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These Unequal States: Corporate Organization and Income Inequality in the United States

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Abstract
In an analysis of data on employment in the 48 contiguous United States from 1978 to 2008, we examine the connection between organizational demography and rising income inequality at the state level. Drawing on research on social comparisons and firm boundaries, we argue that large firms are susceptible to their employees making social comparisons about wages and that firms undertake strategies, such as wage compression, to help ameliorate their damaging effects. We argue that wage compression affects the distribution of wages throughout the broader labor market and that, consequently, state levels of income inequality will increase as fewer individuals in a state are employed by large firms. We hypothesize that the negative relationship between large-firm employment and income inequality will weaken when large employers are more racially diverse and their workers are dispersed across a greater number of establishments. Our results show that as the number of workers in a state employed by large firms declines, income inequality in that state increases. When these firms are more racially diverse, however, the negative relationship between large-firm employment and income inequality weakens. These results point to the importance of considering how corporate demography influences the dispersion of wages in a labor market.

Keywords: employment, firm boundaries, income inequality, social comparisons, wage compression

How economic rewards in a society are distributed is a central question of the social sciences, and scholars from a variety of disciplines have developed theories in attempts to answer it. For example, building from the human capital tradition (e.g., Becker, 1964), skill-biased technological change (e.g., Autor, Katz, and Kearney, 2008) emphasizes how the adoption of information and communication technologies differentially affects the productivity, and thus the earnings,

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of high- and low-skilled workers, leading to greater income inequality. Similarly, globalization is thought to increase inequality by increasing the demand for skilled labor and decreasing the demand for unskilled labor in developed countries (Bentele and Kenworthy, 2013). Institutional-based accounts for the rise of of income inequality have found that declining rates of unionization (Western and Rosenfeld, 2011), changes to the occupational structure (e.g., Mouw and Kalleberg, 2010), financialization (e.g., Lin and Tomaskovic-Devey, 2013), government policy (e.g., Kenworthy and Pontusson, 2005), and family formation practices (see McCall and Percheski, 2010) each have had an important influence on the distribution of income in the United States.

More recently, other scholars have studied the ways in which firms affect the distribution of income that results in rising levels of income inequality. Because wages are often tied to jobs rather than to individuals (Granovetter, 1981), and because the pricing and allocation of labor are often governed by administrative rules rather than market forces (Doeringer and Piore, 1971), advocates of this approach contend that to understand how rewards in a society are distributed, one must examine employers' decisions about the allocation of money, opportunity, and status (Baron, 1984; Bidwell et al., 2013). To date, however, few studies have examined how firms affect income inequality in the broader labor market (Sørensen, 2007). Rather, most studies in this area have focused on explaining patterns of inequality within organizations (e.g., Kalleberg and Van Buren, 1994), which may mask the broader impact of employers' choices about how to structure employment relations. For instance, strategies that likely decrease within-firm income inequality, such as outsourcing and layoffs, may increase societal-level inequality (Cobb, 2016). Although previous studies have found that wage variation among employers accounts for a significant part of the overall variance in workers' wages (e.g., Song et al., 2015), we still lack a robust understanding of the ways in which firms affect the distribution of income in a labor market (Sørensen and Sorenson, 2007).

To help address this concern, we leverage insights from research on the effect of firm size on wages (e.g., Oi and Idson, 1999), social comparisons and firm boundaries (e.g., Nickerson and Zenger, 2008), and organizational wage setting (e.g., Granovetter, 1981) to develop a simple theory about how changes in corporate employment affect rates of income inequality in a labor market. Our core argument is that rates of income inequality are affected by the extent to which workers in a labor market are employed by large firms. Prior research has found that otherwise identical workers earn more when working for large firms and that this firm-size wage effect is greater for low-skilled workers than for high-skilled workers (Hollister, 2004). By paying lower-skilled workers a greater wage premium than higher-skilled ones, large firms compress wages. They may do so to reduce the costs of social comparisons, as researchers contend that workers are prone to compare their rewards with those received by similar others (Festinger, 1954; Adams, 1963) and that employees' responses to any perceived inequity arising from these evaluations impose costs on the firm (Cohn et al., 2014). To minimize these costs, firms may attempt to establish a sense of internal pay equity by compressing wages. Because social comparison costs increase with the scale and scope of the firm (Nickerson and Zenger, 2008), large firms should be more likely than smaller firms to compress wages. On average across large firms, the wages for lower-skilled workers are higher than the going market wage, and wages for higher-skilled workers are at

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or below the going wage. This leads us to expect that the overall distribution of wages in a labor market will be narrower when more workers are employed by large firms.

If large firms compress wages at least in part to minimize their social comparison costs, factors that affect the strength of social comparison processes in large firms should moderate the relationship between large-firm employment and income inequality. Prior research has suggested that people compare themselves with those who belong to the same social categories and those about whom they have more information (Lansberg, 1989). Thus when the large corporate employers in a state are more racially diverse and when their employment is more dispersed across establishments, firms are likely to have greater leeway in differentiating rewards across groups of workers, weakening the relationship between large-firm employment and levels of income inequality in the labor market.

We test our hypotheses on the contiguous 48 U.S. states from 1978 to 2008. Research has found abundant evidence indicating that income inequality in the United States grew dramatically during this period (Atkinson, Piketty, and Saez, 2011), and this growth has been highly uneven across states. States such as Arkansas, Florida, New York, and South Carolina experienced a growth in inequality of over 50 percent during the period, while Colorado, Delaware, Minnesota, and South Dakota had less than 38 percent growth. Because changes in income inequality and corporate demography are not uniform across states over time, we can exploit this variation to examine the impact of large-firm employment on state levels of income inequality.

SOCIAL COMPARISON, CORPORATE ORGANIZATION, AND INEQUALITY

Social Comparison and Wage Compression in Firms

One of the most consistent findings in the research on employment and compensation is that otherwise identical workers earn more when working for large firms. Numerous theories for this empirical regularity have been proposed, including differences related to firm size in information acquisition and monitoring costs, technology, organizational characteristics, and union threats, among others (see Oi and Idson, 1999). Though researchers in this area have primarily focused on examining the causes of the firm-size wage effect, its distributional consequences for employees have been largely unexplored. Yet research has found evidence that large-firm employment is particularly rewarding to lower-skilled workers, who receive an even greater wage premium than higher-skilled ones (Hollister, 2004). These findings suggest that whatever factors lead large firms to offer premium wages, the motivation to do so is stronger for lower-skilled, lower-wage workers, leading firms to compress wages. One factor that might explain why large firms compress wages in this manner is the desire to reduce the costs that arise from perceptions of inequity that occur when rewards inside a firm are widely dispersed.

Large firms compress wages to counter the effects of individuals' tendency to compare their rewards with those received by a set of salient referents, as established in early research on social comparisons (Festinger, 1954; Adams, 1963). Individual motivation is influenced by perceptions of fairness or inequity arising from such comparisons, and, complicating this process, individuals tend

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to overestimate their performance (Weinstein, 1980; Larkin, Pierce, and Gino, 2012) and compare their rewards with those who are similar in perceived performance but receive greater rewards (Martin, 1981). To address these perceptions of inequity, individuals engage in such tactics as reducing their effort (Cohn et al., 2014), lobbying managers who assign compensation (Milgrom and Roberts, 1988), leaving the organization (Carnahan, Agarwal, and Campbell, 2012), or otherwise engaging in counterproductive behaviors that are costly for the group (Gino and Pierce, 2010). We refer to these resulting costs as social comparison costs (Nickerson and Zenger, 2008).

Although social comparisons can arise in any group, prior literature has established that similarity, proximity, the degree of interaction, and the availability of information are key determinants of how employees select salient referents (Festinger, 1954; Kulik and Ambrose, 1992). In the marketplace, individuals have little personal contact and less information about the rewards of others, making social comparisons across firm boundaries more difficult (Akerlof and Yellen, 1988). Thus firm boundaries serve as a natural reference point for employees who are more sensitive to pay differences within a firm than between firms.

Also, the social comparison costs are likely to increase with the scale and scope of the firm, such that these costs are proportionately greater in larger firms than in smaller ones (Nickerson and Zenger, 2008). That is, although individuals compare their rewards with those of others irrespective of firm size, the costs that accrue from the perceived inequities arising from these comparisons should be proportionally greater in large firms, for at least two reasons. First, as the number of employees in a firm increases, the disparity between the most and least productive workers should also increase. If workers earned a wage equal to their marginal product, the disparity in performance and thus wages should exacerbate their propensity to engage in invidious social comparisons.[1] Second, large firms are typically more complex and differentiated (Kalleberg and Van Buren, 1996), forcing them to integrate activities that vary in their average marginal products. Workers within these different activities then become part of each other's reference group, raising the potential for perceived inequities (Nickerson and Zenger, 2008).

Given the disruptive nature of social comparisons and their propensity to arise within larger organizations, a key task for a firm's executives is to structure the organization in a way that forms the desired bundle of human assets while minimizing governance and social comparison costs (Zenger and Huang, 2009). A number of scholars have suggested that one of the key ways in which organizational leaders respond to social comparison costs is by weakening the link between pay and performance (e.g., Akerlof and Yellen, 1988). Orthodox economic theory predicts that wages are likely to be based on the relative quality of workers—evidenced by performance, skills, and credentials—as well as on the broader market forces of supply and demand. Wage-setting systems that reward workers based on their marginal product can lead to higher levels

[1] Throughout, we make reference to pay being determined by workers' productivity. We are agnostic, however, regarding whether wages are a true reflection of workers' productivity, which is difficult to measure, or an outcome of social processes that influence perceptions of workers' value (see Avent-Holt and Tomaskovic-Devey, 2014). Here we are concerned only with the going wage in the labor market rather than what factors determine that wage.

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of wage dispersion within organizations because they increase the wage gap between more and less productive workers (Bandiera, Barankay, and Rasul, 2007). Because organizations often lack objective, observable, and nonsocial standards for performance assessments (Larkin, Pierce, and Gino, 2012) and because individuals have a proclivity to overestimate their abilities (Zenger, 1992), paying individuals differently for the same job will likely exacerbate the costs of social comparisons.

In practice, wages are often tied to jobs rather than to individuals (Granovetter, 1981). Historically, large corporate employers systemized the wage-setting process through job evaluation. In a prototypical job evaluation system, each job is evaluated along dimensions such as the required skill, effort, scope of responsibility, and working conditions (Boxall and Purcell, 2011). Jobs are then assigned wages based on their value to the firm and in relation to other jobs within the organization. To ensure consistency and avoid conflict, pay increases are restricted within modest ranges (Beer, Spector, and Lawrence, 1984). One of the consequences of these types of systems is that they ''bend the market wages for each job—raising some and lowering others . . .'' (Cappelli, 2001: 227), reducing wage dispersion in firms compared with the hypothesized marginal product schedule (Sanchez and Levine, 2012). By assigning wages to jobs and establishing criteria by which jobs are compared, employers hope to mitigate perceptions of inequity (Pfeffer and Davis-Blake, 1992). Not surprisingly, studies on wage setting inside large firms confirm that a weak link exists between performance measures and pay and that non-performance-related factors such as workers' age, tenure, and job grade explain most of the variance in pay (e.g., Brown and Medoff, 1989). Though workers may feel that their efforts merit greater pay, they cannot dispute the procedural fairness of these systems and have little recourse in appeals to management to adjust their pay (Zenger and Huang, 2009).

Forming a sense of internal pay equity requires employers to compress pay along two dimensions. First, horizontal compression occurs when those in the same job receive relatively equal pay even if what they contribute varies. Job evaluation systems have been shown to create only modest wage variation among employees doing the same job (O'Shaughnessy, Levine, and Cappelli, 2001). Second, vertical compression occurs when pay differentials across jobs are flattened, despite the varying contributions to organizational output associated with those positions. Flattening differentials between jobs requires that the firm pay above the marginal product for some employees, typically lower-skilled, lower-wage workers, and/or pay near or below the marginal product for other workers, typically higher-skilled, higher-wage ones (Groshen, 1991).

Though large firms may use wage compression to reduce social comparison costs, they may also use it for other purposes. Some researchers speculate that large firms are likely to pay above-market wages to help stave off unionization attempts (e.g., Mellow, 1982). In the United States many types of professional workers have historically not joined labor organizations (Lichtenstein, 2002), so we might expect that wage premiums resulting from unionization threats would be greater for low- to mid-skill workers. Prior research also suggests that large firms offer premium wages because their monitoring and screening costs are higher (Garen, 1985). If these costs vary within the firm such that they are disproportionately higher for the lower-skilled than higher-skilled workers, large firms may have a more compressed wage distribution

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than smaller firms, so as to gain efficiency from standardizing wages across jobs.

Although there may be other rationales for why large firms compress wages, a vast interdisciplinary literature supports the idea that large firms do so to foster perceptions of equity and to lower social comparison costs (e.g., Baker, Jensen, and Murphy, 1988; Lazear, 1989; Groshen and Levine, 1998; Larkin, Pierce, and Gino, 2012). Additionally, research on internal labor markets suggests that one of the overriding goals of organizational wage-setting policies is to use administrative procedures that help foster perceptions of equity and fairness (Doeringer and Piore, 1971). The literature on wage systems based on job evaluations similarly argues that such systems are designed specifically to ensure a more equitable and procedurally fair distribution of wages inside firms (Bartling and von Siemens, 2010). Moreover, there is little empirical support for union threats, monitoring costs, and information-acquisition costs being responsible for compressed wages (see Brown and Medoff, 1989; Cappelli and Chauvin, 1991). Although we cannot definitively rule out these or other reasons that large firms may be more likely than smaller ones to compress wages, the desire to maintain perceptions of equity seems a crucial motivator.

Social Comparison, Wage Compression, and Firm Boundaries

From 1978 to 2008, large U.S. corporations also undertook a variety of tactics that helped redraw firm boundaries. As a result of divestitures, spin-offs, and other forms of restructuring associated with de-conglomeration, the relative size of the largest employers declined. The number of workers employed by Fortune 500 firms dropped from 16.2 million in 1979 to 11.5 million in 1993 (Useem, 1996). Breaking up these conglomerates was expected to increase the variation in performance across firms' subunits (Jensen, 1993), and the less-profitable subunits would no longer be subsidized by the more-profitable ones. If these diversified business units varied in terms of their average marginal product schedule, separating them into distinct organizations would allow pay to be set more closely to market levels. Batt (2001) found support for these claims in her study of wage inequality in the telecommunications industry: the breakup of the Bell system in 1984 allowed wage inequality among telecommunications service and sales workers to grow over 30 percent between 1983 and 1998.

Though the ''bust-up'' takeover wave subsided by the end of the 1980s, restructuring persisted throughout the following two decades. Beginning in the early 1990s, the use of outsourcing helped disaggregate corporate employment further. When a large firm outsources some of its tasks, the distribution of jobs within the firm changes as entire functions and departments are extricated from within the firm's boundaries and handed to outside vendors. Cappelli (1999: 74) recounted how IBM outsourced all clerical jobs below the rank of executive secretary to employment agencies such as Manpower, Inc., which meant that these jobs became separated from the internal labor markets that reduced wage disjunctures within the firm. Dube and Kaplan (2010) found that outsourced janitors and security guards routinely earned less than their in-house counterparts, as firms removed those mid- to high-paying jobs and turned them into lower-paying jobs. By moving employees outside the boundary of the firm, outsourcing limits the amount of within-firm heterogeneity of

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abilities and rewards, reducing envy and social comparison costs (Rawley and Simcoe, 2010: 1535).

Though the dynamics mentioned above, in aggregate, shrank firm boundaries such that the average proportion of U.S. workers employed in the largest 100 firms declined between 1978 and 2008 (Davis and Cobb, 2010), the trends varied across the U.S. states: the proportion of the labor force employed by firms with at least 10,000 employees in the U.S. declined in 17 states and increased in 31 states. We exploit this variance to examine whether within-state changes in employment at large firms have affected changes in the rates of income inequality in those states over time.

Wage Compression and State-level Income Inequality

Though research has focused primarily on how social comparison costs—and the strategies that managers employ to mitigate them—affect organizational outcomes, these strategies may also affect the distribution of income in a labor market. We do not suggest that all large firms compress wages or even that, within a given firm, all employees are subject to the same wage-setting considerations (Lepak and Snell, 1999). But because large firms on average are expected to compress wages to maintain perceptions of equity (Nickerson and Zenger, 2008), we expect to find, controlling for the size of a state's labor force, a negative relationship between large-firm employment and income inequality at the labor-market level.

To illustrate the mechanisms undergirding the aggregation process we describe above, consider a hypothetical state where in year 1 all labor market participants work for a single employer that compresses wages to constrain the disjuncture between differentially skilled workers. In this firm, lower-skilled workers are paid, on average, above their marginal product while higher-skilled workers are paid closer to or below their marginal product. Income inequality in this case, as measured by the Gini coefficient, is 20.4, as shown in figure 1.[2] In year 2, half of all workers remain employed by the large firm, and the other half are outsourced, work as independent contractors, and get paid according to their marginal product. The slope between wages and skill will be greater than in year 1, and the Gini coefficient increases to 25.8. In year 3, all labor force participants are independent contractors paid according to their marginal product, and the Gini coefficient increases to 32.7. We therefore suggest the following hypothesis:

Hypothesis 1 (H1): As fewer (or more) workers in a state are employed by large firms, income inequality in the state will increase (or decrease).

[2] In this example, skill levels range from 0 to 100 in increments of two, and an equal number of individuals works at each skill level in each year. Individual wage rates vary depending on whether the individual is employed by the firm or is an independent contractor. We calculated the wage rates using the following formulas:

$$W_{large\ firm} = \frac{\left(s + \left[\left(\frac{1}{2}\right) \times \ln(s)\right]\right)}{2} \times \$1{,}000$$

$$W_{market} = s \times \$1{,}000$$

where s equals the worker's skill level. The Gini coefficient was calculated for each state-year using the *ginidesc* command in Stata.

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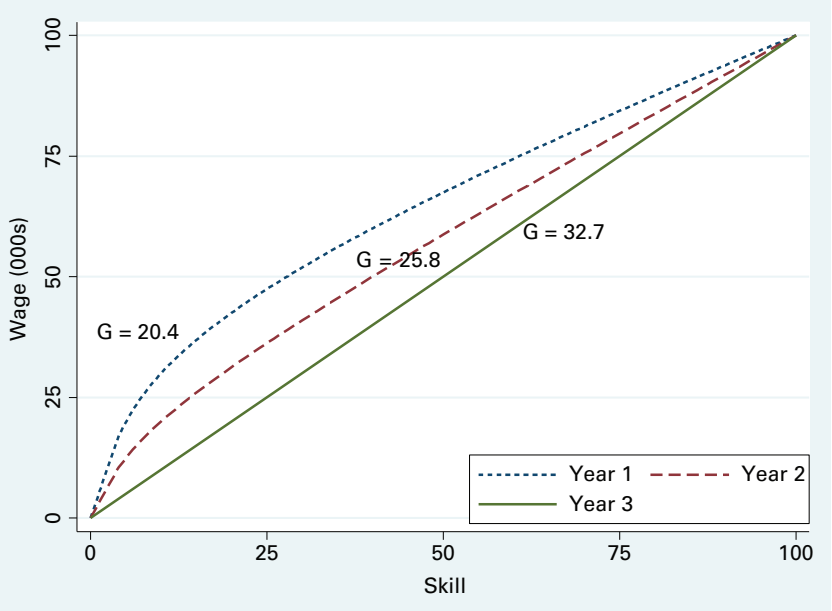
Figure 1. Wage compression and state-level income inequality.



Though organizational membership serves as a powerful force in determining the referents used in social comparisons within organizations, additional factors may influence this process, in particular racial diversity and establishment dispersion.

Social Comparison and the Moderating Impact of Racial Diversity

Prior research has established that social comparison processes are affected by individuals' propensity to separate collectives into smaller social categories (e.g., Blanton, Crocker, and Miller, 2000). Because demographic characteristics are commonly used to distinguish social categories (Tajfel, 1978) and shape the formation of identity groups (Alderfer, 1977), demographic diversity may create a larger number of social categories within the firm, thereby minimizing the scope of social comparisons. Employees who are demographically similar are more likely to view themselves as part of the same social category and select other category members as their referents when making social comparisons (Goodman, 1977). That is, whites are more likely to compare their opportunities and rewards with other whites, blacks with blacks, etc. People tend to make within-group comparisons because they assume in-group referents are similar in attributes related to achievement, such as education and background (Gibson and Lawrence, 2010). We should expect, then, that social comparisons will operate more strongly within these social categories than between them.

To compare differences between groups, individuals engage in social contrasting (Harris, Anseel, and Lievens, 2008). Although people often seek information about others who are dissimilar, social contrasting does not assume expectations of equal entitlement across social categories. Rather, social contrasting assumes that individuals will expect individuals who are dissimilar to

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receive unequal treatment (Lansberg, 1989). The unequal outcomes received by disadvantaged members are often then appraised as legitimate (Wood, 1994) or are otherwise discounted (Markovsky, 1985). Consequently, comparisons with dissimilar individuals do not invite the same sorts of reactions as do comparisons with similar ones. More demographically homogenous firms should therefore have a smaller number of social categories, which would expand the number of salient referents within each category, placing greater pressure on organizations to employ strategies to minimize social comparison costs.

Yet studies have also shown that larger firms are more likely to standardize their wage-setting functions, which can help close the wage gap between the more-advantaged and less-advantaged groups (Hirsh and Kornrich, 2008). This standardization implies that minorities working in large firms receive greater rewards than do otherwise similar minorities working in small firms and that there should be a narrower wage gap between otherwise similar white and minority workers in large firms. In the United States, evidence reveals that racial wage gaps have remained relatively constant (see Leicht, 2008) or declined modestly over the past 40 years (Lang and Lehmann, 2012), but large firms have become much more racially diverse during this period, suggesting that the increased diversity of large-firm employment has not closed racial wage gaps, at least in the aggregate.

Moreover, research has found that perceptions of fairness and egalitarianism are stronger in more demographically homogenous groups (Rothschild-Whitt, 1979) and that diverse groups have more dispersed wages than homogenous groups (Pfeffer and Davis-Blake, 1990). Carrington and Troske (1998) found in a study of large manufacturing firms that most of the black–white wage gap among men was accounted for by within-plant differences. Additionally, they found that whites earn more in plants with more blacks and blacks earn the most in plants that are nearly all white. In other words, while racial minorities may benefit from large-firm employment, that advantage occurs when the overall diversity of the firm is lower. Consistent with our argument that the need to compress wages horizontally and vertically is weaker when firms are more racially diverse, the wage gaps between minority and white workers will also be greater. Accordingly, we expect that social comparisons will operate less vigorously as large firms become more racially diverse, allowing managers to engage in less wage compression.

Hypothesis 2 (H2): The negative effect of large-firm employment on income inequality will weaken (or strengthen) as employment in large firms in a state becomes more (or less) racially diverse.

Social Comparison and the Moderating Impact of Establishment Dispersion

Managers can also reduce social comparison costs by increasing the physical and informational distance between jobs (Nickerson and Zenger, 2008: 1437). Prior work has established that distance serves as an important barrier to the diffusion and exchange of information (Sorenson, 2003), which could hinder workers' ability to know about the rewards of less-proximate others. Distance will also hinder the formation of social ties (Festinger, Schachter, and Back,

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1950), which are crucial to the formation of reference groups (Lawrence, 2006). Conversely, when workers are located in close proximity to one another, they are more likely to identify each other as salient referents, which can increase the costs of social comparisons if their income is more dispersed (Obloj and Zenger, 2015).

One proxy for the physical and informational distance between workers in a firm is the extent to which large-firm employment is spread out across a larger number of establishments—that is, separate locations where the firm's business is conducted. As firms grow, they often build or acquire new plants and subsidiaries in different locations, which increases both the physical and informational distance between jobs. Geographic expansion may give firms access to new markets, lower costs, and other operational benefits, and it can also lower social comparison costs as workers have a smaller set of salient referents. In fact, one reason firms may create separate establishments is to separate higher-wage workers from lower-wage ones to reduce social comparison costs (Nickerson and Zenger, 2008).

Imagine a firm that employs two types of workers: highly skilled engineers and lower-skilled production workers. Were the firm to have all workers employed in the same location, giving a raise to the engineers would likely elicit envy among production workers. Were production and engineering separated in different establishments, however, production workers might be less aware of wage increases for engineers. Thus by segregating high- and low-skill workers, the firm may be better able to adjust wages for engineers without having to increase wages for production workers (see Obloj and Zenger, 2015).

But this relationship might not be so straightforward. If, for example, large firms standardize wages as a means to economize on monitoring, information, and/or administrative costs, we might expect that the firms' wage distributions will be unaffected by establishment dispersion. Furthermore, employees may still have information on wage differentials across establishments. Williamson (1985) recounted the story of a failed post-merger integration between Tenneco, Inc. and Houston Oil and Minerals Corp. because of the variance in how workers from the old and new firms were paid, suggesting that maintaining wage-setting consistency across establishments is still necessary to minimize social comparison costs. Despite these possibilities, if establishing new plants and subsidiaries allows firm managers to have more discretion in differentiating rewards across workers or to segregate higher- and lower-income workers, managers of these firms will have less need to compress wages. Hence we expect that when large firms' employment is spread out over a larger number of establishments, overall social comparison costs should be lower and firms will have less need to compress wages:

Hypothesis 3 (H3): The negative effect of large-firm employment on income inequality will weaken (or strengthen) as employment in large firms in a state becomes more (or less) dispersed across establishments.

METHODS

Unit of Analysis and Sample

To examine the connection between organizational demography and rising income inequality at the state level, we used establishment-level employment

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data derived from reports filed annually with the Equal Employment Opportunity Commission (EEOC), known as EEO-1 reports.[3] As mandated by Title VII of the Civil Rights Act (1964), the EEOC requires all private work establishments with at least 100 employees, all federal contractors with at least 50 employees, and first-tier subcontractors in agreements worth at least $50,000 to file these reports each year. EEO-1 reports cover approximately 40 percent of private-sector employment nationally (Robinson et al., 2005) and contain information on an establishment's size, parent company, industry, demographic composition (e.g., race/ethnicity, sex), and employment across nine occupational categories: officials and managers, professionals, technicians, sales workers, administrative support workers, craft workers, operatives, laborers and helpers, and service workers. Because the data are at the establishment level (i.e., individual work sites) rather than firms as a whole, we were able to isolate firm employment at the state level. We incorporated data from a variety of other sources as well, including the Bureau of Labor Statistics, Bureau of Economic Analysis, and U.S. Census Bureau. Table 1 contains information on the data sources for each of the variables used in the study.

Though we cannot directly assess wage compression or the presence of corporate restructuring, we can capture shifts in the number of workers in a state employed by large firms as well as the racial diversity and establishment dispersion of large firms, allowing us to determine whether these organizational factors have influenced changes in income inequality over time. The sample includes all U.S. states for which we could find reliable measures for income inequality, corporate employment, racial diversity, establishment dispersion, and the control variables between 1978 and 2008. Because of missing data on some of the covariates, the final balanced sample consists of 1,488 observations from the 48 contiguous states.[4]

We chose to analyze states because there are far better data for states than for any other subnational entity. Annual historical data on income inequality and other covariates are not available below the state level, complicating efforts to examine factors related to income inequality at lower levels of analysis. Furthermore, while conventional wisdom suggests that workers are more mobile now than in years past, evidence shows that interstate migration is low and has been falling since the early 1980s (Molloy, Smith, and Wozniak, 2013), suggesting that states are a suitable labor market for the study of firms and income inequality.

Measures

Dependent variable. The measure of income inequality used in this study is the Gini coefficient, which measures the extent to which the distribution of income deviates from a perfectly equal distribution. The Lorenz curve is a graphical representation of cumulative income share on the vertical axis and the

[3] The EEO-1 reports are confidential and not publicly available; the data were obtained from the EEOC through an Intergovernmental Personnel Act (IPA) agreement by one of the authors.

[4] Data on educational attainment were not available for Alaska or Hawaii, and there appear to be issues with missing employment data for both of these states prior to 1986. Including both states without the measures of educational attainment from 1986 to 2008 does not materially affect the results.

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Table 1. Means, Standard Deviations, and Data Source of Variables in the Analysis of State-level Income Inequality (N = 1,488)*

Variable	Mean	S.D.	Min.	Max.	Source
Gini coefficient	57.28	7.31	43.90	87.78	Frank (2009)
Large-firm employment (log)	12.20	1.21	9.31	14.75	EEO-1
Large-firm racial diversity	49.35	10.37	24.80	81.58	EEO-1
Large-firm establishment dispersion	93.96	3.60	57.78	98.84	EEO-1
Labor force (log)	14.42	0.99	12.37	16.85	BLS (State & Area Employment, Hours, & Earnings)
GDP per capita (log)	10.04	0.47	8.87	11.17	BEA (Regional Economic Accounts)
Black employment (%)	10.61	9.41	0.24	43.20	EEO-1
Urban population (%)	68.65	14.57	32.20	94.46	U.S. Census (Urban Percentage of the Population for States, Historical)
Large-firm service employment (%)	39.80	8.64	17.14	65.98	EEO-1
Government employment (%)	16.01	3.03	10.11	25.72	U.S. Census (County Business Patterns)
Manufacturing employment (%)	19.49	8.19	4.01	42.81	U.S. Census (County Business Patterns)
Retail employment (%)	19.32	4.12	11.18	28.75	U.S. Census (County Business Patterns)
College graduates (%)	14.23	4.08	6.44	30.56	Frank (2009)
Foreign direct investment (log)	8.33	1.20	3.86	11.16	BEA (Activities of U.S. Affiliates of Foreign Multinational Enterprises)
Union density (%)	14.55	6.75	2.30	38.30	Hirsch and Macpherson (2003)
Unemployment (%)	5.73	1.95	2.30	17.40	BLS (Local Area Unemployment Statistics)
Democrats in state legislature (%)	56.00	16.94	10.71	98.10	Klarner (2014)
Tax rate (%)	44.31	8.44	28.00	75.94	NBER
Minimum wage	3.13	0.38	2.55	4.08	TPC; DOL (Wage & Hour Division)
Government transfers per capita (log)	4.75	0.19	4.18	5.37	BEA (Regional Economic Accounts)
Patents (per 000s)	0.42	0.39	0.02	2.72	Lai et al. (2015)

* EEO-1 = EEOC's annual EEO-1 reports; BLS = Bureau of Labor Statistics; BEA = Bureau of Economic Analysis; NBER = National Bureau of Economic Research; TPC = Tax Policy Center; DOL = Department of Labor.

distribution of the population on the horizontal axis. Each point on the Lorenz curve represents the share of income held by *x* percent of the population. The Gini coefficient measures the percentage of area that lies between the Lorenz curve and a line of perfect equality. The coefficient varies between 0, which represents complete equality, and 1, which indicates complete inequality (i.e., one person earns all income). For ease of interpretation, we express the Gini coefficient in percentage terms.

The historical Gini coefficient data were compiled from pre-tax income from IRS tax records by Frank (2009). At the national level, capital income (e.g., capital gains and dividends) is separated from salary income; at the state level, however, there is no way to distinguish between the two sources. Atkinson, Piketty, and Saez (2011) found that, for top earners in the United States since 1970, income is derived primarily from salary, suggesting that any concerns regarding whether our measure of income inequality is affected by capital income are minimal. To ensure that our results were not sensitive to the

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ultimate source of the data, we also used Gini data taken from the Current Population Survey (CPS), available through the University of Texas Inequality Project (Galbraith and Hale, 2008). The results are consistent with those presented here.

Independent variables. Our main independent variable is *large-firm employment*. Corporate employment data at the state level were derived from EEO-1 reports, as described above. One challenge in capturing employment by a state's largest employers is that there is no consensus about what constitutes a ''large'' firm. Prior studies have used 1,000 employees as the cutoff (e.g., Bidwell, 2013), which is the largest category used in many individual-level datasets such as that of the CPS. The U.S. Census Bureau, however, provides aggregated employment data at the national level for firm sizes up to 10,000 employees. In the analyses presented below, we used as our measure of large-firm employment the log value of the number of workers in each state employed by firms with 10,000 or more workers nationally.[5] Thus if a firm has 10,000 domestic workers—5,000 in State A and 5,000 in State B—our measure of large-firm employment in each state would reflect the 5,000 workers employed in each state. The correlations between the log number of workers in a state employed by firms with 1,000, 5,000, 10,000, 20,000, and 50,000 or more workers all exceed .97. We ran analyses using these cutoffs, and the results are largely consistent with those presented below.

Our examination of racial diversity's effect on the relationship between large-firm employment and income inequality is based on the conceptualization of diversity as ''variety'' (Harrison and Klein, 2007), with specific interest in the distribution of employees across distinct racial categories within firms. These racial categories do not have meaningful continuous distances between them, so we created a Blau index of racial diversity for each firm from EEO-1 reports to capture the spread of individuals across qualitatively distinct racial categories. The Blau index reflects the chance that two randomly selected group members belong to different categories. Its computational formula is $1 - \Sigma p_k^2$, where p is the proportion of unit members in the kth category. We then standardized the Blau index by dividing it by its theoretical maximum, $(K–1)/K$, where K represents the total number of categories, to create the index of quality variation (IQV) of racial diversity for each large firm. We have four race categories—white, black, Hispanic, and Asian—so the theoretical maximum for racial diversity is .75.[6] We took a weighted average of the IQV of racial diversity for all the large firms that employed workers in each state in each year and multiplied this value by 100 for ease of interpretation to derive our measure of

[5] Davis and Cobb (2010) used the ratio of employees working in the largest firms over the size of the labor force as their measure of large-firm employment. Following this approach would allow us to capture the hypothesized dynamics in a single, self-contained measure. Yet prior research has argued that using ratios in regression analyses may lead to spurious findings because the correlations among ratios will produce a non-zero association even though the components (i.e., the numerators and denominators) are unrelated (Wiseman, 2009). In the supplemental analyses we test our hypotheses using the ratio measure of large-firm employment.

[6] Because whites and Asians tend to be advantaged in the labor market more than blacks and Hispanics, we also calculated an IQV measure of inequality using two categories: (a) white and Asian, and (b) black and Hispanic. The results are similar to those presented below.

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large-firm racial diversity. In 1978, the average racial diversity of large firms was 36.53 (s.d. = 5.05). By 2008, that number was 65.35 (s.d. = 5.30). In supplementary analyses, we examined alternative measures of racial diversity.

The EEO-1 reports contain employment data for each establishment, allowing us to calculate how dispersed each firm's employment was across establishments. To examine the effect of *large-firm establishment dispersion* on the relationship between large-firm employment and income inequality, we created a Blau index to indicate how dispersed employment was in each large firm.[7] We took a weighted average of the Blau index for all the large firms that employed workers in each state in each year, giving us a state-level index of establishment dispersion. Once again, we multiplied the measure by 100. In 1978, the average establishment dispersion of large firms was 94.37 (s.d. = 2.37). By 2008, that number was 97.56 (s.d. = 3.19). In the supplemental analyses, we examined an alternative measure of establishment dispersion.

Control variables. Income inequality may relate to several factors not included in the discussion of the hypotheses. It is possible that large-firm employment, diversity, and establishment dispersion are due, in part, to the size of a state's labor force and economy. To account for these possibilities, we included a log measure of each state's nonfarm *labor force* and the natural log of the state's real gross domestic product per capita (*GDP per capita*).

Because we were interested in how racial diversity affects the relationship between large-firm employment and income inequality, we included a measure of the percentage of each state's labor force that is black (*black employment*). We tested alternative measures, such as the percentage that is black and Hispanic and the percentage that is nonwhite, and the results are similar to those presented below. The Bureau of Labor Statistics (BLS), in its ''Geographic Profile of Employment and Unemployment,'' presents collected data that break down each state's labor force by race for 1970, 1980, 1990, and annually from 1999 onward. We linearly interpolated the BLS data for the intervening years and found that this measure and our EEO-based measure were correlated at .98. The results are unaffected by the data source. Because research has shown that there are differences in workers' skills and returns to workers' skills in urban versus non-urban settings (Bacolod, Blum, and Strange, 2009), we controlled for the proportion of each state's population that lives in urban areas (*urban population*). We linearly interpolated these data for the relevant years between 1970, 1980, 1990, 2000, and 2010.

It is possible that racial diversity and establishment dispersion are affected by changes in the types of occupations large firms now employ. To account for these shifts, we created variables to represent the average proportion of large-firm employment in a state in production, professional, and service occupations. Following Lin (2016), we divided the total number of workers in each occupation by the total number of workers employed by large firms for each state in each year. Production employment includes technicians, craft workers,

[7] Because there is no theoretical maximum for the number of establishments a firm can have, we did not standardize our measure of establishment dispersion. For robustness, however, we assumed a theoretical maximum equal to the largest number of establishments we observed in our sample and standardized our measure of establishment diversity with this number. The results are nearly identical to those presented below.

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operatives, laborers, and helpers. Professional employment includes managers and professionals. Service employment includes sales workers, administrative support workers, and service workers. Because the three measures are highly correlated with one another, we include only the *large-firm service employment* measure in our analyses. We also analyzed production and professional employment in separate equations, and the results were similar to those presented below.

To rule out the possibility that our measures of large-firm employment, racial diversity, and establishment dispersion simply capture the propensity of workers to be employed in certain industries that vary in their pay practices, we included several state-level control variables related to industry employment. Because there are a limited number of within-state observations, we faced some constraints regarding the number of industry employment variables that we could include in our analyses. To determine which measures to include, we regressed the percentage of employment in the agricultural, manufacturing, construction, mining, retail, FIRE (finance, insurance, and real estate), government, and temporary employment sectors along with year dummies on state levels of income inequality and found that manufacturing and government employment had a significant and negative relationship; retail had a significant and positive relationship; and agricultural, construction, mining, FIRE, and temporary employment had no relationship with income inequality. Based on these results, we included measures of *government employment, manufacturing employment*, and *retail employment*.[8]

The relative skill of workers in a state, which some scholars have argued is a direct cause of rising income inequality (e.g., Autor, Levy, and Murnane, 2003), may also influence large-firm employment, diversity, and establishment dispersion. Although we do not have data on the individual characteristics of employees, a common proxy for workers' skill is the level of workers' education in a population (Alderson and Nielsen, 2002); thus we included a measure of the percentage of individuals in the state who are college graduates (*percentage college graduates*). To account for the influence of globalization, we included a measure of the logged real foreign direct investment. Rates of income inequality as well as large-firm employment, diversity, and establishment dispersion may also be influenced by rates of unionization, which have been found to be negatively related to income inequality (Western and Rosenfeld, 2011), so we included a control for *union density*. Additionally, we included a measure of the state's rate of *unemployment* to account for broader labor market conditions that may affect the relationship between large-firm employment and income inequality.

We also included measures to capture the impact of public policy on income inequality. A number of researchers have suggested that the political ideology in a region has important implications for levels of income inequality (e.g., Volscho and Kelly, 2012). To account for the extent of a state's liberality, we took an equally weighted average of the percentage of Democrats in each state's House of Representatives and Senate for each year of study (*Democrats in state legislature*). To test the influence of a specific policy designed to redistribute income more directly, we included a measure of the

[8] As a robustness check, we also ran models including agricultural, construction, mining, FIRE, and temporary employment, and the predicted findings are unaffected by their inclusion.

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state income tax rate. The rate is the maximum rate for an additional $1,000 of income on an initial $1,500,000 of wage income split evenly between a husband and wife filing a joint tax return, and it includes combined state and federal income taxes.

Studies have also found minimum wage rates to be an important predictor of income inequality. To calculate the real *minimum wage*, we took the greater value between federal and state minimum wage rates.[9] In cases in which the minimum wage changed in the middle of the year, we took a weighted average of the minimum wage pre- and post-change. We then deflated this by the consumer price index (1982–1984 = 100). To capture the extent of redistribution policy at the state level, we included a measure of the *real government transfers per capita*. We included only total state-level receipts of retirement, income maintenance, and state and federal unemployment benefits rather than cash-in-kind benefits such as medical and food assistance. The results are similar if we use all benefits. We divided transfers by the population of the state and took the natural log of this figure.

Aghion and colleagues (2015) recently used state-level panel data to investigate the co-occurrence of rising rates of innovativeness and income inequality. Although their study included several measures of income inequality, they found a positive and significant relationship between innovation and the top 1-percent income share, specifically, and not the top 10-percent income share or other measures that capture the entire distribution of incomes (e.g., the Gini coefficient). Despite there being a significant relationship only between innovation-led growth and top incomes in their study, we included a control for state-level *innovation*, as it may affect the relationship between large-firm employment and income inequality. Innovation is captured by the number of patents granted by the U.S. Patent and Trademark Office per 1,000 people.

We also included year dummy codes in all of our analyses, which allowed us to attribute some of the variation in our data to unobserved events in a given year, such as events that affected overall changes in income inequality and the other covariates.[10] The correlation matrix is presented in table 2. We checked for possible multicollinearity in our model by conducting a variance inflation factor (VIF) test. The maximum VIF score obtained for our independent variables was 1.97 and the overall mean VIF was 2.72, both below the commonly used threshold value of 10 (Kennedy, 2003), indicating that multicollinearity was not a concern.

[9] Some researchers have argued that, because federal minimum wage rates do not apply to all workers, one should examine state minimum wage rates even if they are below the federal rate (e.g., Volscho, 2005). But a significant percentage of workers are covered by federal wage laws, and where workers are covered by both state and federal law, the higher rate applies. Because there are 230 state-years in which the state had no minimum wage and 531 state-years in which the state minimum was lower than the federal rate, using the state rather than the higher of the federal or state rate may overstate the impact of state rates on income inequality.

[10] Because we expected that our key independent measures should have a contemporaneous effect on individual income and thus income inequality at the state level, we did not include lagged measures of our measures in our main analyses. For robustness, we ran analyses using lagged measures of the covariates to predict state rates of income inequality. The results are similar to those presented below and are available upon request.

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Table 2. Correlation Matrix

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Gini coefficient											
2. Large-firm employment (log)	.12										
3. Large-firm racial diversity	.77	.34									
4. Large-firm establishment dispersion	–.30	–.27	–.17								
5. Labor force (log)	.15	.98	.34	–.23							
6. GDP per capita (log)	.77	.24	.83	–.19	.24						
7. Black employment (%)	.09	.45	.32	–.01	.40	.08					
8. Urban population (%)	.12	.54	.31	–.17	.54	.29	.03				
9. Large-firm service employment (%)	.56	–.04	.58	–.03	.03	.59	–.16	.34			
10. Government employment (%)	–.23	–.46	–.30	.22	–.41	–.46	.09	–.33	–.22		
11. Manufacturing employment (%)	–.49	.17	–.52	–.09	.10	–.55	.19	–.28	–.71	–.07	
12. Retail employment (%)	–.45	–.42	–.67	.19	–.37	–.63	–.24	–.27	–.26	.51	.18
13. College graduates (%)	.56	.23	.58	–.18	.25	.79	–.03	.38	.49	–.44	–.44
14. Foreign direct investment (log)	.30	.83	.50	–.16	.84	.46	.43	.47	.16	–.34	–.13
15. Union density (%)	–.42	.15	–.44	–.07	.15	–.34	–.26	.25	–.25	–.21	.29
16. Unemployment (%)	–.32	.10	–.33	.06	.10	–.49	.11	–.03	–.40	.22	.31
17. Democrats in state legislature (%)	–.24	.15	–.13	.01	.13	–.30	.45	–.06	–.29	.14	.33
18. Tax rate (%)	–.54	–.10	–.46	.09	–.12	–.59	–.07	–.07	–.40	.21	.35
19. Minimum wage	–.50	–.07	–.46	.02	–.08	–.56	–.13	.04	–.38	.12	.35
20. Government transfers per capita (log)	.46	.16	.42	–.12	.17	.52	–.02	.00	.31	–.44	–.14
21. Patents (per 000s)	.33	.21	.37	–.20	.19	.57	–.13	.31	.24	–.51	–.21

Variable	12	13	14	15	16	17	18	19	20
13. College graduates (%)	–.52								
14. Foreign direct investment (log)	–.42	.31							
15. Union density (%)	.10	–.15	–.01						
16. Unemployment (%)	.29	–.45	.07	.37					
17. Democrats in state legislature (%)	.06	–.22	.09	.09	.33				
18. Tax rate (%)	.16	–.38	–.31	.33	.26	.16			
19. Minimum wage	.14	–.28	–.28	.46	.23	.25	.68		
20. Government transfers per capita (log)	–.41	.37	.27	.15	.07	–.02	–.31	–.28	
21. Patents (per 000s)	–.51	.66	.25	.04	–.27	–.20	–.17	–.02	.31

Analytic Approach

In this study, the unit of analysis is the state, and the unit of observation is the state-year. Our dependent variable is income inequality, which we measured using the Gini coefficient. To examine the relationship between income inequality and large-firm employment, racial diversity, and establishment dispersion, we used a fixed effects, pooled time-series regression analysis. This specification is achieved by subtracting the values of each observation from the state mean, removing all between-firm differences, and leaving only within-state variation to be explained by the covariates (Wooldridge, 2002). A fixed effects framework helps rule out the possibility that states had stable unobserved factors that influenced income inequality. Specifically, we estimated the effects of the covariates on the Gini coefficient as follows:

$$Y_{ij} = \beta_0 + \beta_1 X_{1ij} + \beta_2 X_{2ij} + \beta_3 \left(X_{1ij} \times X_{2ij}\right) \ldots + \beta_p X_{pij} + \alpha_j + \varepsilon_{ij}$$

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where all state-specific effects are accommodated by α_j, the error term is captured by ε_{ij}, and within-state effects are explained by the covariates, represented by the X's. Some scholars question the use of fixed effects in cross-national studies of income inequality, noting that much of the variance occurs between countries (Alderson and Nielsen, 2002). Prior work, however, has suggested that these concerns are minimal when analyzing states (Frank, 2009).

RESULTS

The results of the fixed effects regressions are listed in table 3. Model 1 contains the results of the controls, and in model 2, we introduced our measure of large-firm employment. We included the main-effect measures of racial diversity and establishment dispersion in model 3. In models 4 and 5, we tested the interactions between large-firm employment and racial diversity and large-firm employment and establishment dispersion, respectively.

A number of control variables are significantly related to changes in state income inequality. The size of the labor force is positively related to income inequality, as is foreign direct investment. Conversely, the proportion of workers employed in manufacturing industries, the real minimum wage, and the percentage of Democrats in the state legislature are negatively related to income inequality. Furthermore, we also see a positive and significant relationship between the main effect of large-firm racial diversity and income inequality. Though we did not hypothesize this main effect, the results were unexpected, as they indicate that income inequality in a state increases as the racial diversity of large firms in a state increases. We discuss this finding in the Discussion section.

For hypothesis 1, we predicted that large-firm employment would be negatively related to income inequality. The results indicate that income inequality is lower when more workers in a state are employed by large firms, supporting the first hypothesis. Based on the results in model 3, a 10-percent increase (or decrease) in non-log transformed large-firm employment lowers (or raises) the Gini value by .29 points (.51 percent). Though it appears to be somewhat small, the size of the effect of large-firm employment on income inequality is net of controls and state and year fixed effects. Furthermore, Volscho (2005) found that a $ 0.81 increase in the real hourly minimum wage rate would decrease the Gini coefficient by .10 points for the average state, suggesting that large-firm employment has a similar effect on state levels of income inequality as a $2.40 increase in the real minimum wage. In the supplemental analyses, we further discuss the magnitude of the hypothesized effects on changes in income inequality.

Hypothesis 2 predicted that more racial diversity in large employers in a state would moderate the relationship between large-firm employment and income inequality such that the effect becomes weaker. In support of hypothesis 2, the results in model 4 reveal a positive and significant relationship between income inequality and the interaction of large-firm employment and diversity. For hypothesis 3, we predicted that when large-firm employment is more dispersed across establishments, the negative relationship between large-firm employment and income inequality would become weaker. The coefficient for the interaction term is significant and positive, which supports hypothesis 3.

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Table 3. Fixed Effects Regressions on State Income Inequality, 1978–2008*

Variable	1	2	3	4	5
Large-firm employment (log)	–	–2.886•••	–3.034•••	–2.644•••	–3.121•••
		(.474)	(.496)	(.504)	(.495)
Large-firm racial diversity	–	–	.105•••	.124•••	.110•••
			(.025)	(.026)	(.025)
Large-firm employment × Large-firm racial diversity	–	–	–	.019•••	–
				(.005)	
Large-firm establishment dispersion	–	–	–.035	–.039	–.030
			(.022)	(.022)	(.022)
Large-firm employment × Large-firm establishment dispersion	–	–	–	–	.035••
					(.011)
Labor force (log)	.055	3.815•••	3.710•••	2.390•	3.936•••
	(.786)	(.992)	(1.009)	(1.063)	(1.009)
GDP per capita (log)	–2.434•	–1.643	–1.610	–.947	–1.821
	(.995)	(.991)	(.986)	(.996)	(.985)
Black employment (%)	–.061	–.049	–.094	–.131•	–.098
	(.051)	(.050)	(.051)	(.051)	(.051)
Urban population (%)	.012	.025	.005	.002	.000
	(.035)	(.034)	(.034)	(.034)	(.034)
Large-firm service employment (%)	.010	–.019	–.022	.006	–.022
	(.014)	(.015)	(.015)	(.017)	(.015)
Government employment (%)	.321•••	.281•••	.267••	.195•	.281•••
	(.086)	(.085)	(.084)	(.086)	(.084)
Manufacturing employment (%)	–.163•••	–.104•••	–.119•••	–.089••	–.123•••
	(.025)	(.026)	(.027)	(.028)	(.027)
Retail employment (%)	.033	.060	.093	.094	.096
	(.049)	(.049)	(.049)	(.049)	(.049)
College graduates (%)	–.114••	–.104•	–.108•	–.104•	–.102•
	(.043)	(.043)	(.043)	(.042)	(.042)
Foreign direct investment (log)	.879•••	1.007•••	.986•••	.890•••	.980•••
	(.165)	(.164)	(.163)	(.165)	(.163)
Union density (%)	–.010	.016	.017	.023	.010
	(.028)	(.028)	(.028)	(.028)	(.028)
Unemployment (%)	–.086	–.064	–.062	–.066	–.055
	(.053)	(.052)	(.052)	(.052)	(.052)
Democrats in state legislature (%)	–.039•••	–.038•••	–.040•••	–.033•••	–.042•••
	(.007)	(.007)	(.007)	(.007)	(.007)
State income tax rate (%)	–.050	–.086	–.069	–.079	–.067
	(.075)	(.074)	(.074)	(.074)	(.074)
Minimum wage	–.744•	–.750•	–1.007••	–1.040••	–.913••
	(.320)	(.316)	(.323)	(.322)	(.324)
Government transfers per capita (log)	1.859	2.162•	2.084	3.027••	1.778
	(1.097)	(1.084)	(1.078)	(1.101)	(1.079)
Patents (per 000s)	.166	–.113	–.060	.075	–.129
	(.246)	(.247)	(.258)	(.259)	(.258)
Constant	49.763•••	51.030•••	52.181•••	53.140•••	52.014•••
	(2.180)	(2.163)	(2.167)	(2.171)	(2.160)
R-squared	.81	.86	.88	.89	.88

• $p < .05$; •• $p < .01$; ••• $p < .001$.

* 1,488 observations in 48 states. Year dummies are included in all models. Standard errors are in parentheses.

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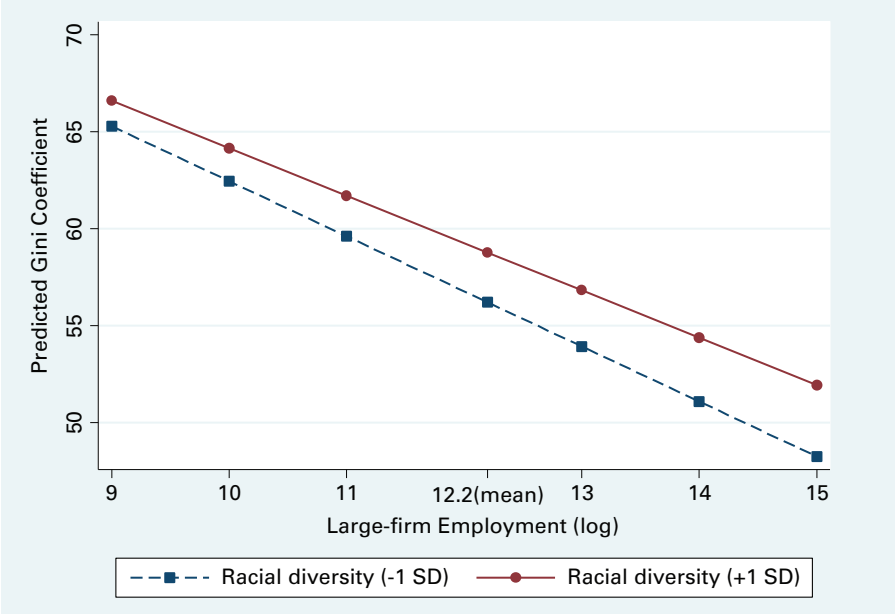
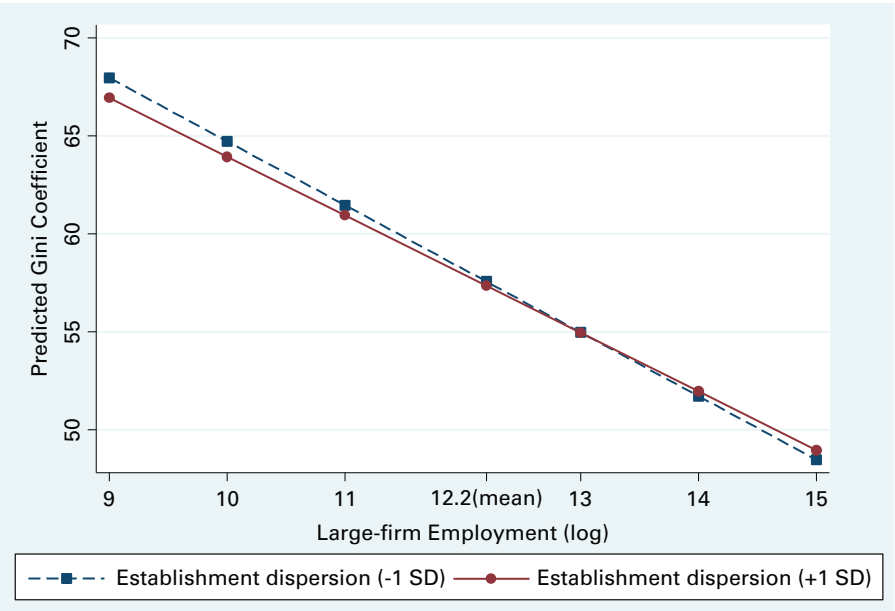
Figure 2. Interaction plots of significant interactions.





To gain more insight into the interaction effects, we plotted the significant interactions based on models 4 and 5 in figure 2.[11] We also followed Aiken and West's (1991) procedure and conducted simple slope tests for significant

[11] We centered our main independent variables prior to creating the interaction terms, which were used in creating this plot. For ease of interpretation, we changed the labels of the x-axis of figure 2 to the corresponding uncentered values of large-firm employment.

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Table 4. Fixed Effects Regressions Using the Ratio of Large-firm Employment to the Non-farm Labor Force, 1978–2008*

Variable	6	7
Proportion of large-firm employment (%)	–.271•••	–.258•••
	(.048)	(.047)
Large-firm racial diversity	.108•••	.117•••
	(.026)	(.025)
Proportion of large-firm employment × Large-firm racial diversity	.008•	–
	(.004)	
Large-firm establishment dispersion	–.037	–.044
	(.022)	(.023)
Proportion of large-firm employment × Large-firm establishment dispersion	–	–.002
		(.002)
Constant	52.334•••	52.362•••
	(2.179)	(2.171)
R-squared	.85	.86

• $p < .05$; •• $p < .01$; ••• $p < .001$.
* 1,488 observations in 48 states. Year dummies are included. Standard errors are in parentheses.

interactive terms. We split the large-firm employment variable into two groups—low (one standard deviation below the mean) and high (one standard deviation above the mean)—and estimated the effect of racial diversity and establishment dispersion for both levels. We found that racial diversity is negatively related to income inequality when large-firm employment is high (simple slope $b = .199$, $p < .05$) but not when it is low ($b = .104$, $p > .10$), supporting hypothesis 2. Employment dispersion is not significantly related to income inequality when large-firm employment is high ($b = -.006$, $p > .10$) or low ($b = -.008$, $p > .10$). Given that figure 2 indicates the presence of a modest crossover interaction, this null result is not surprising (Keppell and Wickens, 2004), but because the results of model 5 do not fully conform to our theory and because we did not find a consistent effect of this interaction term in our supplementary analyses (see below), we do not find strong support for hypothesis 3.

To better illustrate the magnitude of our effects, as well as examine some of the state-level variation in income inequality and large-firm employment, we ran a set of models using the ratio of the number of workers employed by large employers to the size of the overall nonfarm labor force as our measure of large-firm employment (see Davis and Cobb, 2010). This choice was motivated by the fact that the log value of large-firm employment increased or held relatively constant in most states during the observation period. Yet in many of these states, the size of the labor force grew such that the proportion of workers employed by large firms declined. To illustrate our results, using the proportion of workers employed by large firms gives us more flexibility as it allows us to hold constant all the other covariates while manipulating a single, scaled measure of large-firm employment. The results of the analyses, shown in table 4, reveal a negative and significant relationship between the ratio measure of large-firm employment and income inequality; however, this relationship is weaker when those large employers are more racially diverse.

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Figure 3. Change in Gini coefficient and change in the proportion of employment in large firms, 1978–2008.

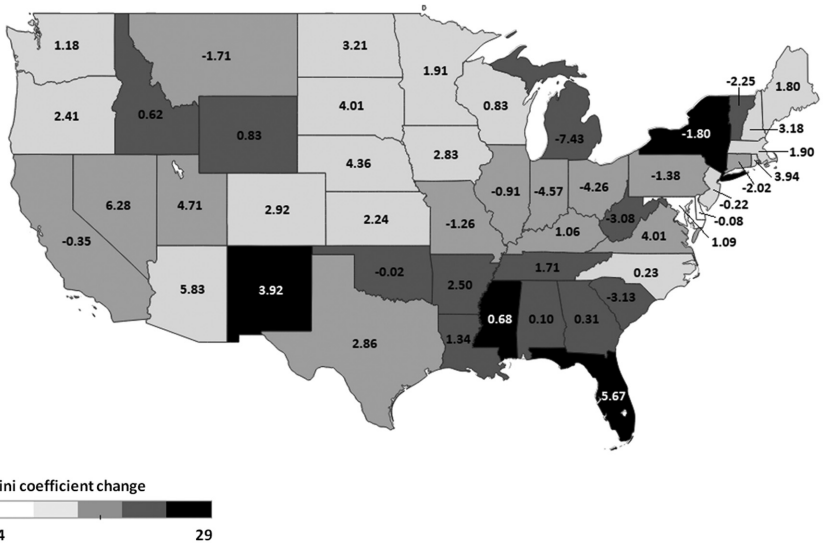

Figure 3 shows the changes in the Gini coefficient between 1978 and 2008 on a map of the contiguous 48 U.S. states. Income inequality increased in each state during the observation period, but the rate of increase varied widely. The numerical values reflect the changes in the percentage of the nonfarm labor force in each state that worked for large firms during the period and reveal that states also varied in the extent to which their labor force remained employed in large firms. Several states throughout the Northeast and Midwest regions, including New York, Vermont, Indiana, Michigan, and Ohio, had proportionally fewer workers employed in large firms over the study period. Conversely, throughout the Central and Southeast regions, states such as Kansas, Nebraska, Colorado, Arkansas, and Florida had proportionally more workers employed in large firms. While there are exceptions, states in which there was a decline in the proportion of workers in the labor force employed by large firms tended to have greater increases in income inequality, and those in which the proportion of workers employed by large firms increased had smaller increases in income inequality.

We also conducted a series of counterfactual analyses on two states, Michigan and Virginia, to see how income inequality in 2008 would have varied had the proportion of workers employed by large firms in each state remained at its 1978 level. In other words, we asked what the level of inequality would be in each state if there had been no change in the ratio of workers employed by large firms. We chose these two states because they have roughly similar labor force sizes and experienced roughly similar changes in the ratio of the labor force employed by large firms. But in Michigan, the proportion of workers employed by large firms declined, whereas in Virginia, the proportion of workers employed by large firms increased. Had the proportion of workers employed by large firms remained at 1978 levels in Michigan, the predicted

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Gini coefficient would have been 2.27 points (3.4 percent) lower. In Virginia, the predicted Gini coefficient would have been 1.66 points (2.3 percent) higher. To put these counterfactual results in some perspective, using the results from model 6, the reduction in income inequality for Michigan associated with maintaining the same proportion of large-firm employment over the period would be equivalent to the effect of a hypothetical increase in the minimum wage in 2008 from $7.28 to $11.70 per hour in that state.[12] For Virginia, maintaining the same proportion of large-firm employment over the period would be equivalent to the effect of a hypothetical decrease in the minimum wage in 2008 from $6.16 to $3.88 per hour in that state.[13]

Supplementary Analyses

We conducted various robustness checks and extensions of our baseline analysis. Unless noted, we included the full complement of control variables in the models.

Distributional effects. Using aggregate measures of income inequality may mask where in the income distribution the covariates have the strongest effect, as the Gini coefficient can increase for different reasons, such as when top incomes increase and/or low incomes decrease. We predicted that large-firm employment would affect income inequality by raising the wage floor for lower-skilled workers relative to higher-skilled ones; therefore, large-firm employment should have a positive and significant effect on incomes at the lower end of the income distribution while having no effect, or possibly a negative effect, on incomes at the higher end of the income distribution. To test this assumption, we used data taken from http://www.inequality.org/ and ran fixed effects regressions in which the dependent variable is the total annual wage and salary income at each decile. Table 5 presents the results of the analyses for the 10th, 30th, 50th, 70th, and 90th deciles in models 8 through 17. As table 5 indicates, large-firm employment has a positive and significant effect on incomes at the 30th, 50th, and 70th percentiles, but it has no effect on incomes at the 10th or 90th percentiles. Large-firm employment also has a positive and significant effect on incomes at the 20th, 40th, and 60th percentiles but no effect on incomes at the 80th percentile. These findings indicate that large-firm employment increases incomes for individuals at the lower, middle, and upper-middle portions of the income distribution. These results suggest that state levels of income inequality are lower, in part, because large-firm employment raises wages for these individuals. This positive effect is also negatively moderated by the racial diversity of these large firms, which is consistent with hypothesis 2.

Additional analyses. In observational studies of this type, establishing causality between the covariates and the dependent variable can be challenging, and we are aware of concerns about endogeneity affecting the associations along with any inferences made about causality. We attempted to

[12] The minimum wage rate in Michigan increased from $7.15/hr. to $7.40/hr. effective July 1, 2008.
[13] The minimum wage rate in Virginia increased from $5.85/hr. to $6.55/hr. effective July 24, 2008.

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Table 5. Fixed Effects Regressions on Total Annual Wage and Salary Income Deciles, 1978–2004*

	8	9	10	11	12	13	14	15	16	17
Variable	10th percentile		30th percentile		50th percentile		70th percentile		90th percentile	
Large-firm employment (log)	.033	.034	.052$^{\bullet\bullet\bullet}$	.051$^{\bullet\bullet}$	.042$^{\bullet\bullet\bullet}$	.040$^{\bullet\bullet\bullet}$	.033$^{\bullet\bullet}$	.030$^{\bullet}$	.024	.022
	(.024)	(.025)	(.015)	(.016)	(.012)	(.012)	(.012)	(.012)	(.015)	(.015)
Large-firm racial diversity	–.002	–.000	–.001	.000	–.001	–.000	–.000	.000	.001	.001
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Large-firm employment × Large-firm racial diversity	–.002$^{\bullet\bullet\bullet}$	–	–.001$^{\bullet\bullet\bullet}$	–	–.001$^{\bullet\bullet\bullet}$	–	–.001$^{\bullet}$	–	.000	–
	(.000)		(.000)		(.000)		(.000)		(.000)	
Large-firm establishment dispersion	–.001	–.001	–.001	–.001	–.001	–.001	–.001	–.001	–.001	–.001
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Large-firm employment × Large-firm establishment dispersion	–	–.000	–	.001	–	.001	–	.000	–	.001
		(.001)		(.001)		(.001)		(.000)		(.001)
Constant	9.597$^{\bullet\bullet\bullet}$	9.665$^{\bullet\bullet\bullet}$	10.145$^{\bullet\bullet\bullet}$	10.198$^{\bullet\bullet\bullet}$	10.337$^{\bullet\bullet\bullet}$	10.373$^{\bullet\bullet\bullet}$	10.615$^{\bullet\bullet\bullet}$	10.631$^{\bullet\bullet\bullet}$	11.010$^{\bullet\bullet\bullet}$	11.003$^{\bullet\bullet\bullet}$
	(.108)	(.110)	(.067)	(.069)	(.054)	(.054)	(.052)	(.052)	(.067)	(.066)
R-squared	.44	.46	.52	.48	.62	.56	.76	.75	.82	.82

$^{\bullet}$ $p < .05$; $^{\bullet\bullet}p < .01$; $^{\bullet\bullet\bullet}p < .001$.
* 1,296 observations in 48 states. Year dummies are included in all models. Standard errors are in parentheses.

address this concern empirically using Arellano–Bond estimator models. We also tested several different measures of income inequality, racial diversity, and establishment dispersion. The results of these tests, which can be found in the Online Appendix (http://asq.sagepub.com/supplemental), are largely consistent with those in table 4. Specifically, we found a significant and negative relationship between large-firm employment and income inequality, though this effect is weaker when the state's large firms are more racially diverse. We saw no effect for establishment dispersion. Taken together, the results of our analyses provide some confidence that, regardless of how the constructs are measured and analyzed, when a state's employment is more heavily concentrated within large employers, income inequality is lower. When those workforces are more racially diverse, the relationship between large-firm employment and income inequality becomes weaker.

DISCUSSION

Over the past 40 years, there has been a general trend of rising levels of income inequality in the United States. Prior research has offered important insights into the role played by human capital characteristics, market forces, and institutional changes for this rise, but less attention has been afforded to how firms affect income inequality in the broader labor market. We advanced a uniquely organizational account of rising income inequality within U.S. states

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over time by proposing that the propensity for workers in a state to be employed by large firms is negatively related to income inequality at the state level. Drawing on research on social comparisons, we argued that large firms are particularly susceptible to invidious social comparisons and try to help ameliorate their damaging effects by compressing wages. Large firms pay some workers, typically lower-wage workers, more than their market wage and other workers, typically higher-wage workers, less than the market wage. These strategies affect the distribution of wages throughout the labor market. The results support our argument, as large-firm employment has a significant and negative relationship with income inequality.

We also argued that social comparison processes will operate less vigorously when large firms are more racially diverse, thus allowing these firms to compress wages to a lesser extent. The results showed that the relationship between employment in a state's largest firms and income inequality becomes weaker when those large employers are also racially diverse. We are not proposing that racial diversity is problematic but are suggesting that, because of social categorization, social comparison processes operate differently in more-diverse firms and that inequities between otherwise similar workers do not invite the same kind of invidious social comparisons in those firms. While there are many organizational and societal benefits to having a more diverse workforce, the results are consistent with the notion that when large firms are more racially diverse, there is less pressure to compress wages, weakening the effect of large-firm employment on state levels of income inequality.

Similarly, although we contended that social comparison processes will operate less vigorously when employment in large firms is more dispersed across establishments, we found little evidence to support our claims. Descriptive statistics revealed that there is little variance over time within states in levels of establishment dispersion, suggesting that employment in large firms is no more dispersed across establishments in 2008 than in 1978. Additionally, it is possible that large firms are prone to standardize wages across establishments.

Implications for Organizational Studies

Despite evidence suggesting that employers play a role in determining societal rates of income inequality, contemporary organizational scholarship has been mostly silent about the phenomenon. Scholars have explored the consequences of wage dispersion at the intraorganizational level (see Shaw, 2014) without giving much attention to where inequality emerges. Furthermore, organizational scholars have documented the practices used over the past four decades to reshape firm boundaries. Major organizational restructuring resulted from leveraged buy-outs, mergers and acquisitions, divestitures of unrelated businesses, and the growth of contract and temporary work (Davis and Stout, 1992; Cappelli and Keller, 2013; Feldman, 2014). Despite these radical changes to firm boundaries and organizational practices over the past 40 years, few attempts have been made to link changes in corporate demography to broader labor market outcomes.

We see these oversights as part of a broader trend whereby the impact of firms on society is largely ignored in contemporary scholarship on organizations (Tilcsik and Marquis, 2013; Cobb, Wry, and Zhao, 2016). How organizations

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affect the general social welfare was a key focus of earlier scholars (e.g., Whyte, 1956), and scholars taking the neostructuralist perspective of stratification have been keenly interested in the impact of hierarchies on inequality, arguing that firms, through their decisions about job allocation and wage setting, help determine levels of income stratification (Baron and Bielby, 1980). Empirical studies in this area, however, have documented the features of organizations associated with inequality within the firm (e.g., Pfeffer and Langton, 1988). In this study, we developed a simple theory that articulates a set of transformational mechanisms (Hedström and Swedberg, 1998) through which firms' strategy and structure lead to state levels of income inequality. In so doing, we offer suggestive evidence that many of the changes to large corporate employers documented in other studies (Osterman, 1996; Davis, 2009a; Cobb, 2015) have played a role in rising levels of income inequality in U.S. states.

Furthermore, by situating organizations squarely in the conversation on income inequality in the broader labor market, our approach highlights the nuanced relationship between firms and their increasingly diverse workforces. The practical inevitability of a racially diverse workplace has directed the attention of organizational scholars and practitioners alike toward understanding its challenges and opportunities (see Williams and O'Reilly, 1998), resulting in a considerable body of literature demonstrating how internal workplace conditions affect ascriptive inequality within organizations (e.g., Kalev, Dobbin, and Kelly, 2006). Although internal organizational processes and dynamics are clearly important for our understanding of inequality, there are obvious implications beyond the boundaries of the firm. For example, Cohen and Huffman (Huffman and Cohen, 2004; Cohen and Huffman, 2007) have suggested that black–white income inequality is driven by the underrepresentation of black employees in managerial positions relative to their concentration in the local labor market. Our research similarly moves beyond firm boundaries by exploring the interplay between corporate employment and the diversity of the workforce in affecting levels of income inequality in the broader labor market.

Implications for Income Inequality Research

Existing perspectives on the rise of income inequality focus primarily on market-based (e.g., skill-biased technological change, globalization) or institutional-based (e.g., unions, minimum wage) explanations (Morris and Western, 1999: 642). Although each of these streams has provided valuable insights into the drivers of income inequality, considerable variance remains unexplained. New and complementary explanations have the potential to add to our understanding of the phenomenon. In this study, we advance a firm-centered perspective on income inequality, arguing that because employers help determine labor market outcomes (Baron and Bielby, 1980) and because much of the increase in income inequality is due to employers paying similar workers differently (Groshen, 1991), corporate organizations are an overlooked driver of income inequality at the state level.

We draw on recent literature on social comparisons and firm boundaries (e.g., Nickerson and Zenger, 2008), the firm-size wage effect (e.g., Hollister, 2004), and organizational wage setting (e.g., Granovetter, 1981) to elaborate a firm-centered theory for how income inequality within a labor market is

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influenced by the characteristics of employers in that market. A few scholars have been interested in how organizations affect income inequality and have focused on the important role played by corporate demography. We complement and extend the work of Davis and Cobb (2010) through data improvements and a clearer articulation of the theoretical mechanisms linking firm structure to income inequality. We also build on the work of Sørensen and Sorenson (2007) by focusing on the role of firm size rather than industrial diversity in influencing income inequality in a labor market.

Moreover, although the state is often treated as a single entity, a more realistic conceptualization is that of a highly differentiated and often loosely coupled political and economic entity operating across federal, state/region, and local geographies (Scott and Davis, 2007: 266). Previous studies have found relationships between income inequality at the U.S. state level and various factors such as the percentage of blacks in the labor force (e.g., Jonish and Kau, 1973), rates of immigration (e.g., Partridge, Rickman, and Levernier, 1996), political party influence (e.g., Kelly and Witko, 2012), and different public policies (e.g., Barrilleaux and Davis, 2003; Volscho, 2005). A related stream of research has also found that discrimination and attainment vary across the U.S. because of the legal institutions present in the state or community (e.g., Tilcsik, 2011). By documenting a relationship between employment in large firms and income inequality at the state level, our research points to the importance and value of examining within-country patterns of inequality, as well as the variance of corporate demography across labor markets.

Limitations and Future Directions

One limitation of this study is that we cannot examine the wage-setting practices of these large firms. U.S. matched employer–employee data on a scale of this size do not readily exist, making it necessary to rely on the demographic dimensions of organizational populations (Carroll and Hannan, 2000). Future work can leverage matched employer–employee data available in many countries, such as Germany and throughout Scandinavia, to add increased precision to the mechanisms we propose here.

We also cannot capture social comparison dynamics directly and are instead relying on firm size as a proxy. We essentially argue that if existing theory about social comparison and firm size is correct, then the steps that firms take to manage social comparison costs have implications for income inequality in a labor market. As we mentioned above, there may be a number of reasons why a firm might compress wages. Although the results of our moderators help provide some confidence that social comparisons are an important factor motivating firms to do so, we cannot rule out these alternative explanations.

The significant and positive main effect between the racial diversity of large firms and income inequality is an interesting finding and one potentially worthy of additional inquiry. In particular, one might reasonably expect that the wage standardization practices employed by large firms would have lowered overall income inequality by closing the racial wage gap. During the observation period, large-firm employment in most states became significantly more diverse. Evidence indicates, however, that the average racial wage gap in the U.S. remained relatively constant or declined modestly during the observation period (Leicht, 2008; Lang and Lehmann, 2012). Moreover, prior research has found

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that blacks earn more in establishments with a greater proportion of white workers (Carrington and Troske, 1998), casting some doubt on the idea that the increased racial diversity of large-firm employment should lower racial wage inequality. Future research can productively examine how changes in the racial diversity of organizations affect the distribution of income inside firms as well as in the broader labor market.

We used establishment dispersion as a proxy for the physical and informational distance between jobs, but future work may be able to find more precise measures, such as geographic distance, to examine whether the proximity of workers across establishments moderates the relationships we hypothesized. Other potential moderators between large-firm employment and income inequality exist, such as unionization and corporate governance structures, which may be of interest to future researchers as well.

Our theory also builds on the idea that, in large firms, lower-skilled workers receive a wage premium, whereas higher-skilled workers receive wages closer to or even below the going market wage. Yet we do not believe that these same dynamics apply well to wage setting closer to the apex of the organization, in executive compensation. In recent years, a number of studies have found that when setting executive pay, corporate boards reference the pay of executives of similar firms and/or a set of ''aspirational'' firms that are typically larger and where executives get paid more (DiPrete, Eirich, and Pittinsky, 2010; Kim, Kogut, and Yang, 2015). Arguably, social comparisons still play a role in setting executive compensation, but it is a comparison across firms rather than within them. Given this, and as our supplementary analyses reveal, our theory is less applicable to measures that rely heavily on top incomes (e.g., the top 1 percent) and are more useful in explorations of income inequality at lower income ranges (e.g., the Gini coefficient).

Finally, it is also important to recognize that the mechanisms we address here are potentially unique to a given time and place and may not hold in other contexts. Over the past several decades, the U.S. economy has undergone a significant transition during which measures of firm size such as revenues, assets, and employment have become increasingly disaggregated (Davis, 2009b). The largest employers are now concentrated more heavily in retail, whereas in the earlier half of our study period many large firms were still in industrial sectors (Davis and Cobb, 2010). Evidence also indicates a weakening of the firm-size wage effect (Hollister, 2004; Cobb, Lin, and Gabriel, 2016) and an increase in the use of pay-for-performance schemes to remunerate higher-skilled workers (Lemieux, MacLeod, and Parent, 2009), which would put their pay closer to market rates. Thus the connections we suggest here may have been stronger in earlier periods and may weaken or reverse as the economy continues to evolve and large firms use wage compression less frequently.

Large-firm employment and racial diversity are not the only factors affecting a state's level of income inequality. Nevertheless, the data presented here suggest an important role for organizational theory in linking market and institutional change to societal change by considering how firms react to external demands. Firms play a central role in how workers are matched to jobs and how they are rewarded for their labor. That these practices have important implications for how income is distributed in a region suggests that more attention be given to understanding how changes in corporate organization affect labor market outcomes.

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