

# The Impact of Progressive Era Labor Regulations on the Manufacturing Labor Market

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## Abstract

We analyze the impact of the broad range of state labor regulations on employment and annual earnings in manufacturing for both wage workers and salaried workers using a new panel data set we have created for the 48 states in 1904, 1909, 1914, and 1919. Fixed Effects analysis with two alternative measures of labor regulation suggests that the regulations were associated with an increase in labor supply and simultaneous reduction in labor demand for wage earners in manufacturing. The rise in labor supply suggests that workers anticipated benefits from the regulations, while the decline in labor demand suggests that at least some employers anticipated harm to their profits from the regulations. The estimated effects for salaried workers were small enough that we have concluded that there was no real impact of the regulations in the salaried labor markets.

## **The Impact of Progressive Era Labor Regulations on the Manufacturing Labor Market**

During the late 19<sup>th</sup> and early 20<sup>th</sup> centuries, there was an expansion in the role that state governments played in regulating labor markets and labor conditions. Most states established bureaus to collect labor statistics and regulatory bodies to inspect boilers, factories, and mines. Many passed employer liability laws to expand the liability of employers for workplace accidents and states eventually regularized the accident compensation process by establishing strict liability in the form of workers' compensation laws. Limits were established for child labor and women's hours. Some states passed laws that promoted unionization by outlawing "yellow dog" contracts and protecting union trademarks and labels. Other states seemed bent on limiting unionization with the passage of anti-enticement laws and laws that limited picketing and were specifically targeted at reducing intimidation of non-union workers.

A growing literature examines the quantitative impact on labor markets of the leading progressive laws in the late 1800s and early 1900s.<sup>1</sup> While each of the studies provides invaluable evidence on how the individual laws influence specific aspects of the labor market, they do not capture the broad range of labor laws in the period. On several occasions the U.S. Commissioner of Labor and later the Bureau of Labor Statistics documented the extent of state labor legislation in the various states. The Labor Department reported on roughly 135 laws that influenced labor markets and workplace conditions. After combining the information from the Labor Department with information on the timing of legislation from Legislative Acts, we use the presence of these labor laws to develop an index of laws that characterize the regulatory climate in the various states and how that climate changed over time. We then examine how

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<sup>1</sup> For example, see Moehling (1999), Sanderson (1974), Osterman (1979), Brown Christiansen, and Phillips (1982), and Carter and Sutch (1996a) on child labor, Goldin (1990) and Whaples (1990a, b) on women's hours laws, Fishback and Kantor (2000), Buffum (1992), Chelius (1976, 1977), Fishback (1986, 1987, 1990), and Aldrich (1997) on workers' compensation and employer liability laws, Fishback (1986, 1990) on coal mining regulations, Aldrich (1997) on safety regulations in manufacturing, mines, and railroads. For a summary of the research, see Fishback (1998). Child labor legislation had little impact on employment of children, but Margo and Finegan (1996) find that school attendance legislation did significantly raise the rate of school attendance.

the regulatory climate influenced the manufacturing labor market using panel data on unionization, demographic, and other information from the Censuses of Manufacturing between 1899 and 1919.

### **Predictions for Progressive Era Labor Legislation**

The Progressive Era has received a tremendous amount of attention in the social science literature, in part because the states and municipalities experimented with so many types of reforms. The United States was a laboratory with an enormous variety of projects going on simultaneously. There is no consensus on the exact timing and boundaries of the Progressive Era nor on the driving force behind it. Some emphasize muckraking reformers, while others emphasize the role of middle-class, social conservatives who were dissatisfied with an existing political system that seemed to be controlled by political bosses. Many see a role for religious attitudes that contributed to pressure for egalitarian reforms. Still others see the Progressive reforms as a response to increased industrialization, modernization, and urbanization.<sup>2</sup>

In examining the introduction of Progressive Era labor legislation, we have found it most useful to think of the driving forces as a complex interaction of interest groups and coalitions. In the area of labor legislation, the key broad interest groups were workers, employers, and social reformers. These groups could be further divided into subgroups. For example, workers could divide along union and nonunion lines or into men and women. Large and small employers often had different attitudes, as did employers in unionized versus nonunionized industries.

The impact of labor legislation was influenced by the groups that were central to the passage of the legislation. If Progressive Era social reformers, workers, and unions were the key coalitions that led to the passage of the legislation over recalcitrant employers, the laws might be seen as beneficial to

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<sup>2</sup> For general readings on the Progressive Era, see Hofstadter (1955), Burnham, Buenker, and Crunden (1977), Moss (1996), Gould (1974), Chambers (1992), Lubove (1968). There are a large number of studies of specific nonlabor Progressive Era regulations. On Food and Drug regulations, see Libecap and Marc Law (2002); for railroads, see Poole and Rosenthal, Gilligan, Weingast, and Marshall, Kolko, Zerbe, and a host of others.

workers at the expense of employers.<sup>3</sup> Therefore, the laws might act as a “tax” on the employers, raising the nonwage costs to them of hiring labor, and thus reducing the demand for labor, putting downward pressure on wages and employment. Such changes might also cause employers to shift towards inputs that are substitutes for labor while reducing inputs that are complementary to labor. Safety legislation might require employers to use more capital or to choose labor saving devices that lead to higher capital expenditures. On the labor supply side, we might expect such legislation to lead to an increase in the supply of labor as the nonwage working conditions for workers improved. The rise in labor supply would put downward pressure on wages and upward pressure on employment. The simultaneous fall in demand and rise in supply would lead to the potential results shown in Table 1. Both would lead to lower wages and the effect on employment would depend on whether the demand shift outweighed the supply shift. If the demand shift were stronger, employment would fall. Employment would rise if the supply shift were stronger, or employment might be unchanged if the two shifts cancel each other out.

The introduction of labor legislation likely increased supervision requirements, particularly in cases where safety laws required increased monitoring, and the extent of paperwork involved in reporting information to state authorities. Thus, we might see a rise in the demand for salaried workers, which in Table 1 would lead to higher salaries and more salaried workers.

On the other hand, Robert Wiebe (1962), Gabriel Kolko (1963), James Weinstein (1967), Roy Lubove (1967), David Moss (1996), Price Fishback and Shawn Kantor (2000), and many others have found substantial evidence that employers and businessmen played important roles in the passage of Progressive Era legislation. A survey of quantitative studies of child labor laws, women’s hours laws, and safety legislation suggests that the laws generally had small effects on child labor, women’s hours, and accidents. Fishback (1998) suggested that the reasons for these small effects were that employers were powerful enough in state legislatures that they could significantly change the legislation proposed by

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<sup>3</sup> In a recent paper on the Progressive Era, Glaeser and Shliefer (2002) argue that Progressive Era regulations were often designed to more closely monitor and regulate businesses, who had essentially subverted the regulatory regimes at times overseen by judges in the 19<sup>th</sup> century. If the laws were successful in this regard, we might see such that employers faced such a tax.

reformers. In consequence, like workers' compensation, employers anticipated a gain from passage. Laws – like child labor, women's hours and safety legislation – passed only with the support of a powerful group of employers as well as workers and reformers. In the give and take of the legislative process that led to the ultimate compromise, laws may have codified the existing practices of leading employers. Thus, the “tax” on employers might have really been imposed only on the remaining employers who had not yet adopted these practices. In such a situation the reduction in the demand for labor described would have been much smaller and concentrated among the subset of employers that found the new regulations binding. Similarly, the supply rise for workers would have been smaller and more concentrated on the newly constrained employers. In this setting the results in Table 1 would have the same sign but be much smaller.

Another possibility is that employers captured the legislature and the regulatory body and established regulations that benefited the employer at the expense of workers.<sup>4</sup> Union leaders in the early 1900s suggested that business interests controlled politics and therefore they distrusted some political solutions (Weinstein, 1967, 159; Skocpol 1992, 205-47; Asher 1969, 457). These fears were confirmed in some states where anti-union legislation was passed or when federal antitrust legislation applied more to busting unions than to busting trusts (Puth 1993, 485). In Table 1, the Employer Capture story has the opposite effect from the ones above with a rise in wages and increases in employment when the demand rise dominates, decreases in employment when the supply effect dominates, or no change if the two offset.

Finally, there is the possibility that labor legislation benefited both employers and workers. For example, Fishback and Kantor (2000) suggest that workers' compensation laws passed because employers, workers, and insurers (in states without state funds) anticipated gains from the new law. The question then arises as to why employers and workers did not privately contract on their own for the changes enacted by the labor legislation. Private contracting for workers' compensation policies in

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<sup>4</sup> For economic models in which the political process may be captured, see Stigler (1971), Becker (1983), Pelzman (1976). For an analysis discussing the capture of judges, see Glaeser and Shleifer (2001).

which workers waived their rights to negligence suits in advance had been disallowed by a mixture of private legislation and court decisions. With respect to other regulations, there may have been situations where employers and workers in many states thought the changes would be a good idea but that they would have been put at a competitive disadvantage within their own state if they unilaterally made the move on their own. Thus, the legislation may have helped prevent a “race to the bottom.” When we extend the discussion outside the borders of a single state, many employers argued against labor legislation in their own state on the grounds that they would be placed at a competitive disadvantage with respect to employers in other states (Moss, 1996). The inter-state argument can extend to private contracting by firms within states. Had both employers and workers anticipated benefits from the legislation, Table 1 shows that the increase in labor demand and the rise in labor supply would have led to an increase in employment, while wages would have risen if the demand rise was stronger, fallen if the supply rise was stronger, or remained the same.

Table 1: Potential Impacts of Labor Laws on Manufacturing

<b>Worker Type</b>	<b>Labor Market Shift(s)</b>	<b>Net Impact(s)</b>
<i>Case 1: Worker Victory over Recalcitrant Employer</i>		
Wage Earner	Demand Fall and Supply Rise	Wage Decline, Employment Rise if Supply Rise dominates, Employment fall if Demand fall dominates
Salary Worker	Demand Rise	Salary Rise, Employment Rise
<i>Case 2: Compromise in which large employers unaffected, smaller employers burdened</i>		
Wage Earner	Demand Fall some and Supply Rise some	Small Wage Decline, Employment rises some if Supply Rise dominates, employment falls some if Demand Fall dominates, or could stay the same
Salary Worker	Demand Rise	Salary Rise, Employment Rise
<i>Case 3: Employer Capture with no workplace benefit to worker</i>		
Wage Earner	Demand Rises and Supply Falls	Wage Rise. Employment rises if the Demand Rise dominates, Employment falls if the Supply Fall dominates, or could stay the same.
Salary Worker	Demand Rise	Salary Rise, Employment Rise
<i>Case 4: Employer and Worker both gain</i>		

Wage Earner	Demand Rise and Supply Rise	Employment rise, wage rises if demand shift greater, wage falls if supply shift greater
Salary Worker	Demand rise	Salary Rise, Employment Rise

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### **The Patterns of State Labor Legislation**

State labor legislation came in several waves. In the late 1800s a number of northeastern and eastern midwestern states began establishing bureaus of labor, created positions for factory inspectors and set up a series of factory regulations, passed the early child labor laws, refined the nature of accident liability for employers, provided political protections for workers as voters, and established a series of laws that gave unions more legal status. A number of mining states established the early regulations for mines and the first mining inspectors. In the first decade of the 20<sup>th</sup> century, the early forms of labor legislation spread to a majority of states and existing laws were refined and updated. The second wave of legislation followed in the 1910s as states became more involved with social insurance, introducing mothers' pensions, and replacing the employer liability system with the statutory rules of workers' compensation. Nearly half of the states passed women's hours laws during this period and about 20 percent established some form of minimum wages for women and children.<sup>5</sup> At the same time the leading labor legislative states reorganized their state labor bureaucracies into industrial commissions and some established child labor commissions.

Since the number and range of state labor laws are extensive, we have sought effective ways to summarize the information in just a few variables. Our goal is to develop measures that give a sense of the labor regulatory climate in the various states. We experimented with using principal component analysis to characterize common influences among the many laws, but such an analysis leads to comparisons as to which states are most alike in the laws that they have, but do not provide a metric for how much of the legislation was adopted or for how strong or weak the legislation is. In this paper, we use a national weighted-sum of laws in each state for each year omitting those that are not relevant to

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<sup>5</sup> Attempts to legislate effective general minimum wages for men at the state level in the early 1900s were struck down by a series of court decisions. (See the *Lochner* case and some other citations)

manufacturing. The weights are based on the proportion of employment in each industry at the national level, and the state's quantity of laws and regulations applied to those industries. Admittedly, this approach is imperfect because the laws varied in character, enforcement, and scope. For more detail on the specific types of laws, Fishback, Holmes, and Allen (2009) contains information on the number of states that had adopted each type of law as of 1894, 1908, 1918, and 1924. There were 135 labor laws that were reported on by the Commissioner of Labor (1896, 1904, 1908) and the U.S. Bureau of Labor Statistics (1914, 1925) in their volumes on "Labor Laws in the United States." We revisited the original state legislative acts to fill in gaps in the timing of the laws. Data on all of these laws are now available at Price Fishback's website at the University of Arizona Department of Economics with address [http://econ.arizona.edu/faculty/webpage1\\_fishback.asp](http://econ.arizona.edu/faculty/webpage1_fishback.asp).

The variation in the state labor law indices across states in 1899, 1909, and 1919 is shown in Figures 1 and 2. The large number of states close to the diagonals on both figures suggests a significant amount of persistence in the state labor law rankings between 1899 and 1919. Massachusetts, Wisconsin, New York, and Minnesota rank highly in all years. Meanwhile, Vermont, Alabama, and Mississippi tend to have the least amount of regulation in each time period. Despite the persistence over time in the rankings, Figure 3 shows that there were substantial changes in the indices between 1899 and 1909 and again between 1909 and 1919. Oregon had the largest jump between 1899 and 1909 and added quite a few more between 1909 and 1919. Texas, Oklahoma, and Colorado sharply increased their regulations between 1909 and 1919 while making few changes between 1899 and 1909. New Jersey took the unusual step of letting some laws lapse between 1899 and 1909.<sup>6</sup>

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<sup>6</sup>Most of the laws that New Jersey removed were laws passed in mid-1890s. They included an employer liability law for railroads passed originally in 1895, boiler inspection, manufacturing hours, hours for others, union organizations exemption from antitrust, fines for enticement, interference with street railroads, labor agreement is not a conspiracy, anti-bribery of foremen, anti company store, voter coercion laws and time off to vote.]



## **Expenditures by States on Labor Issues**

The presence of state laws offer only one indication of the regulatory climate for labor markets in the states. Laws on the books have little impact if they are not enforced. Administrative bodies are likely to have greater impact in making decisions with more resources available to them. We collected information from the legislative statutes on the appropriations for the state labor department, board of arbitration, free employment offices, mining inspection, boiler inspection and other factors related to labor markets. The labor appropriations per gainfully employed worker (LAPGEW) are positively correlated (0.49) with our constructed index for the laws relevant for manufacturing.<sup>7</sup>

The large number of States in the upper left quadrant of Figure 4 shows that most states increased their real expenditures (1967\$) on labor regulation between 1903 and 1916. This figure focuses on all labor regulation including mining regulation. Therefore, some state spending figures are overstated relative to what they spent on manufacturing regulation. For example, the biggest spenders were the western states in part because they had a heavy emphasis on mining regulation and relatively few workers outside mining. Among the non-mining states, New York and Massachusetts had the largest expenditures in both time periods. North Carolina and Florida were the laggards in both periods.

## **Empirical Estimation**

According to classical production theory, in an unregulated market for inputs to production, firms choose profit-maximizing levels of inputs according to their production function and relative input costs. As regulation of industry increases, the firm's profit maximizing choice of inputs may change either due to constraints on inputs, changes in input prices, or both. Most studies isolate the impact of specific labor

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<sup>7</sup> Between 1899 and 1919, all but two states raised their per worker appropriations for administering labor regulations. The real state labor appropriations per worker rose by 25 percent or more in 36 states, by 100 percent or more in 22 states, and by 400 percent in 10 states between 1899 and 1919. The leading states in terms of state labor appropriations per establishment by 1919 tended to be the northeastern industrial centers like Massachusetts, New York, and Pennsylvania. Ohio and Illinois were early leaders in labor legislative spending, and there were very large amounts spent per capita in the West. For more on this see Fishback et al. (2009)

regulations in a specific setting focusing on the impact of one class of laws on the specific outcome. As the number and complexity of regulations increase, the impact of any given new regulation will depend on the cumulative impact of all of the previous laws. In contrast, this study examines the cumulative impact of labor legislation on the manufacturing labor market equilibrium.

We investigate the labor market for manufacturing by estimating reduced form relationships between the measures of labor regulation and (1) total employment of wage earners, (2) the real average annual earnings of wage earners, (3) the number of salaried workers in manufacturing, and (4) the real annual salaries of those salary workers. Since these endogenous variables are jointly determined, we estimate them in reduced-form with several correlates on the right side including each state's nationally-weighted manufacturing laws, a unionization index, and other demographic controls. This non-structural approach enables an initial look into the role of labor regulations and their relative importance in influencing employers' and workers' decisions.

By estimating reduced-form models of employment and wages (and salaries), our strategy is to infer the extent to which labor supply and/or labor demand shifted in response to Progressive Era laws. For instance, a decrease in employment in conjunction with no change in wages is indicative of reductions in both labor supplied by workers and labor demanded by manufacturing firms. We assume that labor supplied by workers is increasing in wages (and salaries) and that labor demand is decreasing in wages (and salaries). Table 2 below summarizes the possible outcomes. Table 3 presents summary statistics, and the estimation results are presented in Tables 4 through 7.

Table 2

Changes in Demand, Supply, or Implicit Wage Floor Associated with Changes in Wages and Employment in Response to Correlates in Reduced Form Equations

Equilibrium Supply and Demand with Upward Sloping Supply and Downward Sloping Demand			
Outcomes Found			
Wage	Employment	Implied Changes	Dominant Effect of Labor Laws
Rise	Rise	Demand Rise Dominates	Benefit Employer
Rise	Fall	Supply Fall Dominates	Harm Workers
Fall	Rise	Supply Rise Dominates	Benefit Workers
Fall	Fall	Demand Fall Dominates	Harm Employers
Rise	Same	Demand Rise Offset by Supply Fall	Benefit Employer & Harm Worker
Fall	Same	Demand Fall Offset by Supply Fall	Harm Employer & Harm Worker
Same	Rise	Supply Rise Offset by Demand Rise	Benefit Worker & Employer
Same	Fall	Supply Fall Offset by Demand Fall	Harm Workers & Employer

The data come from a variety of sources. However, the majority of information comes from the 1899, 1904, 1909, 1914, and 1919 Manufacturing Censuses reported in the Statistical Abstract of the United States.<sup>8</sup> The Union index shows the extent of unionization of industries in that state in 1899, 1909, and 1919, with straight-line interpolations between those years. It is a measure of the extent to which the industries in the state had strong unionization at the national level. The employment is the average number of workers employed by the firm per month, which is calculated as the sum of the number of workers in each month divided by 12. The annual earnings when divided by 12 are average monthly earnings because they are calculated as total wage bill divided by average number of workers over the course of the year. The measures of percent black, percent foreign-born, percent illiterate and percent urban are based on straight-line interpolations between the census years 1900, 1910 and 1920.

## Results

The relationships between the labor law index and the labor demand and supply of wage workers are determined by the combination of coefficients in the reduced-form log wage and log employment

<sup>8</sup> Data for 1899, 1904, 1909: United States Department of Commerce, *Statistical Abstract of The United States, 1913, Thirty-Six Number*, Government Printing Office, Washington DC, 1914, p. 208-213. Data for 1914, 1919: United States Department of Commerce, *Statistical Abstract of The United States, 1923, Forty-Sixth Number*, Government Printing Office, Washington DC, 1924, p. 315-322. The census data we used was confined to “factory system” industries, and excludes the household, hand trades, and neighborhood industries.

equations. Tables 4 and 5 report coefficients and robust standard errors from pooled OLS estimations without fixed effects (or year effects) with no correlates and then while including a series of correlates for unionization and the percent black, illiterate, foreign-born, and urban. A third set of estimates are reported with state and year fixed effects to control for time-invariant features of the states and national shocks to the economy, respectively. We focus primarily on the fixed effects estimates, which do a great deal to reduce problems with omitted variables. We have also included a set of Two-Stage Least Squares (2SLS) using an Instrument for the state law index in columns 4 and 8 of each Table. We do not emphasize the 2SLS because the instrument does not have much strength and there appears to be a great deal of weak instrument bias.<sup>9</sup>

The Fixed Effects coefficient for the labor law index in column 7 of Table 4 was negative and statistically significant. The effect on employment was positive but a zero effect cannot be rejected in the statistical tests. The law index coefficient in the log earnings equation implies that a one standard deviation increase in the labor law index was associated with a 7.7 percent decline in average annual earnings. This is a decline of 0.31 standard deviations and implies an elasticity of -0.18. The law index coefficient in the log employment equation is positive at 0.00698 but not statistically significantly different from zero. A one-standard deviation rise in the law index was associated with a rise in employment of only 0.03 standard deviations. When choosing among the scenarios in Tables 1 and 2 the drop in earnings and the small positive rise in employment is most consistent with a situation where workers gained from the laws and increase their supply of labor to the places with a higher law index, while employers incurred costs from the laws and reduced their labor demand. Both changes led to lower

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<sup>9</sup> The instrumental variables approach uses a simple count index for 6 other progressive era laws that do not pertain to labor as the instrument. Thus, each state's value for each year is 0 to 6 depending on which – if any – of the following had been established: a state tax commission, a state welfare agency, a state merit system, initiative and referendum laws, a direct primary, or electric rate regulation. We believe that these changes would have been uncorrelated with changes in manufacturing labor markets. We report but do not emphasize the IV results because the Kliebergen-Paap F statistic was 5.483 for the first-stage analyses associated with columns 4 and 8 in Tables 4 and 5 implies weak instrument bias in excess of 25%. We face a similar problem with the IV results in columns 4 and 8 of Tables 6 and 7.

annual earnings. The possible rise in employment suggests that the labor supply shift might have had more impact than the labor demand shift in the labor markets of early 1900s.

The estimation is redone in Tables 6 and 7 using labor regulation appropriations per gainfully employed worker as an alternative measure of labor regulation.<sup>10</sup> Given our focus on manufacturing, the appropriations information likely has more measurement error than the manufacturing labor law index because it includes information on appropriations related to regulation of mining. This is reduced somewhat by dividing the appropriations by an employment figure that includes mining, but the adjustment is imperfect because mining tended to be more heavily regulated than manufacturing.

Again, the focus is on the Fixed Effects estimates in columns 3 and 7 in the tables because we have not found an instrument with sufficient strength to eliminate weak instrument bias. The coefficients on the appropriations measure suggest roughly the same story as the coefficients on the Law Index in Tables 4 and 5. The estimates for wage earners in Table 6 show negative effects on annual earnings, as was the case in Table 4. A OSD change in the appropriations measure is associated with a reduction in annual earnings of \$24.94, which is -0.16 standard deviations, with an implied elasticity of -0.04. As was the case for the law index, the relationship of employment with labor appropriations was not statistically significant, although in this case the coefficient has the opposite sign. Here again the combination of reductions in annual earnings and no effect on employment is consistent with a combination of an increase in labor supply combined with a roughly offsetting decline in labor demand. This implies that workers anticipated benefits from the regulation while the employers anticipated harm.

In all of the scenarios of labor legislation we expected that the demand for salaried workers would have risen in response to the labor laws, as the reporting requirements associated with labor regulation would lead to more clerical work. In Table 5 the results show that the labor law indexes were associated with higher earnings and higher employment. However, neither coefficient – in either the Fixed Effects or Instrumental Variables estimation-- is statistically significantly different from zero. In the Fixed

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<sup>10</sup> The Labor appropriations estimations in Tables 6 and 7 have 189 observations instead of 192. There are missing values for AZ in 1904 and 1909 and NV in 1904,

Effects regression for number of salary workers a one-standard deviation rise in the law index was associated with a rise in employment of 2 percent for an implied elasticity of 0.05. For the real annual earnings of salary workers a one-standard deviation rise in the law index was associated with a rise in earnings of a mere 1.2 percent for an implied elasticity of 0.03. These economically small effects did not appear to have led to much administrative burden on the employers overall.

The fixed effects results in Table 7 tell a somewhat different story for salaried workers. Employment was negatively related with labor appropriations and the impact was statistically significant. A OSD increase in LAPGEW (\$0.08) lowers the number of salary workers by 859 workers, or -0.02 standard deviations and the elasticity is -0.04. Salaries were also negatively related to the labor appropriations, but the effect was not statistically significant. This combination is consistent with a situation where both labor demand and labor supply fell in roughly offsetting amounts, implying harm to both employers and salaried workers. The OSD effects for salaried workers in both Table 5 and 7 are substantially smaller than for wage earners in Tables 4 and 6, so the impact on salaried workers may have been relatively small.

The coefficients of the remaining correlates in the model show several interesting findings. The focus of our discussion is on Tables 4 and 5; the results are not much different in Tables 6 and 7. Employment for both wage workers and salaried workers rose with increases in the black share of workers, and the rises were statistically significant. The coefficients of the black share were also positive in the earnings and salary regressions, although not statistically significant. Areas with increases in percent foreign born experienced statistically significant drops in employment of wage earners but had statistically insignificant relationships with annual earnings for wage workers and earnings and employment for salaried workers. Increases in urbanization were associated with higher employment of both types of workers and declines in the annual earnings although the declines were not statistically significant.

The union index essentially captures the share of employment within the state in industries that were more unionized at the national level. Increases in the share of unionized industries had weak and

statistically insignificant relationships with employment for wage earners and for salaried workers. On the other hand a shift toward more unionized industries was associated with a decline in real annual earnings that was even greater when the expansion of unionized industries occurred in the South. A one-standard deviation increase in the union index was associated with 0.16 standard deviation lower annual earnings. The negative relationship was even stronger in the South at 0.83 standard deviation reduction in earnings for wage earners.

### **Preliminary Conclusions**

We analyze the impact of the broad range of state labor regulation on employment and annual earnings in manufacturing for both wage workers and salaried workers using a new panel data set we have created for the 48 existing states in 1904, 1909, 1914, and 1919. We perform an analysis with state and year fixed effects and a set of correlates. Thus, the identification of the relationships comes from variation within states across time after controlling for the correlates and nationwide shocks to the manufacturing industry. Estimates with two alternative measures of labor regulation show that the regulations were associated with lower annual earnings for wage workers but with no statistically significant change in their employment. These reduced form results are consistent with a situation where labor supply increased and labor demand declined by an offsetting amount. The rise in labor supply suggests that workers anticipated benefits from the regulations, while the decline in labor demand suggests that at least some employers anticipated harm to their profits from the regulations.

The introduction of regulations might have led to greater reporting requirements and monitoring activity that would have led to an increase in the demand for salaried workers. Our analysis does not find a very large effect of labor regulations on salaries or employment. If there was an effect, it might have been a reduction in both labor demand and supply associated with greater labor appropriations. However, this effect was much smaller in magnitude than the effect on wage earners.

We plan further work in this area in several ways. First, the Fixed Effects analysis reduces a great deal of omitted variable bias, but there still might be the potential for simultaneity bias and other

omitted variables to lead to endogeneity bias in our coefficients. We are currently seeking an instrument that is strong enough to avoid weak instrument bias. Our strongest instrument to date is an index for Progressive Era labor legislation that was not related to labor markets. However, standard tests of instrument strength suggest that the coefficients have sizeable weak instrument bias with this set of instruments. Second, in the fixed effects analysis we are also beginning work on estimating more complicated relationships between wages, employment, and regulation in which we examine the interactive effects of unionization and regulation in the markets and possible interactions between our measures of the labor laws and the appropriations for those laws. Finally, we are beginning work on separating the labor law index into several parts to see if there are differential effects of the various categories of labor legislation.

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Table 3: Summary Statistics

	Mean	Standard Deviation	Minimum	Maximum
<u>Dependent Variables:</u>				
Wage Earners:				
Total Employment	171,489	265,844	1,016	1,524,761
Real Annual Earnings	\$607.77	\$152.61	\$197.84	\$1,124.29
Salary Workers:				
Total Salary Workers	19,341	34,924	106	247,147
Real Annual Salaries	\$1,363.50	\$368.10	\$666.67	\$2,305.32
<u>Explanatory Variables:</u>				
Index of Laws Relevant for Manufacturing	14.06	5.99	0.93	27.82
Labor Appropriations Per gainfully employed Worker <sup>11</sup>	\$0.07	\$0.077	\$0.00	\$0.43
Union Index	7.50	3.35	1.51	16.17
Union Index*South	1.26	2.57	0	10.26
Population	1,940,998	1,875,963	56,548	10,200,000
% Black	10.92	16.79	0.10	58.50
% Foreign Born	14.00	10.05	0.20	35.40
% Urban	33.73	21.76	5.00	96.70
% Illiterate	10.12	9.34	1.70	38.50

N = 192 (48 states measured in 1904, 1909, 1914, and 1919)

<sup>11</sup> Labor Appropriations are unavailable for Arizona in two years (1904 and 1909) and Nevada in 1904.

Table 4: Labor Market for Manufacturing Wage Earners

Variables:	<i>Natural Log of Total Employment</i>				<i>Natural Log of Real Annual Earnings</i>			
	<i>Pooled OLS</i>	<i>Fixed Effects</i>	<i>IV</i>		<i>Pooled OLS</i>	<i>Fixed Effects</i>	<i>IV</i>	
Index of Laws	0.18099*** (0.02477)	0.05155** (0.02164)	0.00698 (0.00782)	0.10686 (0.10353)	-0.00033 (0.00315)	-0.00072 (0.00513)	-0.01285*** (0.00432)	-0.02621 (0.04628)
Union Index	-0.10397*** (0.03396)	-0.05745*** (0.02095)	0.00198 (0.01117)	0.00970 (0.01676)	0.02263*** (0.00688)	-0.00017 (0.00659)	-0.01236** (0.00610)	-0.01339* (0.00749)
Union*South	0.15666*** (0.03736)	0.04395* (0.02469)	-0.01827 (0.02603)	-0.03674 (0.05277)	-0.05223*** (0.00931)	-0.01880** (0.00845)	-0.06940* (0.03794)	-0.06693*** (0.02359)
Population <sup>12</sup>		0.00000*** (0.00000)	0.00000 (0.00000)	0.00000 (0.00000)		-0.00000 (0.00000)	0.00000 (0.00000)	0.00000 (0.00000)
% Black		0.01544** (0.00652)	0.06064** (0.02844)	-0.03951 (0.11027)		-0.00866*** (0.00212)	0.01963 (0.01852)	0.03302 (0.04929)
% Foreign Born		-0.04042*** (0.01372)	-0.02545** (0.01031)	-0.03425* (0.01943)		0.00815** (0.00332)	-0.00041 (0.00641)	0.00076 (0.00869)
% Urban		0.03506*** (0.00600)	0.01111** (0.00523)	0.00293 (0.01219)		-0.00367** (0.00146)	-0.00682** (0.00329)	-0.00573 (0.00545)
% Illiterate		-0.02024 (0.01326)	-0.00667 (0.01120)	0.00680 (0.01962)		0.00267 (0.00369)	-0.00436 (0.00548)	-0.00616 (0.00877)
Constant	9.16023*** (0.41882)	9.44779*** (0.44526)	10.00404*** (0.28484)	10.31091*** (0.55899)	6.27781*** (0.08813)	6.63204*** (0.11541)	6.59822*** (0.19584)	6.88889*** (0.24987)
Year Effects	No	No	Yes	Yes	No	No	Yes	Yes
State Effects	No	No	Yes	Yes	No	No	Yes	Yes
IV	No	No	No	Yes	No	No	No	Yes
Observations	192	192	192	192	192	192	192	192
R-squared	0.45961	0.84024	0.80670		0.38258	0.63219	0.44219	

*Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1*

<sup>12</sup> The *Population* variable was created through straight-line interpolation of the 1900, 1910, 1920 census values. We used Haines for state values every 10 years, and the US Census values for each year. We formed the ratio in each 10 year period, and then equally distributed the change (in the proportion) to each of the ten years (9 missing).

Table 5: Labor Market for Manufacturing Salary Workers

Variables:	<i>Natural Log of Number of Salary Workers</i>				<i>Natural Log of Real Annual Salaries</i>			
	<i>Pooled OLS</i>		<i>Fixed Effects</i>	<i>IV</i>	<i>Pooled OLS</i>		<i>Fixed Effects</i>	<i>IV</i>
Index of Laws	0.20041*** (0.02337)	0.07391*** (0.02268)	0.00347 (0.00552)	0.09082 (0.09074)	0.01678*** (0.00295)	0.00294 (0.00305)	0.00201 (0.00573)	-0.03836 (0.05465)
Union Index	-0.04960 (0.03367)	-0.00183 (0.01921)	-0.00646 (0.01010)	0.00029 (0.01469)	0.00215 (0.00434)	-0.01003** (0.00478)	-0.00859 (0.00807)	-0.01171 (0.00885)
Union*South	0.15012*** (0.03693)	0.04338** (0.02123)	-0.03991 (0.02962)	-0.05607 (0.04625)	0.00292 (0.00453)	-0.00118 (0.00301)	0.00483 (0.01119)	0.01230 (0.02785)
Population		0.00000*** (0.00000)	0.00000 (0.00000)	0.00000 (0.00000)		-0.00000 (0.00000)	0.00000 (0.00000)	0.00000 (0.00000)
% Black		0.02047*** (0.00525)	0.06252** (0.02364)	-0.02507 (0.09664)		-0.00373** (0.00180)	0.00442 (0.01275)	0.04491 (0.05821)
% Foreign Born		-0.04005*** (0.01304)	-0.00604 (0.01044)	-0.01373 (0.01703)		0.00112 (0.00220)	-0.01458 (0.00874)	-0.01103 (0.01026)
% Urban		0.03227*** (0.00610)	0.01084* (0.00579)	0.00369 (0.01068)		0.00103 (0.00124)	-0.00310 (0.00367)	0.00021 (0.00644)
% Illiterate		-0.03665*** (0.01065)	0.00077 (0.00671)	0.01254 (0.01720)		0.00624 (0.00385)	-0.00324 (0.00740)	-0.00868 (0.01036)
Constant	6.14019*** (0.40476)	6.55279*** (0.46352)	7.20781*** (0.25398)	7.99598*** (0.48994)	6.92865*** (0.03907)	7.52834*** (0.06028)	7.26101*** (0.16730)	7.92271*** (0.29508)
Year Effects	No	No	Yes	Yes	No	No	Yes	Yes
State Effects	No	No	Yes	Yes	No	No	Yes	Yes
IV	No	No	No	Yes	No	No	No	Yes
Observations	192	192	192	192	192	192	192	192
R-squared	0.50902	0.87371	0.93137		0.15632	0.80402	0.87807	

Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 6: Labor Market for Manufacturing Wage Earners

Variables:	<i>Natural Log of Total Employment</i>				<i>Natural Log of Real Annual Earnings</i>			
	<i>Pooled OLS</i>	<i>Fixed Effects</i>	<i>IV</i>		<i>Pooled OLS</i>	<i>Fixed Effects</i>	<i>IV</i>	
Appropriations <sup>13</sup>	1.43158 (3.34623)	-1.73959* (0.98717)	-0.19515 (0.36467)	9.09488 (15.89606)	1.01614*** (0.27471)	0.66574*** (0.23386)	-0.54224** (0.25632)	0.31141 (4.53092)
Union Index	-0.02847 (0.06215)	-0.04140* (0.02297)	-0.00375 (0.01199)	-0.02260 (0.03853)	0.01427** (0.00692)	-0.00460 (0.00557)	-0.01535** (0.00618)	-0.01708 (0.01098)
Union*South	0.04923 (0.03936)	0.02859 (0.02804)	-0.01552 (0.02650)	0.06845 (0.15766)	-0.04191*** (0.00847)	-0.01452* (0.00815)	-0.07374 (0.04714)	-0.06603 (0.04494)
Population		0.00000*** (0.00000)	0.00000 (0.00000)	-0.00000 (0.00000)		-0.00000 (0.00000)	0.00000 (0.00000)	0.00000 (0.00000)
% Black		0.01605** (0.00788)	0.05272** (0.02614)	-0.03079 (0.15132)		-0.00689*** (0.00200)	0.01871 (0.02343)	0.01103 (0.04313)
% Foreign Born		-0.03758** (0.01514)	-0.02790*** (0.00935)	-0.03691 (0.02837)		0.00604** (0.00247)	0.00529 (0.00511)	0.00446 (0.00809)
% Urban		0.04121*** (0.00535)	0.01280** (0.00564)	-0.01218 (0.04445)		-0.00347*** (0.00103)	-0.00334 (0.00331)	-0.00564 (0.01267)
% Illiterate		-0.02916* (0.01551)	-0.00071 (0.00700)	-0.00990 (0.02426)		-0.00149 (0.00364)	-0.00443 (0.00644)	-0.00527 (0.00692)
Constant	11.22155*** (0.37180)	9.93701*** (0.39546)	10.62239*** (0.26815)	14.24035*** (3.26509)	6.24693*** (0.06693)	6.46030*** (0.07632)	6.57331*** (0.24803)	6.82394*** (0.93066)
Year Effects	No	No	Yes	Yes	No	No	Yes	Yes
State Effects	No	No	Yes	Yes	No	No	Yes	Yes
IV	No	No	No	Yes	No	No	No	Yes
Observations	189	189	189	189	189	189	189	189
R-squared	0.01136	0.82286	0.82371		0.45110	0.65369	0.45743	

*Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1*

<sup>13</sup> Labor Appropriations per gainfully employed worker.

Table 7: Labor Market for Manufacturing Salary Workers

Variables:	<i>Natural Log of Total Employment</i>				<i>Natural Log of Real Annual Earnings</i>			
		<i>Pooled OLS</i>	<i>Fixed Effects</i>	<i>IV</i>		<i>Pooled OLS</i>	<i>Fixed Effects</i>	<i>IV</i>
Appropriations	1.47834 (3.57685)	-2.72869** (1.16042)	-0.58779* (0.31255)	5.32038 (12.89138)	1.67208*** (0.18832)	0.48468*** (0.17222)	-0.23515 (0.25561)	-2.39366 (6.46689)
Union Index	0.03760 (0.06428)	0.00624 (0.02368)	0.00166 (0.01074)	-0.01033 (0.03124)	-0.00300 (0.00482)	-0.01487*** (0.00364)	-0.01439* (0.00814)	-0.01000 (0.01567)
Union*South	0.03014 (0.04240)	0.01934 (0.02430)	-0.04875 (0.02930)	0.00465 (0.12786)	0.00772** (0.00351)	0.00207 (0.00281)	0.00664 (0.00902)	-0.01287 (0.06414)
Population		0.00000*** (0.00000)	0.00000* (0.00000)	-0.00000 (0.00000)		-0.00000 (0.00000)	-0.00000 (0.00000)	0.00000 (0.00000)
% Black		0.01463* (0.00864)	0.05900** (0.02529)	0.00590 (0.12272)		-0.00211*** (0.00073)	0.01074 (0.01104)	0.03015 (0.06156)
% Foreign Born		-0.03297** (0.01558)	-0.01504* (0.00819)	-0.02077 (0.02301)		-0.00045 (0.00153)	-0.00919 (0.00817)	-0.00709 (0.01154)
% Urban		0.03871*** (0.00588)	0.00810 (0.00508)	-0.00778 (0.03605)		0.00146 (0.00092)	0.00068 (0.00350)	0.00648 (0.01808)
% Illiterate		-0.03778** (0.01733)	0.00502 (0.00736)	-0.00083 (0.01968)		0.00145 (0.00162)	-0.00365 (0.00802)	-0.00152 (0.00987)
Constant	8.40768*** (0.38615)	7.47553*** (0.37331)	8.30411*** (0.26727)	9.51607*** (2.70870)	7.08049*** (0.03048)	7.09362*** (0.03881)	7.69864*** (0.21918)	7.25586*** (1.35881)
Year Effects	No	No	Yes	Yes	No	No	Yes	Yes
State Effects	No	No	Yes	Yes	No	No	Yes	Yes
IV	No	No	No	Yes	No	No	No	Yes
Observations	189	189	189	189	189	189	189	189
R-squared	0.01531	0.84599	0.93595		0.22316	0.83585	0.88306	



Figure 1  
State Manufacturing Regulation Measures for 1899 and 1909

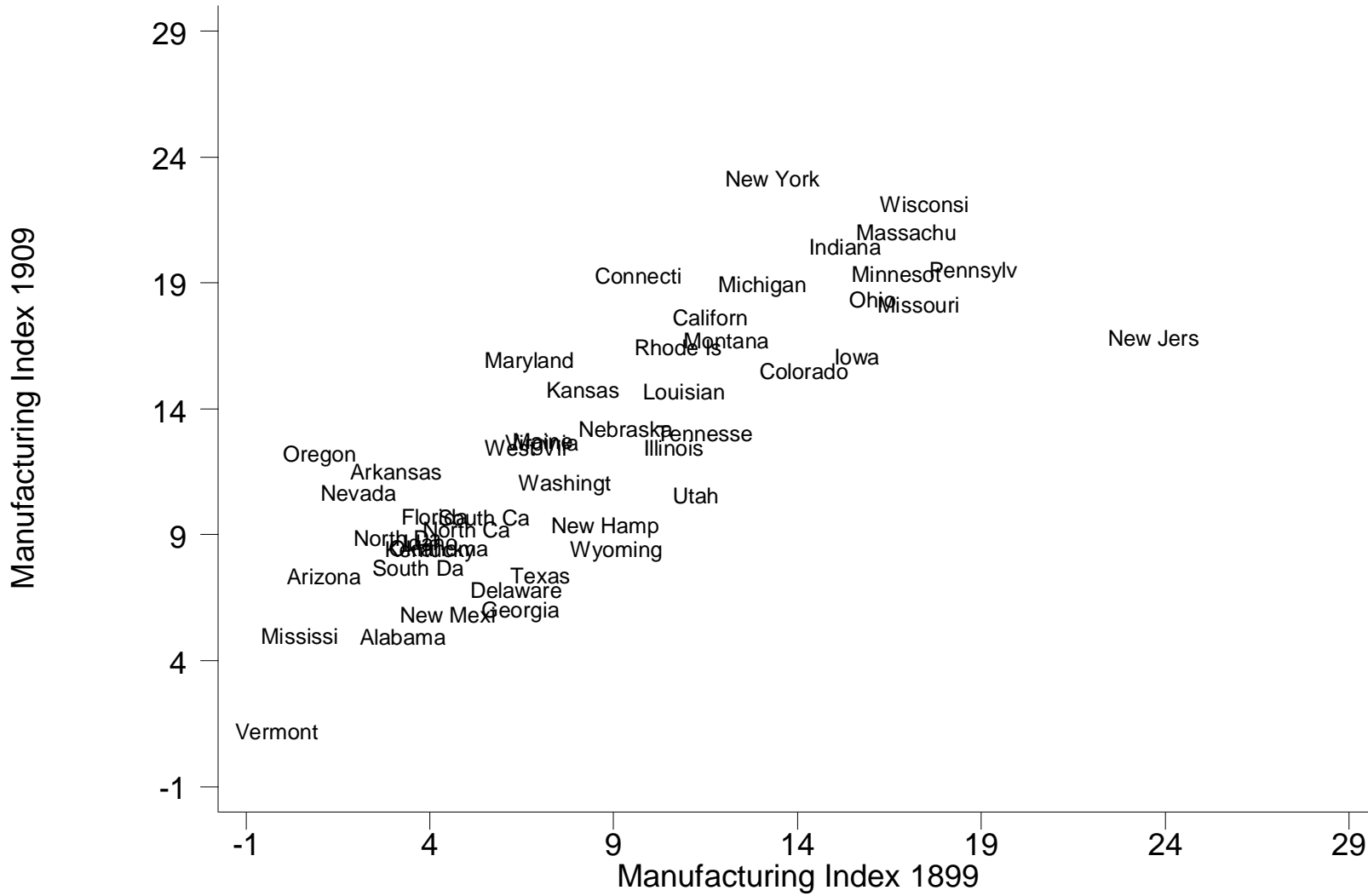


Figure 2  
State Manufacturing Regulation Measures for 1899 and 1909

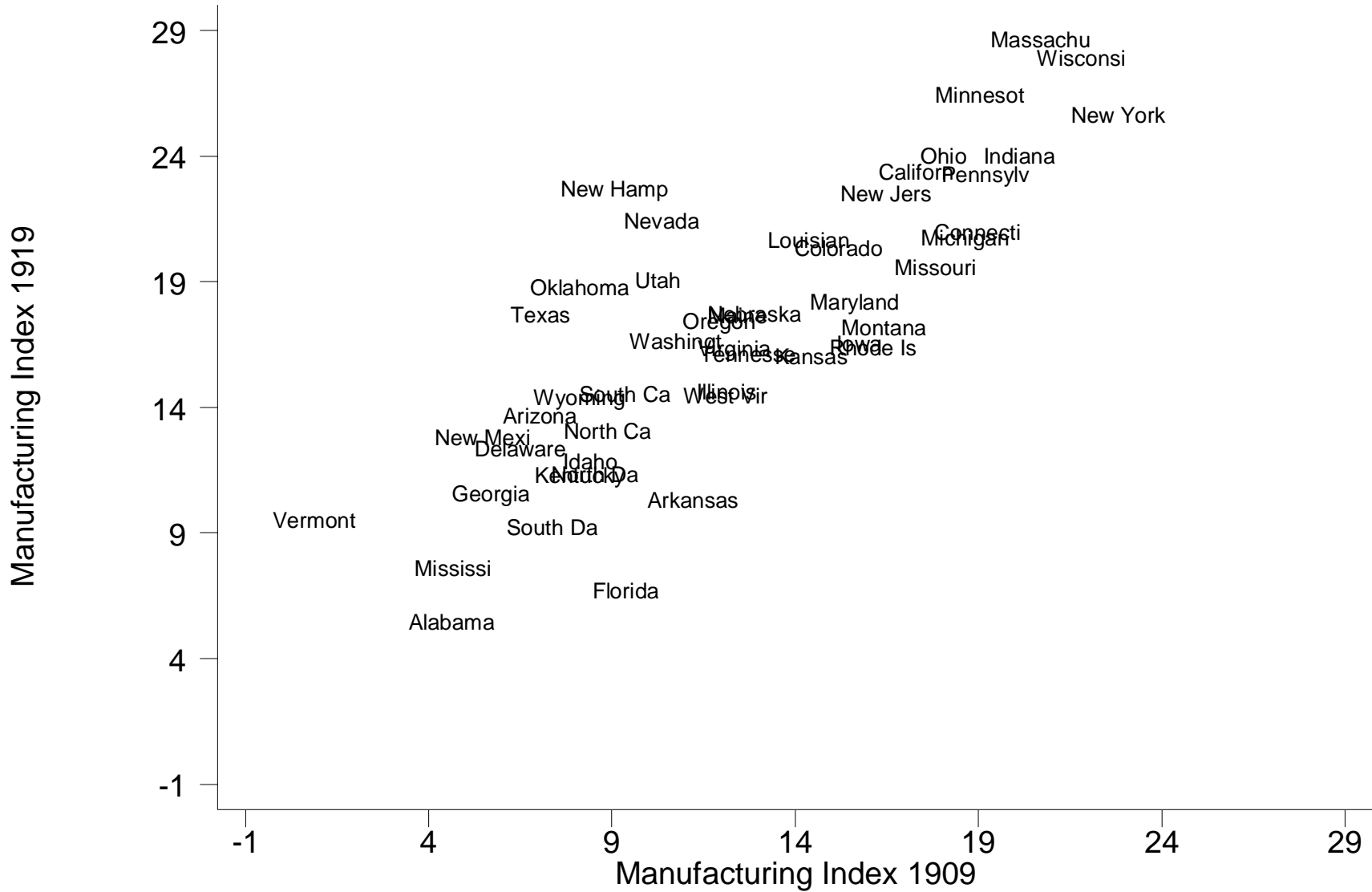


Figure 3  
 Change in State Manufacturing Regulation Measures, 1909-1919 vs. 1899-1909

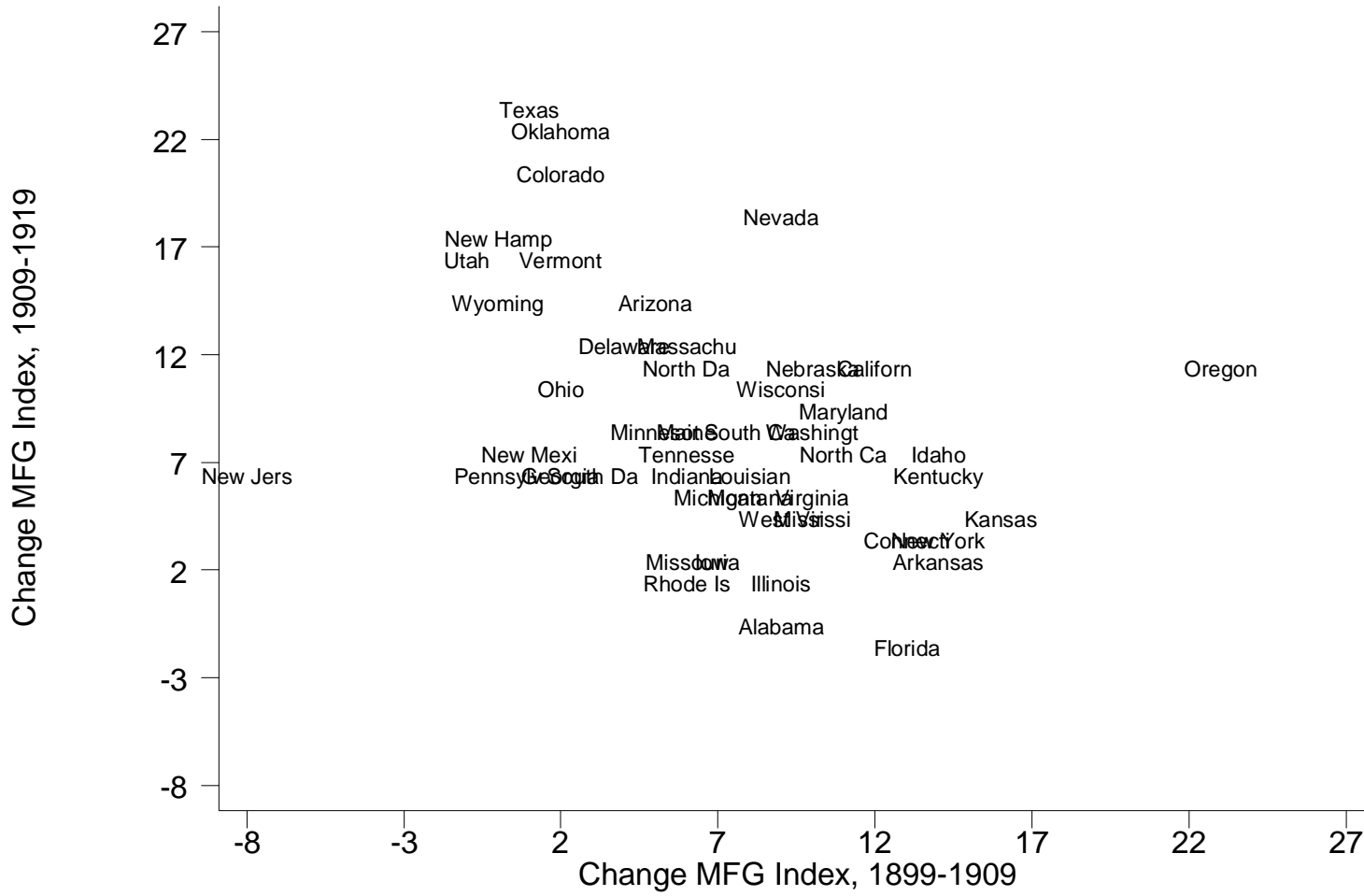


Figure 4  
 State Labor Regulation Spending in 1967 Dollars per Mining and Manufacturing Workers , 1903 vs. 1916

