THREE ESSAYS ON ANGLO-AMERICAN LABOR REFORM

by

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A Dissertation
Submitted to the
Graduate Faculty
of
George Mason University
in Partial Fulfillment of
The Requirements for the Degree
of
Doctor of Philosophy
Economics

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Date: _____ Spring Semester 2020
George Mason University
Fairfax, VA

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Spring Semester 2020
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ACKNOWLEDGEMENTS

I am grateful for the guidance and support I received from the talented members of the George Mason faculty. I particularly wish to acknowledge my director, Professor Johnson and my committee members, Professor Tabarrok and Professor Koyama.

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British Parliamentary Papers..... BPP
House of Commons..... HoC
United Kingdom..... UK
United Mine Workers of America ..... UMWA

ABSTRACT

THREE ESSAYS ON ANGLO-AMERICAN LABOR REFORM

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George Mason University, 2020

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This dissertation focuses on Anglo-American labor reforms during the Industrial Revolution. The most common explanations for the changing age profile of the labor force are evaluated. New insight to the political economy of regulation is provided using empirical methods and game theoretic models. Chapter 1 reviews theories which explain the demand of child labor as a function of technology. Chapter 2 contains an in-depth empirical analysis of the differences in enforcing progressive labor reforms in Victorian Britain. Chapter 3 explores the impact of the United Mine Workers of America (UMWA) on banning child labor from mines. This dissertation is designed to further the study of the political economy of passing and enforcing regulations.

CHAPTER ONE: TECHNOLOGY AND CHILD LABOR

This chapter investigates if the technological progress of the 1800s allowed low-skilled labor to replace high-skilled labor and increased demand for child labor. Some argue that 19th century manufacturing technology was chiefly designed to replace high-skilled labor with low-skilled labor that could be paid a fraction of the former's wage. Others suggest a lack of technology was responsible for child labor. This paper examines the dispersion of technology in the British textile industry and concludes that different technological advances may have had opposite effects.

Section One: Introduction

The 19th century was a time of tremendous social and economic change in Britain. One of the most infamous developments of the Industrial Revolution was the use of young children to perform dangerous or tedious jobs. British census data shows that across most industries, child labor reached a peak mid-century and began a rapid decline. Some attribute the decline to the rising standard of living or new technological developments. Others may credit the decline of child labor to laws and regulations. These laws forbade children from working in certain industries if they were under a specified age which was steadily revised upwards over time until eventually children were required to attend school. Data from British censuses and Parliament Papers shows that the fact patterns lend some support for both interpretations.

Researchers such as Humphries (2010) addressed the issue from the supply side with an analysis of differences in family composition used to explain the amount of child labor supplied. Humphries uses data from the autobiographies of working class and middle class men who included information on their family composition, socio-economic status and location. Family size was positively correlated with likelihood of children working as it was harder for one or two working parents to support a larger family. The supply side research provides a detailed of view but the relatively small samples and limited geographic coverage makes the Humphries data less usable with the data collected from the population of textile factories throughout Britain. This research will focus on demand side theories.

Hicks (1932) commented on the idea of substituting inputs to lower costs, suggesting that "change in the relative prices of the factors of production is itself a spur to invention, and to invention of a particular kind – directed to economizing the use of a factor which has become relatively expensive." Building on this idea, Habakkuk (1962) hypothesized that a key feature of 19th century technology was making low-skilled labor much more productive and more capable of replacing scarce high-skilled labor. Acemoglu (2000) supports Habakkuk's thesis. The hypothesis that technology spurred the adoption of child labor is not universally accepted.

Offering a different but not an opposing view, Nardinelli (1980) credited a change in technology, the development of the steam engine, as instrumental in reducing child labor in textile mills and other factories. Previously mills were located near rivers as water power was the only cost efficient method to run the machinery. Steam engines

allowed the factories to be built by population centers. According to Nardinelli the reduced demand for child labor as factory managers could now employ more adults, a superior input compared to children. Between 1850 and 1861 there was an expansion of steam power from 108,000hp to 375,000hp in the textile industry (Factory Returns 1850, 1861). As the following sections reveal, there was no clearly negative relationship between steam power and employment of children under the age 13.

But there are other fundamental concerns with the relocation argument. Neo-classical economics assumes that people are rational, utility maximizing actors. With this basic assumption, workers should be willing to relocate to areas where their labor is best rewarded, absent high transaction costs. When considering transaction costs, an obvious barrier existed until 1834. The Poor Laws and Settlement Acts made unemployment insurance a parish responsibility and simultaneously prevented the movement of poor people from one parish to another. However, these laws were reformed to allow for labor mobility in 1834, why then should labor still be immobile decades later?

Additionally, adult labor may have had a higher productivity but children worked for one fifth of the cost or less (Supplementary Report, 1834). If adults were not five times as productive, or not suited to all tasks such as tying broken threads back together, then there is still an economic reason to hire children until the marginal product of a pound spent on adult labor was equal to a pound spent on child labor. The research will make use of historical data to explore these two theories from Habakkuk and Nardinelli. The second section reviews relevant laws and reforms. The third section lays out the primary historical sources which provide the data for this study. The fourth section

discusses different models. The fifth section covers the results of the models. The sixth section explores threats to validity and the seventh section concludes the paper. Before wading into the murky waters of statistical regression models, a review of relevant labor laws and history is needed.

Section Two: Historical Background

The Poor Laws and Settlement Laws

Pre-Industrial Britain had a decentralized system of welfare for the unemployed, widows and orphans. This system was funded by local parishes. As far back as the 17th century, there were fears that the poor would relocate to more generous parishes and cause local taxes to increase (Neal, 1995). The remedy for this was the Poor Relief Act of 1662, also known as the Settlement Act. The Settlement Act clarified which parish was responsible for providing relief to a specific person. Wherever a person was born or owned property could be considered their domicile. The poor population was no small number as in 1860, the Journal of the Statistical Society of London reported that "800,000 to 1,000,000 of our fellow creatures," depended partially or entirely upon this system (Purdy, 1860). This was roughly 5% of the population at the time.

The unintended consequences of this law was to inhibit the movement of working class and poor people who could not afford to own their own houses. In order to relocate from one area to another to find work, a member of the lower classes had to obtain a letter from an employer of the destination parish showing intent to hire that person. This created additional transaction costs. Restricting labor mobility may have caused shortages or surpluses in different parishes that did not reach equilibrium. In 1776 Adam

Smith wrote, “the very unequal prices of labour which we find in England at no great distances from one another is probably owing to the obstruction of the law of settlements.”

However, this law was effectively abandoned in 1834 when the Poor Laws were dramatically changed. It appears policymakers were aware that the law was a barrier to commerce. With an increase in labor mobility, factory owners could hire adult workers more easily and shift away from child labor. From this perspective, a potentially important legal reform for reducing child labor was reducing barriers to adult labor. Yet child labor did not vanish from factory floors, in many cases, it spread. But what about the role of technology or the new factory labor laws?

The Factory Acts and Factory Inspectors

Work by Doepke and Zilibotti (2005) created a positive theory of how reformers focused on child labor after the rise of the factory system. Their work suggests that as economic incentives change, attitudes towards child labor change. While arguments can be made that the early Factory Act of 1819 was largely ignored, the 1833 Act provisioned for factory inspectors for the first time. These men examined nearly every textile factory, first in England and Wales and eventually including Ireland and Scotland in their inspections. Enforcing the laws on working ages and conditions was an important part of their job but keeping detailed records of the technology and people employed in the industry was another important function. These records, generally referred to as the Factory Returns, provide the majority of raw data studied in the following sections.

The inspectors routinely fined manufacturers for violating safety or minimum age laws. Factory owners were fined based on the amount of children working in unlawful conditions. From records of prosecutions between 1845 and 1854, it is shown that roughly three quarters of prosecutions results in convictions. The inspectors published a report of all cases and convictions of labor law violations. The fines in the 1840's ranged from 5 shillings to 100 pounds sterling or jail time, although in 1846 the upper limit would be 30 pounds, suggesting the need for harsher penalties. The average fine was 5 pounds sterling. A comfortable working class or middle class family would earn 60 to 80 pounds a year so these fines were equivalent to a month's wages for such a family (Bowley, 1900). A.E. Peacock (1985) asserts that while lax enforcement did occur, it was the exception and not the rule. This will be challenged in Chapter 2. Of course the Factory Acts were simply designed to regulate the employment of children and women, not eliminate it.

Section Three: Variables and Models

The Factory Returns

The Factory Returns, compiled by inspectors and presented to Parliament, recorded a number of statistics that were believed to be valuable in tracking the technological progress of the textile industry. Of course there were records of workers with special attention paid to ages and genders due to working restrictions on women and children. The Factory Returns also contain the amount of horsepower provided by both water and steam and the number and types of machines. Originally this data was recorded at the individual parish level, but over time it was aggregated to the county

level, reducing the size of the Returns by hundreds of pages. This analysis period stops before it was aggregated to the regional level in the 1870s.

Additionally, the inspectors were able to break the textile industry into separate sectors for cotton, wool, flax, worsted and silk. The sectors were further decomposed into factories specializing in spinning raw material, in weaving fabric, in both of those tasks, and none of the above. I make full use of the level of detail provided by the Returns to run my regressions. Because most of the child labor in the textile industry was in the cotton sector, specifically in cotton spinning, I focus only on cotton to the exclusion of wool, flax, worsted and silk.

To summarize the variables provided by the Returns and the derived variables, I refer to the table below. Note that the Factory Returns categorize data points by Cotton or Wool and then by Spinning, Weaving or Both. This means each county can have multiple observations depending on the structure of their textile industry. The summary statistics in the tables below refer to observations, not counties or individual factories. This differentiation is needed because of the fundamental differences in spinning vs weaving factories and cotton vs wool factories. In both cases the latter group always hired fewer child workers.

Some points need to be clarified. The cotton sector was based in and around the county of Lancashire and this was the reference point for the cotton sector regression analyses. Counts of weavers were not available in every Return but counts of workers are included in every Return. The percentages of boys and girls are divided by the total number of workers for each county, not the number of males and females respectively.

Table 1 Variables from Factory Returns

Variable	Description	Notes
year	The year of the Return	1850, 1856, 1961
type	Which type of Factory	Spinning, Weaving or Both
county	County of England, Wales, Scotland or Ireland	85 counties with up to 6 observations per county
factories	Number of factories in county	1 to 727, most observations have less than 10
spindles	Number of spindles in county	Most observations have between 30,000 to 90,000 but larger counties had 300,000 to 1.1 million
power_looms	Number of power looms in county	Most observations had less than 2,000 looms with outliers containing 100,000 or more
weavers	Number of weavers in county	A similar distribution as looms
steam	Amount of steam provided horsepower	More prevalent in cotton industry than wool. Cotton Mean: 2,952 hp Max: 113,326 hp Wool Mean: 186 Max: 10,223 hp Mode: 0
water	Amount of water provided horsepower	Cotton Mean: 247 hp Cotton Max: 1,828 hp Wool Mean: 90 hp Wool Max: 1,877 hp
13male	Number of male textile workers under 13 years of age in the county	Cotton Mean: 330 Max: 9,551 Mode: 0 Wool Mean: 40 Max: 2,545 Mode: 0
13female	Number of female textile workers under 13 years of age in the county	Cotton Mean: 226 Max: 7,740 Mode: 0 Wool Mean: 30 Max: 1,603 Mode: 0
1318male	Number of male workers between 13 and 18 years old	Cotton Mean: 714 Cotton Max: 15,710 Wool Mean: 105 Wool Max: 3,819
14female	Number of female workers over 13 years old	Cotton Mean: 3,881 Cotton Max: 90,389 Wool Mean: 316 Wool Max: 12,819
18male	Number of male workers over 18 years old	Cotton Mean: 1,940 Cotton Max: 48,616 Wool Mean: 292 Wool Max: 10576
allmale	Number of all male textile workers	Cotton Mean: 2,945 Cotton Max: 471,320 Wool Mean: 438 Wool Max: 120,457
allfemale	Number of all female textile workers	Cotton Mean: 4,087 Cotton Max: 653,920 Wool Mean: 346 Wool Max: 95,263
allworkers	Number of all workers	Cotton Mean: 7,032 Cotton Max: 1,125,240 Wool Mean: 784 Wool Max: 27,946
Source: Factory Returns 1850, 1856, 1861		

Measures of Technological Progress

The impact of technological progress on child labor is the focus of this study. Although technological progress is a difficult notion to quantify, regression analysis demands quantifiable inputs and there are a number of statistics used as proxies for technological progress. Habakkuk's deskilling and specialization theory relies on output per worker increasing even as the share of lower skilled workers (children) increases. The Luddites and similar anti-machinery advocates realized that their skills were being devalued by new technology that increased the output of lower skilled workers.

While output per worker is not observable, the number of spindles per worker is an observable proxy. This is a straightforward measurement of how intensely labor was being utilized. The "double-decking" of spindles allowed one worker to watch twice as many spindles as previously. This obviously increased output per worker and is one example of technological progress. Ideally, we would directly measure output per worker, but this data is not available. The speed or sophistication of the machines is also not directly observable. Below is a record of "double-decking" spindles and reducing the number of workers in one mill in 1841.

30*s.* to 42*s.* per week. But an improvement in machinery took its rise at the turn-out, which has since reduced the number of spinners employed nearly one-half, viz., the coupling or double-decking mules, by which one man became able to work twice the number of spindles. It has had no effect, however, in reducing the number of other persons employed, or changing their proportions in respect of age. But by lessening to such an extent the number of the highest paid class of operatives, it has materially lessened the total amount of wages paid.

In our own establishment the number of spinners employed has been lessened 40 per cent., while the total number of other persons employed remains nearly the same.

The effects of the various changes in our mill since 1828 will be seen in the following tabular view :—

Year.	Proportion of Work-people employed.		Total Annual Wages paid, assuming the Sum paid in 1828 as = 100.	Proportion paid to each Class.		Selling Price per Pound in the Month of December.			
						Yarn.		Lace Thread.	
	Spinners.	Other Classes.		Spinners.	Other Classes.	140.	200.	140.	200.
	Per Cent.	*Per Cent.*		*Parts.*	*Parts.*	*s. d.*	*s. d.*	*d.*	*s. d.*
1828	10·6	89·4	100	52	48	7 –	17 –	9 3	24 –
1830	10·3	89·7	85	41	44	5 –	12 –	6 8	16 –
1840	6	94	74	29	45	5 2	10 6	5 2	10 1

Figure 1 1841 Factory Report with Power

While previous writers mentioned that the humidity of the region around Lancashire was especially suitable for manufacturing cotton products, Crafts and Wolf (2013) showed that the humidity of that region is not significantly different than other parts of England, Wales and Scotland. Yet the cotton industry was more heavily clustered around Lancashire than the wool industry was around Yorkshire. An alternative interpretation is that the technology of production was comprised of heavy pieces of machinery and some parts were semi-custom-made that required specialized skill to install. These characteristics of the means of production meant that this technology spread relatively slowly over distance. Dittmar (2011) showed that this pattern held true for the printing press and used geographic distance to instrument for the effect of information technology on city growth rates.

Clark (1987) discusses that Lancashire was exporting textile technology to the rest of the world. The figure below shows the distribution of machine makers in Britain in 1829. The data from this comes from Pigot's 1829 Business Directory. Manchester (historically located in Lancashire) had 32 registered machine makers and roughly half the firms were within a 20 mile radius of the city. Counties that were a greater distance from Lancashire probably had less access to the technology being developed there. Leeds, to the northeast, also housed a significant number of machine makers as well as Nottingham to the southeast.

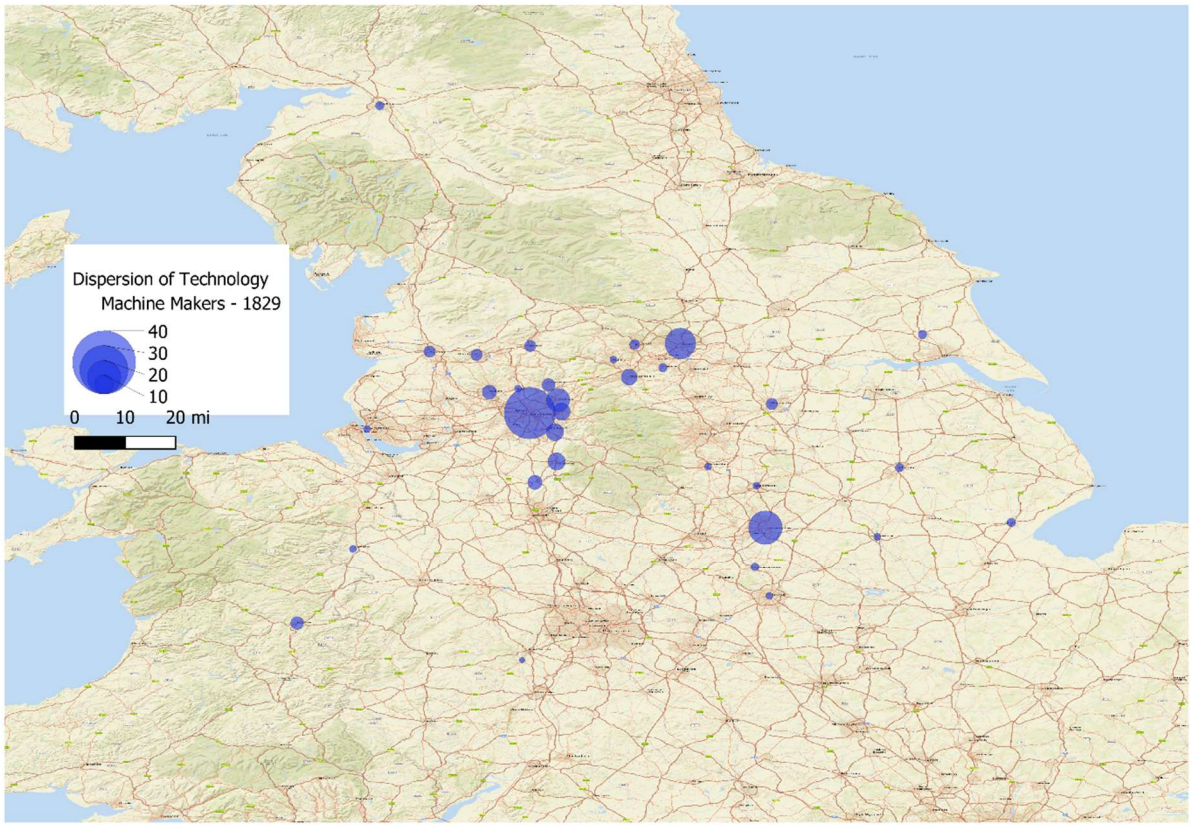

Figure 2: Dispersion of Machine Makers in 1829

Broadening our definition of technology firms to include millwrights, engineers and engine makers, show a similar pattern. Figure 2 shows that the largest cluster of firms is still around Manchester and southern Lancashire. Leeds, Nottingham and Newcastle have much smaller clusters.

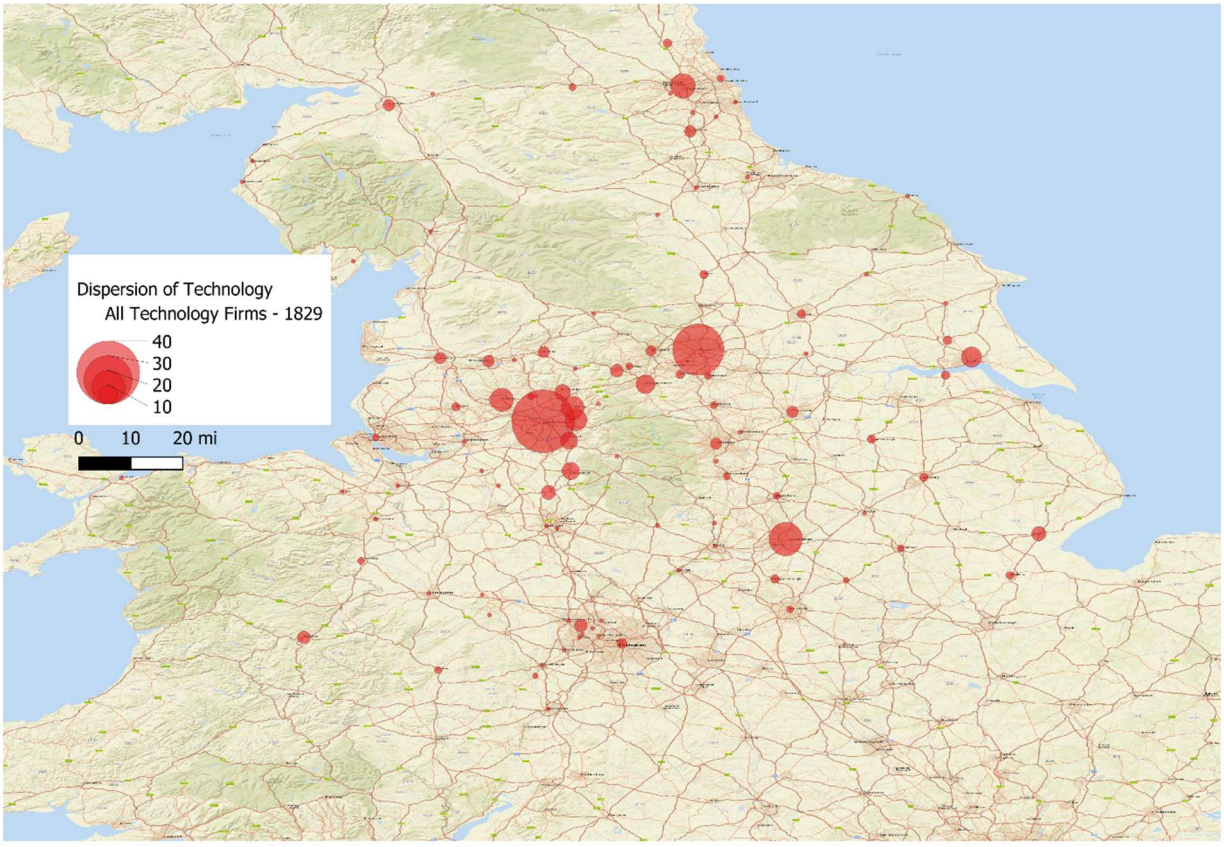

Figure 3: Machine Makers, Mill Wrights, Engineers and Engine Makers in 1829

Because the advanced technology of the day was comprised of heavy machines, being closer this cluster of machine makers, millwrights, and engine makers may have

allowed nearby firms an advantage over more distant firms. Combined with the number of spindles to worker, which is correlated with proximity to Lancashire, these two metrics can be used to test the Habakkuk thesis that more advanced technology allowed for a lower skilled workforce. The model for this is:

Formula 1 Machines and Child Labor

$$lnPercent13 = \beta_0 + \beta_1\left(\frac{spindles}{worker}\right) - \beta_2 distance + \beta_3 time + \varepsilon$$

Nardinelli (1980) claims that steam power allowed for the relocation of mills to urban centers and was a major factor in the decline of child labor. Another measure of technological progress may be steam power per worker. While water power originally drove the machinery, steam power supplanted its predecessor as time went on. By 1850 only 8% of power was provided by water, the rest of the horsepower was provided by steam (Factory Acts). We can test this hypothesis with cross sectional regression using steam power or water power per worker at the county level for factories involved in spinning cotton or performing both activities. Another proxy for technology is the ratio of steam power to water power. A cruder metric is simply observing total steam power in the cotton industry for each county, without considering the number of workers in each county. If Nardinelli is correct, more steam power should indicate less child labor and more water power should indicate more child labor. We can use three different variations of the model to test for the relationship he suggests:

Formula 2 Power per Worker and Child Labor

$$lnPercent13 = \beta_0 - \beta_1\left(\frac{steamhp}{worker}\right) + \beta_2\left(\frac{waterhp}{worker}\right) + \beta_3 time + \varepsilon$$

Formula 3 Power Ratio and Child Labor

$$lnPercent13 = \beta_0 - \beta_1\left(\frac{steamhp}{waterhp}\right) + \beta_2 time + \varepsilon$$

Formula 4 Aggregate Power and Child Labor

$$lnPercent13 = \beta_0 - \beta_1 steamhp\ in\ county + \beta_2 waterhp\ in\ county + \beta_3 time + \varepsilon$$

Section Four: Results

Machinery and Child Labor Results

Using the data from the Factory Return of 1850, 1856 and 1861 it is possible to construct a model with the proportion of workers under 13 within each county as the dependent variable. Each county can provide up to 6 observations because of the three years of records and cotton factories divided into those specializing in spinning and those engaged in both spinning and weaving. The analysis is uses cross-sectional, rather than fixed effects estimation as there is not enough time variation for fixed effects. The explanatory variables are (1) spindles per worker (logged), (2) time, and (3) the straight line distance to Lancashire (logged). I cluster the standard errors at the county level.

Table 2 Machinery and Child Labor in Cotton Mills 1850-1861

VARIABLES	(1) ln13	(2) ln13	(3) ln13	(4) ln13
ln_spin_work	**1.199*** **	**1.176*** **	**1.101*** **	
	(0.295)	(0.309)	(0.299)	
time		0.0178	**0.213***	**0.288****
		(0.0279)	(0.0793)	(0.0840)
ln_miles			**-0.0430***	**-0.0515****
			(0.0158)	(0.0166)
Constant	-9.247***	-9.270***	-8.993***	-4.733***
	(1.254)	(1.248)	(1.209)	(0.356)
Observations	113	113	113	113
SE Clustered	County	County	County	County
Adj. R-squared	0.166	0.160	0.200	0.067

Robust standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05

Table 2 shows the relationship between different measures of technology and the portion of the labor force that was under 13 in the cotton industry of each county. The percentage of the labor force under 13 years old has been logged. The first column shows that the log of spindles per worker, a measure of technology is positively correlated with the portion of workers under 13 years old. A 1% increase in spindles per workers predicts a 1.2% increase in child labor. This estimate is statistically significant at the 0.1% level.

The second column adds a control for time. The passage of time is positively correlated with child labor but not in a statistically significant way. The estimate on spindles per worker is virtually unchanged in magnitude and statistical significance. A 1% increase in spindles per workers still predicts a 1.2% increase in child labor. This estimate is still statistically significant at the 0.1% level

The third column adds a control for distance from the industry cluster in Lancashire. The coefficient on the log of spindles per worker drops to 1.1, indicating a 1% increase in spindles per worker is correlated with a 1.1% increase in the portion of children in the labor force. This estimate is still statistically significant at the 0.1% level. The coefficient on time changes to 0.2, indicating that each year saw an increase of .2% in the portion of child labor and this estimate is significant at the 5% level. The log of distance from Lancashire is negative, suggesting that as distance increased by 100%, a county would have 4.3% fewer children working in its cotton factories. This is significant at the 5% level. The fourth column excludes machines per worker, the primary variable of interest and confirms that without that variable, the estimates on time and distance are robust and their statistical significance is at the 1% level.

Overall this analysis supports the Habakkuk theory that as technology advanced, firms were able to de-skill their workforce and substitute children for adults. More machines per worker correlates positively with child labor. As time passed, technology must have improved which was also correlated to increases in child labor between 1850 and 1861. Finally, being closer to the cluster of machine makers is also correlated to higher levels of child labor. These results are not conclusive but suggest that Habakkuk was correct.

Capital Mobility and Child Labor Results

The results for testing the relationship between steam power and child labor are less clear. Table 3 shows the results for three proxies of power technology, steam and water power per worker, the ratio of steam horsepower to water horsepower, and

aggregates of steam and water power for each observation. The analysis is uses cross-sectional, rather than fixed effects estimation as there is not enough time variation for fixed effects. Standard errors are clustered at the county level. As a reminder, the observations are for a particular year, county and whether the mills were spinning only or conducted both spinning and weaving.

Table 3 Steam Power and Child Labor in Cotton Mills 1850-1861

	(1)	(2)	(3)
VARIABLES	ln13	ln13	ln13
steam_work	0.819		
	(1.006)		
water_work	2.737		
	(1.712)		
time	0.0414	0.0411	0.0640
	(0.0404)	(0.0319)	(0.0265)
steamwaterratio		0.0160	
		(0.0217)	
steam			**-2.28e-05****
			(6.40e-06)
water			**0.00264*****
			(0.000460)
Constant	-5.196***	-4.288***	-5.376***
	(0.406)	(0.344)	(0.307)
Observations	113	89	113
SE Clustered	County	County	County
Adj. R-squared	0.021	0.003	0.207

Robust standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05

The first column shows that both steam and water power were positively correlated with the percent of the labor force under 13 years of age but not in a statistically significant way. The sign on steam power per worker as the opposite sign

predicted by the capital mobility theory. The second column shows that the ratio of steam to water power was not correlated to the variation in child labor and once again, the coefficient has an unexpected sign.

The third column shows that the aggregated amounts of steam and water power for each county-level observation are correlated with child labor and have the signs that Nardinelli's theory predicts. More steam power in a county is associated with less child labor and more water power is associated with more child labor. These estimates are statistically significant at the 0.1% level. The magnitude of these effects appear small but it is important to remember that during this period, steam power increased just over 110,000 horsepower for cotton spinning mills. Too predict a reduction in child labor of 2.3%, aggregated steam power in a county would have to increase by 1,000 horsepower. And to see a reduction of similar size, water power would have to increase by 10 horsepower. These last results are encouraging that Nardinelli's hypothesis is correct.

Ultimately these results show that 19th century technology which lead to mass industrialization cannot be agglomerated into one homogenous entity. Access to some types of technology appears to have encouraged the adoption of more child labor. On the other hand, other technology that allowed for greater capital mobility, is correlated with reductions in child labor. While these results are interesting and promising, there are threats to the validity of these conclusions which are addressed in the next section.

Section Six: Threats to Validity

This exploration of differing theories regarding the demand for child labor has focused on differences in technology. This study is based on machinery and horsepower

statistics taken from the Factory Returns and there is the possibility that omitted variables are causing a bias in the results. Some relevant factors are changes in fertility and demographics, the Great Irish Famine, differences between spinning and weaving industries, and unequal enforcement of laws governing child labor. Each threat should be evaluated before concluding.

Changes in Fertility and Demographics

Figure 1.1. Long-run trends in mortality and fertility in England and Wales
Note: The axis showing life expectancy at birth has been reversed to illustrate the decline of mortality.

Figure 4 Fertility Changes from Robert Woods (2000)

Figure 4 shows a pattern of falling fertility and rising life expectancy (Woods, 2000). These two trends result in an aging workforce as there are relatively fewer young workers and more old workers. In the long run, demographic changes of this magnitude could have contributed to employers substituting away from younger workers as the population aged. From 1830 to 1860 the fertility rate was more stable than the rest of the 19th century. Therefore it is unlikely that the fertility rate had an effect on child labor. Additionally, any change in fertility rates would need to occur in a way that is correlated with the rates of child labor across counties and time.

The Great Famine

The Great Famine resulted in a mass migration of Irish to England and Scotland during 1845 to 1850. The Irish had lower fertility rates with fewer children in their families, and the Irish settled disproportionately in and around Lancashire (Beach and Hanlon, 2018). This would reduce the relative supply of children around the areas that actually had the highest rates of child labor. If there is a bias due to Irish migrations, the bias would be in the opposite direction and understate the impact of the coefficients on machines per worker and distance from Lancashire or Yorkshire. Finally, the Famine ended in 1850, the first year studied, so there is reason to expect that the largest of the Famine's effects on population and labor supply had already occurred by the time frame under study. This means the effects would have been absorbed into the intercept and not caused bias in the estimated effects of the explanatory variables.

Labor Force Differences between Spinning and Weaving

It would have been wrong to assume that the sub-industry profile or distribution of mills engaged in spinning, weaving or both could not have occurred over time. This error was avoided by treating those separate types of factories as separate observations within each county. A cursory review of the data from multiple years of Factory Returns shows a trend of mills that specialized only in weaving employed far fewer children under the age of 13 than spinning mills. The divergence appears to increase with time, suggesting that new developments in the weaving industry made low-skilled child labor more obsolete compared to the spinning industry. This may come in the form of technology such as automatic power looms which were developed in the 1840s.

As the technology spread and became more complicated, it may have displaced the youngest of workers. This would contradict the Habakkuk's thesis of 19th century technology being a substitute for human capital. Meanwhile the spinning industry seemed to have almost no decline between 1838 and 1861. According to the 1861 Factory Returns, factories specializing in spinning had roughly 10% of their workforce under the age of 13. The proportion of child workers in weaving-only factories was 5% of the total labor force. Failing to separate the two main parts of the cotton and wool industries may yield very different results even when accounting for county level and time based effects.

Unequal Enforcement of Labor Laws

Finally, differing degrees of labor law reforms may have caused a bias in our estimates, particularly of the effect of distance from the industry cluster on the demand

for child labor. While A.E Peacock (1985) asserts that the Factory Acts were enforced uniformly and that leniency towards factory owners was a rare exception, close analysis of the court records of this time show otherwise. Leniency was granted more commonly around the Midlands which was the center for the textile industry and employed the largest portion of children under 13 years old. A common violation was for working children (and women) for too many hours. Firms broke these rules to increase the marginal product of these protected classes of workers. If some jurisdictions were systematically more likely to reduce or dismiss charges, the expected marginal product of young and female workers was higher in those places. This pattern in uneven enforcement of labor laws is the subject of chapter 2.

Section Seven: Conclusion

This chapter used different measures of technology from primary source data to test the hypothesis that technology in the textile industry increased or decreased the demand for child labor. Technological progress was measured directly as machines per worker and with different variations on the prevalence of steam and water power. Machines per worker, a measure of labor productivity is ideal for testing the Habakkuk thesis that more advanced technology was related to simplifying work and allowed for de-skilling of the labor force. The measures of steam power are ideal for testing Nardinelli's theory that technology allowing capital mobility was critical for reducing child labor as factories could move to population centers. Low-skilled labor was measured as percentage of the workforce under 13 years of age.

The results show that technological progress measured by machines per worker was positively correlated with the share of child labor. This supported Habakkuk's de-skilling argument. Additionally, the capital mobility measures bases on steam power and water power had the signs predicted by Nardinelli's theory. While these results are not conclusive, they suggest that different Victorian era technology and production techniques had opposite effects on the adoption of child labor, even within the same industry.

A major consideration is that both of the theories explored focus on technology while other factors can impact the demand for child labor in any given setting. Legal differences between counties and parishes can only be assumed away if the laws and the enforcement of the laws are roughly uniform. If a jurisdiction does not enforce laws that would otherwise limit the marginal product of children, that region will have a higher demand for child labor, *ceteris paribus*. The second chapter explores differences in the enforcement of the Factory Acts.

CHAPTER TWO: CRIME AND PUNISHMENT

The Factory Acts created a new system of regulations that limited working hours, mandated safety systems, and generally restricted the behaviors of management in the textile industry. Local magistrates were tasked with enforcing the new regulation. A body of work has debated the willingness of magistrates to convict violators. This chapter shows that magistrates were more likely to show leniency if they had connections to the textile industry and that magistrate backgrounds are useful in predicting case outcomes. At the same time, there is little support for the strategic school of court decisions reflecting a constrained judiciary. It appears magistrates were free to vote according to their own attitudes.

Section One: Introduction

A growing portion of the human experience has become a subject of study of economics. Legal institutions are now analyzed using economic frameworks. United States Supreme Court decisions have been modelled by a number of economists including Toma (1991), Caporale and Winter (2002), as well as Spiller and Gely (1992). A common assumption incorporated into many models is that justices have stable ideological preferences. Research focused on the United States shows that rather than being a completely independent decision making body, the US Supreme Court responds to party changes in the executive and legislative branches. Congress and the president

have the ability to veto statutory decisions made by the Supreme Court, constraining the ability of one branch of government to decide against the other two. Before such research was conducted, the assumption of total judiciary independence was standard.

Early work by Pritchett (1941, 1948) and Segal (1997) suggested judges always vote according to their preferences. In the attitudinal school of thought, judges to do not consider any constraints from the legislative and executive branches. By contrast, the strategic school started with Marks (1988), includes Spiller and Gely (1992) and deals with constraints from other branches. If the Supreme Court makes a ruling that both houses of Congress find too liberal or too conservative, a new law may be passed which the justices will find less preferable to their ruling. As forward looking strategic players, the justices are more likely to locate a decision closer to the middle ground on the ideological spectrum. The figure below illustrates this concept with a panel of three judges (A,B, and C) and the House of Representatives and Senate (H and S).

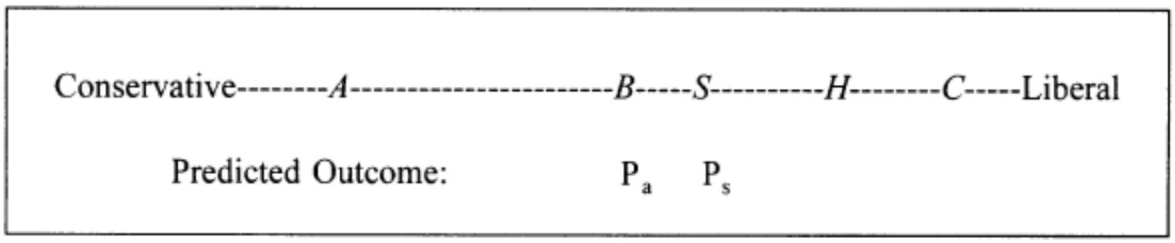

Figure 1 Congressional Constraints From Bergara, Richman, and Spiller (2003)

The above figure shows that without considering political constraints, point P_a, located at Judge B, is the likely outcome. However, P_a is to the left of both the Senate

and House. Each house would be willing to support a bill that was more Liberal. The Pareto optimal contracting range for legislators is between the Senate and House locations on the political spectrum. With the strategic model of Supreme Court decisions, the judges would prefer to rule with in the contracting range so that no Pareto improvement is possible and the decision will not be overturned through new statutes. P_s represents a possible outcome of the strategic process that will not be overturned by Congressional action but is close to the ideological preferences of the justices (Bergara, Richman, and Spiller, 2003). The court can only vote its own preference (determined by the median justice's preference) if that preference is located between the two houses.

The US Supreme Court has perhaps the highest profile of any judicial entity but these concepts can be applied outside the Unites States and throughout history. The Victorian British had an advanced but different judiciary system. Magistrates' courts evolved from the Anglo-Saxon moot court and the manorial court, and were officially founded in 1285, during the reign of Edward I. The King desired 'good and lawful men' to keep the King's peace (Hodgson, 1979). Local magistrates were tasked with enforcing laws and regulations but were not professional judges. Instead they were generally members of the community with high socio-economic status. The Lord Chancellor had the authority to remove a magistrate for improperly performing his duties (Schuster, 1949). This ability functioned as a check on the rulings and conduct of the magistrates. Previous work tested whether the US Supreme Court justices had consistent biases, and whether their rulings were constrained by Congress. This chapter seeks to determine if

magistrates were systematically biased and if the party affiliation of the Lord Chancellor influenced case outcomes by examining court records from 1840 to 1853.

The second section outlines the background of the Factory Acts, which placed regulations on the hours and conditions of employment, as well as the reception of the new laws. The third section outlines the data collected by the factory inspectors. The fourth section outlines specifications of biased judicial behavior. The fifth section discusses the results of the tests and their implications. The sixth section notes threats to validity as well as opportunities for further research. The final section concludes the chapter and summarizes the key findings.

Section Two: Historical Background

The Factory Acts were born of a wave of progressive reforms in Victorian Britain. The working conditions in factories were deemed to be harmful to health of laborers, particularly women and children. Laws were passed to regulate the working hours, cleanliness and safety requirements in textile factories. Factory inspectors were charged with seeking out violators and bringing them to court but local magistrates judged the cases brought before them and were ultimately responsible for enforcing the laws. If the magistrates refused to find the defendants guilty or reduced charges, the laws passed by Parliament would be ineffective.

Some professional bureaucrats also understood that the economic forces of profit and loss can be strong enough to override any law passed in London. In *A Whig Inspector*, Webb (1955) writes that in 1850 when a new order was enacted "to put a stop to such [children working underground in mines], Tremenheere simply declined to act,

stating that it would be a waste of public money, since such labor would go on until the seams were worked out. And there the matter ended. He had been appointed to the inspectorate originally because he had a 'conciliatory' personality. Intervention was new, distrusted, and on sufferance."

Throughout the 1840s and 1850s, there were over one hundred cases involving the Factory Acts each year, demonstrating that many owners and managers did not follow these new laws. However, some employees who had their working hours curtailed and safety improved seemed to favor the law as the following case against Robert Hopwood will illustrate. Naidu and Yuchtman (2013) describe the unbalanced relationship between employer and employee, enforced by the Master and Servant Law, which resulted in more than 10,000 law suits per year in mid-19th century Britain until it was abolished in 1875. Labor markets are usually assumed to be governed by "employment at will" but with traditional British law giving employers additional leverage over employees, the restraints on working hours may have resulted in greater worker utility due an increase in leisure. It is worth noting that each year, for every case of a textile firm violating worker protections, there were fifty to one hundred cases of masters taking their workers to court.

The unbalanced power relationship between employer and employee may explain why workers were known to report their employers for violating limits on working hours. This runs against some veins of economic thinking and modern sweatshop research. In an efficient market, workers will only work as much they desire without feeling compelled to work longer hours. Powell's (2014) research showed that more than 80% of sweatshop workers were unwilling to reduce their hours if it meant a reduction in pay.

His work deals with modern-day textile factories but the classical liberal argument was debated in the nineteenth century as well. It appears that while liberals of the time decried the regulation of working conditions and hours as an obstruction of voluntary exchange, workers did not protest the restrictions, although their weekly wages were cut.

The longer hours may reflect a preference of employers to make maximum use of their capital equipment. When faced with working either 16-hour shifts or not having a factory job at all, workers obviously preferred work to abject poverty, but the long days were not necessarily preferred to shorter days. One of the most surprising and infamous incidents of the time was due to anonymous whistleblowing by workers who were forced to work overtime. The mill owner at fault was Robert Hopwood, a local magistrate sworn to uphold the law, including the Factory Acts. His own workers informed on him.

> "We the undersigned sufferers…draw your attention to the very shameful manner in which some of the mill-owners of Blackburn have been violating the Ten Hours Act… Mr. Hopwood has a shed in which he employs between 400 and 500 weavers, and these he continues to work for half an hour and upwards every night after the other portions have ceased…because it cannot be well seen till you get very near it."
>
> Report by L. Horner 1850. Factories and Workshops. Annual Report of the Chief Inspector of Factories and Workshops 1850.

Leonard Horner, Chief Inspector, reported receiving so many such letters from employees, anonymous or named, that he debated only investigating only some of them. Ultimately, he decided that investigating all the letters received was the appropriate response given the risks the employees took by becoming whistle-blowers.

The members of the inspectorate left various records which reveal a bias in favor of regulation. A mine regulator noted in his journal a conversation with Leonard Horner,

the chief Inspector of Factories. “Met Mr. Leonard Horner, Factory Inspector, at the Council office today. He said that since his appointment in 1833 [seven years ago] he had not met six Mill Owners who expressed any sympathy with, or regard for the improvement of, the labouring classes in their employ!” (Webb, 1955). Fortunately, this chapter will deal with hard evidence, records of allegations, rulings, and penalties and not rely on anecdotal evidence.

Local Differences in Enforcement

The Returns of Prosecutions (Parliament. House of Commons, 1837-1853) left by the factory inspectors are so detailed that they name the magistrates who heard each case as well the outcome for each individual charge. The bench could show leniency by dismissing all or some of the charges. Most magistrates showed very little leniency but in Midlands towns such as Bolton and Blackburn, the leniency rates were relatively high. Bolton magistrates demonstrated a preference for lax enforcement by dismissing or reducing charges against accused factory owners or worker about one third of the time. Such behavior was seen in about one fifth of the cases in Blackburn. The Records of Prosecutions show that the national conviction rate in a typical year, from 1840 to 1850, was between 80% and 90%.

While the textile industry was content with lenient magistrates, the inspectors were not and often wrote notes complaining of such dismissals that were not in keeping with the written law of the Factory Acts. Given that being a local magistrate was a part-time occupation and that some of the magistrates owned textile factories, their aversion to intervention is understandable. This may be viewed as a form of regulatory capture. The

regulators themselves were not be co-opted by the industrialists but the courts were, to a degree. Most cases resulted in a conviction, but the teeth of the Factory Acts were blunted in the Midland parishes and did not bite as deep as in other localities.

Laws are powerful institutions but Pincus and Robinson (2014) explained that the people administrating and enforcing the laws are also a deciding factor of how laws operate. Their work on the Glorious Revolution showed that the most important change was not a written legal reform granting power to Parliament but that Parliament was *controlled by* reformers who used that power to achieve their own ends. The Whig party had an agenda to promote industry and commerce which led to more economic growth. Pincus and Robinson demonstrated the importance of the personal agendas of members of Parliament and this chapter addresses the importance of the motivations of the local magistrates.

The Returns of Prosecutions show that in 1841, Reverend John Hopwood was one of the magistrates presiding in a case against the factory owners Robert Hopwood and son, who faced multiple charges of violating the Factory Acts. Unusually, nearly all charges were directed at the subordinate managers rather than the owners. Half of the charges that were directed at the Hopwood family were dismissed without explanation.

Cases such as these show that magistrates were not monoliths of justice. Buchannan and Tullock (1962) outlined that governments and voters are not monolithic organisms. Such collectives are composed of individuals with unique motivations and goals. Being a magistrate was an unpaid position so wealthy men were well represented

in the magistracy. It is likely that economic, social, and political motivations would cause magistrates with ties to the textile industry to be lax enforcers of the Factory Acts, compared to those with no ties to the industry.

Henry Ashworth was an industrialist famous for his success in lobbying against the Corn Laws and for his opposition to the Factory Acts or any interference in the free market. He was also the head of a family of Bolton magistrates that included himself, his younger brother, Edmund and his son, George (Lewis, 2001). In 1841, the local inspector found children working illegally and fined three of the workers in the Ashworth mill, rather than the owners, for violating the Factory Acts. It is interesting that in this incident the inspector fined people on the spot, rather than take the matter to court. The Ashworths had a record of showing leniency to other textile firms and were not the only family of industrialists and magistrates in Bolton.

C.J. and Robert Darbishire were magistrates in Bolton during the 1840s. C.J. Darbishire was also a member of the Anti-Corn Law League and was elected the first mayor of Bolton in 1838. C.J. Darbishire managed a warehouse and did business with manufacturers in Bolton (Hardman, 2003). Darbishire was a free market proponent and showed leniency in enforcing the Factory Acts in more than one third of the cases he heard. Whether this was out of personal conviction or threat of losing his business relationships is unknown.

There were many instances of part-time magistrates being full-time mill owners and still failing to follow the law. Inspectors made notes of the close relationship

between law and industry in their reports, as L. Horner (1852) wrote, "I think it right to call your attention to the facts, that Mr. William Sidebottom, one of the partners [charged with a crime], is a magistrate, and that,…it was peculiarly incumbent on a magistrate to ascertain that the law at all times was strictly obeyed in his own factory." Yet the inspectors had no say in deciding who was fit or unfit to be a magistrate.

Nardinelli (1985) suggested that the Factory Acts allowed upper class industrialists, many of whom were magistrates, to use the law against relatively poor small mill owners, but this is not demonstrated by the court cases of Bolton and Blackburn. Mr. Robert Hopwood, a relative of a local magistrate, paid the maximum penalty allowed by the law, 100 pounds sterling, with no leniency shown by his peers. The Bracewell family of Skipton also paid the maximum fine that same year for having 60 people working overtime illegally. Their firm was not a small enterprise (Returns of Prosecutions, 1850). In fact, the most common reason for a reduction of penalties is that the defendant was too poor to pay. That pattern does not appear to match the type of exploitation suggested by Nardinelli. However it does appear that magistrates who were textile business owners or otherwise connected to the industry were more likely to display a significant amount of leniency to defendants. This is explored more in the next section.

Section Three: Data Sources and Variables

The Returns of Prosecutions (Parliament. House of Commons, 1837-1853) are part of the British Parliamentary Papers (BPP) and are the primary sources of data for this study. Additional information on the background of magistrates and their connections to

the textile industry must be drawn from a variety of sources such as Abram (1877), Clegg (1888), Lewis (2001) and Pigot's Business Directory (1829). The magistrates' backgrounds will be explanatory variables for predicting whether they showed leniency toward defendants accused of violating the Factory Acts.

The Returns of Prosecutions detail the offense and place of the alleged violation, whether a conviction occurred for each charge and the value of the penalty inflicted. They also list the names of the defendants, the magistrates and the prosecuting sub-inspector. When cases did not go as the prosecuting inspector expected, he would make a note, often expressing frustration at magistrates who failed to uphold the law or explaining why a fine was reduced. Penalties could be severe. John Cage was sentenced to prison for 2 months for falsifying documents for his underage daughter to allow her to work in a mill in 1840. This harsh punishment illustrates that parents and workers were sometimes prosecuted and that falsifying records could result in more severe punishment than most other crimes. By using the microdata generated by the inspectorate and breaking it down into sub-categories, it is possible to detect different patterns of criminal and judicial activity according to the composition of the bench or type of violation.

In the model of judicial bias, the basic unit of measure is the individual magistrate and the dependent variable is his record of leniency in court cases. One explanatory variable is the background of the magistrate and his relationship to the textile industry quantified by an index of zero to four. Zero represents no connection to the industry. Two points are awarded for being a textile firm owner, while one point is awarded for immediate family ties to the industry or having business ties to the industry.

In the model of case outcomes, the basic unit of analysis is a court case and the binary dependent variable is the odds that an individual court case will be shown leniency. This model uses a probit estimator. The chief explanatory variable in this model is the arithmetic mean of magistrate backgrounds, using the same index discussed above. Another variable of interest is the party affiliation of the Lord Chancellor. The number of counts of offense are included as measure of the severity of criminal activity in a given case. The Returns of prosecution are quite detailed in the information provided.

In both models, it is possible to see if outcomes depended on the type of labor protections being violated. Child labor laws included prohibitions against working children both in the morning and afternoon, allowing children to work at night, etc. Female labor laws were generally along the same lines including the ban on night work. The British were obsessive about keeping records and not having files in order and accessible to inspectors was a crime. Failing to enter all employees in the register was a common crime, especially when they were underage children. But the most severe recordkeeping crime, levied against owners, managers and even parents, was falsifying records such as time registers or age certificates. Machinery laws stated that moving pieces of equipment needed to be securely fenced. General regulations can include lack of whitewashing the factory or some other offense relating to working conditions. Of course whitewashing a factory could involve high opportunity costs as work was halted. A full list of the variables and their construction can be found in the appendix.

Section Four: Models for Magistrate Bias and Case Outcomes

Modeling Magistrate Bias

Policy recommendations often assume that the judiciary is an unbiased enforcer of laws and regulation. However, the magistrates that were trusted to dispense justice when the Factory Acts had been violated were sometimes owners of textile factories themselves. Information on the background of magistrates and their connections to the textile industry must be drawn from a variety of sources such as Abram (1877), Clegg (1888), and Lewis (2001). Each magistrate will be coded according to whether they were owners of a textile firm, had family connections to the industry, or had business connections to the industry. A leniency rate for each magistrate, measured as cases in which penalties were reduced divided by the total number of cases the magistrate presided over, can be calculated using the Returns of Prosecutions from years 1837 through 1846 and 1849 through 1853. Binary variables indicate whether a magistrate was a textile firm owner, was related to factory owners, or had business connections with the textile industry. The regression will use the leniency rate for an individual magistrate as a dependent variable with the background binary variables at independent variables. The model is illustrated below:

Equation 5 Magistrate Leniency Rate

$$Leniency\ rate_i = \alpha_0 + \delta_1 Owner_i + \delta_2 Family_i + \delta_3 Business_i + \varepsilon$$

To conserve degrees of freedom, a cumulative index of the first three variables is constructed on a scale of 0 to 4. Having family or business ties to the textile industry is

worth 1 point each while being a textile firm owner is worth 2 points. This weighting assumes that magistrates who are firm owners in the industry will be more biased than if they are tangentially connected to the industry. The condensed specification using the index is:

Equation 6 Condensed Magistrate Leniency Rate

$$Leniency\ rate_i = \alpha_0 + \beta_1 Index_i + \varepsilon$$

Modeling Case Outcomes

Building a model to predict the rulings of a judge or panel of judges is not a new concept. Probit models which predict the probability of a binary dependent variable being equal to one are common. This model will set the dependent variable to equal one if the bench showed leniency by reducing or dismissing charges. Galasso and Schankerman (2014) used patent judge characteristics to determine the likelihood of a given patent being dismissed or upheld. Bergara, Richman, and Spiller (2003) used models which focused on the median judge in Supreme Court. This chapter similarly uses a score of the median magistrate's background. This average is intuitive whether there is one, two, three or four judges on the bench. Most cases were heard with two or three judges. The Returns of Prosecutions from years 1840, 1846, and 1849 through 1853 provide 484 cases which were heard by magistrates whose backgrounds are known.

The effects of political bodies on case outcomes can be measured with a binary variable based on the Lord Chancellor. The party affiliation of the Lord Chancellor, who has the power to remove magistrates, may have an effect on whether magistrates vote their preference. In the case of a functioning political constraint, the leniency of

magistrates will be lessened in years where a Tory Lord Chancellor is in place and more leniency when a Whig holds that position. Using a binary variable to indicate whether the Lord Chancellor is a Tory will accomplish this with the expectation that the variable has a negative sign. I will assume that any constraint on magistrate behavior originates from the Lord Chancellor. This is the equivalent of Congress having the power to pass a bill that overrides a statutory decision made by the Supreme Court.

More egregious offenses may have garnered less sympathy from magistrates and numbers on the individual counts of each type of offense. The total number of counts against each defendant is included in the regression. Controlling for time trends requires an additional variable. There may have been geographical effects and indicator variables for different counties are included producing the below probit model. Standard errors are clustered at the magistrate level and the parish level in different specifications.

Equation 7 Probability of Lenient Outcome

$$Lenient_i = \alpha_0 + \beta_1 Index_i - \beta_2 LordTory_i + \beta_3 TotalCounts_i + \beta_4 Year_i + \boldsymbol{\delta County} + \varepsilon$$

Section Five: Results

Magistrate Bias

An important question for the analysis of regulatory impacts and judicial behavior is whether the magistrates were uniform and objective in their judgements. There appears to be a clear correlation between having connections to the textile industry, either as a textile business owner, having family members in the business or having business ties such as providing coal to local mills. The scatterplot in Figure 5 shows the relationship between a particular magistrate's background and the percent of cases where

that magistrate showed some degree of leniency. Magistrates who heard three cases or less between 1840 and 1850 are eliminated to reduce outliers at 100% and 0. The index is scaled from 0 to 4 and awards 2 points for owning a textile business, 1 point for having family connection to the textile industry and 1 point for having business connection to the industry.

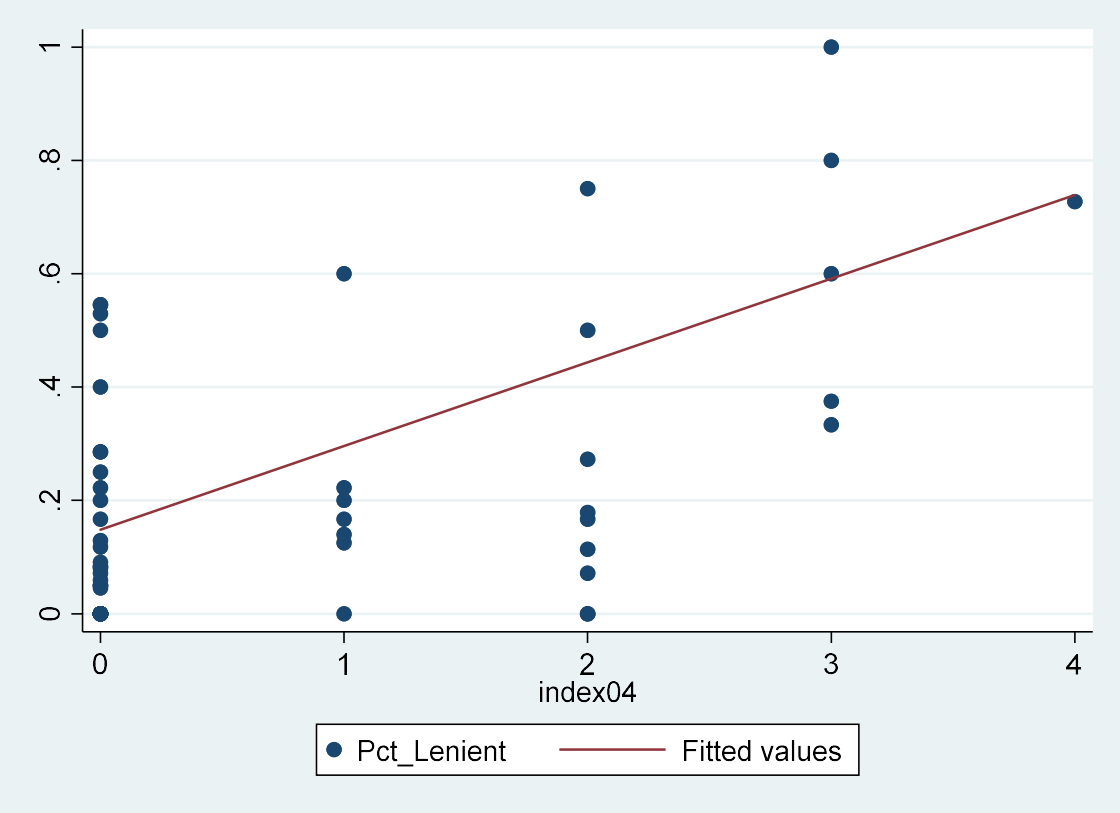

Figure 5 Judicial Leniency and Magistrate Background

The index which combines all three binary variables on a scale of 0 to 4 (with textile firm ownership weighted double) shows a positive correlation that is significant at the 1% level. The index's coefficient shows that moving from 0 to 4 is predicts a

leniency rate of 54%. These results indicate that magistrates were not passive monoliths of justice.

Table 10 in the appendix shows the details of the individual factor. Being a textile firm owner was the most significant predictor of a magistrate's behavior. If a magistrate was a textile firm owner, his predicted leniency rate was 30% higher than if he was not associated with the industry at all. If the magistrate was had business connections, his predicted leniency rate was 30% higher than someone with no industry connections at all. Having family in the textile industry correlates with showing leniency 28% more often. These results are statistically significant and provide confidence that the index is a good explanatory factor for the behavior of magistrates. The index score of the median magistrate is used to predict case outcomes in the probit model.

Case Outcomes

The table below shows the results of the case-level analysis. With the probability of leniency being shown in a case as the dependent variable, the variables of interest are the median magistrate's index score and the party affiliation of the Lord Chancellor who had the power to remove magistrates. The LordTory variable is set to 1 if the Lord Chancellor is a member of the Tory party. Additional controls are the total number of counts of offense in each case and the year the case took place to control for any time trend.

Table 4 Case Outcomes, Magistrate Background and Political Constraints

VARIABLES	(1) Leniency	(2) Leniency	(3) Leniency	(4) Leniency	(5) Leniency
MedianScore	**0.239****	**0.233****	**0.214****	**0.213*****	**0.205****
	(0.0766)	(0.0743)	(0.0778)	(0.0620)	(0.0790)
LordTory		-0.221	-0.172	-0.169	-0.254
		(0.186)	(0.194)	(0.228)	(0.228)
TotalCounts			**0.0250***	**0.0251***	**0.0269***
			(0.0121)	(0.0109)	(0.0115)
Year			0.0390	0.0388	0.0392
			(0.0211)	(0.0221)	(0.0229)
Lancashire					**-0.628***
					(0.305)
Yorkshire					-0.474
					(0.308)
Constant	-0.804***	-0.729***	-72.94	-72.63	-72.76
	(0.123)	(0.128)	(38.93)	(40.71)	(42.14)
SE Clustered	Magistrate	Magistrate	Magistrate	Parish	Parish
Pseudo R^2	0.0018	0.0036	0.0619	0.0615	0.0786
Observations	484	484	484	484	484

Robust standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05

The table shows that in all specifications using outcomes from the 484 cases in the sample, the median index score of the magistrates on the bench correlates to the probability of leniency being shown. The estimated magnitudes of the probit model are not directly interpretable. The sign and the significance of the probit coefficients are straightforward. There is positive correlation at the 1% or the 0.1% level for all specifications. The fifth specification shows that case dismissal or reduction in penalties was 22% likely if the average index score for the bench was zero, but increases to 28% if the median magistrate's index score was 1 which could be caused by the median magistrate having a family or business connection to the textile industry. If the median

magistrate was a textile firm owner, the index would increase to 2 points, which predicts a 35% probability of showing leniency. If the median magistrate had the maximum index score, having family ties, business ties and being a firm owner, the fifth specification predicts a 50% chance of a lenient ruling. The magnitude of effect for the median magistrate score is robust to additional controls and clustering standard errors at different levels. Figure 6 below shows the probability of leniency given the median magistrate's index score.

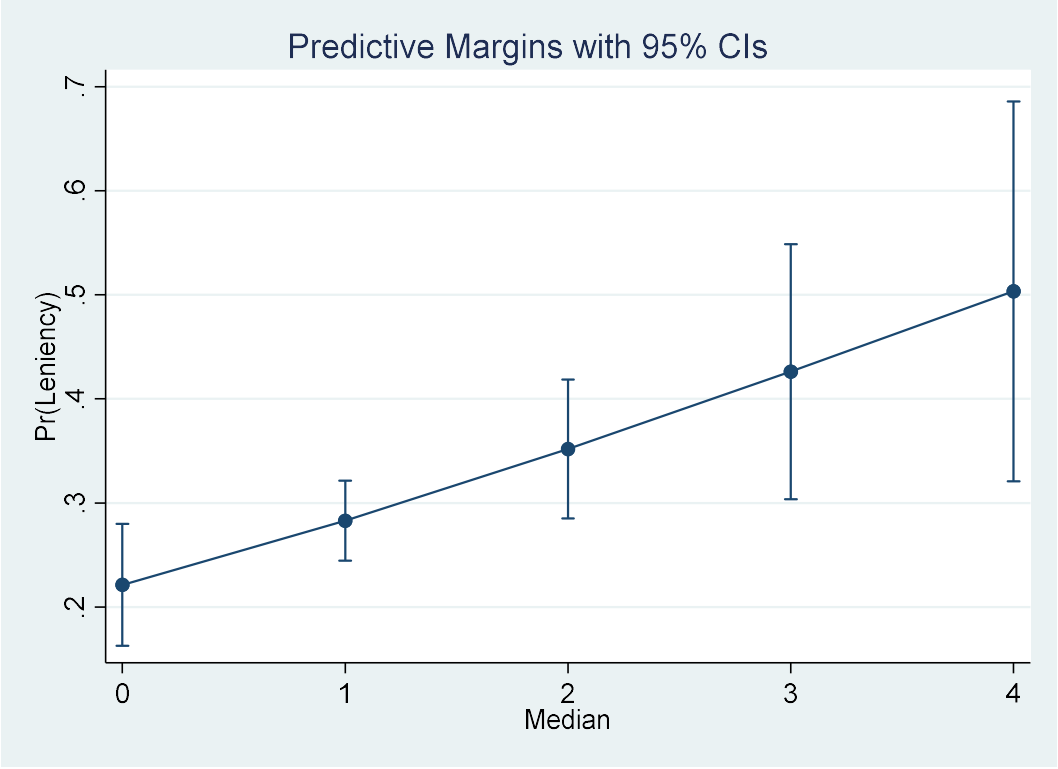

Figure 6 Probability of Leniency and Median Magistrate Index Score

The political affiliation of the Lord Chancellor has no statistically significant correlation with the outcomes. Although the sign is negative as expected, having a Tory as the Lord Chancellor did not have a reliable effect on case outcomes. The strategic school of court behavior suggests that judges take into account political constraints when ruling on cases. The results from this test suggest that county magistrates were not significantly constrained by the Lord Chancellor and voted their preferences in line with the predictions of the attitudinal school of court behavior.

The total counts of offense are also positively correlated with leniency in a statistically significant way as Figure 7 illustrates. As with the coefficient on the median index score, the marginal effects are of a different magnitude. For each additional count of offense, such as working one additional child more than the allowed hours, magistrates were between 0.5% and 0.8% more likely to reduce charges or dismiss the case. A case with 5 counts of offense was 3% more likely to be dismissed or have charges dropped than a case with only 1 count. Since the majority of case involved less than ten counts across all categories of regulations, this effect is not economically significant. Cases with only one or two offenses had fewer opportunities for a reduction of charges but even omitting these minor cases, the relationship holds.

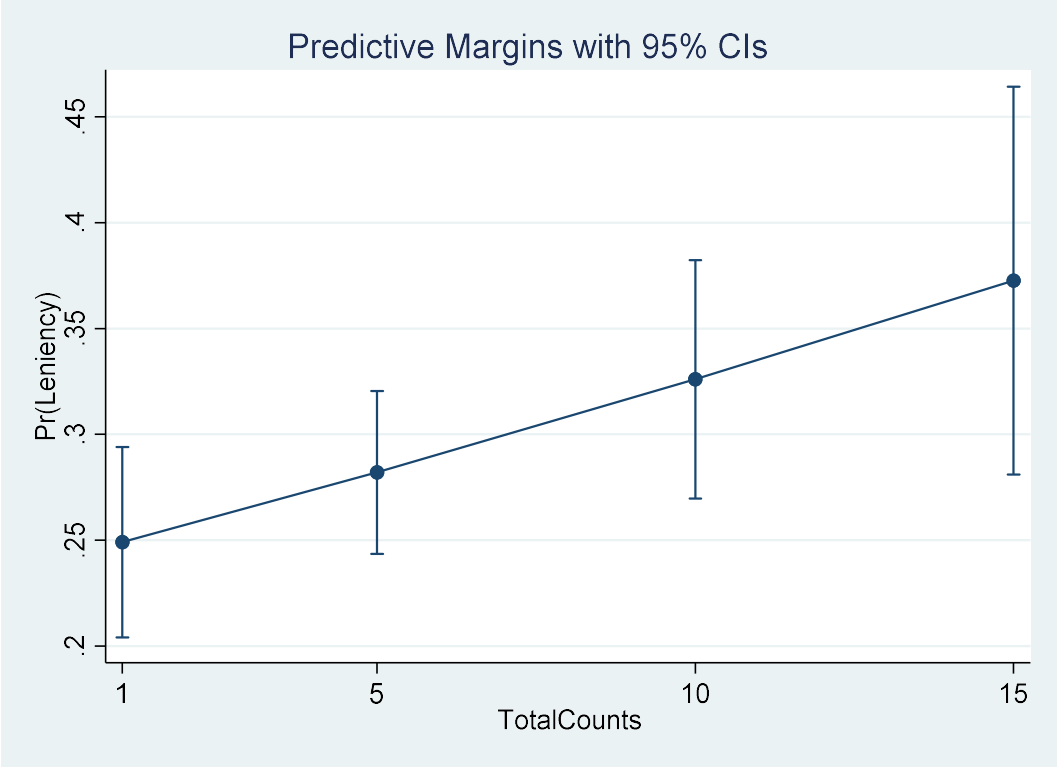

Figure 7 Probability of Lenient Outcome and Total Counts of Offense

Finally, the indicator variable for cases taking place in Lancashire, has a positive coefficient that is statistically significant. This means that the law was enforced more rigorously by magistrates in Lancashire, even controlling for their industry connections. The magnitude of effect suggests that a lenient outcome was 19% less likely if the case took place in Lancashire. This is a surprising result. However, it is only statistically significant at the 5% level and is not robust to changes in specification. The indicators for other counties are statistically insignificant in all specifications.

This analysis was also conducted using the arithmetic mean of the bench index scores, rather than the median magistrate's index score. Results were broadly similar

except that the coefficient on the mean bench index score was one and half times the size of the median magistrate's index score. This suggests there might have been some bargaining or peer effects, rather than simple independent voting. Additionally the time trend variable has a smaller and statistically insignificant coefficient. Omitted from this presentation is the variable for detecting added effects the presiding magistrate who conducted the hearings had on the case. The background of the presiding magistrate had no impact on case outcomes beyond the already included variables. For the same reason, interaction effects between magistrate background and party affiliation of the Lord Chancellor are omitted.

Section Six: Future Research Opportunities

One opportunity for improvement is to refine the measure used for leniency shown in a trial from a binary variable to a percentage or monetary estimate of how much the magistrates reduced the penalties. Having a more precise variable for the amounts of leniency and effective penalty rates might create a clearer picture.

Another possible improvement is using the same basic model for subcategories of cases such as those involving children, women, record-keeping or offenses committed by parents. Preliminary research shows that that industry-connected magistrates were just as strict at punishing crimes of fraudulent or negligent record-keeping as magistrates who shared no connection to the industry. Rates of leniency may vary in interesting ways for other subsets of offenses.

A topic for further research is whether judicial behavior in the 1840s and 1850s affected future industry growth. Additional costs imposed by regulation can force firms

out of business. By reducing the burden on textile firms, magistrates may have sent a message that their parish was pro-business.

Section Seven: Conclusion

The Factory Inspectorate and Parliament desired the laws to be uniformly followed and enforced to promote social welfare among workers and a level playing field among firms. However, this was not the case. It appears that magistrates were not passive arbiters of justice but ruled according to their own interests and biases. Those who were textile firm owners or had some connection to the industry were more lax in their enforcement. The local magistrates represented an essential organ and without their cooperation, the effect of the law was blunted. It appears that the threat of removal by the Lord Chancellor was not a statistically significant constraint on the behavior of the magistrates. They generally ruled according to their preferences as the attitudinal school predicts.

The results of this study are strong evidence of systematic judicial bias among 19th century magistrates. This being the case, any theory or policy which requires judicial officials to be unbiased actors should be viewed with caution. Discretion on the part of law enforcement is a pathway for bias or corruption. As Pincus and Robinson (2014) demonstrated previously, the motivations of the ruling officials are just as important as the official rules. This historical lesson is relevant for policy discussion today.

CHAPTER THREE UNION POWER AND CHILD LABOR

Miners were at the forefront of the union movement in the United States. The leader of the United Mine Workers of America claimed that the union was responsible for banning child labor in the mining industry. This chapter examines the relationship between the prevalence of unions in the mining industry and the timing of prohibitions on child labor in the mining industry compared to the largely non-union manufacturing industry. All data is state-level from 1870 and 1924. The results show a strong correlation between mining unions and child labor laws in the mining industry but no correlation to general minimum age laws.

Section One: Introduction

The public's memory of labor movements is often romanticized with heroes and villains battling for the future of a nation. Economists shed a sobering light on such folklore by using micro-economic models based on self-interested actors and historical data to explain these narratives with less grandeur. Moehling (1999) argues that state laws restricting child labor had relatively small impacts on the decline of child labor. Goldin and Katz (2011) show that compulsory schooling laws had only a modest effect on enrollments. Economists argue whether government action is an effective way of preventing children from undertaking dangerous work. A less obvious question is what motivates the regulation in the first place.

Doepke and Zilibotti (2005) build a positive theory of labor regualtions where the economic incentives facing families and capitalists can explain support or opposition to regulation. In their model, society will only support child labor restricitons if the benefits of restricting the labor supply and increasing future human capital are greater than the costs. Deopke and Zilibotti (2009) also suggest that the efforts of foreign entities to ban child labor can be counter-productive. Their work allows for multiple equilibria of wages and labor similar to the work of Basu and Tzannatos (2003).

Parents may have been less altruistic one hundred years ago compared to today. The work of Goldin and Parsons (1986) argues that parents were more utilitarian in choosing whether to educate their children or put them to work. However, banning child labor was a common cause for many workers and labor reformers. Marx (1867)

suggested that as women and children worked, it depressed men's wages which implies that individual households could not resist the temptation to send women and children into the labor force even though collectively households were worse off. This is similar to a prisoner's dilemma where each household has a strong incentive to send all members to work while preferring that other households restricted their own supply of workers.

Samuel Gompers claimed that the United Mine Workers of America had success in lobbying to restrict child labor from the mining industry and that their efforts were due to altruistic rather than selfish reasons (Gompers, 1906). If altruism was a key motivation, states with highly unionized mine workers should ban child labor from the mines and also pass laws banning children from other industries earlier than states with weaker mining unions.

This chapter relies on state-level data because the US federal government was not able to pass legislation restricting child labor until 1938. Section two details the historical background of the labor union movement. Section three offers a game theoretic basis on why individual households needed the labor union. Section four describes the statistical model used to test for influence of the UMWA. Section five discusses the variables used in the model. Section six shows the results of the analysis. Section seven discusses future research opportunities and section eight concludes the chapter.

Section: Historical Background

The work environment during the late 1800's and early 1900's was the subject of political and legislative action. Increasing numbers of workers were leaving agriculture to work in larger firms as the United States industrialized. This was not a personal preference for many of the workers. Small scale farming was under pressure from larger producers who could ship their goods farther by using railroads (Boudreaux & DiLorenzo, 1993). Pressures for reform and government intervention mounted with greater numbers working in industry (Goodwin, 2013). Government intervention was not always opposed by businesses.

Fishback (2005) suggests that larger employers may have encouraged workplace reforms. Their support had two causes. The first cause is altruism, and the second cause is that large employers were more likely to be unionized, and therefore have additional costs that small employers did not. By sponsoring legislation that mandated smaller firms to incur additional costs from safety and labor standards, large employers made themselves more competitive. Reforms that would have been very costly to large employers, such as unemployment insurance, were not popularly supported, which lends credibility to this theory.

Studying primary sources from the early 20th century demonstrates that there was a growing concern over child labor. According the leader of the United Mine Workers of America (UMWA), Samuel Gompers (1906), “The problem which the gainful employment of two million children under sixteen years of age to-day presents to the American people is a problem of the first magnitude.” Unions had an economic motive

for ending child labor, at least in the particular industry in which the union operated. A restriction of the labor supply meant an increase in wage level for workers who were not restricted, providing a self-interested motivation for unionized men. This charge was leveled at unions by the Ohio Child Labor Committee writing, “The committee. . . is not in sympathy with the movement of labor unions for increasing the age at which children may labor from fourteen to sixteen years. It is felt in the committee that the action of the unions is taken purely for the selfish motive of preventing competition and not with the idea of the child's welfare at heart (Gompers, 1906).”

Gompers claimed firstly, that the union was instrumental in banning children from working in the mines and secondly, that UMWA position was based on altruistic motives. These are testable hypotheses. If union power can have child labor banned from one industry through legislation, it should be able to pass broader laws and affect child labor in other industries to some degree.

This study will exam correlations between unionization rates in the coal mining industry and its effects on child labor in the mining industry and in broader laws regarding child labor that would not directly benefit the mining union workers. Gompers made related claims that were proven false, specifically that in the southern states, mostly white children are forced to work while black children receive educations. According to Gompers (1906) this pattern will produce socially damaging results. Moehling (2003) analyzes school attendance information from the exact time period that Gompers is discusses. Her results show that Gompers's statement is completely at odds with the historical record. Black children were the most likely to be at work rather than enrolled in

school. Political actors often make unsupported claims to justify their own goals. This makes an empirical investigation of the effects of unions on child labor laws more necessary.

The earliest labor unions such as the Noble and Holy Order of the Knights of Labor, founded in 1869, tried to lobby for reforms such as an end to child labor as well as a progressive income tax. The Knights of Labor included nearly 800,000 workers at its peak but was unable to coordinate its broad membership base. It was associated with the Haymarket Affair of 1886 in which dynamite was thrown at police by an unidentified person. The backlash from this event as well as the denouncing of the organization by the Catholic Church led to a decline as workers sought to join more industry specific unions (Wright, 1887).

Miners' hostility towards their employers is understandable. Historians have chronicled that mining firms were often located in remote locations and this allowed the firm a degree of monopsony power in the labor market and monopoly power in the retail market. Workers were paid in company vouchers or "company scrips" that could only be redeemed at the company stores or to pay rent for company housing (Green, 2010). Firms were only able to enjoy this degree of power due to the high transactions costs workers faced in finding a new job and relocating.

Miner unions were not a major force until 1861 when the American Miners' Association (AMA) was formed. Within five years it claimed to represent 22,000 of the 55,000 miners in the United States (Fox, 1994). Mining firms responded by blacklisting the members until the organization disbanded. More unions would rise to take the place

of the AMA and Samuel Gompers (eventual president of the American Federation of Labor) would first be the president of National Federation of Miners in 1880. This organization merged with other mining unions to create the United Miner Workers of America (UMWA) in 1890 which represented 300,000 by 1905 (Warne, 1905). The UMWA listed the prohibition of child labor from the mines as one of its primary goals.

Eventually a coalition between the miners and reformers was able to accomplish the banning of child labor from mines. However state and federal government actors were often in opposition to the miners. Striking was unpopular with voters and in some cases, state governments used force to end strikes. Blatz (1994) offers a summary of the contentious relationship. Ohio and Iowa mobilized their National Guard units in April of 1894 to deal with a coordinated strike in multiple states. In 1897, the police killed 19 miners who were marching in support of unions. President Theodore Roosevelt was needed to arbitrate an agreement to end the Coal Strike of 1902 which was organized by the UMWA. A larger strike which affected the entire nation in 1922 was only resolved with combined efforts of National Guard and President Warren Harding. Miners went as far as renting an aircraft and dropping dynamite bombs on strikebreakers and stole weapons from American Legion halls (Blatz, 1994).

The U.S. Supreme Court ruled against legislation that would have prevented children under the age of fourteen from working in industry. The Keating-Owen Child Labor Bill of 1916 would have prohibited the interstate commerce of products made by children younger than fourteen years old or sixteen years old in the case of mining products. The Child Labor Tax Law of 1918 was similarly overturned. The Child Labor

Amendment of 1924 sought to circumvent the Supreme Court by amending the Constitution but was never ratified (Goldin & Katz, 2011).

The federal government did not restrict child labor so the issue was left for the states. More than 1.1 million children, or one in six, were in “gainful occupations" in 1880 according to the Census Bureau's Statistical Abstract of the United States for that year. That figure grew to 1,752,187 children by 1900, an increase of 56 percent. Given the dramatic increases in child workers over the years, it is understandable that contemporaries such as Gompers (1906) and Taylor (1906) labeled the trend as a national crisis.

The UMWA partnered with other organizations such as the National Child Labor Committee to restrict child labor. The types restrictions, both proposed and passed into law tended to target the mining industry, even to the exclusion of other industries. For example, in West Virginia miners had to deal with a high degree of seasonality in the demand for coal and the wages they received. The slack in demand came in the summer months when heating fuel was not needed (Dix, 1988). In 1907, the UMWA and its allies were able to ban children under fourteen from the mines and expressly forbid children over fourteen from working in the mines during their summer vacation. This restricted the supply of labor and raised the wages for adult miners in West Virginia. No other industries were prohibited from hiring children during the summer. Indeed, the law stated “during the vacation period the law lowers this age limit to twelve years for work in factories, workshops and stores, and to babyhood in all other occupations save mining” (Clopper, 1908).

This brief overview of labor union history shows that mining unions were a powerful and well-organized force in the nineteenth and early twentieth century. It is feasible that the UMWA was a driving force to prohibiting child labor. The next section will suggest a possible prisoner's dilemma among miner households that was solved by the union and eventually the government.

Section Three: Unions and The Prisoner's Dilemma

One may consider why worker households did not freely choose to withhold their children from working in the mines. In other words, why was formal coercion through government intervention necessary? Game theory offers some insight as to why individual households will send children to work.

With an unrestricted labor force, children are sent to work and wages for all workers are low. Restrictions on the labor supply lead to higher wages for adult workers who are part of most households, uniformly higher costs for business owners who do not lose their relative competitiveness, more utility for reformers, and more leisure for children. The difficulty in voluntarily maintaining this ideal equilibrium is that each individual household has an incentive to defect and rely on child labor for greater household income. There is no credible commitment mechanism to prevent defection without union and government involvement. Basu and Tzannatos (2003) theorize that households were stuck in a "bad equilibrium" where the labor of children pushed wages for adults down. This is a negative externality that no household has an incentive to curtail. Figure 8 illustrates the prisoner's dilemma of restricting the labor supply.

		Household 2	
		Use only Adult Labor	Use Child Labor
Household 1	Use only Adult Labor	2,2	-1,3
	Use Child Labor	3,-1	0,0

Figure 8 The Prisoner's Dilemma of Labor Force Composition

Any unilateral choice to use only adult labor is likely to make either household worse off with lower household income shown by the off-diagonals in Figure 1. Having a third party enforcer (the government) restrict child labor is desirable. However, this outcome requires a large number of parties to spend resources in a coordinated way to lobby successfully. The United Mine Workers of America was the intermediate vehicle that acted as a stepping stone to solve this prisoner's dilemma. The union had low dues and reduced the costs of coordinating, a form of transactions costs. Increased coordination allowed strikes and lobbying to be successful. Additionally, adult workers can become cost-efficient monitors who easily spot and report cheating activity if children are sent to work. The adult workers, firms, and altruistic reformers are all satisfied with this self-enforcing equilibrium that levels the playing field between firms, provides adult workers with higher pay, and has low monitoring and enforcement costs.

Heckathorn (1989) stated that "hypocritical cooperation can potentially serve as a bridge spanning the chasm from collective inaction to full cooperation" because people are willing to support norms and chastise cheaters even though individually they are willing to cheat as well. This pattern of hypocritical behavior, ubiquitous in social life can lead to an equilibrium of cooperation if the monitoring costs are low enough and the penalties are high enough.

Doepke and Zilibotti (2005) suggest that when a majority of workers believe that restricting child labor is in their favor, regulations are supported. The primary incentive is limiting competition to adult labor. Doepke and Zilibotti (2009) also explain that due to heterogeneous incentives across individuals, families and industries, coordination can be difficult. Foreign efforts to ban child labor in export industries could theoretically reduce the share of the population that would organize for economy-wide restrictions on child labor. Their work suggests the possibility for multiple equilibria even across similar industries or countries of similar income levels. If this is true, the presence of a powerful union may be critical in coordinating workers and enforcing rules to reach a more preferable equilibrium in a given industry.

The union provides a bridge between the households and firms caught in a prisoner's dilemma and a government which will only act as an enforcer if investments are made into lobbying for new laws. The individual households would not choose to lobby on their own, just as they did not choose to withhold child labor. Acting individually, the costs are too concentrated and the benefits too diffused. However, while a labor union may be able and willing to generate change in its own industry, it may

rationally choose to forgo spending resources to invest in *general* labor laws that do not directly benefit its constituents.

Section Four: The Statistical Model

If the United Mine Workers of America was successful in lobbying for banning child labor from the mines, there should be a correlation between the UMWA share of miners and year that mining bans were passed. If the UMWA were trying to broadly limit child labor in all industries, there should be a correlation between the share of unionized miners and the timing of general child labor bans. It is possible that some other variable is causing both progressive labor reforms and allowing workers to unionize. However, if there was such a causal variable, labor reforms would probably not be directed at only the mining industry to exclusion of others.

An excellent source of state level labor laws was compiled by Holmes and Fishback (2008). This dataset records the year that child labor was banned from mining and manufacturing in each state. Data on the proportion of coal miners that were unionized is available from the Weeks Report and the Statistical Abstract of the United States (Census Bureau, 1900 & 1913). Information on the locations of coal deposits is available from the US Geological Service.

Testing to see if there was a correlation between the rates of unionization in among the coal miners in a given state, and the timing of the state's ban on child labor in the mines is a simple method to see if the UMWA was able to effectively influence government policy. A test of the altruism of the UMWA is more difficult. The method pursued in this study to test whether the unionization rates of mine workers is correlated

with the timing of general state-level bans on child labor. If the union was powerful enough to ban child labor in one industry, it should be able to exert some influence on another. It is also possible to see if there was a correlation between union power and a general ban on child labor or compulsory schooling laws at the state level.

This study seeks to analyze potential predictors of child labor bans and restrictions according to the formula:

Equation 8 Child Labor Bans

$$Ban\ Year_i = \beta_0 + \beta_1 Unionization_i + \beta_2 Distance_i + \beta_3 Statehood_i + \beta_4 Fatalities_i + \varepsilon$$

The first round of regressions uses mining bans on child labor to test if the UMWA had a significant impact on restricting labor in its own industry. The second round of regression uses the same specification with a new dependent variable, general minimum working age laws to test if the UMWA used its influence to protect all children. The last round of regressions replaces the dependent variables with the gap between legislating mining prohibitions and general labor prohibitions on child labor.

Section Five: Describing the Data

Dependent Variables

Mining Restrictions on Child Labor

Data for mining restrictions is contained in the Holmes and Fishback (2008) dataset. Bans on hiring children under the age of fourteen to work in mines began in the year 1885, starting in highly unionized states such as Michigan. The mean year of a child labor ban was 1904 with a standard deviation of 9.8 years. Summary statistics for all variables are located in the appendix. States with low unionization levels did not

implement restrictions on children under fourteen until 1901 with Maryland, the last state to adopt the law, doing so in 1922. The map below shows the dramatic differences between states with regard to adopting this mining law. There appears to be a pattern with the highly unionized states with membership rates 60 percent or more (in green on the graphic) passing child labor bans sooner than their neighbors with membership rates of 20 percent or less (in red on the graphic). This suggests that there is a relationship between the power of the mining union and the time it took for each state to prohibit child labor from mines.

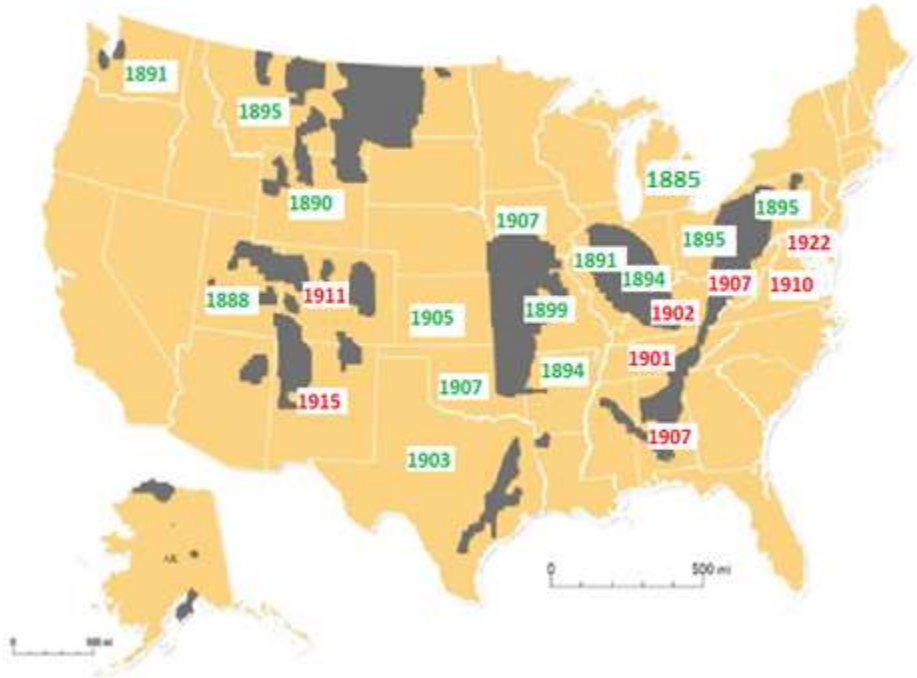

Figure 9 Coal Deposits and Mining Bans

The laws banning children under the age of fourteen from the mines were passed over a period of 37 years from 1885 to 1922. The timing follows a normal distribution as

seen in Figure 10 below. There are 23 states in the sample with an average of 1906 for passage of a mining ban on children under 14 years old.

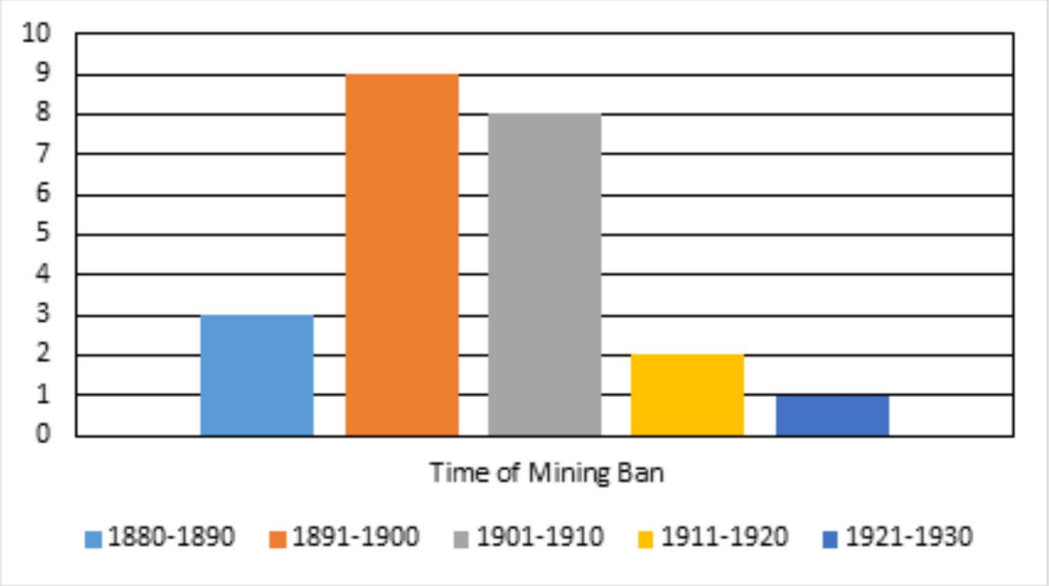

Figure 10 Mining Bans on Child Labor

Manufacturing and General Restrictions on Child Labor

Prohibiting the labor of children under fourteen years of age was also directed at the manufacturing sector in the Progressive Era. Manufacturing was a largely non-unionized industry at this time where only 10 percent of the workers were unionized (Fishback, 2005). If the UMWA exercised their power for the benefit of all workers and especially children, then the timing of manufacturing and general prohibitions on child labor should be correlated with the unionization rates of the mining industry. This metric has more room for interpretation than the restrictions on mining work because of the way the laws are written and categorized in each state. In Utah and Wyoming, child labor in

manufacturing was not prohibited until the 1938 Fair Labor Standards Act. 1906 was the average year of manufacturing bans with 1907 being the mode with seven states banning children working in factories. The distribution of general bans on child labor which cover all industries is very similar to the bans on manufacturing.

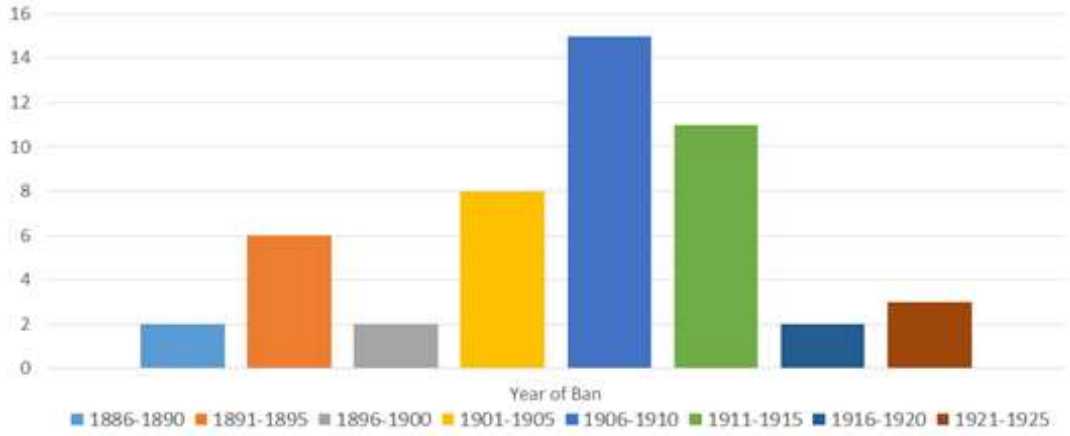

Figure 11 General Bans on Child Labor

Explanatory Variables

Unionization Rates

There is data on coal union membership rates for 23 states from the Census Bureau. The membership rates are averages from 1902 to 1912 with the median year as 1907. The Statistical Abstract of the United States does not have earlier data on coal mining unions. Montana had the highest average rate of membership at 97percent with Illinois behind at 94 percent. West Virginia, Colorado and New Mexico all shared the lowest unionization rate of 10 percent. The membership rates show a stark difference between states that were highly unionized with more than 60 percent of the miners belonging to a union and states that had unionization rates of only 10-20 percent. There

are no states with membership rates between 30 percent and 60 percent that the Census Bureau has data for during this time period. This distribution appears binominal and suggests there were inherent differences in the states that determined their unionization rates for the coal industry. These differences may be linked to the political and legal climate in each state as governors and courts were often opposed to unions. However, the purpose of this chapter is not to determine the factors of successful unionization but determine if there was a relationship between unionization and child labor as Figure 12 suggests.

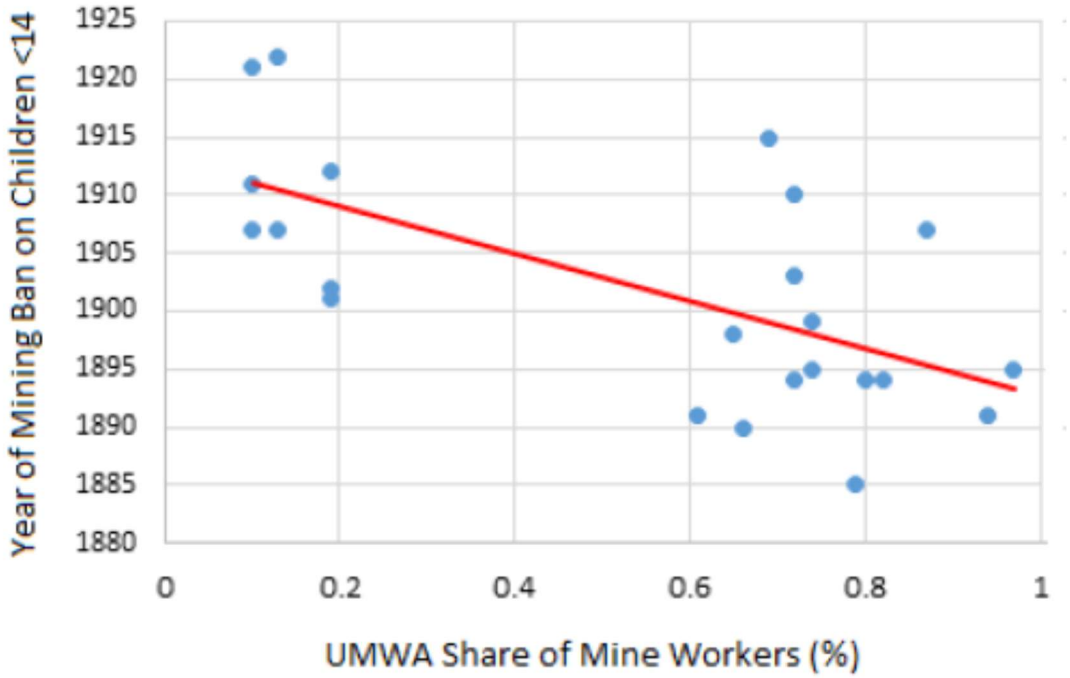

Figure 12 Mining Bans and UMWA Share

Distance to Coal Mines

Transportation was slower and more costly at the turn of the 20th century than today. This transaction cost may have been a significant obstacle when miners were trying to organize marches and protests targeted at state legislatures. I measure the distance from coal deposits to state capitals using data from the US Geological Service (2019), the US Energy Information Agency (2014) and QGIS software. If higher transportation costs hindered the efforts of miners, banning children under 14 years of age from the mines would take longer and the coefficient on distance will be positive. Nineteen state capitals were located within 100 miles of the nearest coal deposits. The average distance from the coal deposits to the state capital is 62 miles with a standard deviation of 70 miles. A basic scatterplot reveals a positive correlation between mining bans and the distance from state capitals to coal mines.

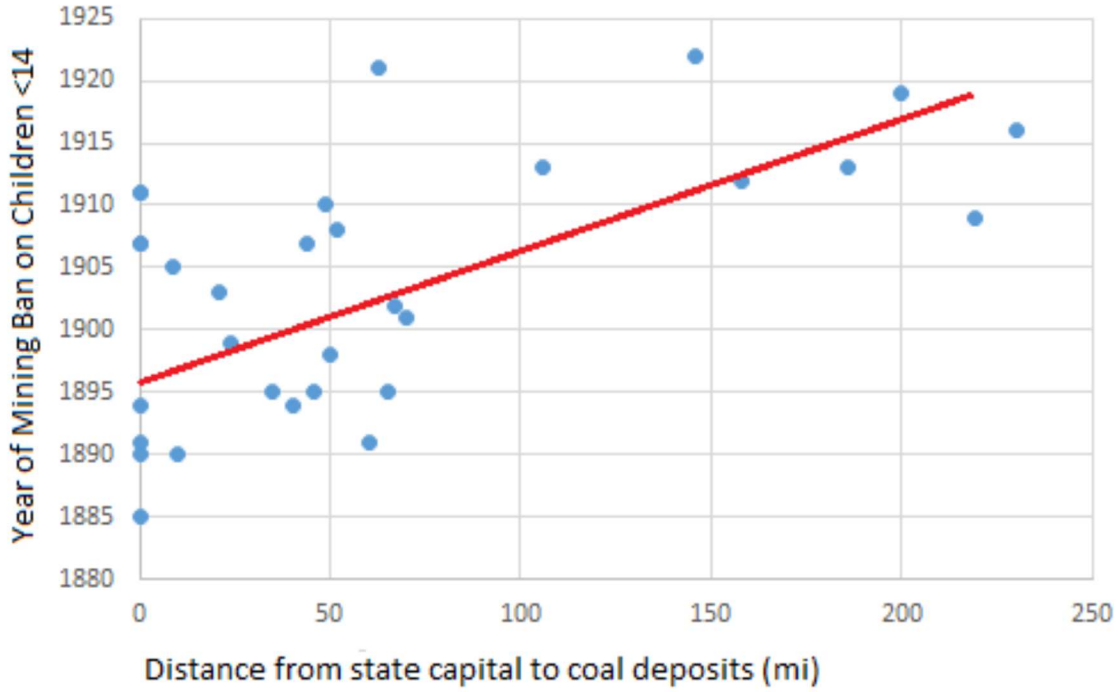

Figure 13 Mining Bans and Distance to Coal Deposits

Mining Fatalities

Concern for safety may be a cause for banning child labor from dangerous industries. Those good intentions may originate from lawmakers, rather than unions. States with more fatalities in the mining industry may reform the labor laws of that industry sooner than states with a safer mining industry. If lawmakers were motivated by concern for the safety of miners, there should be a negative correlation between miner fatalities and the timing of child labor bans. I use the fatality reports from the 1910 Statistical Abstract of the United States (Census Bureau) and take an average of years 1896 to 1909. Legislators in states with higher average fatalities will ban child labor sooner if concern for workers is a driving force of reform. This statistic functions as another control which will assist in isolating the effects of union strength on banning

child labor. I have not divided fatalities by number of workers as I expect political actors and voters to react to the raw numbers of deaths, rather than ask for a death rate.

Year of Statehood

There is not a clear record of when each state began mining coal which obviously affects the timing of any regulations on the industry. This adds noise to a statistical test but I will reduce the noise by using the year in which a state was admitted to the union. Coal mining requires industrial firms or large populations making the start of the coal mining industry correlated to when a territory can become a state. States further west were populated and developed later and had formal governments capable of passing regulations later than those in the east. The first states were incorporated in 1787 and 1788, long before the UMWA or other unions were popular making it an imperfect control, but better than nothing.

Section Six: Results

Mining Bans on Child Labor

Using the above explanatory variables to predict the bans on child labor in the mining industry yields interesting results, shown in Table 5. The share of miners who belonged to the UMWA is negatively correlated with the year a ban was placed. Increasing the union's share of workers from 0 to 100 percent predicts that children under 14 will be banned 21 years or more than 2 standard deviations earlier. This is significant at the 0.1 percent level with no controls. The second column predicts that as the distance from the state capital increased by 100 miles (1.4 standard deviations), the timing of child labor bans took an additional 11 years (0.8 standard deviations). This relationship is also

significant at the 5 percent level. The third column shows that average mining fatalities were only weakly correlated with child labor bans. The t-statistic of 1.99 is not significant with the small sample size of 23 states. However the sign is negative, indicating that states with more mining fatalities restricted child labor sooner.

When all explanatory variables are added, including the year of statehood control, only the UMWA share of miners is still significant with the same sign and a similar magnitude as before. Increasing the portion of unionized miners by 100 percent is correlated with a 17 year decrease in the timing of a child labor ban.

Table 5 Mining Bans on Child Labor

	(1)	(2)	(3)	(4)
VARIABLES	mine ban	mine ban	mine ban	mine ban
umwashare	**-21.10*** **			**-17.49*** **
	(4.770)			(3.598)
distancetocoal		**0.108*** **		0.0708
		(0.0390)		(0.0387)
avefatalities			**-0.00754***	-0.00232
			(0.00379)	(0.00321)
statehood				0.0512
				(0.0444)
Constant	1,913.1***	1,897.1***	1,903***	1,909***
	(3.072)	(2.535)	(2.269)	(3.324)
Observations	23	23	23	23
Adj. R-squared	0.445	0.197	-0.025	0.460

Robust standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05

General Bans on Child Labor

Using the year of general minimum age laws as the dependent variable with the same explanatory variables has very different results from the previous regressions. The first column of Table 6 shows that states with a larger share of unionized miners were not likely to ban child labor from all industries in a statistically significant way. The magnitude of the coefficient is also less than one quarter of the magnitude of the UMWA share on the timing of mining bans. Additionally, column 4 shows that the sign flips as controls are added. The distance from coal deposits to state capitals is not significantly correlated with general minimum age laws. The effect of miner fatalities is insignificant. It appears that the power of the mining union was not connected to child labor reforms outside the mining industry, a result that does not support the claim of altruism made by the miners. However, absence of evidence is not evidence of absence. The results are almost identical when using only manufacturing industry bans instead of general labor restrictions. The manufacturing ban results are shown in the appendix.

Table 6 General Bans on Child Labor

VARIABLES	(1) gen labor ban	(2) gen labor ban	(3) gen labor ban	(4) gen labor ban
UMWA share	-3.283			1.452
	(8.232)			(10.62)
distance to coal		0.0580		0.119
		(0.0536)		(0.0766)
ave fatalities			-0.00774	0.00097
			(0.00639)	(0.00582)
statehood				0.154
				(0.0794)
Constant	1,909.6***	1,905.4***	1,908.4***	1,901***
	(5.203)	(4.261)	(2.511)	(5.942)
Observations	23	23	23	23
Adj. R-squared	-0.042	-0.012	-0.036	0.039

Robust standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05

Taking the Difference

Finally, it must be acknowledged that a host of other factors could result in progressive labor reforms besides the efforts of the UMWA. To control for this, the final round of regressions uses the difference in timing between child labor prohibitions in a given state's mining industry and the state's general child labor prohibitions. A state that is generally more progressive should be faster to restrict child labor in general as well as specifically in the mining industry. If the UMWA had a significant impact on the passing of reforms, the gap between mining bans and general bans should be correlated to the portion of miners in the UMWA, just as the timing of mining bans were correlated with the UMWA share in the first set of regressions. However if the state was more likely to

pass labor reforms anyway, the gap between mining and general reforms should not be correlated with the UMWA share of miners. Table 7 shows the results.

The first column shows that increasing the share of unionized miners from 0 percent to 100 percent predicts a mining ban on child labor nearly 18 years or almost two standard deviations earlier than a general ban on child labor. This result is similar to the first round of regressions with the same sign and similar magnitude. The magnitude rises slight to almost 19 years when the other variables are added. Unfortunately, the statistical significance of this effect decreases as more controls are added due to an increased standard error. However, if there was significant omitted variable bias that the first round of regression in Table 5 was not capturing, the coefficient, not the standard error would be change. The larger standard errors in this table indicate that this is a noisier measurement than the first table. Also, the adjusted R^2 of the models falls from 0.099 to 0.027 as more variables are added, indicating that the explanatory power of these additional variables is insignificant. Overall, this reinforces the findings from Table 6.

Table 7 The Difference of Mine Bans and General Bans

VARIABLES	(1) gen_gap	(2) gen_gap	(3) gen_gap	(4) gen_gap
umwashare	**-17.82***			-18.938
	(7.230)			(11.044)
distancetocoal		0.0500		-0.0486
		(0.0708)		(0.0788)
avefatalities			0.00514	0.0033
			(0.00526)	(0.0054)
statehood				-.1023
				(0.0937)
Constant	3.478	-6.453	-5.192	194.899
	(4.353)	(5.079)	(8.123)	(8.275)
Observations	23	23	23	23
Adj. R-squared	0.099	-0.026	0.010	0.027

Robust standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05

Section Seven: Future Research Opportunities

Before concluding this chapter, it is worth noting that the output of the iron industry (a major consumer of the miners' outputs), the type of coal deposits in a state (anthracite, bituminous, lignite), and other geographical data were tested with insignificant results. There are still opportunities for more research. An area for further research would be to use the least cost travel path, accounting for roads, canals and railroads, rather than using straight line distance to state capitals. Locating infrastructure networks at different points in history is necessary but time consuming and will be left for future research.

Additionally, using the number of striking miners in a given state in a given year may be prove more useful than merely the relative representation of unionized miners.

The Statistical Abstract of the United States has incomplete coverage of this information. More data could be collected from alternative sources such as the archives of newspapers or the UMWA located in Triangle, Virgina.

Finally, finding some instrument that is correlated with the ease of forming unions which is not correlated with labor reforms can add more support for the findings that the UMWA's efforts had a significant impact on passing reforms. One potential instrument is the ethnic backgrounds and level of diversity of miners. The exclusion restriction requires that the ethnic or cultural composition of miners is not correlated to the composition of the general population. The geographic dispersion of mines in the late 19th and early 20th century might also be correlated with the prevalence of unions. States with more geographically concentrated mines may have greater proportions of their miners unionized than states with mines that were more geographically dispersed.

Section Eight: Conclusion

This chapter set out to see if there was a relationship between the prevalence of unions and prohibitions on child labor. Using the mining industry as a test for the power of unions in their own industry, it was demonstrated that the states with highly unionized coal miners banned children under the age of fourteen from working in the mines earlier than states with weakly unionized miners. There was also a weak correlation of the distance from coal deposits to state capitals with the timing of child labor bans, implying the cost of transporting and organizing protests may have slowed the passage of reforms. However that effect became insignificant when controlling for the percentage of miners

in the UMWA. Mining fatalities seemed to offer no explanatory power to the passing of child labor bans on mining. In order to control for unobserved differences between states which may be correlated with child labor reforms, I measured the difference in timing between mining and general reforms for each of 23 states. This timing difference was correlated with the prevalence of the UMWA in a state.

The UMWA claimed to support the prohibition of child labor due to altruism but there is no evidence that it used its significant lobbying power to affect child labor regulations outside the mining industry. The statistical analysis shows that the UMWA membership rates had no relationship to general child labor laws. Political capital is a scarce resource and it appears that the self-interested mining union did not spend theirs to successfully impact other industries, as measured by this analysis. It must be repeated that absence of evidence is not evidence of absence.

Correlations do not prove causality and more data collection and testing is needed to fully determine the relationship between union power and child labor restrictions. Omitted variable bias is always a threat. Discovering the reasons behind the binomial distribution in unionization rates could also explain the differences in timing of labor laws. That said, labor leaders such as Samuel Gompers appear justified in their claims that union power in the mining industry was a significant force in banning child labor in that industry. However the second claim that labor unions strove to prohibit children from toiling in all industries is not supported by the data.

APPENDIX

Table 8 Magistrate Level Variables

Variable	Description
Percent Leniency	The percentage of a magistrate's cases in which charges are reduced or dismissed
textile owner	the magistrate owned a textile firm
family ties	The magistrate had immediate family members who own textile firms
business ties	The magistrate had close business ties to the textile industry (warehousing, landlording, banking, etc)
index04	Quantifies the relationship between a given magistrate the textile industry on a 0 to 4 scale. 2pts for ownership. 1pt for family ties. 1pt for business ties.

Table 9 Case Level Variables

Variable	Description
year	The year of the record
parish	The specific location of where the crime was committed.
county	The county of the alleged crimal activity. Also the same county the case was heard
crime	A brief description of the type of violation and the number of counts for each type
Straight Miles	The straight line distance in miles to the city of Manchester
penalty (L)	The penalty inflicted in pounds sterling. Zero if jailed, or not convicted
costs (L)	The costs to the inspectorate of prosecuting the case.
jail days	Number of days a guilty party spent in jail
leniency	Whether leniency was shown on any charges a defendant faced
child_crime	A binary variable for whether the crime involved child labor laws
record_crime	A binary variable for whether the crime involved record keeping laws
female_crime	A binary variable for whether the crime involved female labor laws
machine_crime	A binary variable for whether the crime involved unfenced machinery or dangerous equipment
other_crime	A binary variable for whether the crime involved regulations not mention above, such as whitewahing the factory
median Magistrate Score	The index score of the Median Magistrate hearing a case
arithmetic Magistrate Score	The average index score for all magistrates hearing case
lord_tory	The current Lord Chancellor is a Tory (Binary)

Table 10 Judicial Leniency and Magistrate Background

VARIABLES	(1) pct_lenient	(2) pct_lenient	(3) pct_lenient	(4) pct_lenient	(5) pct_lenient
textile_owner	**0.301*** **			**0.233** **	
	(0.0782)			(0.0736)	
business_ties		**0.0302** **		**0.218***	
		(0.103)		(0.0981)	
family_ties			**0.283** **	**0.185***	
			(0.101)	(0.0756)	
index04					**0.136*** **
					(0.0251)
Constant	0.124***	0.175***	0.150***	0.101***	0.106***
	(0.0235)	(0.0286)	(0.0259)	(0.0245)	(0.0248)
Observations	76	76	76	76	76
Adj. R-squared	0.248	0.064	0.151	0.334	0.335
Robust standard errors in parentheses			*** p<0.001, ** p<0.01, * p<0.05		

These results indicate that magistrates were not passive monoliths of justice. Being a textile firm owner was the most significant predictor of a magistrate's behavior. If a magistrate was a textile firm owner, his predicted leniency rates was 30% higher than if he was not associated with the industry at all. If the magistrate was had business connections, such as dealing in coal or warehouse spaces, his predicted leniency rates 30% higher than someone with no industry connections at all. This coefficients is significant at the 1% level. Having family in the textile industry correlates with showing leniency 28% more often. The index which combines all three binary variables on a scale of 0 to 4 (with textile firm ownership weighted double) shows a positive correlation The index's coefficient show that moving from 0 to 4 is predicts a leniency rate of 54%.

Table 11 Summary Stastistics

Variable	Obs	Mean	Std. Dev.	Min	Max
umwashare	23	0.5465217	0.3145648	0.1	0.97
distancetocoal	32	61.75	69.99355	0	230
statehood	49	1839.49	48.32232	1787	1959
mine14ban	35	1904.2	9.770303	1885	1922
genlabor14	38	1903.553	10.98819	1882	1923
mfg14banfine	21	1905.238	11.15753	1882	1924
avefatalit~s	26	69.15934	179.6345	0.071429	919.6429

Table 12 Manufacturing Bans on Child Labor

VARIABLES	(1) gen_gap	(2) gen_gap	(3) gen_gap	(4) gen_gap
umwashare	-4.926			-1.002
	(7.049)			(8.977)
distancetocoal		0.0525		0.113
		(0.0448)		(0.0662)
avefatalities			0.00514	0.0026
			(0.00526)	(0.0054)
statehood				**0.172***
				(0.0742)
Constant	1909.4***	1904.5***	1907.3***	1586.3***
	(4.333)	(3.975)	(2.975)	(137.5)
Observations	23	23	23	23
Adj. R-squared	-0.032	-0.015	-0.034	0.126

Robust standard errors in parentheses *** p<0.001, ** p<0.01, * p<0.05

REFERENCES

Abram, W. A. (1877). *A History of Blackburn Town and Parish.* THLC Books. Blackburn, UK.

Acemoglu, D. (2000). *Technical Change, Inequality, and the Labor Market.* Journal of Economic Literature. Vol. 40, No. 1 (Mar., 2002), pp. 7-72.

Basu, K & Tzannatos, Z. (2003). The Global Child Labor Problem: What Do We Know and What Can We Do? *The World Bank Economic Review*, Volume 17, Issue 2, December 2003, Pages 147–173, https://doi.org/10.1093/wber/lhg021.

Bergara, M., Richman, B. & Spiller, P. (2003). *Modeling Supreme Court Strategic Decision Making: The Congressional Constraint.* Legislative Studies Quarterly, Vol. 28, No. 2 (May, 2003), pp. 247-280.

Bickerstaffe, D. (1964). *Politic and party organisation in Oldham*, Durham theses, Durham University. Available at Durham E-Theses Online: http://etheses.dur.ac.uk/9701.

Blatz, P. (1994). *Democratic Miners: Work and Labor Relations in the Anthracite Coal Industry, 1875–1925*. Albany, NY: SUNY Press.

Booth, C. (1886). *Occupations of the People of the United Kingdom, 1801-81*. Journal of the Statistical Society of London, Vol. 49, No. 2 (Jun., 1886), pp. 314-444.

Boudreaux, D. & DiLorenzo, T. (1993). *The Protectionist Roots of Antitrust*. Review of Austrian Economics 6(2): 81-96.

Caporale, T. & Harold W. (2003). *A Positive Political Model of Supreme Court Economic Decisions.* Southern Economic Journal, Vol. 68, No. 3 (Jan., 2002), pp. 693-702.

Clark, G. (1987). *Why Isn't the Whole World Developed? Lessons from the Cotton Mills.* The Journal of Economic History, Vol. 47, No. 1 (Mar., 1987), pp. 141-173

Clegg, James (1888). *Annals of Bolton, History, Chronology, Politics*. The Chronicle Office. Bolton, UK.

Crafts, N. & Wolf, N. (2013). *The Location of the UK Cotton Textiles Industry in 1838: a Quantitative Analysis.* CAGE Online Working Paper Series 148, Competitive Advantage in the Global Economy (CAGE).

Clopper, E. N. (1908). *Child Labor in West Virginia*. National Child Labor Committee. Pamphlet No. 86.

Dittmar, J. E. (2011). *Information technology and economic change: the impact of the printing press*. The Quarterly Journal of Economics, 126(3):1133-1172

Dix, K. (1988). *What's a Coal Miner to Do?* University of Pittsburgh Press. Pittsburgh, PA.

Doepke, M. and Zilibotti, F. (2005). *The Macroeconomics of Child Labor Regulation.* The American Economic Review, 95(5):1492-1524.

Doepke, M. and Zilibotti, F. (2009). *International Labor Standards and the Political Economy of Child-Labor Regulation*. Journal of the European Economic Association 7(2-3), 508–518.

First Report of the Central Board of His Majesty's Commissioners appointed to Collect Information in the Manufacturing Districts as to the Employment of Children in Factories and as to the Propriety and Means of Curtailing the Hours of their Labour. 1833 (450), xx, 78.

Fishback, P. (2005). *The Irony of Reform: Did Large Employers Subvert Workplace Safety Reform, 1869 to 1930?* National Bureau of Economic Research

Fox, M. B. (1990). *United We Stand: The United Mine Workers of America, 1890-1990*. Washington, DC: United Mine Workers of America, 1990.

Galasso, A. and Schankerman, M. (2015). *Patents and Cumulative Innovation: Causal Evidence from the Courts.* Quarterly Journal of Economics.

Goldin, C. and Donald, P. (1989). *Parental Altruism and Self-Interest: Child Labor Among Late Nineteenth Century American Families*. Economic Inquiry. October 1989.

Goldin, C. and Katz, L. (2011). *Mass Secondary Schooling and the State: The Role of State Compulsion in the High School Movement*. Understanding Long-Run Economic Growth: Geography, Institutions, and the Knowledge Economy. University of Chicago Press and NBER; 2011. pp. 275-310.

Gompers, S. (1906). *Organized Labor's Attitude toward Child Labor.* The Annals of the American Academy of Political and Social Science, 27, 79-83. Retrieved from http://www.jstor.org/stable/1010793

Goodwin, D. (2013). *The Bully Pulpit: Theodore Roosevelt, William Howard Taft, and the Golden Age of Journalism*. New York: Simon and Schuster.

Green, H. (2010). *The Company Town: The Industrial Edens and Satanic Mills That Shaped the American Economy*. New York: Basic Books.

Hardman, M. (2003). *Classic Soil: Community, Aspiration, and Debate in the Bolton Region of Lancashire, 1819-1845*. Fairleigh Dickinson Univ Press.

Heckathorn, D. (1989). *Collective Action and the Second-Order Free-Rider Problem.* Rationality and Society.

Hicks, J.R. (1932). *The Theory of Wages*. London: Macmillian.

Hodgson, J. (1979). *The English Legal Heritage*. Oyez Publishing.

Holmes, R. & Fishback, P. (2008). *Measuring the Intensity of Labor Regulation During the Progressive Era.* Quantitative Economic History: The Good of Counting, edited by Joshua Rosenbloom. New York: Routledge Press, 2008, pp. 119-145.

Humphries, Jane. (2010). Childhood and Child Labor and the British Industrial Revolution. Cambridge University Press. Cambridge, UK.

Kafensky, J. W. (1979). *The Diffusion of Power Technology in British Industry 1760-1870.* Doctoral Thesis. University of Exeter.

Krugman, P. (1991). *Increasing Returns and Economic Geography.* Journal of Political Economy 99, no. 3 (Jun., 1991): 483-499.

La Porta, R. and Shleifer, A. (2014). *Informality and Development.* Journal of Economic Perspectives 28: 109-126.

Lewis, B. (2001). *The Middlemost and the Milltowns, Bourgeois Culture and Politics in Early Industrial England.* Stanford University Press. Stanford, CA.

Lindsay, S. (1906). *Child Labor a National Problem*. The Annals of the American Academy of Political and Social Science, 27, 73-78. Retrieved from http://www.jstor.org/stable/1010792

Mannex, P. (1855). *History, Topography and Directory of Mid-Lancashire.* Bailey and Thomson. Preston, UK.

Marks, B. (1988). *A Model of Judicial Influence on Congressional Policymaking: Grove City College v. Bell.* Working Paper in Political Science P-88-7, Hoover Institution.

Marx. K. (1909). *Capital*. vol. I. Chicago: Charles H. Kerr & Company.

Moehling, C. M. (1999). *State Child Labor Laws and the Decline of Child Labor.* Explorations in Economic History, Elsevier, vol. 36(1), January.

Moehling, C. M. (2003). *Family Structure, School Attendance, and Child Labor in the American South in 1900 and 1910*. National Bureau of Economic Research, June 2003. Retrieved from http://www.econ.yale.edu/~cmm54/famst603.pdf

Naidu, S. & Yuchtman N. (2013). *Coercive Contract Enforcement: Law and the Labor Market in Nineteenth Century Industrial Britain.* The American Economic Review 2013, 103(1): 107–144. http://dx.doi.org/10.1257/aer.103.1.107

Nardinelli, C. (1985). *The Successful Prosecution of the Factory Acts: A Suggested Explanation.* Econ. Hist. Rev. 2nd ser. XXXVIII (1985), pp. 428-9.

Nardinelli, C. (1980). *Child Labor and the Factory Acts.* The Journal of Economic History, Vol. 40, No. 4 (Dec., 1980), pp. 739-755.

Neal, F. (1995*). Lanchashire, the Irish Famine and the Poor Laws: A Study in Crisis Management*. Irish Economic and Social History, Vol. 22 (1995), pp. 26-48. www.jstor.org/stable/24341458

Number of persons employed in Cotton, Woollen, Worsted, Flax and Silk Factories respectively in the United Kingdom. (1847). (294), XLVI, 609. BPP.

Nuvolari, A. & Verspagen, B. & Von Tunzelmann, N. (2011). *The Early Diffusion of the Steam Engine in Britain*. Cliometrica (2011) 5:291–321.

Nuvolari, A. & Verspagen, B. (2005). *Unravelling the Duty: Lean's Engine Reporter and the Dynamics of Innovation in Steam Power Technology*. Working Papers. Eindhoven Center for Innovation Studies.

Parliament. House of Commons. (1850). *Returns of Mills and Factories*. (745.) XLII.

Parliament. House of Commons. (1856). *Returns of Mills and Factories.* (41), XLII.

Parliament. House of Commons. (1861). *Returns of Mills and Factories*. (163), CXVII.

Parliament. House of Commons. (1839). *Number and names of Persons summoned for Offenses against the Factory Act*. (43.) XLII. 429.

Parliament. House of Commons. (1840). *Number and names of Persons summoned for Offenses against the Factory Act*. (171.) XXXVIII. 577.

Parliament. House of Commons. (1841). *Number and names of Persons summoned for Offenses against the Factory Act*. (99.) XVIII. 657.

Parliament. House of Commons. (1842). *Number and names of Persons summoned for Offenses against the Factory Act*. (40.) XXXII. 547.

Parliament. House of Commons. (1843). *Number and names of Persons summoned for Offenses against the Factory Act*. (66.) XLII. 283.

Parliament. House of Commons. (1844). *Number and names of Persons summoned for Offenses against the Factory Act*. (106.) XXXIX. 275.

Parliament. House of Commons. (1845). *Number and names of Persons summoned for Offenses against the Factory Act*. (121.) XXXVII. 267.

Parliament. House of Commons. (1846). *Number and names of Persons summoned for Offenses against the Factory Act*. (87.) XXXIV. 501.

Parliament. House of Commons. (1847). *Number and names of Persons summoned for Offenses against the Factory Act.* (106.) XLVI. 559.

Parsons, M., & Rose, M. (2005). *The Neglected Legacy of Lancashire Cotton: Industrial Clusters and the U.K. Outdoor Trade, 1960-1990*. Enterprise & Society, 6(4), 682–709. https://doi.org/10.1093/es/khi124.

Peacock A. E. (1985). *Factory Act Prosecutions: A Hidden Consensus?* The Economic History Review, New Series, Vol. 38, No. 3 (Aug., 1985), pp. 431-436

Peacock, A. E. (1982). *The Justices of the Peace and the Prosecution of the Factory Acts, 1833-1855.* University of York, 1982, p. 78, Table 10.

Peacock, A. (1984). *The Successful Prosecution of the Factory Acts, 1833-55.* The Economic History Review, 37(2), 197-210.

Pigot, J. (1829). Pigot's Business Directory.

Pincus, S. & Robinson, J. (2014). *What Really Happened During the Glorious Revolution?* Institutions, Property Rights, and Economic Growth: The Legacy of Douglass North. New York: Cambridge University Press.

Powell, B. (2014). *Out of Poverty.* Cambridge University Press. New York, NY.

Pritchett, C. H. (1941). *Divisions of Opinion among Justices of the Supreme Court, 1939-1941.* American Political Science Review 35:890-98.

Pritchett, C. H. (1948). *The Roosevelt Court: Votes and Values.* American Political Science Review 42:53-67.

Purdy, F. (1860). *The Statistics of the English Poor Rate before and since the Passing of the Poor Law Amendment Act*. Journal of the Statistical Society of London, Vol. 23, No. 3 (Sep., 1860), pp. 286-329. www.jstor.org/stable/2338499

Reports of the Inspectors of Factories for the half-year ending 31st December 1839. (1840). (218), XXIII p. 14. Reports of the Inspectors of Factories for the half-year ending 3ISt December 1940, 1841 (294), x, p. 15.

Schuster, L. (1949). *The Lord Chancellor.* Cambridge Law Journal. Vol. 10, No. 2 (1949), pp. 175-190. Stable URL: https://www.jstor.org/stable/4503796. Accessed: 15-01-2020.

Segal, J. A. (1997). *Separation-of-Powers Games in the Positive Theory of Congress and Courts.* American Political Science Review 91:28-44.

Smith, A. (1776). *An Inquiry into the Nature and Causes of the Wealth of Nations*. Edwin Cannan, ed. 1904. Library of Economics and Liberty.

Spiller, P. & Gely, R. (1992). *Congressional Control or Judicial Independence*. The RAND Journal of Economics, Vol. 23, No. 4 (Winter, 1992), pp. 463-492.

Statistical Abstract of the United States. (1880). 3rd ed. Washington: Government Printing Office, 1880.

Statistical Abstract of the United States. (1900). 23rd ed. Washington: Government Printing Office, 1900.

Statistical Abstract of the United States. (1913). 36th ed. Washington: Government Printing Office, 1913.

Supplementary Reports of the Central Board of His Majesty's Commissioners appointed to Collect Information in the Manufacturing Districts, as to the Employment of Children in Factories, and as to the Propriety and Means of Curtailing the Hours of their Labour March 1834, Parts I and II, 1834 (167), XIX, 253; xx, I. Hereafter referred to as Factories Inquiry Commission Supplementary Reports, 1834.

Taylor, G. (1906). Parental Responsibility for Child Labor. The Annals of the American Academy of Political and Social Science, 27, 96-98. Retrieved from http://www.jstor.org/stable/1010795

Toma, Eugenia E. (1991). *Congressional influence and the Supreme Court: The budget as a signaling device*. Journal of Legal Studies 20:131-46.

Toma, E. E. (1996). *A contractual model of the voting behavior of the Supreme Court: The role of the chief justice*. International Review of Law and Economics 16:433-47.

U.S. Energy Information Agency. (2014). *Annual Coal Report 2014*. Washington: Government Printing Office.

Warne, F. (1905). *The Miners' Union: Its Business Management*. The Annals of the American Academy of Political and Social Science, 25, 67-86. Retrieved from http://www.jstor.org/stable/1010178

Webb, R. K. (1955). *A Whig Inspector*. The Journal of Modern History, Vol. 27, (4) pp. 352-364. The University of Chicago Press. Stable URL: https://www.jstor.org/stable/1872786. Accessed: 15-02-2020.

Woods, R. 2000. *The Demography of Victorian England and Wales*. University Press. Cambridge, UK

Wright, C. (1887). *An Historical Sketch of the Knights of Labor*. The Quarterly Journal of Economics, 1(2), 137-168. Retrieved from http://www.jstor.org/stable/1880768

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