APPENDIX: FOR ONLINE PUBLICATION ONLY

A. Details and Extensions of ROWTT Analysis

A.1. Documentation of ROWTT Laws

Table A.1 provides links to each state's ROWTT policy.

We define an ROWTT as the first law within a jurisdiction which protects the rights of workers to disclose their own pay and inquire about the pay of coworkers, and extends to all workers in the private sector (with minimal exceptions, such as human resource representatives). We identify the enactment of ROWTT by conducting a stemmed search of the labor codes of all 50 states, and the District of Columbia,[1] for the terms "transparency," "discuss," "inquire," "disclose," and "reveal," and verifying the date the law became effective within the jurisdiction. For the state labor codes that contain these terms, we read the relevant statues to verify that they satisfy the above definition of ROWTT. We cross-check the list of identified states and timing of policy enactment with a U.S. Department of Labor publication, which lists transparency laws for each state.[2] For 12 of 13 states in our analysis (i.e. those listed in Table A.1), the law identified using our search procedure matches with law listed on the Department of Labor website. For one state (CA), the Department of Labor website lists a newer ROWTT with expanded penalties for violating firms that supersedes the ROWTT we identify, and which took effect on 1/1/2019, after the window of our analysis. The Department of Labor website additionally lists six states (WA, NV, CO, NE, LA, MA) which were identified by our search, but not included in our analysis as the ROWTTs in question are enacted after 2016.

A.2. Public Sector Workers

In Figure A.1, we replicate our baseline specification on a sample restricted to public sector workers. Public sector workers, by and large, experienced pay transparency earlier than ROWTT enactment. Many local laws made salaries public information for government workers; for example, in California two-thirds of cities independently chose to disclose the compensation of city employees prior to a 2010 mandate to disclose salaries of all municipal employees (Mas, 2017). When we restrict attention to public sector workers, our standard errors are wider, however, the evidence points to minimal or no change in overall wages following ROWTT enactment in this subsample. The average of all post-period coefficients is -1.1% (p-value =0.242). Visually, point estimates of the change in wages year over year appear to decline only slightly, and the confidence interval always includes 0 effect. Our interpretation of a null effect on wages must be taken with a grain of salt, because the post-treatment confidence interval ranges from -3.0 to +0.9.

Figure A.1 Panel B reports the estimated coefficients, replacing our dependent variable with the share of workers employed full time in the private sector. Our point estimates suggest that employment remains constant leading up to the ROWTT enactment, and continues on the same path after ROWTT. After one year, the coefficient is -0.03% (p-value= 0.807) and after three years the point estimate is -0.14% (p-value= 0.355). We cannot reject zero impact on employment during the 3 years after ROWTT enactment.

[1] The website for each state's labor office is linked at https://www.dol.gov/agencies/whd/state/contacts.

[2] See https://www.dol.gov/agencies/wb/equal-pay-protections.

A.3. Alternative Empirical Specifications

All Events: 2004-2016

We expand our baseline specification to include all events, resulting in an unbalanced panel of states in the period after ROWTT enactment. We follow Equation 7, and include relative lags and leads for each event between 2004 through 2016. We present these results in Panel A of Figure A.2. Detailed estimates can be found in Col. 2 of Table I. Prior to the enactment of the policy, the dynamic effects are small and confidence intervals always include zero. In this specification, we estimate that wages fall by 1.7% (p-value = 0.019) in the first year after the policy and that they continue to fall to -2.7% (p-value = 0.041) by year three.

Figure A.3 Panel A reports the estimated dynamic effects, replacing our dependent variable with the share of workers employed full time in the private sector. Our point estimates suggest that employment remains constant leading up to the ROWTT enactment, and rises modestly after ROWTT. After one year, the coefficient is 0.23% (p-value= 0.324) and after three years the point estimate is 0.75% (p-value= 0.062).

Including Region-by-Year Fixed Effects

In this specification, we depart from the baseline by adding region-by-year fixed effects α_{tr} using the nine detailed divisions of the U.S. Census.[3] We present these results in Panel B of Figure A.2. Detailed estimates can be found in Col. 3 of Table I. Prior to the enactment of the policy, the dynamic effects are small and confidence intervals always include zero. In this specification, we estimate that wages fall by 2.0% (p-value = 0.022) in the first year after the policy and that they continue to fall to -2.4% (p-value = 0.138) by year three.

Figure A.3 Panel B reports the estimated coefficients, replacing our dependent variable with the share of workers employed full time in the private sector. Our point estimates suggest that employment remains constant leading up to the ROWTT enactment, and rises modestly after ROWTT. After one year, the coefficient is 0.16% (p-value= 0.491) and after three years the point estimate is 0.59% (p-value= 0.053).

Weighting by Gender-by-Education in $t=-1$

In this specification, we estimate the baseline model presented in Panel A of Figure III, re-weighting to fix the gender-by-education at its level in $t=-1$. The reweighting factor can be expressed as $\frac{w^t_{egs}}{w^{E_s-1}_{egs}}$, where w^t_{egs} is the total weight of all of the workers with education e and gender g in state s at time t. We present these results in Panel C of Figure A.2. Detailed estimates can be found in Col. 4 of Table I. Prior to the enactment of the policy, the dynamic effects are small and confidence intervals always include zero. In this specification, we estimate that wages fall by 1.9% (p-value < 0.001) in the first year after the policy and that they continue to fall to -2.5% (p-value = 0.019) by year three.

Figure A.3 Panel C reports the estimated coefficients, replacing our dependent variable with the share of workers employed full time in the private sector. Our point estimates suggest that employment remains constant leading up to the ROWTT enactment, and rises modestly after ROWTT. After one year, the coefficient is 0.36% (p-value= 0.007) and after three years the point estimate is 0.72% (p-value= 0.038).

[3]We pool together the "West North Central" and "East North Central" divisions to form the "Midwest" Census region to ensure that there are no singleton divisions.

Sun-Abraham Weighted Interaction Estimator

Following the Sun and Abraham (2020) procedure, we fully interact a vector of cohort indicators with the dynamic effect indicators. Thus, we estimate the following equation, recovering the cohort-specific dynamic effects β_{we}.

$$y_{ist} = \alpha_s + \sum_{e \in \mathcal{E}} \left[\mathbf{1}\{E_s = e\} \times \left(\sum_{\ell=-6}^{-2} \beta_{\ell e} \mathbf{1}\{t - E_s = \ell\} + \sum_{\ell=0}^{3} \beta_{\ell e} \mathbf{1}\{t - E_s = \ell\} + \gamma_e \mathbf{1}\{t - E_s < -6\} + \delta_e \mathbf{1}\{t - E_s > 3\} \right) \right] + \boldsymbol{\lambda} \boldsymbol{X}_{ist} + \epsilon_{ist} \tag{9}$$

where $\mathcal{E}$ is the set of all event times E_s. We then recover the interaction-weighted dynamic effects β_ℓ^{IW} by taking the weighted average of the underlying cohort-specific dynamic effects $\beta_{\ell e}$ in a given period ℓ. We assign each cohort its sample weight ω_e, which is simply the (sample-weighted) number of observations in each cohort divided by the total weight of the sample such that $\sum_{e \in \mathcal{E}} \omega_e = 1$. The IW estimates β_ℓ^{IW} are given by

$$\beta_\ell^{IW} = \sum_{e \in \mathcal{E}} \omega_e \beta_{\ell e} \tag{10}$$

To create a valid control for a final cohort, we do not estimate the treatment effects of the 2016 cohort. We then collapse these cohort-specific dynamic effects and report the weighted average, where each cohort is weighted by its share of the estimation sample. To ensure a consistent set of states in the post period, (and to make estimates comparable to the baseline balanced specification) 2014 and 2015 cohorts receive zero weight in the post period $w \geq 0$.

We present these results in Panel D of Figure A.2. Detailed estimates can be found in Col. 5 of Table I. Prior to the enactment of the policy, the dynamic effects are small and similar to the baseline specification. However, these estimates are much more precisely estimated, so standard errors do exclude zero in periods -3 and -2. Post period effects are also much more precise and exclude zero with p-values $<$ 0.001 in all periods. The estimate in the first year of the event is a 2.3% decrease, and the estimated effect after three years is -2.9%. The 95% confidence intervals of the average effect in the post period $w \geq 0$ covers -2.7% to 1.8%.

Figure A.3 Panel D reports the estimated coefficients, replacing our dependent variable with the share of workers employed full time in the private sector. Our point estimates suggest that employment remains constant leading up to the ROWTT enactment, and rises modestly after ROWTT. After one year, the coefficient is 0.32% (p-value= 0.042) and after three years the point estimate is 0.67% (p-value<0.001).

A.4. *Alternative tests of statistical significance*

Across all specifications in the body of our paper, we use the cluster-robust variance estimator (CRVE) with two-way clustering at the state and year level to calculate standard errors. In this section, we turn to alternative methods of estimating the precision of our dynamic treatment effects, as CRVE may overreject when the number of clusters is small, and non-homogeneous in size.

Cluster-level model estimates (Donald and Lang, 2007)

First, we replicate our main analysis after collapsing our data to the level of the state-year cluster. We follow a two-step procedure proposed by Donald and Lang (2007) and applied in Angrist and Lavy (2009) (Table A.3). Using this method, we first estimate state-year level mean outcomes (wage and employment) adjusted for all the micro-covariates in our model, but excluding reference period dummies used to identify time-varying treatment effects. We then collapse these residuals to the state-year level, creating a state-year panel of micro-covariate-adjusted means. We then regress these adjusted means on the dynamic effect indicators, including state and year fixed effects. We continue to two-way cluster at the state and year level. Following Angrist and Lavy (2009), we report heteroskedasticity robust standard errors from the second stage regression, and allow standard errors to be correlated within states across years, as well as within years across states for correlation within state and within year.

Our key findings are corroborated in collapsed, state-level analyses of group wages and employment. Cols. 2, 4, 6, 8, 10 of Table A.3 reveal the collapsed estimates for our five specifications. All but one specification results in highly similar point estimates and standard errors. For example, by the third year following ROWTT, in our baseline specification (Cols. 1 and 2), cluster-collapsed estimates of wage declines are -0.025 (s.e.=0.012) compared to our micro-data estimates of -0.027 (s.e.=0.010). The average wage decline in the post-enactment period, less the average wage in the pre-enactment period is -0.015 (s.e.=0.006). Relaxing our assumption of homogeneous effects across cohorts (Cols. 9 and 10) leaves results virtually unchanged.

Wild Cluster Bootstrap with Random Inference (MacKinnon and Webb, 2019, 2020)

Second, we randomize the timing of ROWTT enactment across all states repeatedly in placebo tests in order to calculate the Wild Cluster Bootstrap with Random Inference (WBRI) proposed by MacKinnon and Webb (2019), and expanded upon in MacKinnon and Webb (2020).[4] Across our micro-data specifications and collapsed-data specifications we apply WBRI methods and report p-values for our average treatment effect coefficient.

1. We estimate our regression models using two-way cluster-robust variance estimators, and calculate our central test statistics: the coefficient identifying the average treatment effect (mean effect size post-ROWTT-enactment less the mean effect pre-ROWTT-enactment).

2. We next randomly permute ROWTT enactment dates across states and execute the restricted cluster bootstrap on this counterfactual dataset. The details are as follows:

   (a) We estimate residuals $u_{it} = y_{it} - X_{it}\beta_R$ from our regression model, excluding the vector of dynamic effect indicators. We refer to this as the restricted regression, since we have estimated β_R under the restriction that all dynamic effects are zero.

   (b) We randomly assign to each state the cluster weight $d_g \in \{-\sqrt{1.5}, -1, -\sqrt{0.5}, \sqrt{0.5}, 1, \sqrt{1.5}\}$ where each weight has probability 1/6.

[4] MacKinnon and Webb (2017) explain why the Wild Cluster Bootstrap (WCB) without randomization inference does not solve the problem of overrejection.

(c) We calculate the new pseudo-residual $\hat{u_{it}} = d_g u_{it}$ and the corresponding pseudo-outcome measure $\hat{y_{it}} = X_{it}\beta_R + \hat{u_{it}}$.

(d) Finally, we estimate the full regression model from step 1) using the pseudo-outcome $\hat{y_{it}}$ and calculate our central test statistic: the mean effect size post-ROWTT-enactment less the mean effect pre-ROWTT-enactment

3. We repeat step 2 1,000 times for each specification to generate a bootstrap distribution of test statistics under the null hypothesis.

4. We sort the absolute values of our test statistics across re-randomizations and find the location of our "true" test statistic from step (1) corresponding to the regression when treated states were assigned to their true treatment year, and residuals are not replaced with pseudo-residuals. Formally, the symmetric p-values are $\frac{1}{B}\sum_{b=1}^{B}\mathbf{1}(|\tau| > |\tau_b|)$, where τ is the true test-statistic and τ_b is the test statistic corresponding to iteration b and $B = 1{,}000$.

We extend Figure III to display the WBRI confidence intervals (95th percentile) in Figure A.4 for our main specification. Each grey line represents a single random permutation of the ROWTT enactment dates across states, and the resulting restricted cluster bootstrap on this counterfactual dataset. 2.5% of these resulting estimates fall above, and 2.5% fall below the dotted line representing the 95% confidence interval. In Table I, we report the resulting p-values from this procedure across all of our specifications of interest. Relative to p-values associated with the cluster-robust variance estimator (CRVE), WBRI p-values are generally larger across specifications, though still consistently below the standard threshold of 0.05. One exception for both sets of p-values is our specification with region-by-year fixed effects. In this highly saturated specification, WBRI and CRVE p-values hover above 0.10 for both our mico-data specification and our cluster-collapsed specification.

A.5. Employee Composition Bounding Exercises

Our model identifies channels that could result in changes in wages after an increase in pay transparency. First, increased bargaining power to firms will lower wages within firm. Second, transparency may lead to either increased or decreased employment, or a reallocation of workers across firms.

In this section, we attempt to bound the impact of the composition effect on wages. To do so, we assume that transparency has no (bargaining) effect on wages within a firm, and then bound the total wage effect the composition change would have.

In this section, let A represent the average wage prior to an increase in transparency, N the number of employed workers, ϵ the proportional increase in employment following the transparency policy, and δ the elasticity of wages with respect to reallocation toward lower-value firms. To create a conservative estimate for the impact of bargaining on reducing wages, for all parameters we describe below, we input the upper end of the 95^{th} percent confidence interval of the respective coefficient estimate, in the direction of inflating the composition change.

Method 1

This method assumes, as in our model, that each firm has a value v for each worker it employs, which is constant across workers. Therefore, reallocation toward lower-value firms could result in lower wages. The proportional wage change due to the composition effect is

$$\frac{(1-\delta)A\cdot\frac{N(1+\epsilon)}{N(1+\epsilon)}-A\frac{N}{N}}{A\frac{N}{N}}=-\delta$$

where the first term in the numerator on the left-hand side is the average wage following the policy, and the second term is the average wage before the policy. Note that the change in overall employment, ϵ, does not appear in the final wage effect.

We estimate δ in two steps: first, we compute the change in the firm-level revenue per worker of the average worker from a subsample of firms included the Fundamentals Annual series provided by Compustat. Our sample covers 1,088 large, publicly traded companies. In 2016, the median firm in our sample employed 1,147 people and had revenues of roughly 400 million dollars. We estimate the change in the average firm's revenue-per-worker (weighted by the number of workers at each firm) following ROWTT, using our event-study framework. The post-transparency effect can be bounded at decreasing the firm-level revenue per worker of the average worker by no more than 0.021 log points.

Second, we bound the expected effect of a decrease of 0.021 log points in the firm-level revenue per worker on wages. Table 7 of Barth et al. (2013) finds that each log point decrease in revenue per worker is associated with (bounded at 2 standard errors from their largest parameter estimate) a 0.386 log point decrease in wages at the firm level. Hence, we estimate an upper bound for δ as $0.021\cdot0.386=0.008$.

Given our upper bound estimate of δ, Method 1 suggests changes in workforce allocation could conservatively account for a 0.008 log point decrease in wages.

Method 2

This method assumes that workers are differentially productive, and therefore, changes in the overall workforce may affect average productivity, thus driving down wages.

From Table I Col. 1, the overall level of employment changes by $\epsilon\in(0.002,0.006)$ log points. Again, to conservatively bound our estimates of wage decline due to bargaining, we take $\epsilon=0.006$. Moreover, we assume that this change is due to an ϵ increase in hiring (i.e. no existing workers exit). To bound the impact of new arrivals, we assume that all new workers are from the bottom of the productivity distribution and receive 0 wages. The proportional wage change due to the decomposition effect is therefore

$$\frac{\frac{(1-\delta)AN+0\cdot\epsilon N}{N(1+\epsilon)}-A\frac{N}{N}}{A\frac{N}{N}}=-\frac{(\epsilon+\delta)}{1+\epsilon}$$

Using our bound on δ described above in Method 1, we calculate an overall upper bound on the wage decline at 0.013 log points.

A.6. Effect by Detailed Education Levels

In Figure A.5 we further break out the education groups, roughly into thirds: those with no college, some college and those with a 4-year degree or more. In our sample, 37.3% of workers have only high school education, 23.1% of workers have some college experience, and 39.7% have a 4-year college degree. For the least-educated group, wages fall by only 0.9% (p-value = 0.264) following ROWTT enactment. Those with some college education experience wage declines of 1.3% (p-value = 0.177), and, for the most-educated group (those with 4-year college degrees), wages fall by 3.1% (p-value = 0.021) over the same period. Thus, we see evidence of a gradient whereby the higher the education of workers, the larger the effect of the transparency mandate on wages. However, we should take these differences with a grain of salt because we cannot statistically distinguish them apart at this level of granularity.

A.7. *Effect by Quartile of Occupation-Level Unionization*

In Figure A.6, we show a gradient in the effect of pay transparency on wages corresponding to the unionization rates at the occupation level. When splitting occupations by their unionization rates, on average 1.9% of workers are covered by a union or collective bargaining agreement in the lowest quartile. In the second quartile, that share is 3.5%, in the third 7.6% and in the fourth quartile 19.7%. We find that in the least-unionized quartile, wages fall by 3.6% (p-value = 0.003) three years after the event. However, in the most unionized quartile, wages fall by only 1.8% (p-value = 0.168) over the same period. The middle quartiles fall in between.

A.8. *Additional Heterogeneity Employment Results*

Employment Share by Education

In Figure A.7 Panel A we separately plot the dynamic effects of ROWTT on the share of workers employed in the private sector among those who do, and do not, have a four-year college degree, estimated jointly following Equations 7 and 8. In Panel B we plot the difference between the effects for those with a four year college degree and those without. Leading up to the enactment of ROWTT, the share employment follow the same trajectory regardless of college education, and remain on the same path in the years following enactment. Among those with a four-year college degree, employment rises by 0.31% (p-value = 0.723) one year after enactment and remains at 0.70% (p-value = 0.473) three years after enactment. For those without a four-year college degree, employment rises by 0.55% (p-value = 0.064) one year after enactment and remains at 0.83% (p-value $<$ 0.001) three years after enactment. We cannot rule out that the effects on employment are equivalent in the post-ROWTT period.

Employment Share by Unionization

In Figure A.8 Panel A we separately plot the dynamic effects of ROWTT on the share of workers employed in the private sector for occupations with above and below the median share of unionized workers, estimated jointly following Equations 7 and 8. In Panel B we plot the difference between the effects for occupations with low and high rates of unionization. Leading up to the enactment of ROWTT, share employment in high and low unionized occupations follow the same trajectory, and remain statistically unchanged in the years following enactment. Among relatively unionized occupations, employment rises by 0.66% (p-value = 0.063) one year after enactment and remains at 0.84% (p-value = 0.016) three years after enactment. For occupations with relatively low rates of unionization, employment rises by 0.46% (p-value = 0.434) one year after enactment and 1.00% (p-value = 0.222) three years after enactment. We cannot rule out that employment effects are equivalent for occupations with high and low unionization rates.

A.9. *Wage Compression Results*

Quantile Regressions as a Measure of Wage Compression

Our model corroborates the intuition of policy-makers that wages become more compressed between similar workers within a firm. However, our empirical setting is not the ideal place to test this prediction. We cannot observe the match between workers and their employers. And, because the ACS is cross sectional, we are unable to track workers longitudinally.

Nevertheless, we can empirically assess the effect of ROWTT on different percentiles of the income distribution, conditional on being in the same occupation, industry, and state. This is still far from ideal because the composition of workers can (and is predicted to) change across the quantiles of the income distribution as ROWTT differentially impacts workers of different types. Nevertheless, in Figure A.9 we use a series of quantile regressions (Firpo et al., 2009) to estimate the dynamic effects of ROWTT at various quantiles of the wage distribution. We take advantage of the flexibility of the recentered influence function (RIF) estimation procedure to define the quantiles within state-year-occupation-industry cells, excluding cells with fewer than 10 observations.[5] The second stage regression taking the RIF as the outcome follows the baseline model outlined in Section III.A.3. As in the baseline specification, we two-way cluster standard errors by state and year.

The median income effect closely tracks the average treatment effect. One year after enactment, the wage decline is 2.4% (p-value<0.001) and by the third year it is 1.9% (p-value = 0.062). The average post-treatment effect for the 10th, 25th, 50th, 75th and 90th percentiles are -2.8%, -3.2%, -1.8%, -1.7%, and -0.8% respectively (p-values = 0.001, <0.001, <0.001, 0.001, 0.261, respectively).

Wage declines are evident at each percentile of the income distribution. However, the decline does not shrink in magnitude for lower percentiles, as we predict would occur at the firm-position level. Theorem 4 predicts wage compression *within* the workers at a firm. However, this prediction does not necessarily hold *across* firms, even within what is typically considered a "labor market." To see this point in the context of our model, we expand upon our discussion in Section II.D. Let i and j be two workers in different marketplaces. Suppose the firm in each marketplace has the same value v, and further suppose that workers i and j would be hired under both Λ' and Λ'', where $\Lambda' < \Lambda''$. $\theta_i > \theta_j$ does not imply that i's wages are reduced more than j's as transparency rises from Λ' to Λ'' in each marketplace. Other parameters of each marketplace affect the responsiveness of wages to transparency: the proof of Proposition 3 reveals that when the market is "tight," parameterized by large r (low firm value) and s (high worker outside options), transparency has a small effect on wage outcomes: $\underline{w}_{i,1} \approx \theta_i$ even for $\Omega = 0$ and $\bar{w} \approx v$ even for $\Omega = 1$. Similarly, as we have discussed in Theorem 1, the effect of an increase in transparency will depend on the nominal level of firm bargaining power (k), the frequency of renegotiations (P), and the initial level of pay transparency (Λ').

Gender Wage Gap

We are unable to directly test the compression of wages between males and females within a firm because we do not observe matched worker-firm data. Women could be disproportionately engaged in markets that are hardest hit by the transparency mandate vis-a-vis wage declines, eg. low wage work, and this could offset within-firm relative gains. In the previous section we discuss the complexity of across-marketplace comparisons.

In Figure A.10 Panel A, we replicate our baseline specification separately for male and female full-time workers, and Panel B displays the difference between their change in wages (male wage changes minus female wage changes). The evidence points to similar wage declines for both groups following ROWTT enactment, with only slightly larger declines for male point estimates. The average of all post-period coefficients for women is 1.6% (p-value=0.023) and for males is 2.0% (p-value=0.001). The gender wage gap falls by 0.7 pp (p-value=0.198) by the third year following ROWTT enactment.

Figure A.11 Panel A displays private sector employment trajectory separately for males and

[5] Our sample includes just under two million observations after this restriction; roughly 15% of our sample is excluded.

females, and Panel B plots their difference (male employment less female employment). Our point estimates suggest that employment remains constant leading up to the ROWTT enactment, and continues on the same path after ROWTT. We cannot reject zero impact on employment for both males and females during the 3 years after ROWTT enactment, however we also cannot reject a swing of 1% in private sector employment given the precision of our estimates.

A.10. Internal Validity Checks

Balance Plot

In Figure A.12, we present several characteristics of states in the year before they implement a ROWTT policy. In the first row we show the mean gender gap, without adjusting for covariates. In the second row, we show the difference between the 90th and 10th percentiles of the state-level wage distribution. In the third row, we show the statutory state-level minimum wage, using data from Borg et al. (2022). In the fourth row, we show the share of prime-age women who report being employed. Finally, in the fifth row, we present means of our occupation-level union coverage variable.

Corporate tax

We test whether a proxy for a pro-business environment (corporate tax rates) exhibits the same dynamic relationship to wages as ROWTT enactment. In Figure A.13, we replicate our main event study analysis, replacing our dependent variable with state corporate tax rates, using data from Slattery and Zidar (2020). We find a reasonably precisely estimated null effect of ROWTT on state corporate taxes. The 95% confidence interval of the mean of the post period coefficients ranges from -0.55% to 0.08%.

B. Study Details from Meta-Analysis

We aim to include the universe of pay transparency studies, subject to certain criteria: first, the study must evaluate the effect of a pay transparency policy in a real-world labor market. Second, the study must evaluate the effect of pay transparency on the wages of all employees in that labor market. Third, to meet our search criteria, the study must refer to the policy evaluated as "pay transparency." The full list of stemmed search terms include "pay transparency," "wage transparency," "salary transparency," "pay disclosure," "wage disclosure," and "salary disclosure." We searched for papers on the Econ lit database, SSRN, arxiv, NBER working papers series, IZA working paper series, Google Scholar, and the works cited of other included studies. We performed this search several times, with the final search being conducted in May, 2021.

Our search results in eight independently-conducted papers. Seven of these papers each include one study (Baker et al., 2021; Bennedsen et al., 2019; Blundell, 2021; Böheim and Gust, 2021; Duchini et al., 2020; Gulyas et al., 2020; Mas, 2017; Obloj and Zenger, 2020), while Baker et al. (2021) contains two studies, one for unionized workers and one for non-unionized workers. In total, these papers evaluate six distinct pay transparency mandates spanning five countries. In four of these studies, governments mandate disclosure of individual employee salaries, and in the remaining five, wage gaps between men and women. Our restrictions lead some high-quality studies (e.g. Breza et al. (2018); Gächter and Thöni (2010)) to be excluded as they investigate transparency in a lab context or lab in the field where researchers role play as employers. Some high-quality studies (e.g. Burn and Kettler (2019); Gamage et al. (2020); Kim (2015); Roussille (2021)) are excluded as they investigate the effect of transparency on subsets of workers.

For each study, we extract information about overall wage effects and labor market unionization. We select the author's preferred specification when clear, as is the case for six of the nine studies. When not specified, we select the specification closest to our theoretical framework, i.e. examining wage spillovers within position. Baker et al. (2021) (both studies) and Obloj and Zenger (2020) present two preferred specifications each. In Baker et al. (2021), one specification considers a worker as treated if the wage of a coworker at the same department and institution is revealed. Another specification consider a worker as treated if the wage of a coworker at the same department, institution, and *rank* is revealed. We select the latter specification because our model's predictions are in settings where wages of peers with the same value to the employer are revealed. The authors note on page 14 that this specification is the one that better captures "horizontal" rather than "vertical" comparisons. We apply the same reasoning to our choice of specification in Obloj and Zenger (2020).

In Table A.4 we include the full set of studies surfaced using our criteria for inclusion, and relevant details of each study. For each study, we include details of the labor market setting studied, the type of transparency intervention studied, the unionization rate, the effect of the policy on men's wages (and the associated standard error), the effect of the policy on women's wages, as well as information necessary to present the imputed wage effect for all workers: the share of men in the market, and the pre-policy female to male wage ratio. Figure A.14 plots the point estimates of the effect of transparency on the gender wage gap in each study.

C. Omitted proofs

Proof of Proposition 1: Due to the fact that the distribution of worker outside options $G(\cdot)$ is continuous and has full support over [0,1], and assumptions **A1-3**, there is some worker $i \in I$ such that $\underline{w}_{i,1} = \bar{w}$ and there will be no worker j such that $w_{i,1} > \bar{w}$. Therefore, for any $k < 1$ upon renegotiating, any worker i infers $\bar{w}$ and offers $\underline{w}_{i,2} = \bar{w}$. Each worker $i \in I$ negotiates at time $t = 1$ to solve:

$$\underline{w}_{i,1} \in \underset{w}{\operatorname{argmax}} \; [(k+(1-k)P\Lambda)\mathbb{E}(\bar{w}|\bar{w} \geq w)+(1-(k+(1-k)P\Lambda))w](1-\bar{F}(w))+\theta_i \bar{F}(w) \tag{11}$$

where the first term represents the expected wage the worker receives, if matched with the firm: she receives $\bar{w}$ if $w_{i,1} = \bar{w}$, which happens with probability k, or if she observes the wages of her peers and has the ability to renegotiate, which happens with probability ΛP. Otherwise, she receives $\underline{w}_{i,1}$. The second term represents the earnings of the worker if she exceeds $\bar{w}$ with her initial offer, in which case she consumes her outside option. In what follows, let $\Omega := k + (1-k)\Lambda P$, i.e. Ω is the probability that an employed worker receives $\bar{w}$.

In a series of steps, we modify the objective function without affecting the maximizer.

$$\begin{aligned}
& \underline{w}_{i,1} \in \underset{w}{\operatorname{argmax}} \; [\Omega\mathbb{E}(\bar{w}|\bar{w} \geq w)+(1-\Omega)w](1-\bar{F}(w))+\theta_i \bar{F}(w) \\
\iff \quad & \underline{w}_{i,1} \in \underset{w}{\operatorname{argmax}} \; [\Omega\mathbb{E}(\bar{w}|\bar{w} \geq w)+(1-\Omega)w](1-\bar{F}(w))+\theta_i \bar{F}(w)-\theta_i \\
\iff \quad & \underline{w}_{i,1} \in \underset{w}{\operatorname{argmax}} \; [\Omega\mathbb{E}(\bar{w}|\bar{w} \geq w)+(1-\Omega)w-\theta_i](1-\bar{F}(w)) \\
\iff \quad & \underline{w}_{i,1} \in \underset{w}{\operatorname{argmax}} \int_w^1 (\Omega x+(1-\Omega)w-\theta_i)\bar{f}(x)dx
\end{aligned} \tag{12}$$

where the first equivalence follows because subtracting θ_i from the objective function does not change the set of maximizers, and the last equivalence comes from assumption **A3** that $\underline{w}_{i,1}$ and $\bar{w}$ are absolutely continuous.

Letting $\bar{G}(x) = Pr(\underline{w}_{i,1} \leq x)$, the firm solves:

$$\bar{w} \in \underset{w}{\operatorname{argmax}} \int_0^w (v - (\Omega w + (1-\Omega)y))\bar{g}(y)dy \tag{13}$$

as each hired worker with initial offer strictly less than $\bar{w}$ receives wage $\bar{w}$ with probability Ω.

The rest of the proof is outlined in the main text. ■

Proof of Theorem 1 Recalling that $\Omega = k + (1-k)\Lambda P$, it is easy to see that $\Omega \in [0,1]$ for any $(k,\Lambda,P) \in [0,1]^3$. Also, for any $(k,\Lambda,P) \in (0,1)^3$, Ω is twice differentiable in all three variables.

Ω is increasing in k,Λ, and P: $\frac{\partial \Omega}{\partial k} = 1 - P\Lambda \geq 0$ since $P\Lambda \leq 1$ (the inequality is strict unless $P = \Lambda = 1$). $\frac{\partial \Omega}{\partial P} = (1-k)\Lambda \geq 0$ since $\Lambda \leq 1$ and $k \geq 0$ (the inequality is strict unless $k = \Lambda = 0$). $\frac{\partial \Omega}{\partial \Lambda} = (1-k)P \geq 0$ since $P \leq 1$ and $k \geq 0$ (the inequality is strict unless $k = P = 0$).

Ω is submodular in Λ and k: $\frac{\partial^2 \Omega}{\partial \Lambda \partial k} = -P \leq 0$ since $P \geq 0$ (inequality is strict unless $P = 0$). Ω is supermodular in Λ and P: $\frac{\partial^2 \Omega}{\partial \Lambda \partial P} = 1 - k \geq 0$ since $k \leq 1$ (the inequality is strict unless $k = 1$). Ω is submodular in P and k: $\frac{\partial^2 \Omega}{\partial P \partial k} = -\Lambda \leq 0$ since $\Lambda \geq 0$ (the inequality is strict unless $\Lambda = 0$). ■

Proof of Proposition 2: Let $\bar{w} = \beta(v)$ and let $\underline{w}_{i,1} = \gamma(\theta_i)$ for each i and assume that a linear equilibrium exists. Workers are hired at initial wages in some range $[a,h]$ where $0 \leq a \leq h \leq 1$. By the linearity hypothesis, it must be the case that

$$\bar{w} = \begin{cases} v & 0 \leq v < a \\ a + \frac{h-a}{1-a}(v-a) & a \leq v \leq 1 \end{cases}, \quad \underline{w}_{i,1} = \begin{cases} a + \frac{h-a}{h}\theta_i & 0 \leq \theta_i \leq h \\ \theta_i & h < \theta_i \leq 1 \end{cases} \tag{14}$$

Furthermore, by definition $\bar{F}(x) = Pr(\beta(v) \leq x) = F(\beta^{-1}(x))$, and similarly $\bar{G}(x) = G(\gamma^{-1}(x))$. Inverting the functions in Equation 14 and plugging in to the distributions in Equation 6 yields that for all $a \leq x \leq h$

$$\bar{F}(x) = 1 - \left(1 - a - \frac{(x-a)(1-a)}{h-a}\right)^r, \quad \bar{G}(x) = \left(\frac{(x-a)h}{h-a}\right)^s \quad a \leq x \leq h \tag{15}$$

Equations 4 and 5 give another set of equations for $\gamma^{-1}(\cdot)$ and $\beta^{-1}(\cdot)$. Plugging these in to the distributions in Equation 6 yields that for all $a \leq x \leq h$

$$\bar{F}(x) = 1 - \left(1 - x - \Omega\frac{\bar{G}(x)}{\bar{g}(x)}\right)^r, \quad \bar{G}(x) = \left(x - (1-\Omega)\frac{1-\bar{F}(x)}{\bar{f}(x)}\right)^s \tag{16}$$

Solving Equations 15 and 16 simultaneously results in a unique solution in which

$$a = \frac{(1-\Omega)s}{(s+\Omega)r + (1-\Omega)s}, \quad h = \frac{(1-\Omega)s + rs}{(s+\Omega)r + (1-\Omega)s} \tag{17}$$

As $\bar{w}$ and $\underline{w}_{i,1}$ are pinned down by a and h due to linearity, there is a unique linear equilibrium. ■

Proof of Proposition 3: We first show $\bar{w}_\Omega(v)$ is strictly decreasing in Ω for all $v \in [a,1]$. Using Equations 14 and 17, we see that $\bar{w}_\Omega(v) = a + \frac{s}{s+\Omega}(v-a)$ for all $v \in [a,1]$. Differentiating with respect to Ω yields

$$\frac{\partial \bar{w}_{\Omega}(v)}{\partial \Omega} = \frac{\partial a}{\partial \Omega}\left(1-\frac{s}{s+\Omega}\right)-\frac{s}{(s+\Omega)^2}(v-a) \tag{18}$$

Noting that $\frac{s}{s+\Omega}\in(0,1]$ and that from Equation 17, $\frac{\partial a}{\partial \Omega}\overset{\text{sign}}{=}-r(s+1)<0$ implies that $\frac{\partial \bar{w}_{\Omega}(v)}{\partial \Omega}<0$ for all $v\in[a,1]$. From Equation 15 we see that $\frac{\bar{G}(x)}{\bar{g}(x)}=\frac{x-a}{s}$ for all $x\in[a,h]$. Therefore, from Equation 5 we see that $\bar{w}_{\Omega}(v)\to v$ for all $v\in[0,1]$ as $\Omega\to 0$.

By virtue of the fact that $\bar{w}_{\Omega}(v)$ is decreasing in Ω for all v, it must also be the case that h is decreasing in Ω. (It is possible to directly verify this by computing $\frac{\partial h}{\partial \Omega}$.) From Equation 15 we calculate $\frac{1-\bar{F}(x)}{\bar{f}(x)}=\frac{h-x}{r}$ for all $x\in[a,h]$. Since h is decreasing in Ω, $\frac{1-\bar{F}(x)}{\bar{f}(x)}$ is also decreasing in Ω over this range. Therefore, from Equation 4 we see that $\underline{w}_{i,1,\Omega}(\theta_i)$ is strictly decreasing in Ω for all $\theta_i\in[0,h]$, and $\underline{w}_{i,1,\Omega}(\theta_i)\to\theta_i$ for all $\theta_i\in[0,1]$ as $\Omega\to 1$. ■

Proof of Theorem 3: We calculate the probability that a worker is hired by the firm ex-ante. Let $\mathbb{H}(r,s,\Omega)$ be the expected equilibrium employment level in a market with distribution parameters r and s and transparency Ω. Then

$$\begin{aligned}\mathbb{H}(r,s,\Omega) &\equiv \int_0^h Pr\left(\bar{w}\geq \underline{w}_{i,1}(\theta)\right)g(\theta)d\theta \\ &= \int_0^h Pr\left(v\geq a+\tfrac{1-a}{h}\theta\right)g(\theta)d\theta \\ &= s\cdot(1-a)^r\int_0^h\left(1-\tfrac{1}{h}\theta\right)^r\theta^{s-1}d\theta \\ &= s(1-a)^r h^s\tfrac{\Gamma(r+1)\Gamma(s)}{\Gamma(r+s+1)}\end{aligned} \tag{19}$$

where the first equality comes from substituting in Equation 14, the second equality comes from substituting in the distribution of outside options from Equation 6, and the third from the definition of the Gamma Function, i.e. $\Gamma(x)\equiv\int_0^\infty y^{x-1}e^{-y}dy$. As we see, transparency affects the hiring rate through changing a and h. Because all of the terms not involving a and h are strictly positive in Equation 19, it is the case that

$$\operatorname*{argmax}_{\Omega}\mathbb{H}(r,s,\Omega)=\operatorname*{argmax}_{\Omega}(1-a)^r h^s \tag{20}$$

Substituting in from Equation 17 and taking the first order condition with respect to Ω yields

$$\Omega^*=\frac{r+1}{r+s+2} \tag{21}$$

It remains to show that the maximization problem in Equation 20 is concave in Ω over $[0,1]$. Taking the first order condition of Equation 20 we see that

$$\frac{\partial(1-a)^r h^s}{\partial\Omega}=-\frac{r^2s^2(1-a)^{r-1}h^{s-1}(r(\Omega-1)+(2+s)\Omega-1)}{(s(1+r-\Omega)+r\Omega)^3} \tag{22}$$

From this, since $r,s>0$ and $a<1$ we see that the first order condition in Equation 21 holds. Substituting in from Equation 6 gives us the particular form of Ω^* in the theorem. We further can calculate

$$\frac{\partial^2(1-a)^r h^s}{\partial\Omega^2} \overset{\text{sign}}{=} \begin{aligned}[t] &-s^3(r^2+r(2-\Omega^2)+(1-\Omega^2)) \\ &-r\Omega\left(r^2(2-\Omega)+2r(\Omega^2-3\Omega+2)+(4\Omega^2-5\Omega+2)\right) \\ &-s^2\left(r^3+r^2(-2\Omega^2+2\Omega+2)+r(-2\Omega^2+4\Omega+1)+2\Omega(1-\Omega^2)\right) \\ &-s\left(r^3(-\Omega^2+2\Omega+1)+r^2(3-2\Omega^2)\right) \\ &-s\left(r(6\Omega^2-6\Omega+3)+(-4\Omega^3+7\Omega^2-4\Omega+1)\right)\end{aligned}$$

A sufficient condition for $\frac{\partial^2(1-a)^r h^s}{\partial\Omega^2} < 0$ for all $\Omega \in (0,1)$ is that each of the parenthetical polynomial terms involving Ω be strictly positive for $\Omega \in (0,1)$. It is easy to check each of these polynomials separately to see that this sufficient condition is indeed satisfied. Therefore, extreme point Ω^* is the global maximizer of expected employment. To see the second point, note that in equilibrium, there is an outside option cutoff for employment $\theta(\Omega,v)$ such that all workers with outside options weakly less than $\theta(\Omega,v)$ negotiate wages that are acceptable to the firm. Then the hiring rate is equal to $G(\theta(\Omega,v))$. Noting that a worker i with outside option $\theta(\Omega,v)$ sets $\underline{w}_{i,1}=\bar{w}$ it must be the case that $G(\theta(\Omega,v))=\bar{G}(\bar{w})$. From Equations 14 and 15 it is the case that for all $v \geq a$

$$\bar{G}(\bar{w})=\left(\frac{h}{1-a}(v-a)\right)^s \tag{23}$$

We can use a monotonic transformation of $\bar{G}(\bar{w})$ to complete the claim, that is, we show submodularity of $\frac{h}{1-a}(v-a)$ in v and Ω:

$$\frac{\partial \frac{h}{1-a}(v-a)}{\partial v}=\frac{h}{1-a}=\frac{(1-\Omega)s+rs}{(s+\Omega)r} \tag{24}$$

which is clearly decreasing in Ω. Therefore, $\bar{G}(\bar{w})$ is submodular in v and Ω for a firm of type $v \geq a(\Omega)$. ■

Proof of Theorem 2: We show that the expected equilibrium profit of the firm is strictly increasing in Ω. That the worker expected equilibrium surplus is strictly decreasing in Ω follows a similar calculation. We invoke the law of iterated expectations by first finding the firm's profit for a particular draw $v > a$ which we denote by $\pi(v,\Omega)$.

$$\begin{aligned} \pi(v,\Omega) &= \int_a^{\bar{w}} (v-(1-\Omega)y-\Omega\bar{w})\bar{g}(y)dy \\ &= \int_a^{\bar{w}} (v-(1-\Omega)y-\Omega\bar{w})s\left(\frac{h}{h-a}\right)^s (y-a)^{s-1}dy \\ &= \frac{(\bar{w}-a)^s}{s+1}\left(\frac{h}{h-a}\right)^s (a(\Omega-1)-\bar{w}(\Omega+s)+sv+v) \end{aligned} \tag{25}$$

where the second equality comes by using Equation 15. The ex-ante expected profit of the firm can be expressed as $\pi(\Omega)=\int_a^1 \pi(v,\Omega)f(v)dv$. A tedious, but straightforward calculation shows that $\frac{\partial\pi(\Omega)}{\partial\Omega} > 0$ for all $r,s > 0$ as desired.

The proof that expected discounted wages are decreasing in Ω follows from Theorem 3 and the earlier part of the current proof. Let Ω^* be the expected employment maximizing level of transparency as defined in Equation 21. From Theorem 3 we know that the expected hiring rate is increasing in Ω on $[0,\Omega^*]$ and we have just shown that expected worker surplus is decreasing in Ω on $[0,\Omega^*]$. Therefore, it must be the case that expected discounted wages, conditional on employment, must be decreasing in Ω on $[0,\Omega^*]$. Similarly, from Theorem 3 we know that the expected hiring rate is decreasing in Ω on $[\Omega^*,1]$ and we have just shown that firm surplus is increasing in Ω on $[\Omega^*,1]$. Therefore, it must be the case that expected discounted wages, conditional on employment, must be decreasing in Ω on $[\Omega^*,1]$. Combining these two arguments, we see that expected discounted wages, conditional on employment, are decreasing in Ω on $[0,1]$, as desired. ■

Example 1. *Increasing transparency does not increase profits for all firm types: Let $v=1$ and let $r=s=1$. We can calculate the profit $\pi(v,\Omega)$ of the firm using Equation 25. We see that $\pi(1,1)=\frac{1}{4}$ while $\pi(1,\frac{1}{2})=\frac{9}{32}$. Notice that by symmetry of our model, this example implies that increasing transparency can strictly increase the expected earnings of workers with very low outside options. This observation was first made in Yilankaya (1999).*[6] ■

Proof of Theorem 4: Recall from Equation 12 that the expected wage of a worker with outside option θ_i at a firm with value v is $T(\Omega,v,\theta_i):=(1-\Omega)\underline{w}_{i,1}+\Omega\bar{w}$. A sufficient condition for $T(\cdot,v,\theta_i)-T(\cdot,v,\theta_j)$ being strictly decreasing in Ω is that $\frac{\partial^2 T(\Omega,\theta)}{\partial\theta\partial\Omega}<0$ for all $\Omega,\theta\in[0,1)$ and all $v\in[0,1]$. From Equations 12 and 14 we see that

$$\frac{\partial^2 T(\Omega,v,\theta)}{\partial\theta\partial\Omega}=\frac{\partial(1-\Omega)\frac{h-a}{h}}{\partial\Omega}=\frac{\partial(1-\Omega)\frac{r}{r+(1-\Omega)}}{\partial\Omega}=\frac{-r^2}{(r+1-\Omega)^2} \tag{26}$$

where the second equality comes from Equation 17. Since $r>0$ and $\Omega\leq 1$ we have $\frac{\partial^2 T(\Omega,v,\theta)}{\partial\theta\partial\Omega}<0$ as desired. To show $T(\cdot,v,\theta_i)-T(\cdot,v,\theta_j)\to 0$ as $\Omega\to 1$, we note that $T(\cdot,v,\theta_i)=(1-\Omega)\underline{w}_{i,1}+\Omega\bar{w}$. Since $\underline{w}_{i,1}$ is bounded below by θ_i then $T(\cdot,v,\theta_i)$ converges to $\bar{w}$ for any θ_i. ■

D. Theoretical Extensions

D.1. Other Transparency Processes

Other pay transparency policies may not directly promote individual worker observation of the firm's wage profile. Instead, these policies could reveal average wages, average wage gaps across groups, or salary ranges.

We show that such policies have similar equilibrium effects as increasing transparency, as studied in our base model. The central insight is that all of these policies have similar equilibrium effects that reveal information about the firm's willingness to pay for a position. As we show below, the policies we study increase workers' information about the maximum wage they can receive, which in turn affects (re)negotiations, triggering the supply and demand effects.

[6]We are grateful to an anonymous referee for alerting us to the similarity of this example to Yilankaya's finding.

We make the following change to our model: suppose the information arrival does not reveal the entire profile wages, but rather reveals average wages of all initially hired workers workers, i.e. the average of $\{w_{i,1}\}_{i\in I_1}$.

By **A3**, both $\bar{w}$ and $\underline{w}_{i,1}$ are strictly increasing in v and θ_i, respectively. As workers trace out the set $[a,1]$ for some $a>0$ with their initial offers, there is a one-to-one relationship between average wage (prior to information arrival) and $\bar{w}$. Therefore, upon observing the average wage, workers learn $\bar{w}$ in equilibrium.

Workers may similarly learn $\bar{w}$ in equilibrium if the arrival process reveals the wage gap across groups. Suppose there are two groups of workers, M (men) and W (women), and each worker i belongs to exactly one group. Each group contains a positive measure of workers. Let G_ℓ represent the distribution of outside options for type $\ell\in\{M,W\}$, and let $G(x):=qG_M(x)+(1-q)G_W(x)$ for all $x\in[0,1]$, where $q\in[0,1]$ is the proportion of M-group workers in the market. If G_M dominates G_W in the likelihood ratio order, that is $\frac{g_M(x)}{g_W(x)}$ is strictly increasing in x, then as $\bar{w}$ increases, the average wage of M-group workers increases by more than the average wage of W-group workers. Therefore, there is again a one-to-one relationship between the size of the wage gap and $\bar{w}$, implying that workers learn $\bar{w}$ in equilibrium upon observation of the wage gap.

The following result summarizes both of these cases.

PROPOSITION **5.** *Suppose the information process arrives with probability $\Lambda>0$.*

1. *If the information process reveals the average wages of all workers, then the set of equilibrium outcomes satisfying **A1-A3** is identical to that in our base game.*
2. *If the information process reveals the gap between the average wages of M- and W-group workers, then the set of equilibrium outcomes satisfying **A1-A3** is identical to that in our base game if G_M dominates G_W in the likelihood ratio order.*

Proof of Proposition 5 We prove only point 2 of the proposition, as the proof of point 1 is similar.

First, suppose that for any $i\in I$ and any $\underline{w}_{i,1}$, i identifies $\bar{w}$ upon the arrival of the information process. Then i will successfully renegotiate her wage to $\bar{w}$ if she is able to renegotiate her wage, as in our base model.

Therefore, the proof is completed by showing that in any equilibrium satisfying **A1-A3**, each initially employed worker $i\in I_1$ identifies $\bar{w}$ on equilibrium path upon arrival of the information process. In any such equilibrium, both M- and W-group workers with outside option θ_i make the same initial offer. We know that $\underline{w}_{i,1}$ is strictly increasing in θ_i by **A3**.

Let $L:[0,1]\to[0,1]$ be the average wage of hired M-group workers minus the average wage of hired W-group workers in equilibrium as a function of $\bar{w}$, and let $\bar{\theta}_\ell:[0,1]\to[0,1]$ be the average outside option of group $\ell\in\{M,W\}$ workers hired in equilibrium as a function of $\bar{w}$. We claim that $L(\cdot)$ is strictly increasing. To see this, take $\bar{w}'>\bar{w}$. The assumption that $\frac{g_M(x)}{g_W(x)}$ is strictly increasing in x implies that there are increasing differences in worker group and firm offer, that is, $\bar{\theta}_M(\bar{w}')-\bar{\theta}_M(\bar{w})>\bar{\theta}_W(\bar{w}')-\bar{\theta}_W(\bar{w})$. By the arguments in the preceding paragraph, this completes the claim that $L(\cdot)$ is strictly increasing.

Because $L(\cdot)$ is strictly increasing, it is invertible, leading each worker $i\in I_1$ who observes the wage gap to identify $\bar{w}$. ■

Heterogeneous Worker Qualities and Salary Range Revelation

Until now we have assumed that all workers are equally productive. Here we discuss our findings in contexts where there may be significant heterogeneity in worker productivities. Information arrival about wages reveals the range of salaries offered to all workers. Therefore, we refer to transparency in this context as salary range revelation.

First, we extend the results of our base model to the case where each worker's productivity is common knowledge. Suppose each worker $i \in I$ has a publicly observable type $\tau \in \mathcal{T}$ where $\mathcal{T}$ is a countable set, each containing a positive measure of workers. Each worker i of type τ has a private outside option $\theta_i \overset{iid}{\sim} G_\tau[0,1]$. Let $v_\tau \sim F_\tau[0,1]$ be the productivity of type τ workers, which is known only to the firm.[7] Mirroring the assumptions of our base model, we assume that for each $\tau \in \mathcal{T}$ the distribution of outside options and firm values F_τ and G_τ are twice continuously differentiable with densities f_τ and g_τ, respectively, where $f_\tau(x) > 0$ for all $x \in (0,1]$ and $g_\tau(y) > 0$ for all $y \in [0,1)$. We also assume agents have strictly increasing virtual reservation values, i.e. $\theta + \frac{G_\tau(\theta)}{g_\tau(\theta)}$ is strictly increasing in θ and $v - \frac{1-F_\tau(v)}{f_\tau(v)}$ is strictly increasing in v for all $\tau \in \mathcal{T}$. Our base model is a special case in which $|\mathcal{T}| = 1$, that is, all workers are equally productive.

As before, each worker i of type τ makes an initial wage offer $\underline{w}_{i,\tau,1}$, and then an additional wage offer after observing peer wage information with probability P. The firm picks a maximum wage $\bar{w}_\tau(v_\tau)$ for each type τ.

If all workers' types τ are known then the results of our paper go through within type. That is, each τ forms a different market. On equilibrium path, the firm picks the maximum wage for type τ workers $\bar{w}_\tau(v_\tau)$ as in the base model given distributions F_τ and G_τ, and each worker i of type τ picks an initial offer $\underline{w}_{i,\tau,1}$ as in the base model given distributions F_τ and G_τ. Upon observing wage information, each worker i identifies the maximum wage associated with her productivity type, and offers that amount to the firm in renegotiations.

We shift our focus on the case in which workers are differentially productive, but each worker knows only her own productivity type. To highlight mechanisms at play, we study the extreme case in which at no point prior to bargaining do workers receive a signal of their (relative) productivity type: outside options are distributed independently of productivity type and the value for workers of different productivity are drawn from the same distribution.

Formally, we suppose that there are two productivity types τ and τ'. v_τ and $v_{\tau'}$ are drawn independently from the same distribution F. Each worker is equally likely to have productivity type v_τ or $v_{\tau'}$. The firm knows each worker's productivity type, but workers observe only their own productivity type. Denote the maximum wage the firm selects for each productivity type as $\bar{W}_{v_\tau}$ and $\bar{W}_{v_\tau}$, where we use capital letters to denote the model where workers observe only their own productivity types.

Under full privacy ($\Lambda = 0$), the equilibrium outcome mirrors that of the base model. Therefore, firm profits, the expected level of employment, and wage dispersion are the same as before.

For tractability, we consider only the effects of full transparency with common renegotiations ($\Lambda P = 1$) with $k = 0$. Without loss of generality, we assume that $v_\tau \leq v_{\tau'}$. Therefore, $\bar{W}_{v_\tau}(v_\tau)$ and $\bar{W}_{v_\tau}(v_\tau)$ denote the maximum wage functions for the less productive and more productive workers,

[7]We do not require that each v_τ is drawn independently. For example, (with minor notational changes to accommodate different supports) we could allow that the productivity of type $\tau \in \mathcal{T}$ workers is given by $\tau \cdot v$ where $v \sim F[0,1]$ as in Mussa and Rosen (1978) and Shaked and Sutton (1982).

respectively. However, we highlight that workers do not know whether $v_\tau \le v_{\tau'}$ or $v_\tau > v_{\tau'}$.

We first argue that in any equilibrium satisfying our regularity conditions, $\bar{W}_{v_\tau}$ and $\bar{W}_{v_{\tau'}}$ are identified by all workers whose initial offers are not rejected by the firm. (Recall that workers do not know which value corresponds to the maximum wage for their own productivity type, since they do not know whether $v_\tau \le v_{\tau'}$ or $v_\tau > v_{\tau'}$.) Given the change in our setting, we make slight changes to our regularity conditions below:

$\bar{A}1$ $0 \le \bar{W}_{v_\tau} \le \bar{W}_{v_{\tau'}} \le 1$ for all $v_\tau, v_{\tau'}$. If $v_{\tau'} \le \underline{w}_{i,1}$ for every worker i according to equilibrium strategies then $\bar{W}_{v_{\tau'}} = v_{\tau'}$.

$\bar{A}2$ $\theta_i \le \underline{w}_{i,1} \le 1$ for all i. If there is no $v_{\tau'}$ such that $\theta_i \le \bar{W}_{v_{\tau'}}$ according to equilibrium strategies then $\underline{w}_{i,1} = \theta_i$.

$\bar{A}3$ $\bar{W}_{v_{\tau'}}$ and $\underline{w}_{i,1}$ are strictly increasing functions of $v_{\tau'}$ and θ_i, respectively. Moreover, $\bar{W}_{v_{\tau'}}$ is continuously differentiable for $v_{\tau'} \in \big(\underline{w}_{i,1}(0), 1\big)$ and $\underline{w}_{i,1}$ is continuously differentiable for $\theta \in \big(0, \bar{W}_{v_{\tau'}}(1)\big)$.

Lemma **1.** *Let $\Lambda P = 1$ and $k = 0$. In any equilibrium satisfying $\bar{A}1 - \bar{A}3$, all workers whose initial offers are accepted by the firm learn $\bar{W}_{v_\tau}$ and $\bar{W}_{v_{\tau'}}$ and $\underline{w}_{i,1} = \theta_i$ for all workers.*

Proof of Lemma 1 Suppose an equilibrium satisfying $\bar{A}1 - \bar{A}3$ exists. Then the distribution of initial offers is given by $G(\gamma^{-1}(x))$ for a continuous and strictly increasing function γ for each $x \in [\gamma(0), 1]$.

As argued in Proposition 1, upon observing peer wages any worker initially employed by the firm infers $\bar{W}_{v_{\tau'}}$ as equal to the maximum wage observed.

We now turn our attention to $\bar{W}_{v_\tau}$. First suppose that $v_\tau < v_{\tau'}$. Worker i of type v_τ will be hired if and only if $\gamma(\theta_i) \le \bar{W}_{v_\tau}$ and a worker j of type $v_{\tau'}$ will be hired if and only if $\gamma(\theta_j) \le \bar{W}_{v_{\tau'}}$. Given our assumption that $g(\cdot)$ has full support and $\gamma(\cdot)$ is continuous, there will be a discontinuity in the density of wages $\{w_{i,1}\}_{i \in I_1}$ at $\bar{W}_{v_\tau}$, i.e. the density of initial wages will be equal to $g(\gamma^{-1}(x))$ for any $x \in [0, \gamma^{-1}(\bar{W}_{v_\tau})]$ and will be equal to $\frac{g(\gamma^{-1}(x))}{2}$ for any $x \in (\gamma^{-1}(\bar{W}_{v_\tau}), \gamma^{-1}(\bar{W}_{v_{\tau'}})]$. Given that we have assumed that $g(\cdot)$ is continuous, the discontinuity at $\bar{W}_{v_\tau}$ is the unique such discontinuity. If $v_\tau = v_{\tau'}$ then there is no such discontinuity.

Finally, we argue that in any such equilibrium it is the case that $\underline{w}_{i,1} = \theta_i$ for all $i \in I$. Note that given that all workers are able to infer $\bar{W}_{v_\tau}$ and $\bar{W}_{v_{\tau'}}$ and renegotiate their wages, and the fact that $\bar{W}_{v_{\tau'}}$ is strictly increasing and continuous in $v_{\tau'}$, each worker i with $\theta_i \le \bar{W}_{v_{\tau'}}(1)$ will (uniquely) maximize her expected payoff with a strategy that takes the following form: offer $\underline{w}_{i,1} = \theta_i$ and $\underline{w}_{i,2} \in \{\bar{W}_{v_\tau}, \bar{W}_{v_{\tau'}}\}$ (where $\bar{W}_{v_\tau}$ and $\bar{W}_{v_{\tau'}}$ are identified as in the previous paragraph). By Assumption $\bar{A}2$, all other workers also offer $\underline{w}_{i,1} = \theta_i$. ■

Consider any equilibrium and any worker $i \in I$. If $\bar{W}_{v_{\tau'}} < \theta_i$ then i's initial wage offer is rejected by the firm. Otherwise, at $t = 2$, she will offer $\bar{W}_{v_\tau}$ (and remain employed with probability 1) if $\bar{W}_{v_\tau} > \frac{1}{2}\bar{W}_{v_{\tau'}} + \frac{1}{2}\theta_i$ and she will offer $\bar{W}_{v_{\tau'}}$ (and remain employed with probability $\frac{1}{2}$) if $\bar{W}_{v_\tau} \le \frac{1}{2}\bar{W}_{v_{\tau'}} + \frac{1}{2}\theta_i$. To do away with a multiplicity of payoff-equivalent equilibria, we assume that $\bar{W}_{v_\tau} \in [\frac{\bar{W}_{v_{\tau'}}}{2}, \bar{W}_{v_{\tau'}}]$.

There is clearly a loss in employment (and therefore firm profits) at $t = 2$ caused by the uncertainty workers have over their own productivity types. On the other hand, low outside option, productivity $v_{\tau'}$ workers may offer $\bar{W}_{v_\tau}$ at $t=2$, meaning that the firm is able to hire some high productivity workers at low wages, increasing profits. We show that, because of this latter effect, the firm sets $\bar{W}_{v_\tau}$ higher than it would have for the same v_τ with publicly known worker productivities.[8]

PROPOSITION **6.** *Fix $\Lambda P=1$ and $k=0$. There is a unique equilibrium satisfying $\bar{A}1-\bar{A}3$. In it, $\bar{W}_{v_{\tau'}}=\bar{w}_{\tau'}(v_{\tau'})$ and all employed workers receive final pay weakly higher than $\bar{w}_\tau(v_\tau)$.*

Proof of Proposition 6 We have already explained that workers with $2\bar{W}_{v_\tau}-\bar{W}_{v_{\tau'}}>\theta_i$ will offer a wage of $\bar{W}_{v_\tau}$ and those with $\bar{W}_{v_{\tau'}}\geq\theta_i\geq 2\bar{W}_{v_\tau}-\bar{W}_{v_{\tau'}}$ will offer a wage of $\bar{W}_{v_{\tau'}}$ (at $t=2$). Therefore, the firm maximizes:

$$\left(\frac{1}{2}v_\tau+\frac{1}{2}v_{\tau'}-\bar{W}_{v_\tau}\right)G(2\bar{W}_{v_\tau}-\bar{W}_{v_{\tau'}})+\frac{1}{2}\left(v_{\tau'}-\bar{W}_{v_{\tau'}}\right)\left[G(\bar{W}_{v_{\tau'}})-G(2\bar{W}_{v_\tau}-\bar{W}_{v_{\tau'}})\right] \tag{27}$$

with respect to $\bar{W}_{v_\tau}$ and $\bar{W}_{v_{\tau'}}$. We solve this maximization problem under the assumption that $2\bar{W}_{v_\tau}-\bar{W}_{v_{\tau'}}>0$ and later deal with the boundary case of $2\bar{W}_{v_\tau}-\bar{W}_{v_{\tau'}}=0$.

Solving the FOCs jointly yields the following two equations that implicitly define $\bar{W}_{v_\tau}$ and $\bar{W}_{v_{\tau'}}$:

$$\frac{G(2\bar{W}_{v_\tau}-\bar{W}_{v_{\tau'}})}{g(2\bar{W}_{v_\tau}-\bar{W}_{v_{\tau'}})}=v_\tau-[2\bar{W}_{v_\tau}-\bar{W}_{v_{\tau'}}] \tag{28}$$

$$\frac{G(\bar{W}_{v_{\tau'}})}{g(\bar{W}_{v_{\tau'}})}=v_{\tau'}-\bar{W}_{v_{\tau'}} \tag{29}$$

We make note of several points. First, the virtual value assumptions we make imply that there is a unique solution to these equations, and that said solution maximizes firm surplus (as we have previously argued in Footnote 10). Second, it must be the case that $\bar{W}_{v_{\tau'}}>\bar{W}_{v_\tau}$ whenever $v_{\tau'}>v_\tau$ (and the firm hires a positive measure of workers in equilibrium). Third, when $\Omega=1$ in our base model, Equation 5 implies that $\frac{G(2\bar{W}_{v_\tau}-\bar{W}_{v_{\tau'}})}{g(2\bar{W}_{v_\tau}-\bar{W}_{v_{\tau'}})}=v_\tau-[2\bar{W}_{v_\tau}-\bar{W}_{v_{\tau'}}]$, for otherwise Equation 28 would not be satisfied. Therefore, it must be the case that $2\bar{W}_{v_\tau}-\bar{W}_{v_{\tau'}}=\bar{w}_\tau(v_\tau)$, implying that $\bar{W}_{v_\tau}>\bar{w}_\tau(v_\tau)$ (whenever $v_{\tau'}>v_\tau$ and the firm hires a positive measure of workers in equilibrium).

In the case in which $2\bar{W}_{v_\tau}-\bar{W}_{v_{\tau'}}=0$ the optimal choice of $\bar{W}_{v_{\tau'}}$ must satisfy Equation 29. Therefore, all workers will offer $\underline{w}_{i,2}=\bar{W}_{v'_\tau}$, and any employed worker will receive final wages equal to $\bar{W}_{v_\tau}\geq\bar{w}_\tau(v_\tau)$.■

In this setting, transparency leads to wage compression as opposed to complete wage equalization. All employed, low-productivity workers earn $\bar{W}_{v_\tau}$ as the firm rejects all such workers who demand more. Employed, high-productivity workers earn either $\bar{W}_{v_\tau}$ or $\bar{W}_{v_{\tau'}}$. Since $\bar{W}_{v_\tau}\geq\bar{w}_\tau(v_\tau)$, and $\bar{W}_{v_{\tau'}}=\bar{w}_{\tau'}(v_{\tau'})$, the gap in pay between low- and high-productivity workers is smaller than in the base model. Interestingly, the firm may set $\bar{W}_{v_\tau}>v_\tau$ when v_τ is sufficiently small, incurring a loss on low-productivity workers![9]

[8]This effect is similar to "conflationary" strategies of monopolists in a price discrimination model (Loertscher and Muir, 2021a)–by increasing the wage paid to low-productivity workers, the firm homogenizes the wages it pays, leading low outside option workers to opt for the riskless, lower wage.

[9]To see this, note that when G follows the distribution family of distributions in Equation 6, the following FOC are obtained: $\bar{W}_{v_\tau}=\frac{s}{2(1+s)}(v_\tau+v_{\tau'}),\bar{W}_{v_{\tau'}}=\frac{s}{1+s}v_{\tau'}$. It is easy to check that $2\bar{W}_{v_\tau}-\bar{W}_{v_{\tau'}}>0$ for any $(v_{\tau'},v_{\tau'},s)\in[0,1]\times[v_\tau,1]\times[0,\infty)$. One can also see that $\bar{W}_{v_\tau}>v_\tau$ whenever $\frac{s}{s+2}v_{\tau'}>v_\tau$.

The fact that $\bar{W}_{v_\tau} \geq \bar{w}_\tau(v_\tau)$ raises the fraction of low productivity workers who are eligible for employment, compared to the counterfactual world in which productivity types are observable. Assuming a positive measure of workers are employed at wage $\bar{W}_{v_\tau}$ in equilibrium (i.e. $2\bar{W}_{v_\tau} - \bar{W}_{v_{\tau'}} > 0$), this completely offsets the reduction in employment caused by high outside option, low type workers requesting $\bar{W}_{v_{\tau'}}$. The fact that the firm is able to secure low outside option, high productivity workers at wage $\bar{W}_{v_\tau}$ also offsets the profit loss caused by missing out on certain low productivity workers.

PROPOSITION **7.** *Let $\Lambda P = 1$ and $k = 0$, and consider the unique equilibrium satisfying $\bar{A}1 - \bar{A}3$. If $2\bar{W}_{v_\tau} - \bar{W}_{v_{\tau'}} > 0$ then firm profit, average wages, and the employment level in equilibrium are the same as in the baseline model with observable productivity differences when $\Omega = 1$.*

Proof of Proposition 7 Fix $v_\tau \leq v_{\tau'}$, and let $2\bar{W}_{v_\tau} - \bar{W}_{v_{\tau'}} > 0$. We first show that the employment rate is the same in the two cases. In the model with unknown worker productivities, the measure of workers hired is

$$G(2\bar{W}_{v_\tau} - \bar{W}_{v_{\tau'}}) + \frac{1}{2}(G(\bar{W}_{v_{\tau'}})) - G(2\bar{W}_{v_\tau} - \bar{W}_{v_{\tau'}})) \tag{30}$$

as all workers with outside options weakly below $2\bar{W}_{v_\tau} - \bar{W}_{v_{\tau'}}$ are hired as they all offer wage $\bar{W}_{v_\tau}$ at $t = 2$ and only workers of productivity type $v_{\tau'}$ are employed if they offer $\bar{W}_{v_{\tau'}}$ at $t = 2$. In the model with known worker productivities, the measure of workers hired is

$$G(\bar{w}_\tau(v_\tau)) + \frac{1}{2}(G(\bar{w}_{\tau'}(v_{\tau'}) - G(\bar{w}_\tau(v_\tau))) \tag{31}$$

as all workers with outside options weakly below $\bar{w}_\tau(v_\tau)$ are hired and all τ' workers with outside options weakly below $\bar{w}_{\tau'}(v_{\tau'})$ are hired. Recalling from the Proof of Proposition 6 that $2\bar{W}_{v_\tau} - \bar{W}_{v_{\tau'}} = \bar{w}_\tau(v_\tau)$ and $\bar{W}_{v_{\tau'}} = \bar{w}_{\tau'}(v_{\tau'})$ implies that Equations 30 and 31 are equal. We further note that since $\bar{W}_{v_{\tau'}} = \bar{w}_{\tau'}(v_{\tau'})$ it is the case that the same measure of $v_{\tau'}$ type workers are hired in both cases (and therefore that the same measure of v_τ type workers are hired in both cases). This completes the claim regarding employment.

Recalling that $2\bar{W}_{v_\tau} - \bar{W}_{v_{\tau'}} = \bar{w}_\tau(v_\tau)$, substituting in Equation 27, the difference in firm profits in the two cases is

$$\begin{aligned}
&\left(\frac{v_\tau}{2} + \frac{v_{\tau'}}{2} - \bar{W}_{v_\tau}\right) G(\bar{w}_\tau(v_\tau)) + \frac{v_{\tau'} - \bar{W}_{v_{\tau'}}}{2}\left[G(\bar{W}_{v_{\tau'}}) - G(\bar{w}_\tau(v_\tau))\right] - \frac{v_\tau - \bar{w}_\tau(v_\tau)}{2} G(\bar{w}_\tau(v_\tau)) - \frac{v_{\tau'} - \bar{w}_{\tau'}(v_{\tau'})}{2} G(\bar{w}_{\tau'}(v_{\tau'})) \\
&= [-\bar{W}_{v_\tau} + \frac{\bar{W}_{v_{\tau'}}}{2} + \frac{\bar{w}_\tau(v_\tau)}{2}] G(\bar{w}_\tau(v_\tau)) \\
&= 0
\end{aligned}$$

where the first equality comes from canceling terms, and the second equality comes from the fact that $2\bar{W}_{v_\tau} - \bar{W}_{v_{\tau'}} = \bar{w}_\tau(v_\tau)$. Therefore, the firm earns the same profits in both cases.

Finally, noting that the firm's profit and measure of workers of each productivity type hired is identical in both cases, it must therefore be that average wages are equal in both cases as well. ■

D.2. A Model of Collective Bargaining

We show that the muted effect of transparency on wages when k is large also holds in an augmented model in which unions are involved in wage setting. A key observation is that although unions are designed to increase the bargaining power of workers as a whole, they result in low *individual* bargaining power in that workers frequently receive a TIOLI offer in wage negotiations (as documented in Hall and Krueger, 2012).

We model the union as an entity that allocates a fixed per-worker budget to employed workers under the $k=1$ bargaining protocol. The union prefers Pareto improvements in the wage profile of workers, but potentially favors some workers over others. We show that when the union is unable to price discriminate, the equilibrium impact of transparency is as in our base model: it does not impact the equilibrium outcome. If the union is able to price discriminate, then transparency may impact the equilibrium outcome, but it will not impact average wages, as the union will always disperse all of its budget.

There is an exogenous $\bar{w} \in (0,v]$ known to the union, which represents the per-employed-worker budget and the set of employed workers cannot receive average pay strictly greater than $\bar{w}$.[10] There exists an exogenous partition $\mathcal{P}$ of I, where $\mathcal{P}=\mathcal{P}^1 \cup \mathcal{P}^2 \cup ... \cup \mathcal{P}^{\mathcal{M}}$. For each $m \in \{1,...,\mathcal{M}\}$ the set $\mathcal{P}^m$ has positive measure, and let $G^m(x)=|\{i \in \mathcal{P}^m | \theta_i \leq x\}|$ for any $x \in [0,1]$.

The union has a utility function that depends on the profile of worker wages $\{w_i\}_{i \in I}$ and transparency level Λ, $u(\{w_i\}_{i \in I},\Lambda)$. The dependence on the profile of wages allows the union to care differently about the wages of different workers (eg. men vs women), and the dependence on Λ allows the union to prioritize the wages of different workers depending on the level of transparency (eg. the union may want to have a smaller gender wage gap if the wage gap is likely to be observed).

For each $m \in \{1,...,\mathcal{M}\}$ the union sets a maximum wage $\bar{w}_m$, representing that the union can potentially wage discriminate (the case in which $\mathcal{M}=1$ prevents the union from doing so). We allow the union, as opposed to the firm, to potentially discriminate because the union may have more knowledge of worker outside options.[11] To capture that unions set wage contracts (given constraints imposed by the firm) and workers have no individual bargaining power, wages are set with "$k=1$" i.e. for $t \in \{1,2\}$ any worker $i \in \mathcal{P}^m$ who makes wage offer to the union $\underline{w}_{i,t}$ is rejected if $\underline{w}_{i,t} > \bar{w}_m$, in which case, she consumers her outside option θ_i. Otherwise, i is employed at wage $w_{i,t}=\bar{w}_m$.

We say that a wage schedule $\{w_i\}_{i \in I}$ is *feasible* if the average wage of employed workers is no greater than $\bar{w}$, and each unemployed worker i receives $w_i=0$. We assume that $u(\{w_i\}_{i \in I},\cdot) \geq 0$ for any feasible wage schedule $\{w_i\}_{i \in I}$. Let $\{w_i'\}_{i \in I}$ and $\{w_i\}_{i \in I}$ be two feasible wage schedules. For any Λ, $u(\{w_i\}_{i \in I},\Lambda)=u(\{w_i'\}_{i \in I},\Lambda)$ if $w_i=w_i'$ for almost all $i \in I$. For any Λ, if $w_i' \geq w_i$ for almost all $i \in I$, and $w_j' > w_j$ for all $j \in J$ where J is a positive measure subset of I, then $u(\{w_i'\}_{i \in I},\Lambda) > u(\{w_i\}_{i \in I},\Lambda)$. That is, the union's preferences respect Pareto wage improvements for the workers. If $\{w_i\}_{i \in I}$ is not feasible, then $u(\{w_i\}_{i \in I},\cdot) < 0$. The union's preferences are also continuous: Fix $\epsilon > 0$ and Λ. Then there exists δ such that for any two feasible wage schedules $\{w_i'\}_{i \in I}$ and $\{w_i\}_{i \in I}$ such that $|w_i - w_i'| < \delta$ for all $i \in I'$ where $|I'| < 1-\delta$, it is the case that $|u(\{w_i'\}_{i \in I},\Lambda) - u(\{w_i\}_{i \in I},\Lambda)| < \epsilon$.

[10] We do not explicitly model the process by which $\bar{w}$ is determined. However, we will show that the value of the union's objective function increases as $\bar{w}$ increases, and therefore, the standard efficient contract assumption in union bargaining models suggests that any (sufficiently high) $\bar{w}$ is viable.

[11] This discrepancy has likely widened with recent policies often referred to as "salary history bans" which attempt to limit firms' ability to acquire information about workers' previous wages. For more details on these policies, see, for example, Hansen and McNichols (2020).

As $k=1$, each worker i sets $\underline{w}_{i,1}=\theta_i$ in equilibrium.

Proposition 8. *For any Λ there exists at least one equilibrium. The average wage of employed workers equals $\bar{w}$ in any equilibrium, regardless of Λ.*

Proof of Proposition 8 To show existence, consider change of variables and associated utility function $u'(\bar{w}_1,...,\bar{w}_{\mathcal{M}},\Lambda)$ such that $u'(\bar{w}_1,...,\bar{w}_{\mathcal{M}},\Lambda) = u(\{w_i\}_{i\in I},\Lambda)$ where for all $i \in \mathcal{P}^m$ and $m \in \{1,...,\mathcal{M}\}$,

$$w_i = \begin{cases} \bar{w}_m & \text{if } \theta_i \leq \bar{w}_m \\ 0 & \text{otherwise} \end{cases}$$

for any Λ. By virtue of the fact that $k=1$, the union can achieve utility $u'(\bar{w}_1,...,\bar{w}_{\mathcal{M}},\Lambda)$ for any $\bar{w}_1,...,\bar{w}_{\mathcal{M}}$ subject to the following feasibility constraint:

$$\frac{\sum_{m=1}^{\mathcal{M}} \bar{w}_m \cdot G^m(\bar{w}_m)}{\sum_{m=1}^{\mathcal{M}} G^m(\bar{w}_m)} \leq \bar{w}$$

To see that there exists a maximizer, note that $u'(\cdot,...,\cdot,\Lambda)$ is continuous in the first $\mathcal{M}$ arguments for any Λ due to the continuity of $u(\cdot,\Lambda)$ in the wage schedule and the continuity of G. Moreover, the set of feasible vectors $(\bar{w}_1,...,\bar{w}_{\mathcal{M}})$ is a closed and bounded subset of $[0,1]^{\mathcal{M}}$. Therefore, by the extreme value theorem, an equilibrium vector $\bar{w}_1,...,\bar{w}_{\mathcal{M}}$ exists.

We now show that in any equilibrium, the average wage of employed workers is $\bar{w}$. Suppose not, that is, there exists $\epsilon > 0$ such that the average wage of employed workers $\frac{\sum_{m=1}^{\mathcal{M}} \bar{w}_m \cdot G^m(\bar{w}_m)}{\sum_{m=1}^{\mathcal{M}} G^m(\bar{w}_m)} = \bar{w} - \epsilon$.

Consider the following alternative union strategy for each $m \in \{1,...,\mathcal{M}\}$:

$$\bar{w}'_m = \begin{cases} \bar{w}_m & \text{if } \bar{w}_m > \bar{w}, \\ \bar{w} & \text{if } \bar{w}_m \in [\bar{w}-\epsilon, \bar{w}], \\ \bar{w}_m + \epsilon & \text{otherwise} \end{cases}$$

We claim that this alternative strategy $\bar{w}'_1,...,\bar{w}'_{\mathcal{M}}$ results in a Pareto wage improvement in equilibrium, and is feasible. To see that this leads to a Pareto improvement, note that no workers receives lower pay in equilibrium under this alternative, and a positive measure of workers receive strict increases in pay; the fact that average wages of employed workers is strictly less than $\bar{w}$ implies that there is some positive measure set of workers $J \subset \mathcal{P}^m$ for some $m \in \{1,...,\mathcal{M}\}$ such that each $j \in J$ has $\theta_j \leq \bar{w}_m < \bar{w}$ and $\bar{w}'_m > \bar{w}_m$.

We now argue that $\bar{w}'_1,...,\bar{w}'_{\mathcal{M}}$ is feasible. Let $\bar{w}_m < \bar{w}$ for all $m \leq M_1$ (we have established the existence of such $M_1 \leq \mathcal{M}$ in the preceding paragraph). Then the average wage of employed workers in equilibrium under $\bar{w}'_1,...,\bar{w}'_{\mathcal{M}}$ is

$$
\begin{aligned}
\frac{\sum_{m=1}^{\mathcal{M}}\bar{w}'_m \cdot G^m(\bar{w}'_m)}{\sum_{m=1}^{\mathcal{M}}G^m(\bar{w}'_m)} &\leq \frac{\sum_{m=1}^{M_1}(\epsilon+\bar{w}_m)\cdot G^m(\epsilon+\bar{w}_m)+\sum_{m=M_1+1}^{\mathcal{M}}\bar{w}_m \cdot G^m(\bar{w}_m)}{\sum_{m=1}^{M_1}G^m(\epsilon+\bar{w}_m)+\sum_{m=M_1+1}^{\mathcal{M}}G^m(\bar{w}_m)} \\
&\leq \epsilon + \frac{\sum_{m=1}^{M_1}\bar{w}_m \cdot G^m(\epsilon+\bar{w}_m)+\sum_{m=M_1+1}^{\mathcal{M}}\bar{w}_m \cdot G^m(\bar{w}_m)}{\sum_{m=1}^{M_1}G^m(\epsilon+\bar{w}_m)+\sum_{m=M_1+1}^{\mathcal{M}}G^m(\bar{w}_m)} \\
&\leq \epsilon + \frac{\sum_{m=1}^{M_1}\bar{w}_m \cdot G^m(\bar{w}_m)+\sum_{m=M_1+1}^{\mathcal{M}}\bar{w}_m \cdot G^m(\bar{w}_m)}{\sum_{m=1}^{M_1}G^m(\bar{w}_m)+\sum_{m=M_1+1}^{\mathcal{M}}G^m(\bar{w}_m)} \\
&\leq \epsilon + \frac{\sum_{m=1}^{\mathcal{M}}\bar{w}_m \cdot G^m(\bar{w}_m)}{\sum_{m=1}^{\mathcal{M}}G^m(\bar{w}_m)} \\
&= \bar{w}
\end{aligned}
$$

where the third inequality follows from the fact that $G^m(\cdot)$ is nondecreasing for each m and $\bar{w}_m < \bar{w}_{m'}$ for each $m \leq M_1 < m'$, and the equality follows from the definition of ϵ. This contradicts that $\bar{w}_1,...,\bar{w}_M$ is an equilibrium strategy by the union.

That average wages are unaffected by Λ in equilibrium follows from the above argument and the fact that $\bar{w}$ is constant in Λ. ■

D.3. Group-Level Wage Compression

Theorem 4 can be used to study transparency's effect on wage gaps across groups of workers within a marketplace. Suppose there are two groups of workers, M (men) and W (women), and each worker i belongs to exactly one group. Each group contains a positive measure of workers. Let G_ℓ represent the distribution of outside options for group $\ell \in \{M,W\}$, and let $G(x) := qG_M(x) + (1-q)G_W(x)$ for all $x \in [0,1]$, where $q \in [0,1]$ is the proportion of M-group workers in the market. As before, the firm sets a single maximum wage $\bar{w}$ that holds across all workers, prohibiting the firm from making group-specific wage offers.[12] Denote the average equilibrium earnings of employed workers of group $\ell \in \{M,W\}$ with outside option θ_i as $T(\Omega,v,\theta_i,\ell)$. The following result considers the case where the outside options of the M group first-order stochastically dominate those of the W group (see Figure 1 in Caldwell and Danieli (2021) for evidence supporting this assumption.)

Corollary **2.** *Consider the unique linear equilibrium given the family of distributions in Equation 6. If $G_M(\cdot)$ first-order stochastically dominates $G_W(\cdot)$ then $\frac{\mathbb{E}_{G_W}[T(\Omega,v,\theta_i,W)]}{\mathbb{E}_{G_M}[T(\Omega,v,\theta_i,M)]}$ converges monotonically to 1 as Ω converges to 1 for all v.*

The average earnings of employed W-group workers is rising relative to the average earnings of employed M-group workers as transparency increases, and in the limiting case of $\Omega = 1$, wages are completely equalized across groups.

[12] Di Addario et al. (2022) empirically find that employers do not tailor wage offers to workers based on outside option. Corollary 2 considers the situation in which the outside options of M-group workers first order stochastically dominate those of W-group workers. In this case, a wage gap exists across groups when $\Lambda P < 1$ and $k < 1$, due to the "ask gap" between the two groups: M-group workers will typically offer higher initial wages than W-group workers due to the distributions of outside options. Such an "ask gap" between men and women has been documented empirically in Roussille (2021).

This result follows when $G_M(\cdot)$ first-order stochastically dominates $G_W(\cdot)$ because it is possible to pair up every W-group worker with an M-group worker with a higher outside option; let $\mu:[0,1]\to[0,1]$ specify for each W-group worker i an M-group worker j such that $\theta_j \geq \theta_i$ and $\mu(\theta_i)\neq\mu(\theta_{i'})$ for any $i\neq i'$. The remainder of the argument follows from Theorem 4.

D.4. Superstar Firms

We expect different effects of transparency when a firm's value is higher than the outside options of all workers; due to its value, the firm optimally chooses a ceiling wage that allows it to hire all workers. Hence transparency raises the wages of low-outside option workers, rather than to push the ceiling wage for everyone down. In other words, the demand effect no longer plays a role in the bargaining outcome.

Theoretically, we investigate the effect of a move from full secrecy ($\Omega=0$) to full transparency ($\Omega=1$) on a "superstar" firm with value $v>1$. Workers' outside options continue to be drawn on a distribution with support [0,1] while a superstar firm has value $v>1$. Moreover, workers' beliefs about the firm's value are misspecified, and they continue to believe $v\sim F[0,1]$. As before, workers successfully renegotiate to the highest wage they observe at the firm in equilibrium.

In contrast to Theorem 3, transparency has a clear, non-positive effect on employment for a superstar firm. When $\Omega=0$ the firm hires all workers, but the firm may set $\bar{w}<1$ when $\Omega=1$ to avoid information spillovers. From Equation 5, $\bar{w}$ is non-decreasing in v when $\Omega=1$, so the difference in hiring between privacy and transparency is shrinking in v.

Proposition **9.** *A superstar firm hires fewer workers in equilibrium when $\Omega=1$ than when $\Omega=0$. Moreover, the ex-post hiring rate is supermodular in $v>1$ and Ω.*

This supermodularity stands in contrast to the submodular impact of transparency and v on hiring for a non-superstar firm (Theorem 3).

Transparency can also increase wages and decrease profits for a superstar firm. The demand effect dominates in this case: transparency equalizes the pay of all workers to that of the highest wage worker, increasing average wages and decreasing profits.

Proposition **10.** *Profits (average wages) are submodular (supermodular) in v and Ω for a superstar firm. There exists $v^*\geq 1$ such that profits are lower and wages are higher when $\Omega=1$ than when $\Omega=0$ for all $v>v^*$.*

To understand this result, consider the increase in profit for a private firm as its value increases from $v>1$ to $v+\Delta$ for some small $\Delta>0$. Since $v>1$, it hires all workers when its value is v and $v+\Delta$, so its profits increase by Δ per worker. That is, the firm's profit increases by $\Delta G(1)=\Delta$. The same exercise for a transparent firm yields an increase in profit of approximately $\Delta\cdot G(\bar{w})$. This is because the profit is $(v-\bar{w})G(\bar{w})$ and the derivative with respect to v is $G(\bar{w})$ by the envelope theorem. Because $G(\bar{w})\leq 1$, the profit of a superstar firm grows more slowly in v under transparency. We complete the argument by noting that the supermodularity of employment in transparency and $v>1$ implies that the employment effect of transparency becomes small for sufficiently large v. Therefore, the highest wage paid under transparency and privacy are approximately equal for sufficiently large v. Under secrecy this implies that average wages are bounded away from 1 for all v whereas under transparency they converge to 1 as v grows large.

D.5. Continuous time model

In this section we study a continuous time version of our model, in which transparency is measured by an arrival rate of peer wage information. In this model, we allow for the possibility that workers can renegotiate wages prior to observing the wages of peers. This model predicts the same effects of transparency as in our base model (Theorems 2-4), even in the case that workers can renegotiate their pay prior to observing peer wages.

Time is continuous, and is indexed by $t \in \mathbb{R}_+$. There is a single firm in the economy, and a unit measure of workers I. Each worker $i \in I$ has a private outside option $\theta_i \overset{iid}{\sim} G[0,1]$, which is the flow payment i receives when unemployed.[13] The firm has a constant-returns-to-scale production function; the flow productivity of labor is common across all workers, $v \sim F[0,1]$, and is known only to the firm. All agents exponentially discount the future at rate δ, are risk neutral, and seek to maximize discounted expected flow payments. We assume that F and G are twice continuously differentiable with densities f and g, respectively. We also assume agents have strictly increasing virtual reservation values, i.e. $\theta + \frac{G(\theta)}{g(\theta)}$ is strictly increasing in θ and $v - \frac{1-F(v)}{f(v)}$ is strictly increasing in v.

Before any workers arrive, the firm selects a maximum wage it is willing to pay $\bar{w}(v) \in [0,1]$. $\bar{w}$ is not immediately observed by workers. An initial round of bargaining takes place at $t=0$. Each worker i makes offer $\underline{w}_{i,0}(\theta_i) \in [0,1]$. As in a double auction (Chatterjee and Samuelson, 1983), i is employed if and only if $w_{i,0} \leq \bar{w}$. If hired, i receives flow wage $w_{i,0}$ until wage renegotiation, where $w_{i,0}$ is a random variable that equals $\underline{w}_{i,0}$ with probability $1-k$ and equals $\bar{w}$ with probability k (independently across workers), where $k \in [0,1]$ is the known "bargaining weight" of the firm. If $w_{i,0} > \bar{w}$, then i is permanently unmatched from the firm, and she receives flow payments equal to her outside option θ_i.

We model transparency as the (stochastic) arrival of information about current wages. At time $t \geq 0$ each matched worker observes the set of wages the firm pays to employed workers, $\{w_{i,t}\}_{i \in I_t}$, where I_t represents the set of workers employed at time t, according to an independent Poisson arrival process with (commonly known) rate $\lambda \in [0,\infty) \cup \{\infty\}$, where we take $\lambda = \infty$ to mean that the process arrives at every time t. For convenience, we assume that $\{w_{i,0}\}_{i \in I_0} = \{\bar{w}\}$.[14] Therefore, higher λ corresponds to more transparency.

Renegotiation opportunities also arrive to each worker i independently according to a known arrival process. To capture that that observing peer wages can "speed up" wage renegotiations following empirical evidence from Biasi and Sarsons (2021) and Cullen and Pakzad-Hurson (2022), the arrival rate of negotiation opportunities for each worker i is $\rho_1 \in [0,\infty)$ prior to the first arrival of peer wage information, and $\rho_2 \in [\rho_1,\infty]$ thereafter. Each worker i and the firm renegotiate i's wage using the same bargaining protocol in any time period t: i submits a new offer $\underline{w}_{i,t}$ and she

[13] There is a known measurability issue with the assumption of a continuum of i.i.d. random variables (Judd, 1985). A solution is to assume that worker outside options are drawn "almost" i.i.d. in the sense of Sun (2006). This solves the measureability issue and has the intuitive and intended property that the distribution of realized outside options is given by the same function $G(\cdot)$.

[14] Without this assumption, all workers under full transparency (and a measure zero set of workers for any $\lambda > 0$) face an openness issue of wanting to renegotiate wages at the earliest time $t > 0$. It is possible to deal with this issue as in Simon and Stinchcombe (1989): suppose workers can only renegotiate every $\frac{1}{N}$ periods, $N > 1$. Define a worker's payoff in continuous time as the limiting value as $N \to \infty$. Using this definition, even if a worker observes nothing at $t=0$, her payoff under full transparency is equivalent to the case in which she receives a wage of $\bar{w}$ for all $t \geq 0$. For ease of notation, we continue with the simplifying, if unrealistic, assumption that $\{w_{i,0}\}_{i \in I_0} = \{\bar{w}\}$.

remains employed if $\underline{w}_{i,t} \leq \bar{w}$. If employed, i receives flow wage $w_{i,t}$ until wage renegotiation, where $w_{i,t}$ is a random variable that equals $\underline{w}_{i,t}$ with probability $1-k$ and equals $\bar{w}$ with probability k.

The timing of the stage game is as follows for every worker i who has not yet been permanently unmatched from the firm: First, at each time $t \geq 0$ worker i learns $\{w_{i,t}\}_{i \in I_t}$ independently with arrival rate λ. Second, (re)negotiation opportunities arrive: if $t=0$ each worker negotiates with the firm, or if $t>0$ a renegotiation opportunity arrives at rate ρ_1 if the worker has not observed $\{w_{i,t'}\}_{i \in I_{t'}}$ for any $t' \leq t$ and ρ_2 if the worker has observed $\{w_{i,t'}\}_{i \in I_{t'}}$ for any $t' \leq t$.

We investigate pure strategy perfect Bayesian equilibria (PBE) of the game. Throughout, we write w_i^* to represent worker i's equilibrium wage offer at $t=0$ assuming that she has not observed $\{w_{i,0}\}_{i \in I_0}$. As in our two period model, we restrict our attention to equilibria satisfying the following conditions:

A1' $0 \leq \bar{w} \leq v$ for all v. If $v \leq w_i^*$ for every worker i according to equilibrium strategies then $\bar{w} = v$.

A2' $\theta_i \leq w_i^* \leq 1$ for all i. If there is no v such that $\theta_i \leq \bar{w}$ according equilibrium strategies then $w_i^* = \theta_i$.

A3' $\bar{w}$ and w_i^* are strictly increasing functions of v and θ_i, respectively. Moreover, $\bar{w}$ is continuously differentiable for $v \in (w_i^*(0),1)$ and $w_i^*(0)$ is continuously differentiable for $\theta \in (0,\bar{w}(1))$.

There always exists an equilibrium of the game satisfying **A1'-3'**. Each worker will earn $\bar{w}$ in any wage renegotiation after observing peer wages, as before. We additionally show that at any time $t>0$ at which a worker renegotiates prior to observing peer wages, she offers $\underline{w}_{i,t} = \underline{w}_{i,0}$.

PROPOSITION **11.** *The set of equilibria is non-empty. In any equilibrium, each worker i offers $\underline{w}_{i,0}$ in any negotiation if she has neither received $\bar{w}$ in a previous negotiation nor observed the wages of peers. Thereafter, she offers (and receives) $\bar{w}$.*

Proof of Proposition 11 It remains to show that each worker will offer a fixed wage following any history in which she neither observes peer wages nor receives $\bar{w}$ in a previous negotiation. Towards a contradiction, suppose there is (for some worker i) an optimal function that maps histories into offers which is non-constant: there exists $w(\cdot)$ mapping histories h_t into [0,1] which is nondecreasing and satisfies $w(h_t) < w(h'_{t'})$ for some $h_t \subset h'_{t'}$. By the stationarity of the arrival processes in any relevant history, it is without loss of optimality to assume that the worker offers a strictly higher wage during her first renegotiation than during her initial negotiation. We will denote this offer $\underline{w}_i^1 > \underline{w}_{i,0}$, and we similarly define $\underline{w}_i^2, \underline{w}_i^3$.... Therefore, the wage function $w(\cdot)$ is characterized by $\underline{w}_{i,0}, \underline{w}_i^1, w_i^2$,,....

Let $u(1)$ represent the additional expected discounted utility (at the time of renegotiation) that i receives by following $w(\cdot)$ as opposed to alternative plan $w'(\cdot)$ which dictates that i offers $\underline{w}_{i,0}$ until she receives or observes $\bar{w}$ and offers $\bar{w}$ thereafter. By the equilibrium hypothesis it must be that $u(1) \geq 0$.

Suppose for contradiction that $u(1) > 0$. We claim this implies i improves her equilibrium discounted expected payoff at $t=0$ by altering $w(\cdot)$ to $w''(\cdot)$ such that her initial offer is $\underline{w}_i^1$, her first renegotiation offer is $\underline{w}_i^2$, and so on. To see this, note that since $u(1) > 0$ it must be that i's time 0 discounted utility according to $w(\cdot)$ is nonincreasing in the time of the first renegotiation. But as the time of the first renegotiation approaches 0, i's expected utility under $w(\cdot)$ converges to that under $w''(\cdot)$. Contradiction.

Therefore, it must be that $u(1)=0$. By induction, it must be that i is indifferent between following $w(\cdot)$ and $w'(\cdot)$. Similarly, it must be that i is indifferent between following $w''(\cdot)$ and $w'''(\cdot)$, where $w'''(\cdot)$ dictates that i offers $\underline{w}_i^1$ until she receives or observes $\bar{w}$ and offers $\bar{w}$ thereafter. Therefore, it must be that i is indifferent between $w'(\cdot)$ and $w'''(\cdot)$ which both offer a constant wage before receiving or observing $\bar{w}$. Our proof is complete if we show that there cannot be multiple utility maximizing "constant" wage offers.

To show this, let $\bar{F}(x)=Pr(\bar{w}\leq x)$, for all $\lambda<\infty$. For any equilibrium wage plan that offers a constant wage prior to receiving or observing $\bar{w}$, any worker $i\in I$ negotiates at time $t=0$ to solve:

$$w_i^*\in\underset{w}{\operatorname{argmax}}\left(\frac{k\mathbb{E}(\bar{w}|\bar{w}\geq w)}{\delta}+\frac{1-k}{\delta+\lambda+k\rho_1}\left[w+k\rho_1\frac{\mathbb{E}(\bar{w}|\bar{w}\geq w)}{\delta}+\frac{\lambda}{\delta+\rho_2}\left(w+\rho_2\frac{\mathbb{E}(\bar{w}|\bar{w}\geq w)}{\delta}\right)\right]\right)(1-\bar{F}(w))+\frac{\theta_i}{\delta}\bar{F}(w) \tag{32}$$

where the first term represents the expected discounted wage the worker receives, given the arrival rate of information, if matched with the firm: she receives a convex combination of w_i and $\bar{w}$ until the transparency process arrives, at which time she renegotiates her wage to $\bar{w}$. The second term represents the discounted earnings of the worker if she exceeds $\bar{w}$ and instead consumes her outside option. When $\lambda=\infty$, the pricing scheme is a posted price in which all workers elect to either make an offer $\underline{w}_{i,0}=\bar{w}$ or unmatch with the firm.

In a series of steps, we modify the objective function without affecting the maximizer. For $\lambda\in[0,\infty)$

$$\begin{aligned}
&w_i^*\in\underset{w}{\operatorname{argmax}}\left(\tfrac{k\cdot\mathbb{E}(\bar{w}|\bar{w}\geq w)}{\delta}+\tfrac{1-k}{\delta+\lambda+k\rho_1}\left[w+k\rho_1\tfrac{\mathbb{E}(\bar{w}|\bar{w}\geq w)}{\delta}+\tfrac{\lambda}{\delta+\rho_2}\left(w+\rho_2\tfrac{\mathbb{E}(\bar{w}|\bar{w}\geq w)}{\delta}\right)\right]\right)(1-\bar{F}(w))+\tfrac{\theta_i}{\delta}\bar{F}(w)\\
\Longleftrightarrow &w_i^*\in\underset{w}{\operatorname{argmax}}\left(k\mathbb{E}(\bar{w}|\bar{w}\geq w)+\tfrac{1-k}{\delta+\lambda+k\rho_1}\left[\delta w+k\rho_1\mathbb{E}(\bar{w}|\bar{w}\geq w)+\tfrac{\lambda}{\delta+\rho_2}(\delta w+\rho_2\mathbb{E}(\bar{w}|\bar{w}\geq w))\right]\right)(1-\bar{F}(w))+\theta_i\bar{F}(w)\\
\Longleftrightarrow &w_i^*\in\underset{w}{\operatorname{argmax}}\left(k\mathbb{E}(\bar{w}|\bar{w}\geq w)+\tfrac{1-k}{\delta+\lambda+k\rho_1}\left[\delta w+k\rho_1\mathbb{E}(\bar{w}|\bar{w}\geq w)+\tfrac{\lambda}{\delta+\rho_2}(\delta w+\rho_2\mathbb{E}(\bar{w}|\bar{w}\geq w))\right]-\theta_i\right)(1-\bar{F}(w))\\
\Longleftrightarrow &w_i^*\in\underset{w}{\operatorname{argmax}}\left(w(1-k)\left[\tfrac{\delta}{\delta+\lambda+k\rho_1}+\tfrac{\lambda}{\delta+\lambda+k\rho_1}\tfrac{\delta}{\delta+\rho_2}\right]+\mathbb{E}(\bar{w}|\bar{w}\geq w)\left[k+(1-k)\left(\tfrac{k\rho_1}{\delta+\lambda+k\rho_1}+\tfrac{\lambda}{\delta+\lambda+k\rho_1}\tfrac{\rho_2}{\delta+\rho_2}\right)\right]-\theta_i\right)(1-\bar{F}(w))\\
\Longleftrightarrow &w_i^*\in\underset{w}{\operatorname{argmax}}((1-\Omega')w+\Omega'\mathbb{E}(\bar{w}|\bar{w}\geq w)-\theta_i)(1-\bar{F}(w))\\
\Longleftrightarrow &w_i^*\in\underset{w}{\operatorname{argmax}}\int_w^1((1-\Omega')w+\Omega'x-\theta_i)\bar{f}(x)dx
\end{aligned} \tag{33}$$

where $\Omega'=k+(1-k)\left(\frac{k\rho_1}{\delta+\lambda+k\rho_1}+\frac{\lambda}{\delta+\lambda+k\rho_1}\frac{\rho_2}{\delta+\rho_2}\right)$. Note that the algebraic steps and the final form mirror those in Equation 12. Similarly, letting $\bar{G}(x)=P(\underline{w}_{i,1}\leq x)$, it is the case that for any $\lambda\in[0,\infty)$ the firm solves:

$$\bar{w}\in\underset{w}{\operatorname{argmax}}\int_0^w(v-(\Omega'w+(1-\Omega')y))\bar{g}(y)dy \tag{34}$$

The rest of the proof follows from the Proof of Proposition 1. ■

We now show how we can parameterize an equivalent equilibrium to that in our two period model. In what follows, it is helpful to write $\Omega'=k+(1-k)\Psi$ where $\Psi=\frac{k\rho_1}{\delta+\lambda+k\rho_1}+\frac{\lambda}{\delta+\lambda+k\rho_1}\frac{\rho_2}{\delta+\rho_2}$. Therefore, $1-\Omega'=(1-k)(1-\Psi)$ and $1-\Psi=\frac{\delta}{\delta+\lambda+k\rho_1}+\frac{\lambda}{\delta+\lambda+k\rho_1}\frac{\delta}{\delta+\rho_2}$.

If $\rho_1=0$ then $\Omega'=k+(1-k)\left(\frac{\lambda}{\delta+\lambda}\frac{\rho_2}{\delta+\rho_2}\right)$. Therefore, denoting $\Lambda':=\frac{\lambda}{\delta+\lambda}$ and $P':=\frac{\rho_2}{\delta+\rho_2}$ implies that $\Omega'=k+(1-k)\Lambda'P'$ as in the two period model.

To finish showing that our main results extend to this new model, we discuss how increasing k, λ, ρ_1, and ρ_2 affect Ω'. The following result shows that these affect Ω' in the same ways that k, Λ, and P affect Ω in our two period model.

THEOREM **5.** *Ω' is increasing in k,λ, ρ_1, and ρ_2. Ω' is submodular in k and λ, submodular in k and ρ_2, and supermodular in λ and ρ_2.*

Proof of Theorem 5

- Ω' is strictly increasing in k for $\lambda<\infty$ (for otherwise $\Omega'=1$). It suffices to show that $1-\Omega'=(1-k)(1-\Psi)$ is strictly decreasing in k. $\frac{\partial(1-\Omega')}{\partial k}\overset{sign}{=}\frac{\partial}{\partial k}\frac{1-k}{\delta+\lambda+k\rho_1}\overset{sign}{=}-(\delta+\lambda+k\rho_1)-(1-k)\rho_1<0$ where the inequality follows because $\delta>0$, $k\in[0,1]$, and λ, $\rho_1\geq 0$ by assumption.

- Ω' is strictly increasing in λ for $k<1$ (for otherwise $\Omega'=1$): It suffices to show that $1-\Psi=\frac{\delta}{\delta+\lambda+k\rho_1}\frac{\delta+\rho_2}{\delta+\rho_2}+\frac{\lambda}{\delta+\lambda+k\rho_1}\frac{\delta}{\delta+\rho_2}$ is strictly decreasing in λ. $\frac{\partial(1-\Psi)}{\partial\lambda}\overset{sign}{=}(\delta+\lambda+k\rho_1)(\delta+\rho_2)\delta-\delta(\delta+\rho_2+\lambda)(\delta+\rho_2)=k\rho_1-\rho_2<0$ where the inequality follows because $k<1$ (since $\Omega'<1$) and $\rho_1\leq\rho_2$ by assumption.

- Ω' is strictly increasing in ρ_1 for $k\in(0,1)$ and $\lambda<\infty$ (for otherwise $\Omega'=1$, or renegotiations before observing peer wages have no effect on a worker's own wage). It suffices to show that $1-\Psi=\frac{\delta}{\delta+\lambda+k\rho_1}\frac{\delta+\rho_2}{\delta+\rho_2}+\frac{\lambda}{\delta+\lambda+k\rho_1}\frac{\delta}{\delta+\rho_2}$ is strictly decreasing in ρ_1. $\frac{\partial(1-\Psi)}{\partial\rho_1}\overset{sign}{=}-\delta\,(\delta+\rho_2+\lambda)\,k(\delta+\rho_2)\delta<0$ where the inequality follows because $k\in(0,1)$ (since $\Omega'<1$), and all other parameters are weakly positive and $\delta>0$.

- Ω' is strictly increasing in ρ_2 for $k<1$ (for otherwise $\Omega'=1$) and $\lambda>0$ (for otherwise wage information never arrives). It suffices to show that $1-\Psi=\frac{\delta}{\delta+\lambda+k\rho_1}\frac{\delta+\rho_2}{\delta+\rho_2}+\frac{\lambda}{\delta+\lambda+k\rho_1}\frac{\delta}{\delta+\rho_2}$ is strictly decreasing in ρ_2. $\frac{\partial(1-\Psi)}{\partial\rho_2}\overset{sign}{=}-\delta(\delta+\lambda+k\rho_1)(\delta+\rho_2)\delta-\delta(\delta+\rho_2+\lambda)(\delta+\lambda+k\rho_1)=-\lambda<0$ where the inequality follows because $\lambda>0$ by assumption.

- Ω' is submodular in k and λ. We show that $1-\Omega'$ is supermodular in k and λ. $\frac{\partial(1-\Omega')}{\partial\lambda}=\frac{\delta}{\delta+\rho_2}\frac{(1-k)(k\rho_1-\rho_2)}{(\delta+\lambda+k\rho_1)^2}$. Therefore, $\frac{\partial^2(1-\Omega')}{\partial\lambda\partial k}\overset{sign}{=}(\delta+\lambda+k\rho_1)(\rho_1-2k\rho_1+\rho_2)-2(1-k)(k\rho_1-\rho_2)\rho_1$. To see that this is positive, note that both terms are positive because $k\leq 1$ and $\rho_1\leq\rho_2$ (with the inequality strict for $k<1$).

- Ω' is supermodular in ρ_2 and λ. We show that $1-\Omega'$ is subrmodular in ρ_2 and λ. $\frac{\partial(1-\Omega')}{\partial\lambda}=\frac{\delta}{\delta+\rho_2}\frac{(1-k)(k\rho_1-\rho_2)}{(\delta+\lambda+k\rho_1)^2}$. Therefore, $\frac{\partial^2(1-\Omega')}{\partial\lambda\partial\rho_2}\overset{sign}{=}-(\delta+\rho_2)-(k\rho_1-\rho_2)=-\delta-k\rho_1<0$.

- Ω' is submodular in ρ_2 and k. We show that $1-\Omega'$ is supermodular in ρ_2 and k. $\frac{\partial(1-\Omega')}{\partial k}=\frac{\delta(\delta+\rho_2+\lambda)}{\delta+\rho_2}\frac{-(\delta+\lambda+k\rho_1)-(1-k)\rho_1}{(\delta+\lambda+k\rho_1)^2}$. Therefore, $\frac{\partial^2(1-\Omega')}{\partial k\partial\rho_2}\overset{sign}{=}-\frac{\partial}{\partial\rho_2}\frac{\delta+\rho_2+\lambda}{\delta+\rho_2}\overset{sign}{=}\lambda\geq 0$. ■

Finally, we note that if we change the model by requiring a common rate of renegotiation $\rho:=\rho_1=\rho_2$, our conclusions above still hold, i.e. Ω' is increasing in ρ, supermodular in ρ and λ, and submodular in ρ and k.

D.6. Multiple firms

We embed our analysis of pay transparency into a search model by including multiple firms, and show that many of the insights of our continuous time model carry over to this setting. For tractability, we study only the cases of full privacy ($\lambda=0$ and $k=0$) and full transparency ($\lambda=\infty$). Let $\mathcal{N}=\{1,2,...,N\}$ be the set of firms, each with a value for labor v^n drawn iid from distribution F. As before, workers have outside options drawn iid from distribution G. Workers negotiate with firms in a predetermined order without the possibility of returning to an earlier firm. Without loss of generality, we assume that workers first meet with firm 1, then firm 2, and so on.

If a firm rejects a worker's offer the two are ineligible to match at any point in the future, and the worker (instantly) moves to the next firm in the sequence. Although we do not do so for simplicity of exposition, it is possible to embed a search friction in this formulation without affecting the qualitative findings.[15] A worker whose offer is rejected by firm N becomes persistently unemployed and consumes her outside option. A worker whose offer is accepted by firm $n<N$ is replaced with a worker of identical outside option who moves on to firm $n+1$ as if her offer had been rejected at firm n.[16]

Each firm n selects a maximum wage it is willing to pay for a worker $\bar{w}^n(v^n)\in[0,1]$, where the choice of $\bar{w}^n$ is not immediately observed by workers. As before, each worker i bargains for wages by making wage offers $w_{i,t,n}$ to firm n when she first arrives, or upon the arrival of a renegotiation opportunity at rates ρ_1 and ρ_2, depending on whether the worker has observed the wages at her current firm. Workers who at any time offer a wage greater than $\bar{w}^n$ to firm n are permanently unmatched with the firm. If worker i offers $w_{i,t,n}\leq\bar{w}^n$ then i's flow wage until renegotiating is $k\bar{w}^n+(1-k)w_{i,t,n}$. Let W_t^n denote the set of wages firm n is paying to its employed workers, where $W_0^n=\{\bar{w}^n\}$.

We model transparency as a random arrival process; at time t, workers matched to firm n observe W_t^n according to an independent Poisson arrival process with rate $\lambda\in\{0,\infty\}$, where we take $\lambda=\infty$ to mean that the process arrives whenever a worker first matches with a firm, and at every instant while she is employed. The timing of the stage game is as follows:

1. ***t*=0, Entry:** Initialize $m=1$, and $\ell_i=1$ for each worker i.
2. ***t*≥0, Search and Bargaining:**
   (a) Unmatched workers match to firm m if $\ell_i=m$.
   (b) Each worker i matched to firm m learns W_t^m independently with arrival rate λ.
   (c) Newly entering workers must bargain with the firm and any existing, matched worker i renegotiates with arrival rate ρ_ℓ, $\ell\in\{1,2\}$, depending on whether or not she has previously observed wages at firm m.
   (d) For any i such that $w_{i,t}^m>\bar{w}^m$ increase ℓ_i by 1.
   (e) If $m<N$, for all i such that $w_{i,t}^m\leq\bar{w}^m$, create a new worker j with $\theta_j=\theta_i$ and $\ell_j=\ell_i+1$, increase m by 1 and repeat Step 2.

We work backward to solve for the unique equilibrium. Workers meeting firm N face the same decision as workers in the base model: they face a firm with value v^N drawn from distribution F

[15] Each time a worker's offer is rejected, we could instead make the worker unable to meet with subsequent firms with positive probability. Including such a search friction does not meaningfully change the remaining analysis.

[16] This "cloning" assumption is made for tractability, and it is frequently adopted in the search literature (see, for example, Burdett and Coles (1999), Bloch and Ryder (2000), and Chade (2006)).

and are among an incoming cohort with outside options determined by distribution G. Denote by $\theta_i^{n,\lambda}$ the expected equilibrium lifetime utility (under transparency level λ) of a worker with outside option θ_i immediately upon matching with firm n (before making an offer or learning wages through the transparency process), and denote by $G^{n,\lambda}$ the distribution of $\theta_i^{n,\lambda}$. Then, when negotiating with firm $N-1$, workers face the same decision but with θ_i replaced with $\theta_i^{N,\lambda}$, and firm $N-1$ will face the same decision as firm N but with distribution G replaced with $G^{N,\lambda}$. Inducting backward toward the first firm, we can characterize the equilibrium actions of agents as the following for $n \leq N$:

$$\begin{array}{lll} \text{Workers} & \lambda=0,\ k=0: & w_i^n - \theta_i^{n+1,0} = \frac{1-F(w_i^n)}{f(w_i^n)} \\ \text{Firms} & \lambda=0,\ k=0: & v^n = \bar{w}^n \\ \text{Workers} & \lambda=\infty: & w_i^n = \bar{w}^n \mathbf{1}_{\{\bar{w}^n \geq \theta_i^{n+1,\infty}\}} \\ \text{Firms} & \lambda=\infty: & v^n - \bar{w}^n = \frac{G^{n+1,0}(\bar{w}^n)}{g^{n+1,0}(\bar{w}^n)} \end{array} \tag{35}$$

As θ_i is constant over time, $\theta_i^{\cdot,\lambda}$ is a non-increasing sequence, and strictly decreasing for workers with $\theta_i < 1$. Therefore, $\frac{G^{\cdot,\lambda}}{g^{\cdot,\lambda}}(x)$ is non-increasing in n. In other words, workers' outside options, which include the option value of bargaining with future firms, decreases as they move along the sequence of firms. Realizing this, under full transparency, earlier firms accept higher wages to incentivize workers to accept their offers rather than wait to meet future firms. We now provide results that are similar to the theorems in the main text.

PROPOSITION **12.** *The expected average utility of workers is higher in equilibrium with $\lambda=0$, $k=0$ than $\lambda=\infty$. The expected utility of firms is higher in equilibrium with $\lambda=\infty$ than $\lambda=0$, $k=0$.*

Proof of Proposition 12: We prove this result for workers, and the converse for firms is similar. As before, the expected utility of any worker who reaches firm N is higher under $\lambda=0$, $k=0$ than $\lambda=\infty$. Therefore, $\theta_i^{N,0} > \theta_i^{N,\infty}$ for all θ_i. When meeting firm $N-1$, worker θ_i is in expectation better off under full privacy, for two reasons. First, by the same logic as before, she is able to make a TIOLI offer rather than receive it. Second, her outside option is higher, i.e. $\theta_i^{N,0} > \theta_i^{N,\infty}$, implying that for any bid that she places, she is weakly better off. By induction, worker i is better off at every firm she meets under full privacy. ■

The proof of the following result is omitted, as the logic follows from our previous analysis.

PROPOSITION **13.** *When $\lambda=\infty$ there is no wage dispersion between workers at the same firm in equilibrium. The ex-post employment maximizing level of transparency is weakly decreasing in v. When each firm can select $\lambda \in \{0,\infty\}$ as a function of v there is an essentially unique equilibrium outcome. In equilibrium, each firm selects $\lambda=\infty$ for all $v>0$.*

One additional consideration is whether wages are transparent to workers outside the firm. If the arrival process revealed the wages of *all* workers in the market then the results would change depending on whether or not there is a search friction, defined as a probability $\zeta \in (0,1)$ of a worker being unable to meet with subsequent firms after a wage-offer rejection.

Suppose $(v_1,...,v_N)$ is known to all firms before they (simultaneously) set their maximum acceptable wages. With no search friction ($\zeta=0$), firms under transparency will effectively Bertrand compete for workers. In equilibrium, all employed workers will seek out the highest value firm and receive pay $w^* = \max\{v_{(2)}, \bar{w}(v_{(1)})\}$–either the value of the second highest firm, or the equilibrium wage the firm would pay if it had value $v_{(1)}$ in the base game. Workers with outside options higher than this value will remain unemployed. With a search friction $\zeta \in (0,1)$, firms which do not have the highest value set higher wages $\bar{w}$ to disincentivize workers from targeting higher-value firms. In the extreme case of $\zeta = 1$, no worker will ever leave a profitable employment opportunity to seek out a higher wage elsewhere, and so the model collapses to the base model we study in the main body of the paper.

D.7. Dynamic effects of increases in transparency

We extend our model to discuss the effects of unanticipated transparency legislation that occurs after the onset of the game. This model sheds lights on the transition of wages and employment levels to a new steady state, and we document the potentially heterogeneous impacts on workers who are hired before and after the enactment of transparency legislation. As the questions of interest deal with dynamics, we study these issues in a continuous time model. A key reason for the heterogeneous impact is that we do not allow nominal wages for existing workers to fall, following the seminal finding of Bewley (1999). If there is typically nominal wage growth due to inflation, the rate at which the firm can decrease real wages of existing workers is equal to the rate of inflation, that is, the firm can fix nominal wages, thus reducing real wages.[17]

The model is a variant of our continuous time model in Section D.5. We formalize this variant of our continuous time model via the following timing of the stage game for each period $t \geq 0$:

- First, at every time period each worker departs exogenously at rate γ.
- Second, at each integer time period $t = 0,1,2,...$, the outside option of each remaining worker i, $\theta_{i,t}$, and the value of the firm, v_t, increase by some known constant $\Delta > 0$. We will refer to Δ as the steady state rate of nominal wage growth.
- Third, at each integer time period $t = 0,1,2,...$, a unit measure of new workers enters the market. Each incoming worker has an outside option drawn from a distribution G_t, where $G_t(x + t \cdot \Delta) = G(x)$ for all $x \geq 0$. That is, outside options are "shifted up" by Δ for each new cohort.
- Fourth, at each integer time period $t = 0,1,2,...$, the firm sets maximum wages. The maximum wage for $\bar{w}_{t,t'}$ depends on both the time period t and the entry date of the worker, t'. This captures that the firm can differentially negotiate with workers of different seniority levels if it so chooses. We assume that $\bar{w}_{t,t'} \geq \sup_{\tau \leq t} w_{i,\tau}$ for any worker i entering in any time period $t' < t$, that is, the firm cannot reduce the nominal wages it pays to any existing worker.
- Fifth, each worker independently observes the wages of existing workers at rate λ.[18]
- Sixth, at each integer time period $t = 0,1,2,...$, every active worker i bargains with the firm. At non-integer time periods, each worker independently bargains with the firm at rate ρ_1 or ρ_2, depending on previous observation of peer wages. Bargaining occurs as in our base model (with some known k): without observing $\bar{w}_{t,t'}$ for any t,t', i offers $\underline{w}_{t,i}$.[19] The resulting flow

[17] That inflation presents a mechanism by which real, but not nominal, wages can be reduced has been recently studied by Kaur (2019).

[18] As before, the zero measure set of workers who observe wages at period $t = 0$ for any $\lambda < \infty$ directly observe $\bar{w}_{0,0}$.

[19] With the exception of the zero measure set of workers who observe wages at $t = 0$.

wage is denoted $w_{i,t}$ for any employed worker i, while each unemployed worker i receives flow payoff $\theta_{i,t}$.

All other aspects of the model are as in our standard continuous time model.[20] We will refer to the real wage of a worker i at time t as $w_{i,t}-\Delta\lfloor t\rfloor$, and the nominal wage as $w_{i,t}$.

We investigate stationary equilibria in which the real wages of top earners do not change prior to a change in λ: for any integer t,t',t'' such that $t',t''\leq t$ the firm sets $\bar{w}_{t,t'}=\bar{w}_{t,t''}=\bar{w}_{0,0}+t\Delta$. Due to the construction of G_t, such a stationary equilibrium clearly exists following the same logic as our base model prior to a change in transparency, and the firm sets the same maximum wage at time t for all previous cohorts. We therefore simplify notation and simply refer to the maximum wage paid at time t as $\bar{w}_{I,t}$. Almost every existing employed worker will offer $\sup_{t'\leq t} w_{i,t'}+\Delta$. This is because the distributions of "real" worker outside options and firm values are constant across cohorts. Therefore, excepting workers who receive the maximum wage in renegotiation at integer time t for the first time (which occurs for $1-k$ fraction of workers who are receiving wage strictly less than $\bar{w}_{A,t-1}$ prior to integer time t) and workers who observe peer wages at integer time t for the first time (which occurs for a zero measure of workers when $\lambda<\infty$), nominal wages, but not real wages, increase by Δ for each worker i. There is some highest outside option worker employed at $t=0$, $\bar{\theta}_{0,0}$, and therefore the highest "real" outside option worker employed at any time t is $\bar{\theta}:=\bar{\theta}_{0,0}+\lfloor t\rfloor\Delta$.

Now, suppose that transparency unexpectedly increases at some integer time T prior to the departure of existing workers (i.e. prior to the beginning of the stage game). For simplicity, we assume that the market moves from some initial level of transparency $\lambda_A<\infty$ to $\lambda_P=\infty$–the forces will be similar for a move to a higher level of partial transparency, but exact calculations become cumbersome. We refer to workers employed at the firm prior to time T as *ex-ante workers* and those entering at $t\geq T$ as *ex-post workers*. At any time $t\geq T,t'$ all active workers know $\bar{w}_{t,t'}$ in equilibrium.[21] [22]

As the firm's maximum wage for each cohort changes, so too does the employment level in a predictable way: due to full transparency, each worker will (continue to) match with the firm if and only if her outside option does not exceed the maximum wage the firm is willing to pay her. Therefore, we track the changes in the firm's maximum value for ex-ante and ex-post workers at each time $t\geq T$. We continue to denote the former by $\bar{w}_{A,t}$ and denote the latter by $\bar{w}_{P,t}$ for entrants. Two forces result in potentially different wages for ex-ante and ex-post workers. In the short run (i.e. for t slightly greater than T), downward nominal wage rigidity can lead to $\bar{w}_{A,t}>\bar{w}_{P,t}$ as the firm may not be able to immediately adjust the wages of ex-ante workers to the new steady state level. Second, ex-ante workers have outside options that are (weakly) first-order stochastically dominated by new entrants; only those with outside options below $\bar{\theta}$ are employed prior to time T, so the distribution of outside options for ex-ante workers is truncated from the

[20]The formulation of Ω' will change in the following ways: δ will be replaced by $\delta'=\delta+\gamma$ and ρ_1 will increase by 1 to accommodate the additional bargaining opportunities during integer times.

[21]Recall that in our base model we assume that under full transparency all workers who observe peer wages observe $\bar{w}$ at $t=0$. Even if this is not the case for $t>0$, workers will deduce $\bar{w}_{t,t'}$ for all $t',T\leq t$ in equilibrium because observing $\bar{w}_{T,t'}$ reveals v_t.

[22]As we will shortly discuss, the change in transparency will induce the firm to alter its maximum wage. To account for separations and rehiring of workers across the labor market (i.e. workers leaving other unmodeled firms), we could allow workers who failed to reach a wage agreement with the firm at any time $t'<T$ (i.e. who is consuming her outside option at time t) to rematch with the firm at any time $t\geq T$ as an ex-post worker, following the same bargaining protocol. Our qualitative findings would not change.

top. Therefore, the optimal long run "posted wage" for ex-post workers weakly exceeds that for ex-ante workers. The following result summarizes these points.

PROPOSITION **14.** *Let transparency increase from $\lambda_A < \infty$ to $\lambda_P = \infty$ at integer time period $T > 0$. There exist parameters of the model such that $\bar{w}_{A,t} > \bar{w}_{P,t}$ for some $t \geq T$. However, for any model parameters there exists $T' \geq T$ such that $\bar{w}_{A,t} \leq \bar{w}_{P,t}$ for all $t \geq T'$.*

We discuss parameterizations that match our empirical results. Specifically, from Table I, we observe empirically that across specifications, real wages decline in the period immediately following an increase in transparency and without subsequent declines while employment is either constant or increases more gradually.

We proceed to rationalize the wage results following period T. First, because the firm does not have a downward wage constraint for new entrants, $\bar{w}_{P,T} + \lfloor t \rfloor \Delta = \bar{w}_{P,t}$ for all $t > T$. That is, real wages for ex-post workers instantly reach their new steady state level after the increase in transparency. Wages for ex-ante workers may take time to converge due to downward wage rigidity. Denote the difference between the firm's maximum wage in steady state under transparency levels λ_A and λ_P as $M_{\lambda_A}(v) := \lim_{t=T,T+1,\ldots} \bar{w}_{A,T-1} + (t-(T-1))\Delta - \bar{w}_{A,t}$. Proposition 3 implies that $M_{\lambda_A}(v) \in [0,1]$. If $\Delta - M_{\lambda_A}(v) \geq 0$, then the firm sets a new maximum wage at time T, $\bar{w}_{A,T} = \bar{w}_{A,T-1} + \Delta - M_{\lambda_A}(v)$, which is higher in nominal terms than $\bar{w}_{A,T-1}$, even though it is lower in real terms. If $\Delta - M_{\lambda_A}(v) < 0$, then the firm cannot set $\bar{w}_{A,T} = \bar{w}_{A,T-1} + \Delta - M_{\lambda_A}(v)$ because this would requiring reducing nominal wages of incumbents. Due to our monotonicity assumptions on the hazard rate of the firm's value, it will set $\bar{w}_{A,t} = \max\{\bar{w}_{A,t-1}, \bar{w}_{A,T-1} + (t-(T-1))\Delta - M_{\lambda_A}(v)\}$ for integer times $t \geq T$. Therefore, real wages for ex-ante workers will decline until (and including) period $t^* := T - 1 + \lceil \frac{M_{\lambda_A}(v)}{\Delta} \rceil$.

The separation rate of ex-ante workers will potentially increase until, and including, period t^*. In order for the share of workers exiting the firm to remain unchanged in the interval $[T, t^*]$, it must be that $\bar{\theta}_{t^*} := \bar{\theta}_{0,0} + t^* \Delta = \bar{w}_{A,t^*}$, i.e. no workers who were employed by the firm prior to T will ever voluntarily exit the firm. In order for the hiring rate to remain unchanged, it must be that the employment level in our base model is equal under λ_A and λ_P.

If the increase in transparency causes any change in the hiring rate, we would observe a trend (either upward or downward, depending on whether hiring increased or decreased) in periods after t^*, as ex-post workers make up a larger and larger fraction of the workforce. If the increase in transparency causes an increase in separation for ex-ante workers, we would observe a deviation (again, either increasing or decreasing) from this trend in integer periods in the interval $[T, t^*]$.

PROPOSITION **15.** *Let transparency increase from $\lambda_A < \infty$ to $\lambda_P = \infty$ at integer time period $T > 0$. If and only if $\Delta - M_{\lambda_A}(v) \geq 0$ and $\bar{\theta} \leq \bar{w}_{A,T}$ will real wages decline once, and only once, at time T, and employment smoothly trend (weakly) upward. Both ex-ante and ex-post workers receive the same real wage in all periods including and following T.*

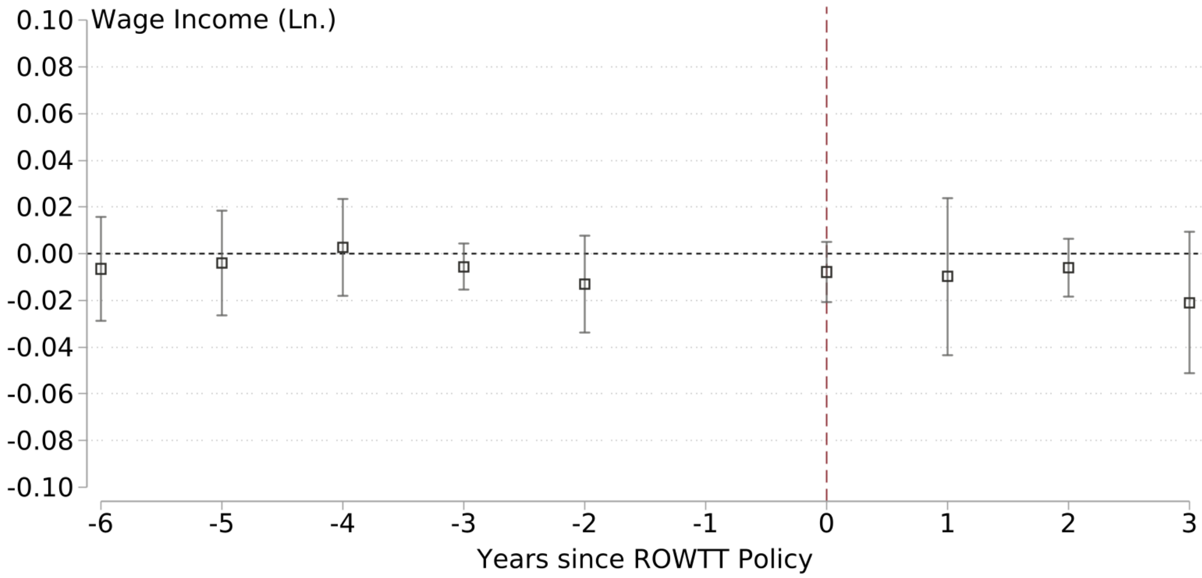
That we empirically observe only a single wage decline immediately following an increase in transparency can only be rationalized in our model by $\Delta - M_{\lambda_A}(v) > 0$. Note that this condition also satisfies a sanity check; the average rate of nominal wage growth over the time period of our empirical analysis is 2.8%[23] (corresponding to Δ), while the observed rate of wage decline is around 2% (M_{λ_A}).

[23] According to https://www.ssa.gov/oact/cola/central.html, nation-wide average wages rise nominally by an average of 2.8% each year from 2004-2016.

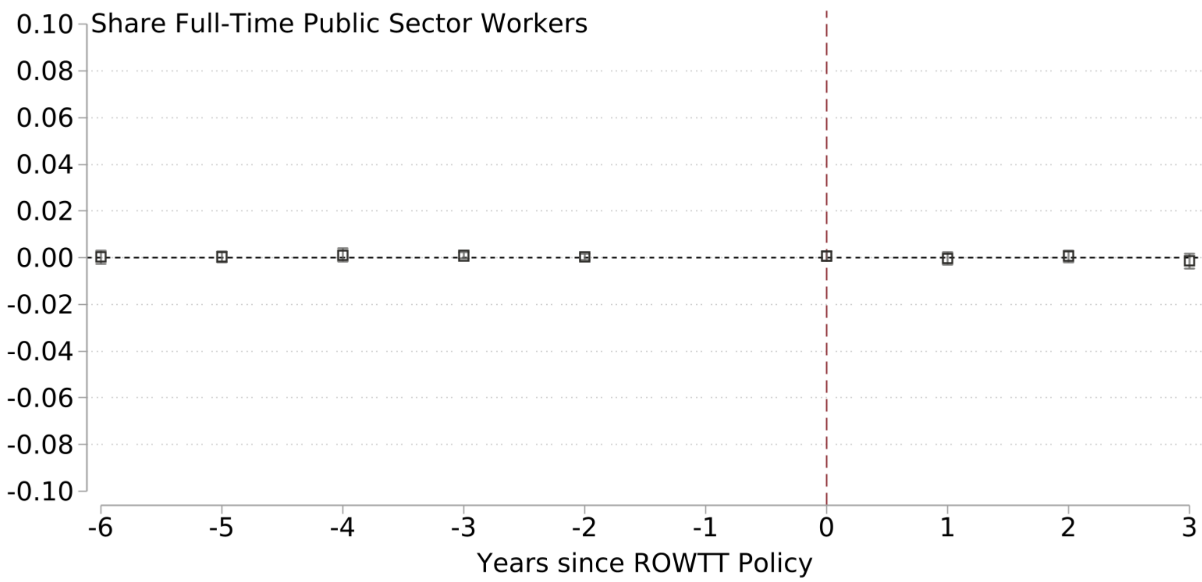
Figure A.15 below plots the transition path of real wages following an increase in transparency from $\lambda_A = 0$ to $\lambda_P = \infty$ at time T when $k = 0$. Panels A and B display the case in which Δ is "low" and it takes several periods for the real wages of ex-ante workers to reach steady state. The real wages of ex-ante workers (Panel A) and the average wages of all workers (Panel B) trend downward toward the new steady state. Panels C and D display the case in which Δ is "high" and the real wages of ex-ante workers immediately reach steady state. Our empirical results (see, eg. Figure III, Panel A) most resemble the "high" Δ cases.

Figure A.1: Effects of ROWTT Policies on Public Sector Workers

Panel A: Wage Income (ln)

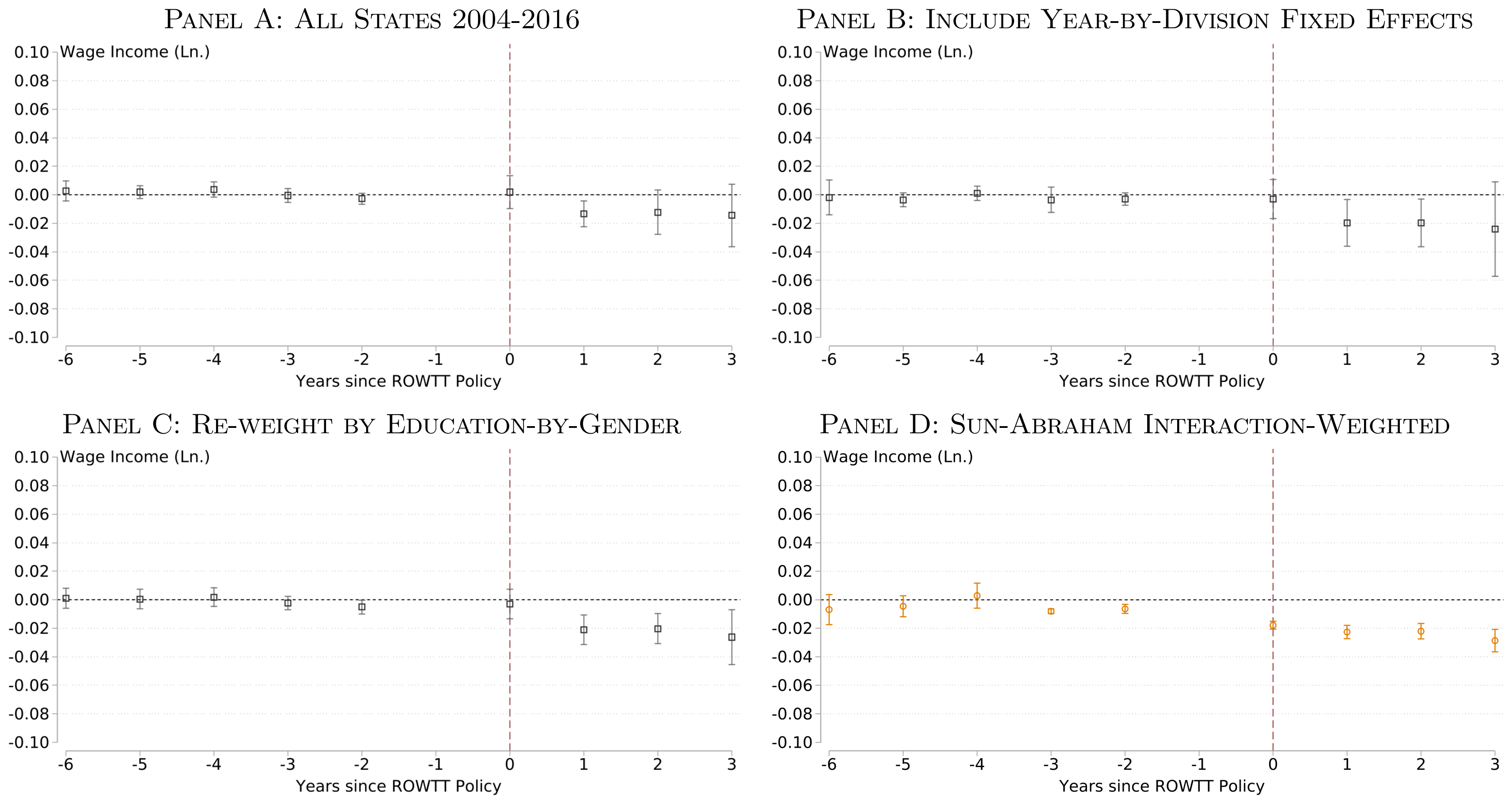


Panel B: Employment



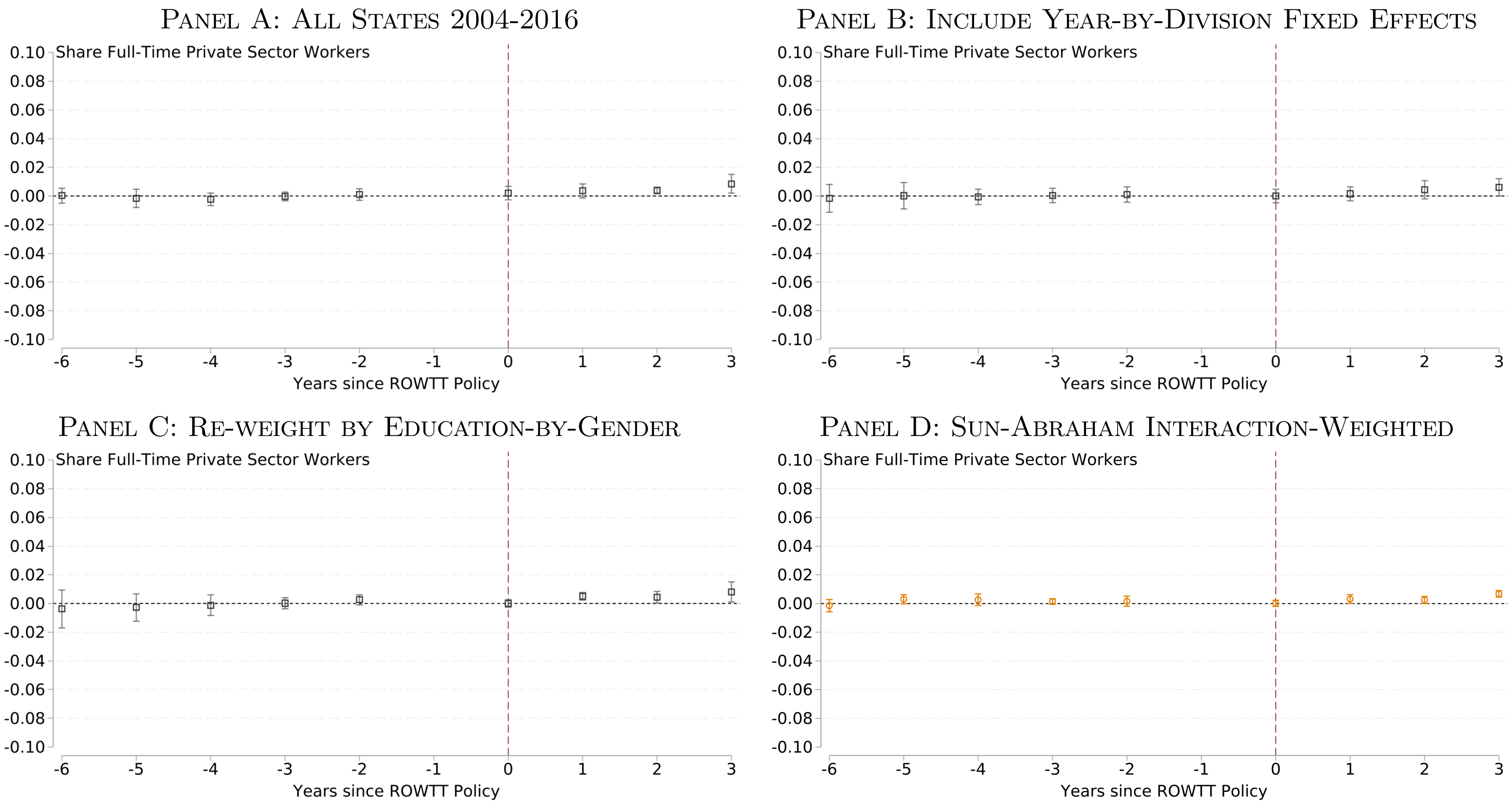
Note: In this figure, we present our baseline multiperiod difference-in-difference estimates. In this baseline specification, we report the results from a balanced composition of states following the enactment of the law. Thus, we estimate the dynamic post period effects for states with events through 2013 separately and report these in periods 0 to +3. See Equation 7 for more information on this specification. The standard deviation of the state-level mean from 2000 to 2016 is 0.103 for log wage income and 0.017 for the share of full-time private sector workers. We use the current population survey to estimate the share of workers covered by a union or collective bargaining agreement at the occupation level each year and split at the median occupation.

Figure A.2: Wage Dynamic Effect Estimates, Alternative Specifications



Note: See Appendix Section A.3 for details.

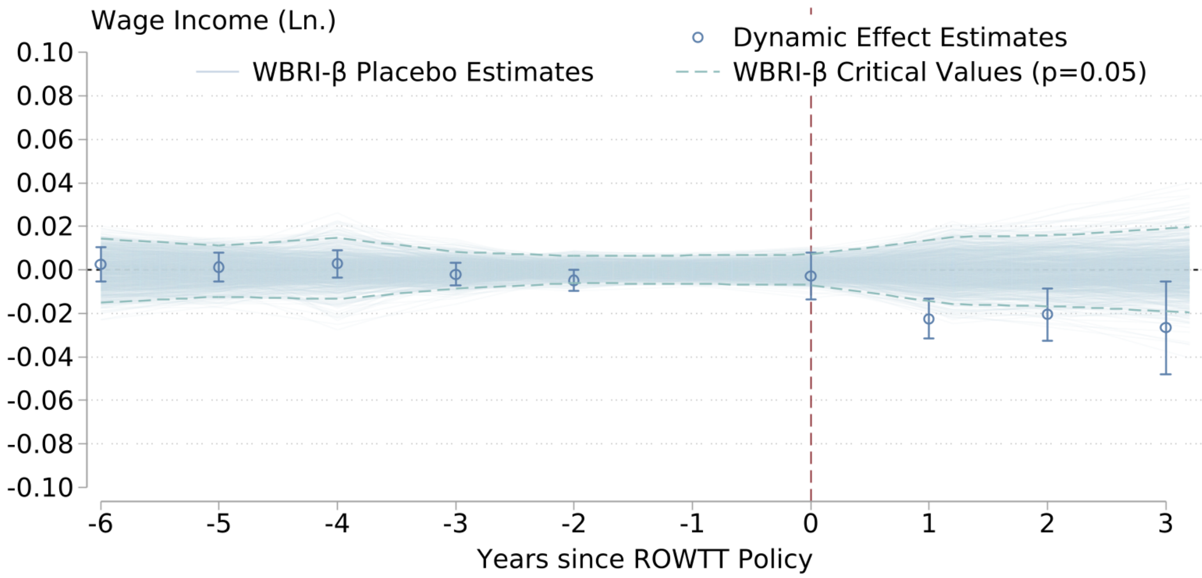
Figure A.3: Employment Dynamic Effect Estimates, Alternative Specifications



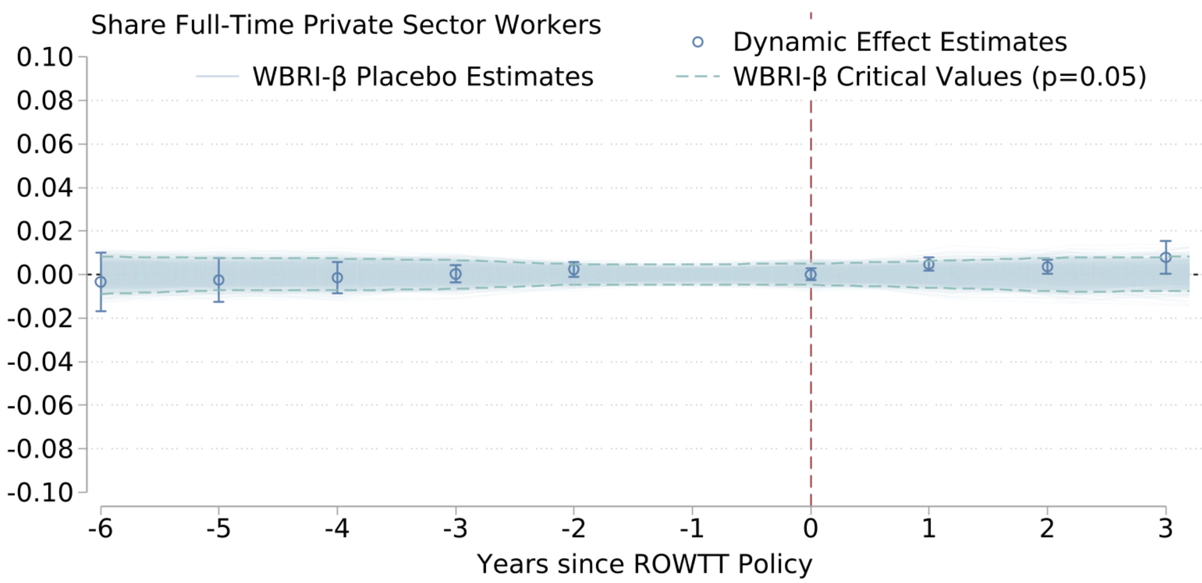
Note: See Appendix Section A.3 for details.

Figure A.4: Randomization
Inference: Effect of ROWTT Policies on Labor Market Outcomes

Panel A: Wage Income

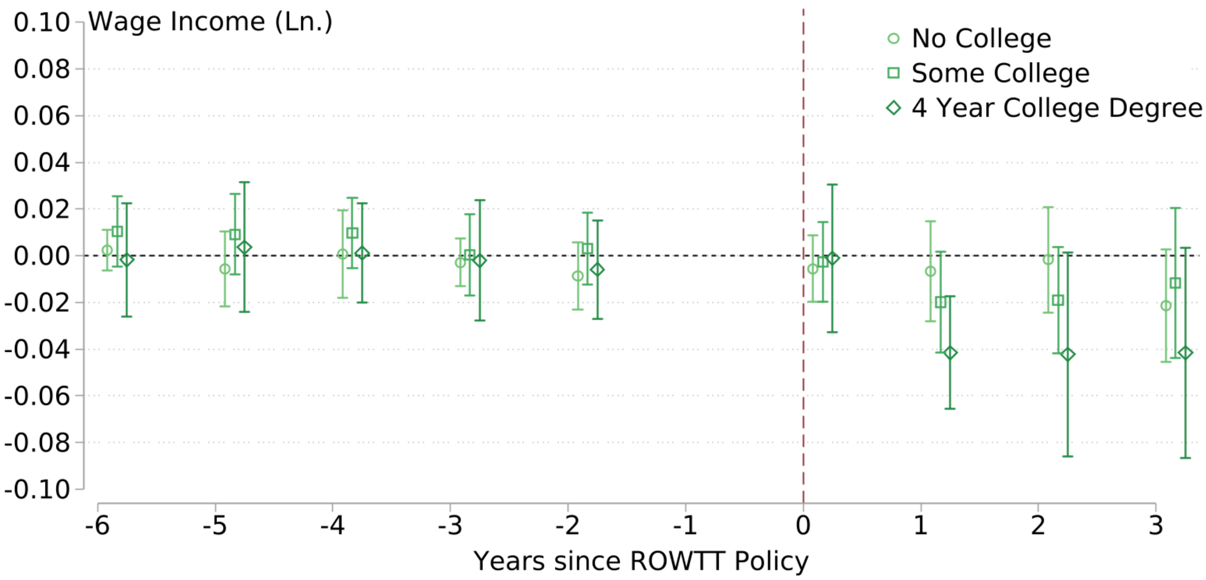


Panel B: Employment



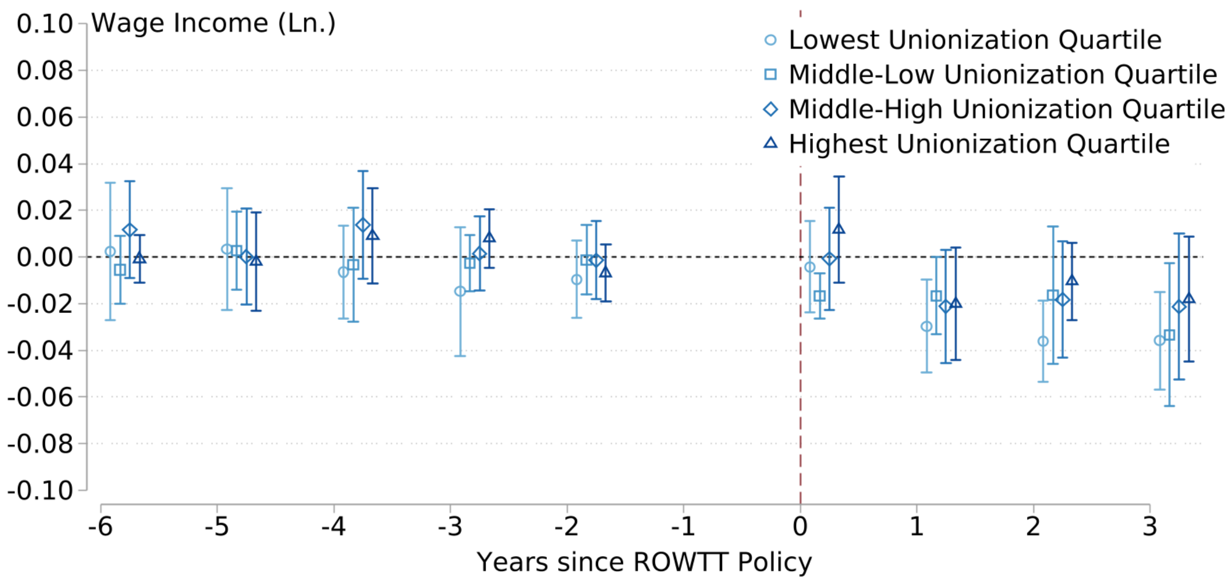
Note: We supplement Figure III by overlaying our point estimates and standard errors from our baseline cluster-robust variance estimator (CRVE) with confidence intervals constructed from the Wild Cluster Bootstrap with Randomization Inference (WBRI) procedure. The WBRI procedure involves randomizing the timing of ROWTT enactment across all states repeatedly in placebo tests designed by MacKinnon and Webb (2019). Each gray line corresponds to a permutation of ROWTT enactment dates, and estimation of our main specification under the null of no dynamic treatment effects. Dashed lines correspond to the WBRI critical values of treatment effects corresponding to a p-value of 0.05. The standard deviation of the state-level mean from 2000 to 2016 is 0.103 for the natural logarithm of wage income and 0.017 for the share of full-time private sector workers.

Figure A.5: Heterogeneous Effects of ROWTT on Wages, by Level of Education



Note: In this figure, we present estimates for workers with different levels of education: no college education, some college education, and 4 year college degree. We fully interact a vector of indicators for each education group with the dynamic effect indicators, and include all controls from the baseline specification. The standard deviation of the state-level mean from 2000 to 2016 is 0.103 for log wage income.

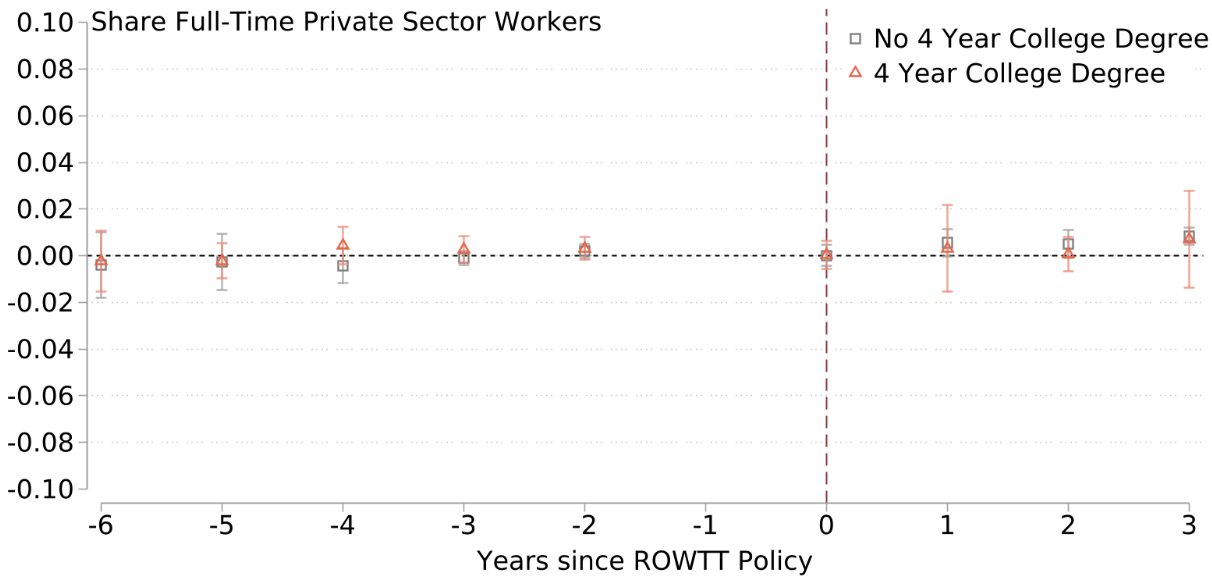
Figure A.6: Heterogeneous
Effects of ROWTT Policies on Wages, by Level of Occupational Unionization



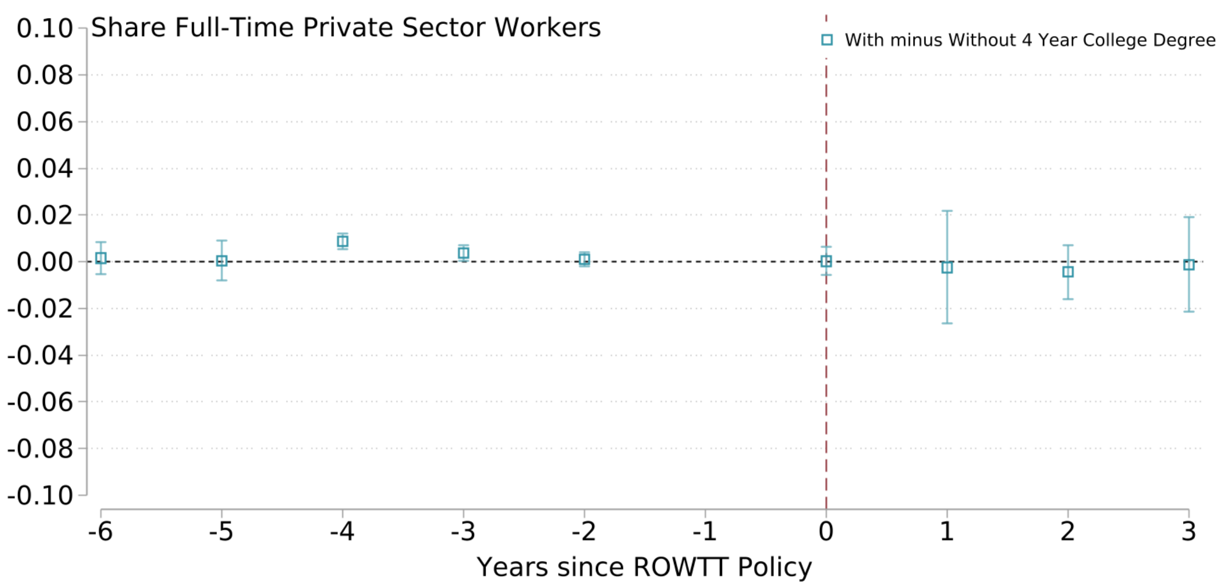
Note: In this figure, we present estimates for each quartile of occupation-level unionization coverage. We fully interact a vector of indicators for each quartile with the dynamic effect indicators, and include all controls from the baseline specification. The standard deviation of the state-level mean from 2000 to 2016 is 0.103 for log wage income. We use the current population survey to estimate the share of workers covered by a union or collective bargaining agreement at the occupation level each year.

Figure A.7: Heterogeneous
Effects of ROWTT Policies on Employment, By College Education

Panel A: Employment, With vs. Without College Education



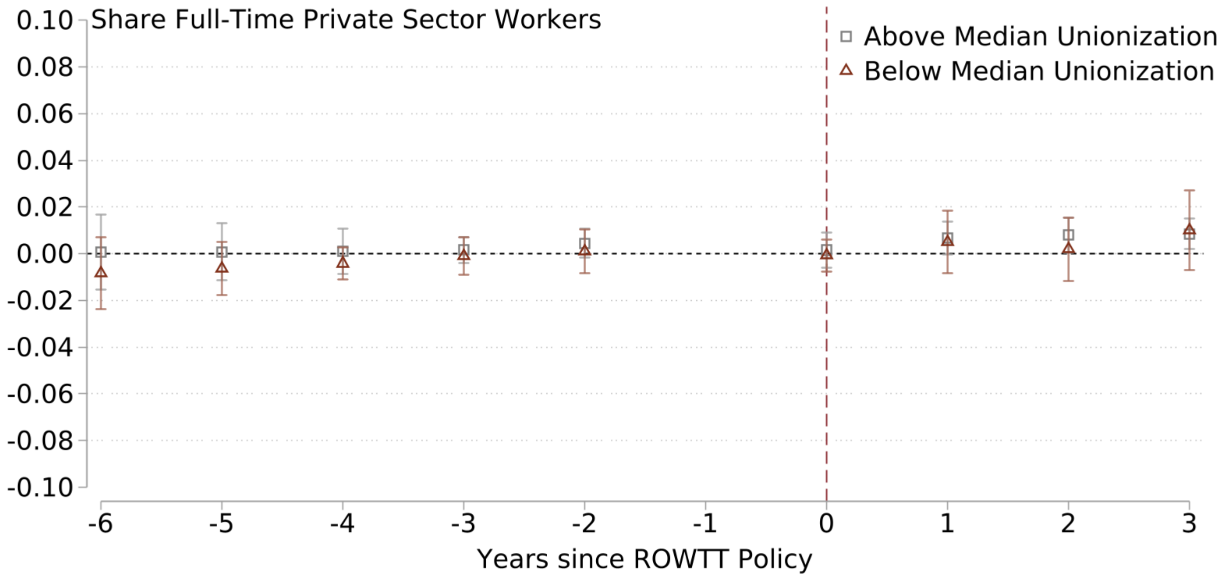
Panel B: Employment Difference, With vs. Without College Education



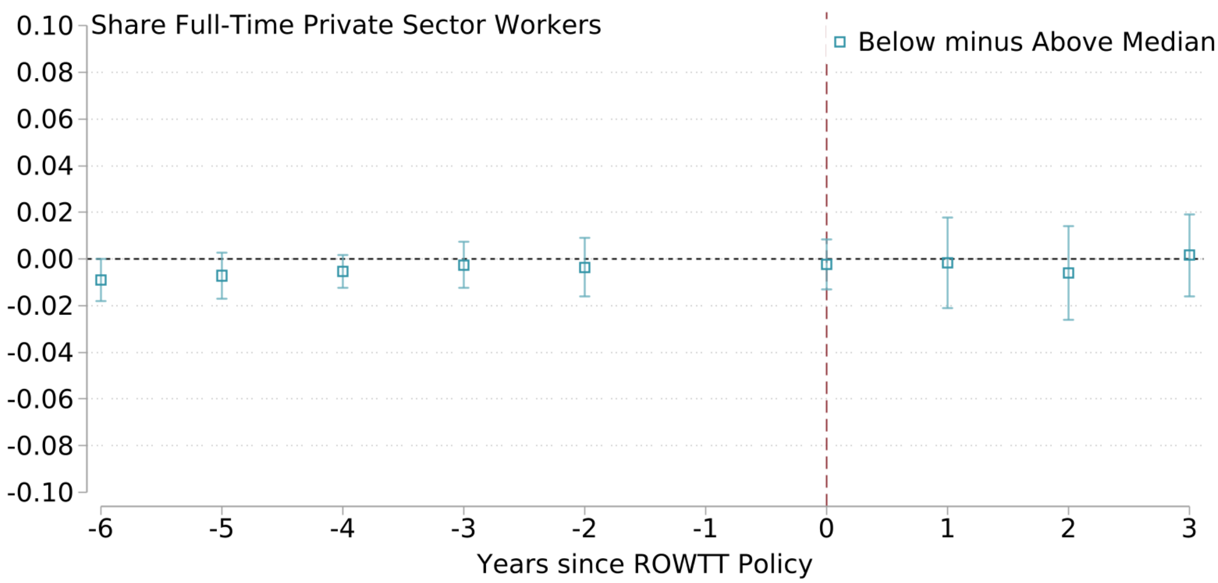
Note: In this figure, we present our baseline multiperiod difference-in-difference estimates. In this baseline specification, we report the results from a balanced composition of states following the enactment of the law. Thus, we estimate the dynamic post period effects for states with events through 2013 separately and report these in periods 0 to +3. See Equations 7 and 8 for more information on this specification. The standard deviation of the state-level mean from 2000 to 2016 is 0.103 for log wage income and 0.017 for the share of full-time private sector workers.

Figure A.8: Heterogeneous
Effects of ROWTT Policies on Employment, By Unionization Rate

Panel A: Education Split, Below- vs. Above-Median Unionization Rate

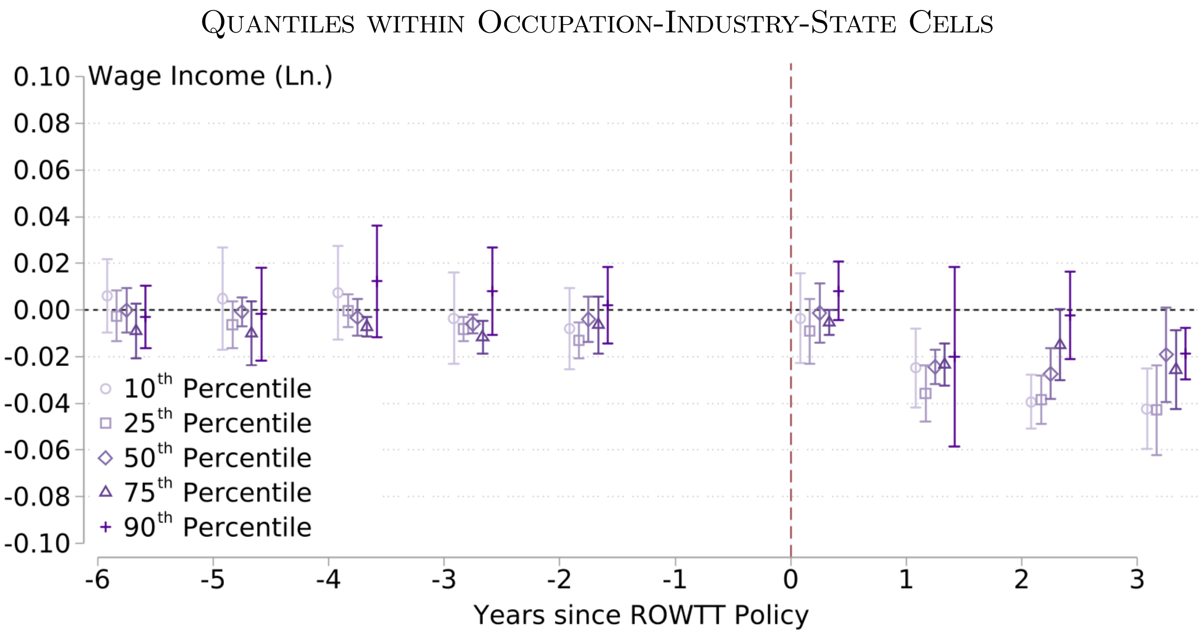


Panel B: Union Difference, Below- vs. Above-Median Unionization Rate



Note: In this figure, we present our baseline multiperiod difference-in-difference estimates. In this baseline specification, we report the results from a balanced composition of states following the enactment of the law. Thus, we estimate the dynamic post period effects for states with events through 2013 separately and report these in periods 0 to +3. See Equations 7 and 8 for more information on this specification. The standard deviation of the state-level mean from 2000 to 2016 is 0.103 for log wage income and 0.017 for the share of full-time private sector workers. We use the current population survey to estimate the share of workers covered by a union or collective bargaining agreement at the occupation level each year and split at the median occupation.

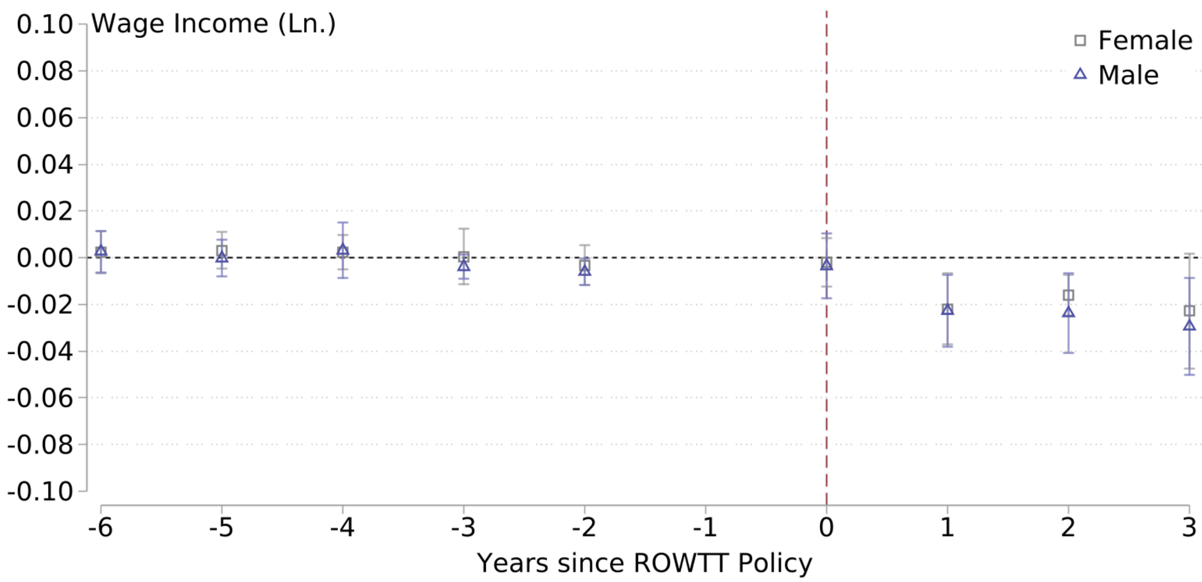
Figure A.9: Heterogeneous
Effects of ROWTT on Wages, Quantiles within Occupation-Industry-State



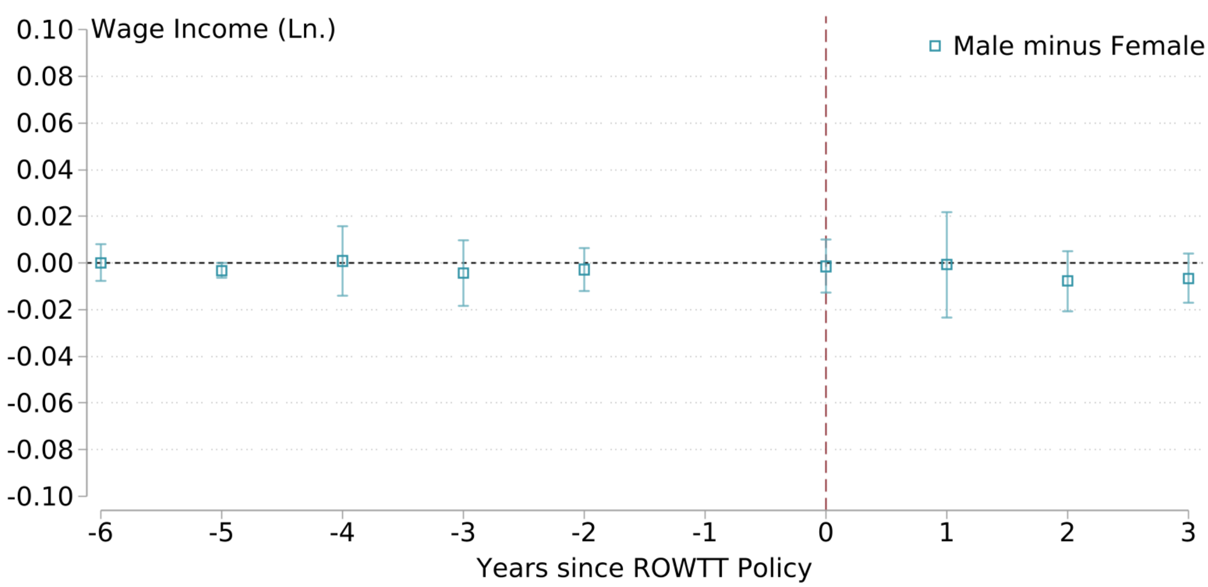
Note: In this figure, we present estimates of the effect of ROWTT on wages at various points in the wage distribution within state-industry-occupation. We use the two-stage re-centered influence-function (RIF) regression to recover these estimates separately for each quantile of interest (Firpo et al., 2009; Rios-Avila, 2020). We estimate the RIF for each quantile within state-industry-occupation-year cells. We include all of the control variables and fixed effects from the baseline model in the second step regression. Effects at each quantile are estimated separately. The standard deviation of the state-level mean from 2000 to 2016 is 0.103 for log wage income and 0.017 for the share of full-time private sector workers.

Figure A.10: Heterogeneous Effects of ROWTT Policies on Wages, By Gender

Panel A: Wage Income



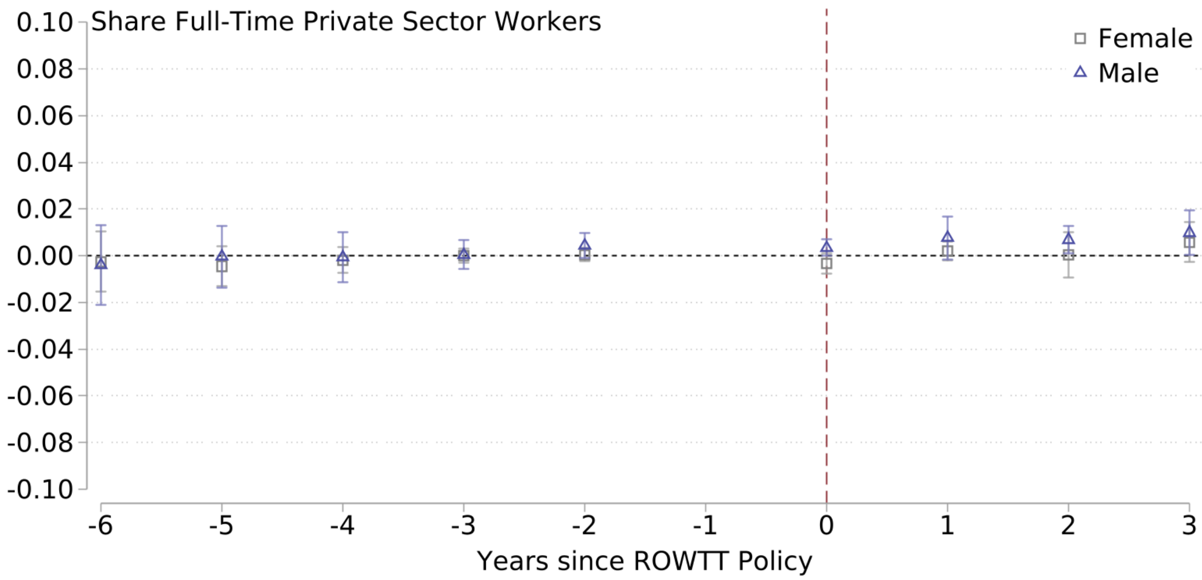
Panel B: Wage Income, Difference



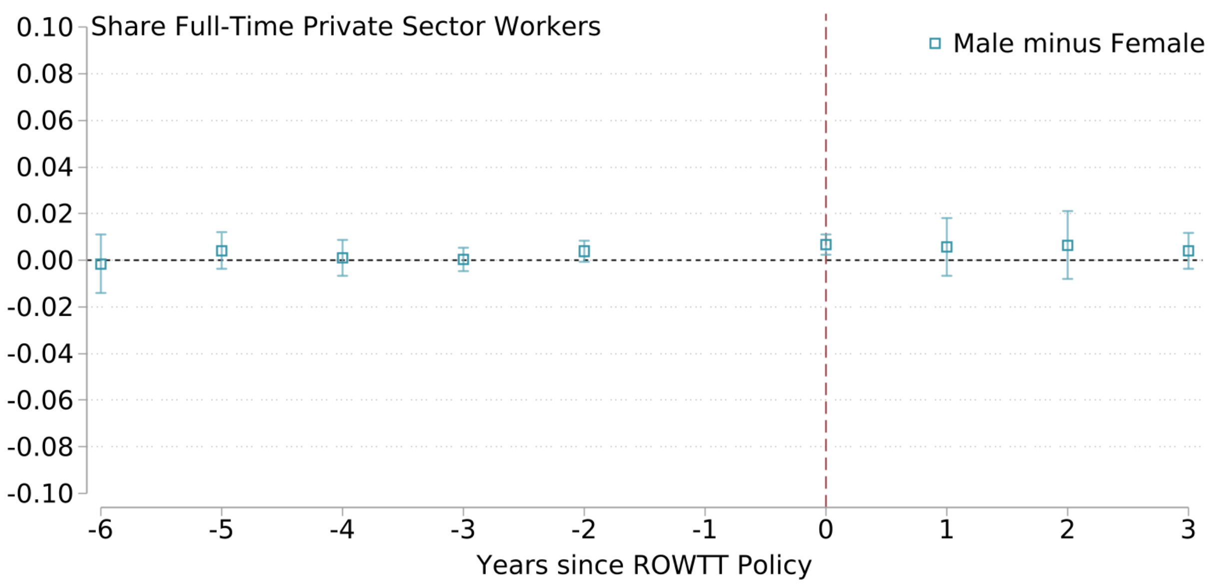
Note: In this figure, we present our baseline multiperiod difference-in-difference estimates. In this baseline specification, we report the results from a balanced composition of states following the enactment of the law. Thus, we estimate the dynamic post period effects for states with events through 2013 separately and report these in periods 0 to +3. See Equations 7 and 8 (replacing "low individual barg.power" with "female" in Equation 8) for more information on this specification. The standard deviation of the state-level mean from 2000 to 2016 is 0.103 for log wage income and 0.017 for the share of full-time private sector workers.

Figure A.11:
Heterogeneous Effects of ROWTT Policies on Employment, By Gender

Panel A: Employment

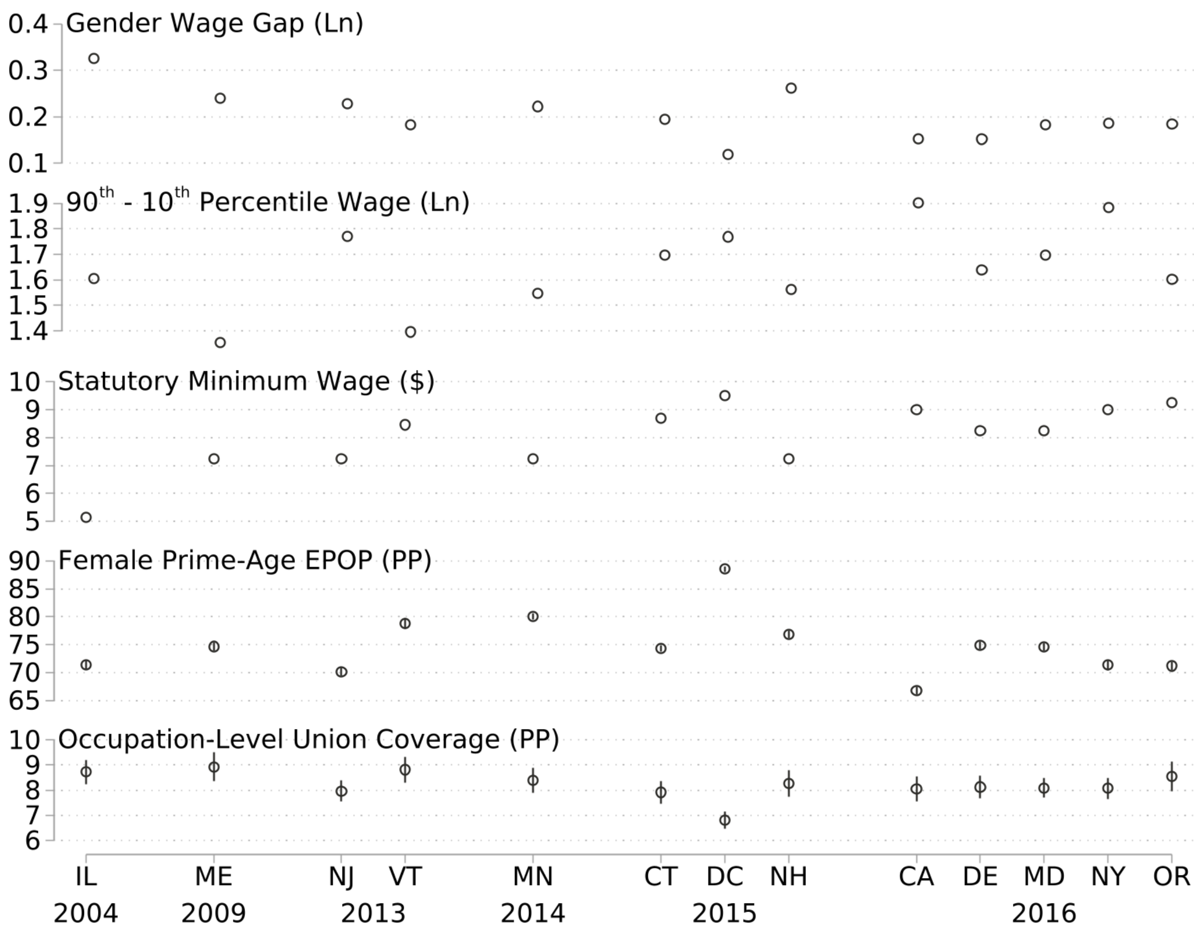


Panel B: Employment, Difference



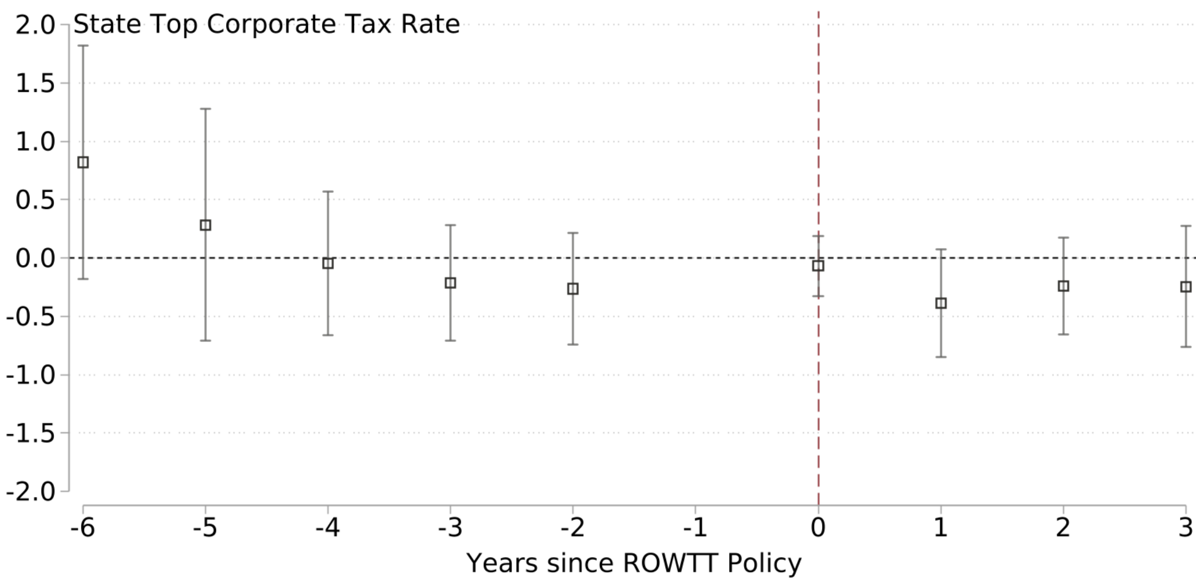
Note: In this figure, we present our baseline multiperiod difference-in-difference estimates. In this baseline specification, we report the results from a balanced composition of states following the enactment of the law. Thus, we estimate the dynamic post period effects for states with events through 2013 separately and report these in periods 0 to +3. See Equations 7 and 8 (replacing "low individual barg.power" with "female" in Equation 8) for more information on this specification. The standard deviation of the state-level mean from 2000 to 2016 is 0.103 for log wage income and 0.017 for the share of full-time private sector workers.

Figure A.12:
State-Level Conditions in the Year Before Implementing a ROWTT Law



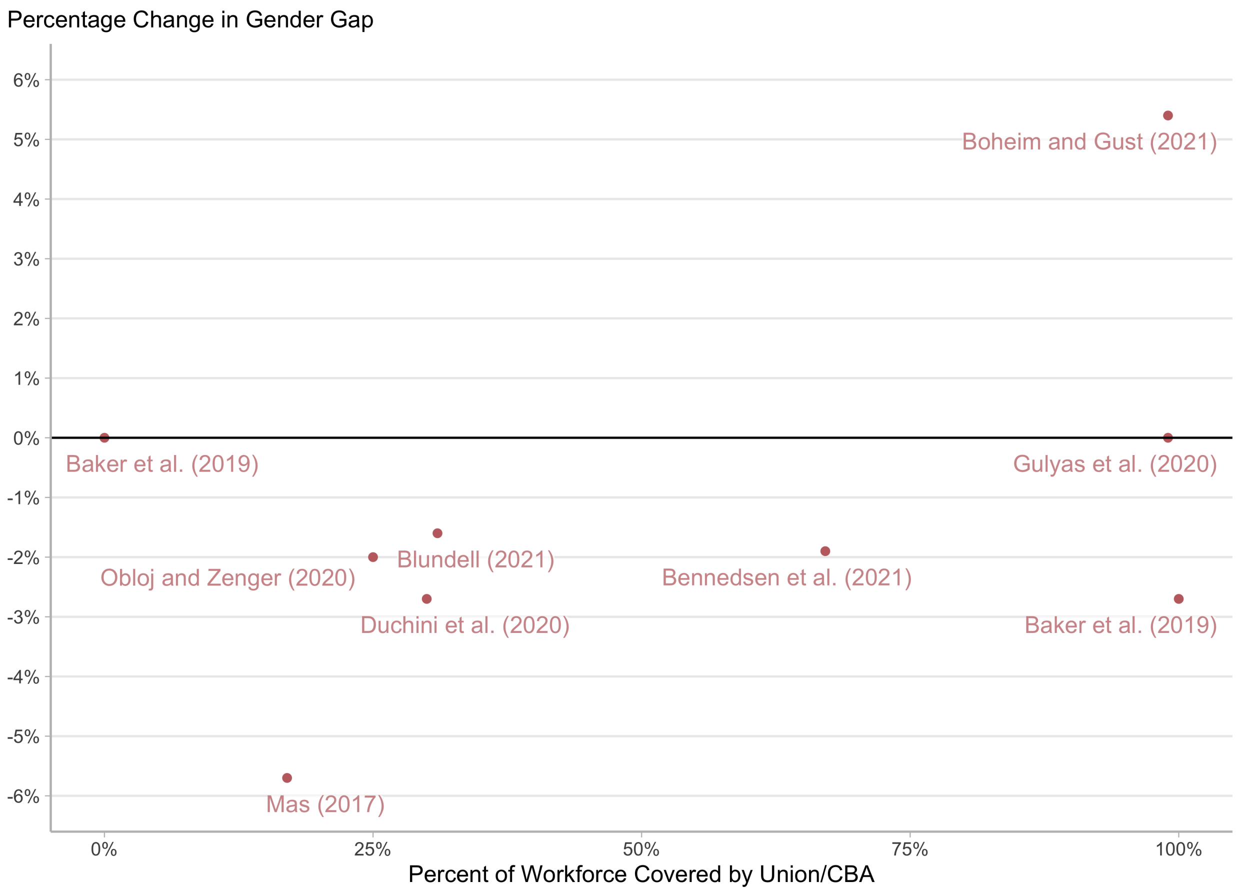
Note: In this figure, we report state level means of various outcomes in the year before the event. In the first row, we regress log salary on a set of state indicators interacted with a gender indicator and report the coefficient on the interaction coefficient of male × state. In the second row, we use a regression of the re-centered influence function to estimate the difference between the 90th and 10th percentiles, following Firpo et al. (2009). In the third row, we show the statutory minimum wage for each state in the year before the ROWTT policy goes into effect, using data from Borg et al. (2022). In the fourth row, we show the share of prime age women that report having any kind of employment. Finally, in the fourth row, we take the average of the occupation-level union coverage variable for each state.

Figure A.13: Effect of ROWTT on State-Level Corporate Tax Rates



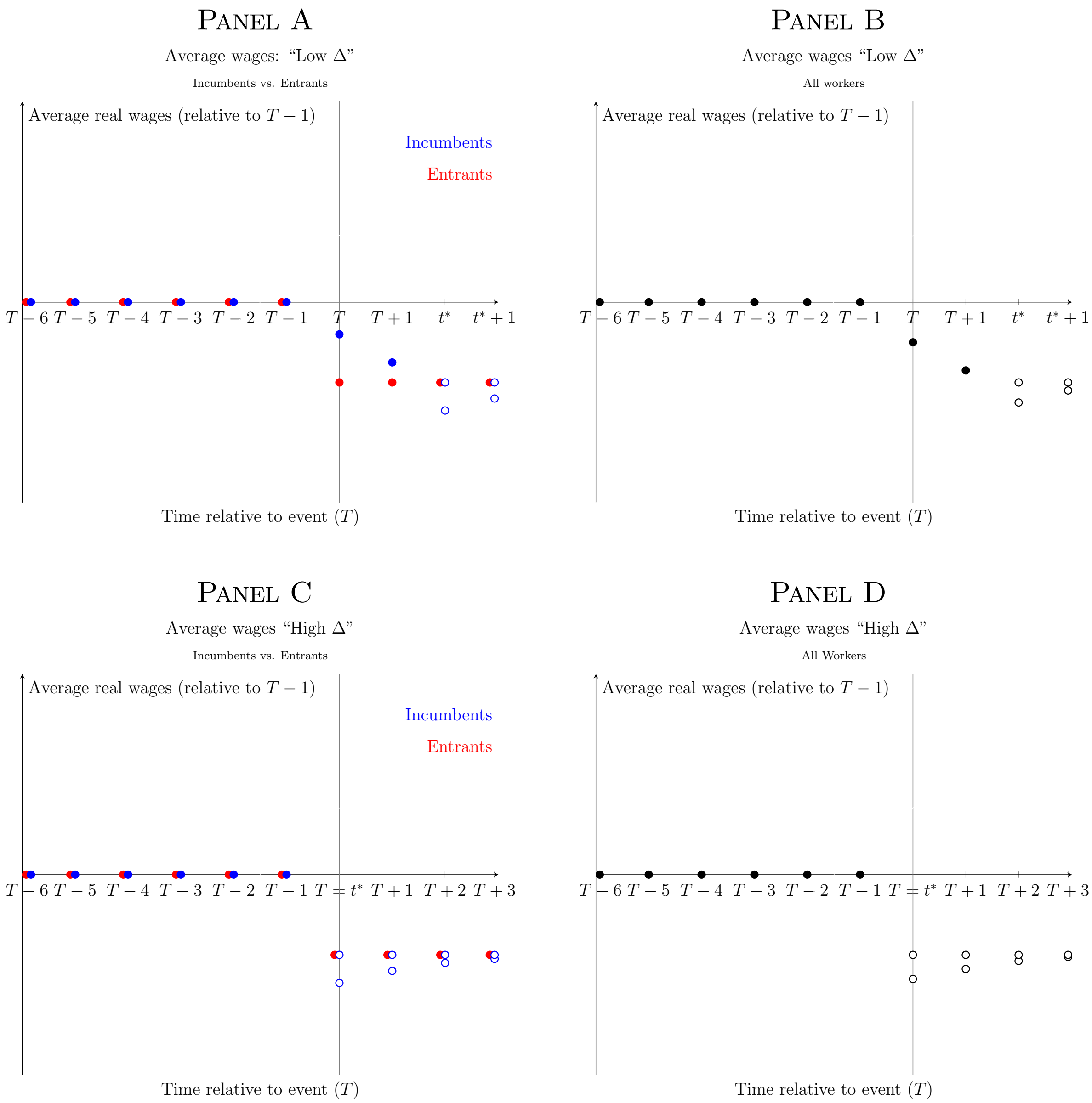
Note: In this figure, we replicate our baseline multi-period difference-in-difference estimates, replacing the dependent variable with the state corporate tax rates. We report the results from a balanced composition of states following the enactment of the law. We measure the state-level top corporate tax rates using data from Slattery and Zidar (2020).

Figure A.14: Effect of Transparency on the Gender Pay Gap by Individual Bargaining Power, Existing Studies



Note: In this figure, we graphically present findings from related literature. In Section III.B we describe the criteria for inclusion in our analysis, and provide the details of each study in Table A.4. We plot point estimates reported on the change in the gender wages gap in each study we evaluate, where the x-axis denotes the share of the workforce covered by a union/collective bargaining agreement. Standard errors are not available for the coefficient estimate from Böheim and Gust (2021), and we note that this imputed value may not be statistically significant. Of the six studies with negative coefficient estimates, all are statistically significant.

Figure A.15: Possible wage paths after unexpected transparency increase



Note: This figure shows the possible wage effects of the introduction of raising transparency from $\lambda_A = 0$ to $\lambda_p = \infty$ at time T, when $k = 0$. Panel A separately shows the effects for incumbents (blue, those who entered the market before the period in question) and entrants (red, those who enter the market in the current period) in the case where $t^* - (T-1) = \lceil \frac{M_{\lambda_i}(v)}{\Delta} \rceil = 3$, i.e. steady state nominal wage growth is approximately one-third the size of the long run real wage decrease due to transparency. Hollow blue circles after period t^* indicate two possible average wage paths for incumbents: the top path illustrates the case in which $\bar{\theta} = \bar{w}_{I,T}$ i.e. the optimal monopsonistic wage for those hired prior to period T is not affected by the truncated distribution of outside options for these workers, and the bottom path illustrates the case in which $\bar{\theta} > \bar{w}_{I,T}$ i.e. the optimal monopsonistic wage for those hired prior to period T is lowered due to the truncated distribution of outside options for these workers. Panel B shows the same case as Panel A, aggregating the average wages of all workers. Hollow circles after period t^* indicate the two possible average wage paths described. Panels C and D are analogues of Panels A and B, respectively, in the case where $t^* - (T-1) = \lceil \frac{M_{\lambda_i}(v)}{\Delta} \rceil = 1$, i.e. steady state nominal wage growth is larger than the size of the long run real wage decrease due to transparency.

TABLE A.1: DOCUMENTATION OF ROWTT POLICIES

State	Effective Date	Documentation
Illinois	1/1/2004	820 ILCS 112
Maine	9/1/2009	Maine Revised Statues 26.628
Vermont	7/1/2013	Act 31, H.99
New Jersey	8/29/2013	P.L.2013, Chapter 154
Minnesotta	10/5/2014	Chapter 239–H.F.No. 2536
New Hampshire	1/1/2015	RSA 275:38
Washington, DC	3/11/2015	D.C. Act 20-531
Connecticut	7/1/2015	Public Act No. 15-196
California	1/1/2016	California Labor Code Section 1197.5
Oregon	1/1/2016	ORS 659.A
New York	1/19/2016	NY Labor Law Section 194
Delaware	6/20/2016	Delaware Code, Section 711 Title 19
Maryland	10/1/2016	Annotated Code of Virginia Section 3–304.1

Note: We define an ROWTT as the first law within the jurisdiction which protects the rights of workers to disclose their own pay and inquire about the pay of coworkers, such that this protection extends to all workers in the private sector (with minimal exceptions, such as human resource representatives who have access to pay information of others throughout the course of their normal work duties). We identify the enactment of ROWTT by conducting a stemmed search of the labor codes of all 50 states and the District of Columbia, for the terms "transparency," "discuss," "inquire," "disclose," and "reveal," (and variants thereof), and verifying the date the law became effective within the jurisdiction. We corroborate our findings with a U.S. Department of Labor publication, which lists transparency laws for each state (see https://www.dol.gov/agencies/wb/equal-pay-protections). In addition to the states listed above, NV (NRS 613.330) enacted an ROWTT in 2017, and WA (RCW 49.12.175) and MA (Chapter 177, General Laws) enacted ROWTTs in 2018. These additional states do not enter our event study regression framework, but do enact ROWTTs prior to the completion of the survey waves described in Figure II. Some states (MI, 1983; CA, 1985; VT, 2005) enact weaker laws that do not protect workers' rights to inquire about the wages of their peers. Some states (CO, 2009; LA, 2013; VA, 2020) enact laws that only extend to subsets of workers.

TABLE A.2: Summary Statistics: Combined American Community Survey (ACS) and Current Population Survey (CPS) Sample, 2000-2016

	Panel A: Prime-Age Full-Time Private Sector Employees						
	Median	25th P'tile	75th P'tile	Min./Max.	Mean	Std. Dev.	Obs.
Wage Income (Ln.)	10.65	10.20	11.16	5.70–13.48	10.69	0.72	2,341,981
Share Full-Time Private Sector Workers	1.00	1.00	1.00	1.00–1.00	1.00	0.00	2,341,981
Occ. Unionization	0.05	0.03	0.11	0.00–1.00	0.08	0.09	2,339,694
Male	1.00	0.00	1.00	0.00–1.00	0.59	0.49	2,341,981
Age	39.00	32.00	46.00	25.00–54.00	39.22	8.47	2,341,981
Sex					*Share*		*Count*
Male					0.59		1,344,480
Female					0.41		997,501
State							
California					0.35		790,564
New York					0.20		456,690
Illinois					0.13		317,049
Education Level							
4 Year College+					0.37		929,797
High School Only					0.40		872,363
Some College					0.23		539,821
Race							
White					0.69		1,700,862
Other					0.09		173,746
Black					0.09		172,071

	Panel B: Full Prime-Age Sample						
	Median	25th P'tile	75th P'tile	Min./Max.	Mean	Std. Dev.	Obs.
Wage Income (Ln.)	10.49	9.90	11.00	5.30–13.48	10.37	1.04	4,261,749
Share Full-Time Private Sector Workers	0.00	0.00	1.00	0.00–1.00	0.44	0.50	5,452,711
Occ. Unionization	0.05	0.03	0.12	0.00–1.00	0.09	0.09	4,838,993
Male	0.00	0.00	1.00	0.00–1.00	0.50	0.50	5,452,711
Age	40.00	32.00	47.00	25.00–54.00	39.56	8.58	5,452,711
Sex					*Share*		*Count*
Female					0.50		2,785,968
Male					0.50		2,666,743
State							
California					0.37		1,955,753
New York					0.20		1,055,036
Illinois					0.13		681,978
Education Level							
High School Only					0.43		2,229,524
4 Year College+					0.34		1,979,486
Some College					0.23		1,243,701
Race							
White					0.68		3,886,332
Black					0.11		491,974
Other					0.09		403,438

Note: Panel A reports statistics for the sub-sample of the ACS-CPS sample that is employed full-time and is prime working age, Panel B reports statistics for the full sample of working age individuals. Information about individual demographics, earnings, employment and geography are captured by the ACS. The ACS caps recorded earnings at the 99.5th percentile within each state from 2003 onwards, and top codes in earlier years (https://usa.ipums.org/usa-action/variables/INCWAGE#codes_section). Occupation unionization rates are taken from the CPS data. The merge between data sets uses the standardized 1990 occupation codes provided by Ruggles et al. (2021) and Flood et al. (2020). As a result, the distribution of occupation unionization rates in this table reflects the weighted distribution of individuals across occupations. The median unionization rate across occupations, unweighted by population, is 7%. For state of work, education level and race, we report summary statistics about the three largest categories.

TABLE A.3: Dynamic Effect Estimates: Alternative Specifications

	Balanced		Unbalanced		Add Reg.× Yr. FE		Fix Ed.× Sex Dist.		Sun-Abraham IW Estimator	
					Panel A: Wage Income					
Mean Pre-Treatment Estimate	-0.000	0.001	0.000	0.001	-0.002	-0.001	0.001	0.001	-0.005	-0.005
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.003)	(0.004)	(0.001)	(0.001)
Dynamic Post Treatment Effect Estimates										
$t=0$	-0.003	-0.004	-0.005	-0.005	-0.003	-0.001	-0.001	-0.002	-0.018	-0.019
	(0.005)	(0.004)	(0.003)	(0.003)	(0.006)	(0.003)	(0.004)	(0.004)	(0.001)	(0.001)
$t=1$	-0.022	-0.015	-0.017	-0.016	-0.020	-0.007	-0.019	-0.012	-0.023	-0.023
	(0.004)	(0.007)	(0.006)	(0.007)	(0.007)	(0.005)	(0.004)	(0.006)	(0.002)	(0.002)
$t=2$	-0.021	-0.017	-0.015	-0.014	-0.020	-0.009	-0.019	-0.015	-0.022	-0.022
	(0.006)	(0.006)	(0.008)	(0.008)	(0.008)	(0.005)	(0.004)	(0.006)	(0.002)	(0.003)
$t=3$	-0.027	-0.025	-0.027	-0.026	-0.024	-0.012	-0.025	-0.024	-0.029	-0.029
	(0.010)	(0.012)	(0.012)	(0.013)	(0.015)	(0.011)	(0.009)	(0.011)	(0.004)	(0.004)
Mean Effect, t $\geq$ 0	-0.018	-0.015	-0.016	-0.015	-0.017	-0.007	-0.016	-0.013	-0.023	-0.023
	(0.005)	(0.006)	(0.006)	(0.006)	(0.009)	(0.006)	(0.004)	(0.006)	(0.002)	(0.003)
Mean Difference: Post − Pre	-0.018	-0.017	-0.016	-0.016	-0.014	-0.006	-0.017	-0.015	-0.018	-0.018
	(0.005)	(0.005)	(0.005)	(0.005)	(0.010)	(0.006)	(0.004)	(0.004)	(0.001)	(0.002)
P-Value (CRVE)	0.002	0.007	0.011	0.010	0.170	0.335	0.002	0.004	$<$ 0.001	$<$ 0.001
P-Value (WBRI-β)	0.022	0.009	0.020	0.009	0.105	0.115	0.025	0.022	0.052	0.046
N:										
Microdata : 2,341,955										
Collapsed (State-Year): 221										
Collapsed Data	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Balanced Post-Period	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Year-by-Region FE	No	No	No	No	Yes	Yes	No	No	No	No
Fix Gender-by-Education Composition	No	No	No	No	No	No	Yes	Yes	No	No
Mean	10.77	10.77	10.77	10.77	10.77	10.77	10.77	10.77	10.77	10.77
(within state SD)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)
					Panel B: Employment					
Mean Pre-Treatment Estimate	-0.001	-0.001	-0.001	-0.001	-0.000	0.000	-0.003	-0.003	0.001	0.002
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.001)	(0.001)
Dynamic Post Treatment Effect Estimates										
$t=0$	0.000	0.000	-0.000	-0.000	0.000	0.000	-0.001	-0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
$t=1$	0.005	0.003	0.002	0.002	0.002	0.000	0.004	0.002	0.003	0.003
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$t=2$	0.004	0.003	0.005	0.004	0.004	0.002	0.004	0.004	0.002	0.002
	(0.002)	(0.001)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.001)	(0.001)
$t=3$	0.008	0.008	0.007	0.007	0.006	0.003	0.007	0.007	0.007	0.007
	(0.004)	(0.003)	(0.004)	(0.004)	(0.003)	(0.001)	(0.003)	(0.003)	(0.001)	(0.001)
Mean Effect, t $\geq$ 0	0.004	0.004	0.004	0.003	0.003	0.001	0.004	0.003	0.003	0.003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Mean Difference: Post − Pre	0.005	0.004	0.005	0.005	0.003	0.001	0.007	0.006	0.002	0.001
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.001)	(0.003)	(0.003)	(0.001)	(0.001)
P-Value (CRVE)	0.108	0.142	0.133	0.145	0.331	0.344	0.064	0.056	0.224	0.286
P-Value (WBRI-β)	0.168	0.179	0.148	0.165	0.210	0.220	0.111	0.076	0.726	0.762
N:										
Microdata : 5,452,696										
Collapsed (State-Year): 221										
Collapsed Data	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Balanced Post-Period	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Year-by-Region FE	No	No	No	No	Yes	Yes	No	No	No	No
Fix Gender-by-Education Composition	No	No	No	No	No	No	Yes	Yes	No	No
Mean	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
(within state SD)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)

Note: Obs=2,341,955, Clusters=221, across all specifications in Panel A. Obs=5,452,696, Clusters=221 in Panel B. In Cols. 1-8, we use the standard multiperiod DID estimator to recover the dynamic effect of state-level ROWTT legislation on wage income (Panel A) and on the share of workers in full-time private sector employment (Panel B). For the wage income analysis in Panel A, we explicitly restrict the sample to workers in full-time private sector employment. Odd Columns 1,3,5,7,9 report results from our main specification using microdata. Even Columns 2,4,6,8,10 execute the main specification using the two-step procedure proposed by Donald and Lang (2007) and described in Section A.4 whereby we first collapse the data to the level of the state-year cluster, extracting adjusted mean wages and employment at the cluster level, and in the second step we estimate dynamic treatment effects using the cluster-collapsed data. Following Donald and Lang (2007) and Angrist and Lavy (2009) we report CRVE standard errors from the second stage. In Cols. 1-2, we present the baseline model, balancing the set of states identifying the post-treatment dynamic effects by absorbing post-treatment dynamic effect estimates for cohorts with events after 2013. In Cols. 3-4 our estimates includes all cohorts from 2000 to 2016. In Cols. 5-6, we add year-by-region fixed effects to our baseline specification. In Cols. 7-8, we reweight our sample by education-by-gender within each state. We take the year before the policy is enacted as the reference year and estimate the educational distribution of each state separately for men and women. Within each state, we then reweight the sample in each year to match the education-by-gender distribution in that state's reference year. In Cols. 9-10, we use the Sun and Abraham (2020) interaction-weighted (IW) estimator to allow for heterogeneous treatment effects across cohorts. The IW estimator requires that the last-treated cohort be used as a control group in the absence of never-treated units. Thus, in this specification, the 2016 cohort does not contribute to dynamic effect estimates. We balance the post-treatment estimate by estimating the full set of cohort-specific dynamic effects, but excluding the 2014 and 2015 cohorts from the post treatment interaction-weighted estimates. In the final two rows of each panel, we report p-values associated with the mean difference between the post-treatment effects and pre-treatment effects calculated first using our cluster-robust variance estimator, and second with the wild cluster bootstrap with randomization inference described in Section A.4.

TABLE A.4: Meta Analysis study details

Study	Setting	Policy	Union/ CBA rate	Men's wage effect	Men's wage SE	Women's wage effect	Share men	W:M Pay Ratio (pre policy)	Imputed wage effect
Baker et al. (2021)	Canadian Universities (unionized)	Posting individual salaries	1	-0.009	0.006	0.018	0.68	0.89	-0.001
Baker et al. (2021)	Canadian Universities (non unionized)	Posting individual salaries	0	-0.024	0.006	-0.024	0.74	0.89	-0.024
Bennedsen et al. (2019)	Danish Private Sector	Disclosure of relative earnings of men and women	0.67	-0.015	0.0037	0.0036	0.7	0.84	-0.010
Blundell (2021)	U.K. Private Sector	Disclosure of relative earnings of men and women	0.3	-0.014	0.0047	0.002	0.61	0.83	-0.008
Böheim and Gust (2021)	Austrian Private Sector	Disclosure of relative earnings of men and women	0.99	0.005		-0.008	0.42	0.78	-0.000
Duchini et al. (2020)	U.K. Private Sector	Disclosure of relative earnings of men and women	0.3	-0.026	0.011	0.001	0.54	0.80	-0.017
Gulyas et al. (2020)	Austrian Private Sector	Disclosure of relative earnings of men and women	0.99	0.002	0.004	0.001	0.58	0.75	0.002
Mas (2017)	CA Public Sector	Posting individual salaries	0.17	-0.014	0.017	-0.07	0.99	2.80	-0.014
Obloj and Zenger (2020)	U.S. Universities	Posting individual salaries	0.25	-0.016	0.008	0.005	0.614	0.93	-0.009

Notes: For all studies, we report coefficient estimates from the specification with the most fixed effects. For studies that report a single treatment effect coefficient, we include that number. For studies that do not, we report the treatment effect coefficient from the final year of the analysis. Except as noted below, all numbers are drawn from each paper, respectively. Baker et al. (2021): Numbers drawn from Table 4 Col. 4 and 5, Table 2. We assume same W:M pre-intervention pay ratio in unionized and non-unionized workplaces. Bennedsen et al. (2019): Numbers drawn from Table 3 Col. 7, Table 1. Unionization share from Visser (2019). Duchini et al. (2020): Numbers drawn from Table 5 Col. 1, Table 2. Unionization number calculated as average of male and female unionization rate from Table 2. Blundell (2021): Numbers drawn from Figure 1, Table 1, Table 2 Col. 5. Union/CBA not provided, but sample of firms largely overlaps with that of Duchini et al. (2020), and therefore, the figure from Duchini et al. (2020) is used. Böheim and Gust (2021): This study reports wage effects from staggered implementation of a law which successively applies to firms above successively smaller and smaller threshold number of employees. As a result, we provide only a single estimate corresponding to the final cohort analyzed, corresponding to a 150 worker threshold. All cohorts have wage effects that are statistically indistinguishable from zero. Weighing the average change in each cohort by number of workers leads to similar inferences. This study reports the effect on wage levels, not the natural logarithm of wages, therefore we impute the wage effects for each group as follows: from Table 1, we calculate the share of women and the W:M pay ratio as the average of these numbers from the set of firms above and below to 150 threshold. We use these numbers and coefficient estimates from Table 4, Panel D. Row 2 to calculate the percentage change in men's and women's wages in each group. Union/CBA not provided, but sample of firms largely overlaps with that of Gulyas et al. (2020), and therefore, the figure from Gulyas et al. (2020) is used. Gulyas et al. (2020): Numbers drawn from Table 1, Table B2 Col. 2, Footnote 6. Unlike other papers, women are used as base category. To calculate SE of men's wage effect, we assume 0 covariance between women's wage effect dummy and differential effect for men and women coefficient. Mas (2017): Numbers drawn from Table 2 Col. 5 Row 3, Table 3 Col. 2 Row 3. Additional numbers and unionization rate drawn from the California municipal pay website at https://publicpay.ca.gov and Reese (2019). Disclosure of employee salaries is facilitated by newspapers and other organizations who release salary information garnered through Freedom of Information Act requests. The author reports the effect of transparency on managers' and non-managers' wages. We abuse terminology and refer to managers as "men" and non-managers as "women." Separately, the author presents the differential wage effects of transparency for male and female managers in Table A3, Column 2. We use these estimates in Figure A.14.Obloj and Zenger (2020): Numbers drawn from Table 1 Col. 6, page 5. Unionization share from Schmidt (2012). Disclosure of employee salaries is facilitated by newspapers and other organizations who release salary information garnered through Freedom of Information Act requests.