)	0.004 (0.042)
t=1931	0.108 (0.030)	0.131 (0.028)	0.018 (0.033)	0.100 (0.030)	0.123 (0.028)	0.009 (0.033)
t=1934	0.057 (0.036)	-0.012 (0.030)	0.033 (0.032)	0.127 (0.036)	0.059 (0.030)	0.103 (0.032)
t=1935	0.086 (0.034)	0.017 (0.031)	0.003 (0.031)	0.148 (0.034)	0.079 (0.031)	0.065 (0.031)
t=1936	0.158 (0.037)	0.092 (0.034)	0.060 (0.034)	0.158 (0.037)	0.092 (0.034)	0.060 (0.034)
t=1937	0.178 (0.037)	0.113 (0.034)	-0.023 (0.037)	0.156 (0.037)	0.091 (0.034)	-0.045 (0.037)
t=1938	0.162 (0.037)	0.095 (0.034)	-0.050 (0.036)	0.171 (0.037)	0.103 (0.034)	-0.042 (0.036)
t=1939	0.136 (0.033)	0.143 (0.032)	0.102 (0.032)	0.091 (0.033)	0.098 (0.032)	0.057 (0.032)
t=1940	0.105 (0.041)	0.189 (0.036)	0.140 (0.034)	0.018 (0.041)	0.102 (0.036)	0.054 (0.034)
ln(Market Cap <sub>t-1</sub> )			0.215 (0.025)			0.215 (0.025)
Fixed Effects		X	X		X	X
Observations	3698	3698	3371	3698	3698	3371
R-squared	0.01	0.74	0.79	0.01	0.74	0.79

Notes: Each estimate is compensation in that year relative to 1932. Standard errors clustered on firm in parentheses. P99.5 is the 99.5th percentile of the income distribution (excluding capital gains) from the Piketty and Saez (2003) tax data. Market capitalization is in millions of dollars.

**Table 3. Pay-Performance Sensitivity and the  
Relationship between Firm Size and CEO Compensation, before and after Mandated Disclosure**

	<u>Δ CEO Compensation (\$1000s)</u>		<u>log(CEO Compensation)</u>	
	<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>
Δ market cap <sub>t</sub> (\$millions)	0.264 (0.124)	0.342 (0.155)		
post*Δ market cap <sub>t</sub> (millions\$)		-0.281 (0.143)		
ln(market cap <sub>t-1</sub> )			0.292 (0.016)	0.311 (0.022)
post* ln(market cap <sub>t-1</sub> )				-0.031 (0.019)
Observations	2684	2684	3371	3371
R-squared	0.12	0.14	0.41	0.41

Notes: Standard errors clustered on firm in parentheses. Post is 1 for years 1934-1940. All models include year dummies.

**Table 4. Variance and Residual Variance by Year**

	Firms in both FTC and SALC Records					Balanced Sample 1928-1938				
	Variance (1)	p-value (2)	Residual variance (3)	p-value (4)	Obs (5)	Variance (6)	p-value (7)	Residual variance (8)	p-value (9)	Obs (10)
1928	0.65	0.00	0.35	0.00	294	0.74	0.00	0.28	0.00	95
1929	0.73	0.00	0.45	0.00	310	0.79	0.00	0.37	0.00	95
1930	0.64	0.00	0.35	0.00	334	0.73	0.01	0.28	0.00	95
1931	0.61	0.00	0.32	0.00	330	0.67	0.02	0.28	0.00	95
1932	0.57	0.00	0.30	0.00	320	0.61	0.05	0.30	0.00	95
1933	--	--	--	--	--	--	--	--	--	--
1934	0.44	--	0.20	--	275	0.41	--	0.13	--	95
1935	0.45	0.90	0.21	0.56	298	0.42	0.87	0.14	0.54	95
1936	0.49	0.39	0.22	0.30	303	0.45	0.63	0.15	0.37	95
1937	0.49	0.41	0.23	0.16	303	0.49	0.40	0.19	0.06	95
1938	0.49	0.44	0.20	0.99	284	0.47	0.48	0.15	0.39	95
1939	0.49	0.36	0.20	0.89	350	0.48	0.43	0.16	0.30	93
1940	0.47	0.61	0.21	0.48	297	0.44	0.75	0.15	0.38	77

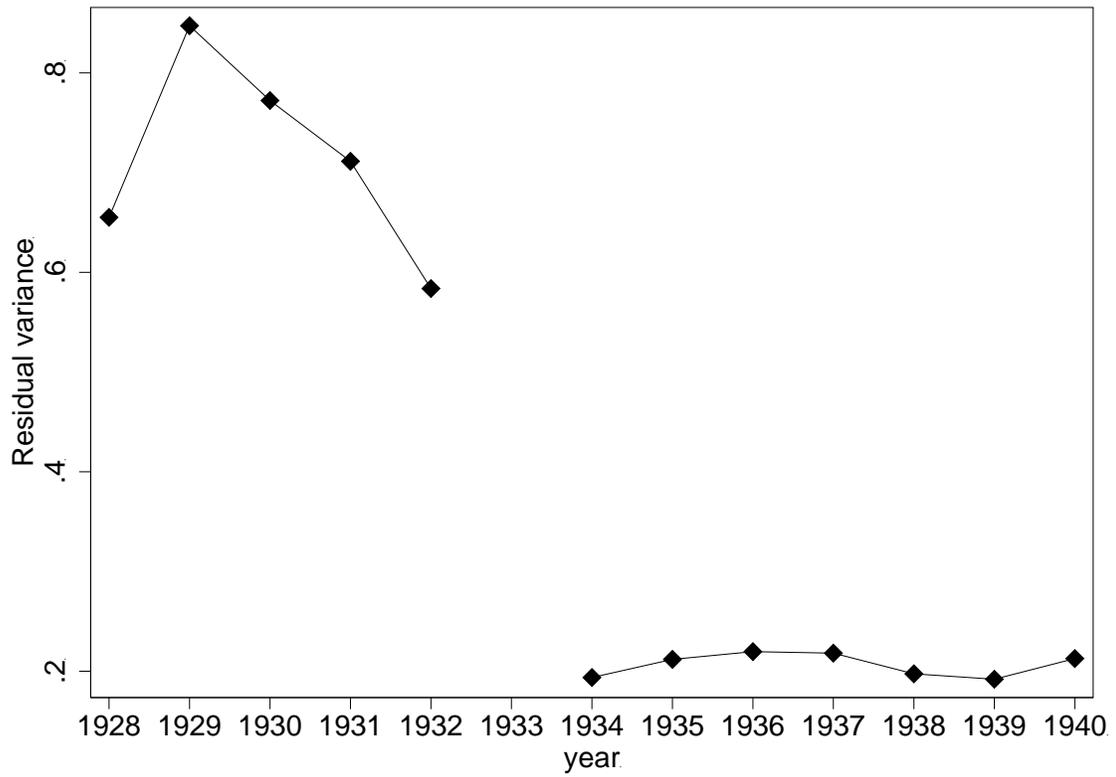
Notes: Variance refers to the variance of log CEO compensation. Residual variance is the variance of residuals from a regression of log CEO compensation on log market capitalization in t-1 and 2-digit industry, estimated separately in each year. p-value corresponds to the null that the variance and residual variance in a given year is equal to the 1934 value. Observations correspond to the variance columns.

**Table 5. Relationship between Pre-mandate Residual, Compensation Level, and Change in CEO Compensation**

	(1)	(2)
Residual <sub>t-L</sub> * 1(t=1934)	-0.193 (0.087)	-0.237 (0.099)
ln(CEO Comp <sub>t-L</sub> ) * 1(t=1934)	0.040 (0.057)	-0.021 (0.075)
Residual <sub>t-L</sub>	-0.244 (0.042)	-0.246 (0.052)
ln(Comp <sub>t-L</sub> )	-0.053 (0.023)	-0.075 (0.032)
1(t=1934)	-0.525 (0.612)	0.103 (0.820)
Δln(market cap <sub>t</sub> )	0.162 (0.017)	0.102 (0.023)
Constant	0.614 (0.248)	0.857 (0.343)
Observations	1410	891
R-squared	0.24	0.25
L=2	X	
L=3		X

Notes: Standard errors clustered on firm in parentheses. “L” denotes the length of the lag. In column (1) the model is estimated over years 1930, 1932, 1934, 1936, 1938 and 1940. In column (2) the model is estimated over 1931, 1934, 1937, and 1940. Residual is the residual of a regression of log CEO compensation on lagged market value and 2-digit industry, calculated separately each year. ln(Comp) is the natural log of CEO compensation. The dependent variable is the two year change in ln(Comp/P99.5) in column (1) and the three year change in ln(Comp/P99.5) in column (2).

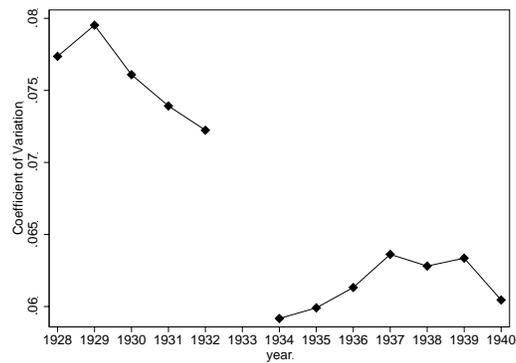
**Appendix Figure 1. Residual Variance by Year; Full-sample**



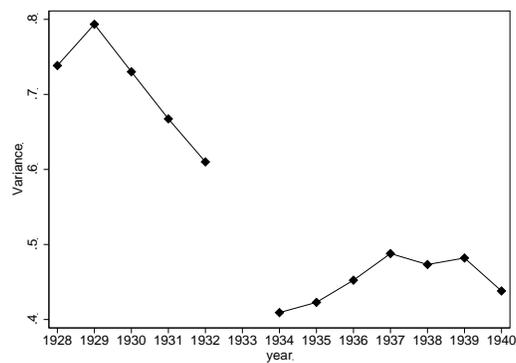
Notes: The figure plots the residual standard deviation of log CEO compensation using the full sample. Residuals are computed by regressing log CEO compensation log market value in t-1 and 2-digit SIC dummies (equation 2).

## Appendix Figure 2. Dispersion Measures; Sample Balanced over 1928-1938

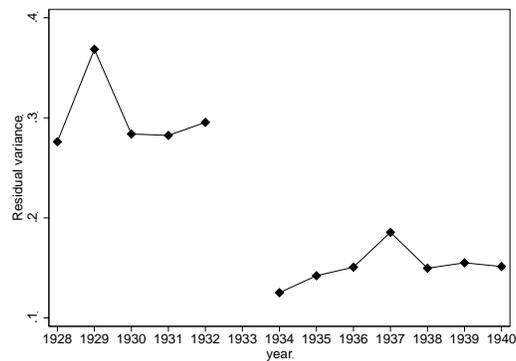
Panel A. Coefficient of Variation



Panel B. Variance

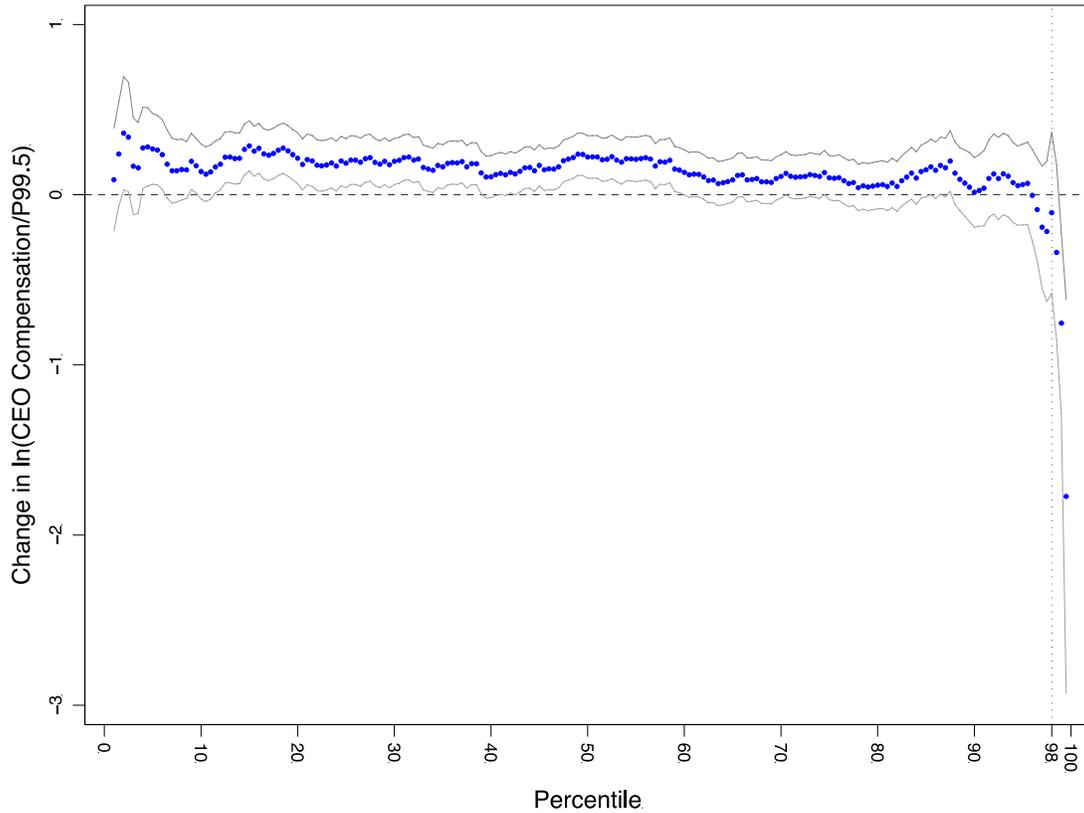


Panel C. Residual Variance



Notes: Sample is restricted to firms that have no missing salary, market value or industry values over the 1928-1938 period.

**Appendix Figure 3. Post-Disclosure Change in  $\ln(\text{CEO Compensation}/P99.5)$  by Percentile of the Unconditional CEO Earnings Distribution; No controls**



Notes: This figure plots estimates of the coefficients on a post-disclosure dummy on the unconditional quantile of  $\ln(\text{CEO}/P99.5)$  for quantiles ranging from the 1<sup>st</sup> percentile to the 99.5th percentile in increments of 0.5. The coefficients on the post disclosure dummies are plotted by percentile. The vertical dotted line denotes the 98th percentile, for reference.