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The Political Economy of State Regulation: The Case of the English Factory Acts

by

Katherine A. Moos

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Katherine A. Moos¹

Assistant Professor of Economics, University of Massachusetts Amherst

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Abstract

This paper proposes a theory of why the state enacted social policy that regulated the length of the working day in 19th century industrial England. This paper will argue that, far from being capable of self-regulation, the capitalist labor market during Britain's industrial revolution is best conceptualized as consisting of two major social coordination problems resulting from conflicting interests between and within capital and labor. Left unregulated, this dual social coordination problem caused the overexploitation of labor, with dire consequences for both the capitalist and working classes. The reason why this coordination problem could not self-correct was because the wage-labor bargain contained the externality of unwaged household labor. The existence of this externality became deleterious to firms' profitability and workers' survival, especially given the high levels of female labor force participation. This social coordination problem justified and required state regulation into industrial relations. By conceptualizing protective policy as the solution to a dual social coordination problem caused by conflicting interests among heterogeneous firms and workers, this paper extends the Polanyian framework with an explicit theory of exploitation based on the classical theory of competition and a feminist emphasis on social reproduction and unwaged labor.

JEL classification codes— B54 Feminist Economics, C720 Non-Cooperative Games, J880 Labor Standards: Public Policy, N3 Labor & Consumers, Demography, Education, Health, Welfare, Income, Wealth, Religion & Philanthropy

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“It was not that he was paid too little, or even that he labored too long - though both happened often to excess - but that he was now existing under physical conditions which denied the human shape of life”

- Karl Polanyi, *The Great Transformation: The Political and Economic Origins of Our Time*, ([1944]2001, 102).

1 Introduction

The political economy of time encompasses the history of labor struggle in the workplace as well as feminist analysis of unwaged labor in the home. The study of conflicts over working time also helps explain why state regulation is a persistent, and necessary, facet of the capitalist economy. From early social policy such as 19th century English Factory Acts, to contemporary laws on overtime and paid leave, class struggle over the length of the workday is a source of political and economic contention. Historically, major disputes over time have not been solved through employer-employee bargaining alone, but through state policy-making. From an economic standpoint, this contradicts the neoclassical assumption that utility-maximizing agents would find the optimal solution for firms and workers.

This contradiction of labor history with the standard model presents a series of questions with major implications for an economic theory of social policy. Most fundamentally, why does the state intervene into industrial relations? Why does it appear that business and labor cannot agree upon the length of the workday through bargaining alone? Furthermore, we observe great heterogeneity within the categories of capital and labor. How does inter- and intra-industry competition shape how state-policy develops? How does the composition of the labor market, in terms of the age and sex of workers, affect the development of social policy?¹

Using the English Factory Acts of the 19th century as a case study, this paper will discuss why state intervention into industrial relations, in particular with respect to the length of the workday, was the necessary solution to a dual social coordination problem inherent in the labor market. The historical episode of the English factory legislation enacted between 1833-1878 provides a quintessential example of how and why capitalist markets and protective policy develop in tandem, as argued by Polanyi (1944). In this case, the demands of increasing industrial production expanded the markets for female and child labor, which prompted legislation that protected their hours of work. Factory legislation eventually set the legal foundation for labor laws throughout and beyond the manufacturing sector. The English Factory Acts that regulated the 19th century textile

¹This paper focuses on sex and age characteristics, however, other historical episodes may lend more concretely to broadening the analysis of labor legislation to include race, ethnicity, nationality, caste, and other worker characteristics.

industry present a useful case study to understand how, in the context of expanding markets for labor, social policy is created.²

This paper will argue that, far from being capable of self-regulation, the labor market represents a major social coordination problem as discussed by Bowles (2004). Social coordination problems arise when there are differences between individual and collective interests. In the case of English textile industry in the 19th century, both firms and workers faced social coordination problems as their individual interests were at odds with their broader class interests. On an abstract theoretical level, these social coordination problems would exist even if all firms and households were identical. However, our historical example highlights that capital and labor are heterogenous and that inter- and intra-industry competition among firms, as well as the age and sex composition of the labor market, shape how and what labor policy develops. Social history demonstrates that the conflicting interests between and within the capitalist and working classes can cause an overexploitation of labor. The reason why this dual social coordination problem cannot self-correct is because the wage-labor bargain contains the externality of unwaged household labor, which is necessary for capitalist society, but is not reflected in the wage. In other words, the two social coordination problems are linked by the externality of unwaged domestic labor which is necessary to reproduce the individual worker and the working-class family unit. When capitalist production includes high levels of female labor force participation, the existence of this externality can become deleterious to firms' profitability or workers' survival.

Social relations between capitalists and workers can best be understood as an antagonistic yet symbiotic relationship. Capitalism requires the exploitation and the reproduction of workers. This is part of the contradictory nature of capitalism that the state must manage. Marx likens legislation that shortens the working day to the need to fertilize soil that has been exhausted from overproduction (Marx [1867] 1990, 900). Shortening the working day and fertilizing the land are both necessary to maintain capitalist exploitation given its destructive tendencies towards human and natural resources. For this reason, the dual social coordination problem requires state regulation into industrial relations. The state is understood as embedded within the political economy conditions set forth by business and workers' antagonistic need for capital accumulation and social reproduction.³ Due to the drive of profit-seeking firms to extract as much surplus labor as possible, the need to reproduce capital through capitalist production can, at times, threaten the

²With this in mind, we can understand the assertion made by Booth (1978), who considered the factory legislation "a precursor to the modern welfare state" and compelled economists to study Marx's analysis of the Factory Acts as a means of creating a Marxian theory of social policy (156).

³The character of the manager of labor-power is based on a single assumption that the state, like capital and labor, must reproduce itself. This is true by definition, if the capitalist state intends to continue to be a capitalist state, it must preserve both its own authority, as well as capitalism. In this sense the state, as the manager of the labor-power commodity, "is necessarily bound up with modifications of the conditions of capitalist accumulation" (de Brunhoff 1978, 24). Based on this parsimonious assumption of the state, we can see that a crisis for capital or labor could lead to a crisis for the state.

ability of labor to reproduce labor-power. This is the crux of the inherent conflict between capital and labor, but it also demonstrates that profit-seeking firms may harm their own long-term self-interests. Capitalist production cannot exist without a labor supply that is in excess of labor demand. A shortage of available labor can make production impossible, or put upward pressure on wages, which will harm profitability. In other words, capital cannot be reproduced unless labor-power is reproduced. When these conflicts get extreme enough, the entire system can be put in jeopardy. The capitalist system requires growth that is predicated on the exploitation of labor, but there is no inherent mechanism within capitalism that will ensure that the needs of capital accumulation and social reproduction will be met. Because the state is dependent on the existence of capitalism, this motivates and legitimates state intervention into the production process through social and labor legislation.

The paper will have the following structure. First, we will discuss the source of the coordination problem, in particular how conflicting individual and collective interests for firms and workers, as well as the externality of the wage-labor bargain that links the two classes. Second, we will discuss the consequence of the social coordination problem in terms of the deleterious effects that overexploitation has on the health and productivity of the working-class, in addition to social conflict and the development of civil society. Third, we will discuss the solution to the coordination problem, and its implications for class and gender struggle. Finally, we will discuss the implications of this theory for future research.

2 The Source of the Coordination Problem

The antagonistic symbiosis of capital and labor is emphasized by classical political economy and other heterodox economics, particularly Marxian and Post-Keynesian traditions. In these schools of thought, it is clear that the interests of capital and labor are at odds, particularly with regard to the length of the workday or the distribution of value added. However, it is also important to note that there are conflicting interests *within* classes. In other words, what may be in the best interests of a particular firm or household, may not be in the best long-term interests of its class.

While the broad categories of capital and labor are useful analytical abstractions for understanding class struggle, the terms can obscure inter-class conflicts that result from the interests of smaller units of analysis. In other words, the interests of capital and labor may be distinct when thinking about the firm or household, versus what is in the best interest of the class. This paper does not adhere to the idea of a representative agent, as sub-classes demonstrate the heterogeneity among firms and workers. Table 1.1 illustrates a more detailed level of analysis within the broad categories of capital and labor.

Conflicting interests within classes leads to what Bowles (2004) calls a coordination problem, or “situations in which coordination failures occur with significant likelihood”

Input	Individual	Unit	Sub-Classes	Class
Capital	Entrepreneur	Firm	Size/Industry/Sector/Etc	Capitalist
Labor	Worker	Household	Age/Gender/Race/Etc	Working

Table 1: Capital and Labor at Different Levels of Analysis

(40-41). In other words, conflicting interests lead to noncooperative interaction within both the capitalist and working classes. Such behavior can result in outcomes which are not Pareto optimal for the class as a whole (40). According to Bowles,

“Coordination problems are ubiquitous – depleting a fishing stock is little different in the formal structure of its incentives than clogging the freeways of the Internet, arms races, free-riding on work mates, conspicuous consumption, fiscal competition among nation states, or leaving it to somebody else to tell the neighbors to turn down the volume on their TV” (2004, 128).

This paper argues that the industrial capitalist labor market represents a dual social coordination problem, as there is no internal mechanism to ensure that individual actors pursue their broad class interests, rather than their individual class interests. The argument advanced in this paper, but not necessarily by all game-theoretic frameworks, represents a departure from the rational expectations hypothesis, as it demonstrates that individuals pursuing their own individual interests will not necessarily guarantee the fulfillment of their long-term expectations or interests. This paper could be made consistent with a theory of bounded rationality.

2.1 What Motivates Capital and Labor?

The motivation of both individual capitalists and the capitalist class utilized in this paper is based on the classical theory of competition, as described in Smith (1776), Ricardo (1821), and Marx (1867) and developed by Shaikh (2016), Moudud, Bina, and Mason (2013), Botwinick (1993), among others.⁴ The classical theory of competition states that capitalism requires firms to intensify the rate of surplus value in order to compete with one another. Capitalist competition is a war-like environment in which firms must pursue ever-higher profits. The exploitation of labor is not due to the character of the individual capitalist, but because all firms must compete by lowering their unit labor costs so as to drive out their competition (Marx [1867] 1990, 381). This is because value is only created by surplus labor. Firms must exploit workers as much as possible; they do this by increasing the intensity and extensivity of the working day. A Marxian interpretation of policy as found in de Brunhoff (1978), Booth (1978), and Moudud (2014) would argue that the

⁴For an analysis of how the classical theory of competition is more consistent with actual business behavior, see Moudud, Bina, and Mason (2013), chapter 2.

inherent vulnerability of workers is due to capitalist exploitation and surplus labor extraction. The behavior of capitalist firms, in their attempt to exploit workers as much as possible leads to the disregard for the wellbeing of the worker.

This framework assumes that workers are motivated, not by the maximization of utility in a Benthamite sense, but by the will to survive and ensure the survival of their offspring. For our purposes, the essential assumption is that a worker's motivation for working is due to his or her dependence on income for survival, not a labor-leisure trade-off model. This echoes Marx's emphasis on workers being "doubly free" in not being tied to particular employer through law or custom (as in Feudalism or slavery), and also being "free" from owning the means of production, and therefore dependent on wage-labor for income. Furthermore, in most cases, workers live in families or households that pool their income and are interdependent for subsistence and survival.

The motivations of capitalists and workers are intrinsically linked. Capitalists cannot accumulate capital unless they are able to appropriate profits created by workers' surplus labor time. Workers are not able to survive unless capitalists hire them to work. In two or more periods, social reproduction requires not only subsistence for the individual worker, but also for the working-class family as a whole. In other words, the motivating factors behind both capitalist and working-class interests are linked by the social reproduction of the working-class family. This includes permitting workers to form familial units that produce children who will become workers. When thinking about the reproduction of labor-power and the working class family, it is important to remember that, "The production of labor-power viewed socially is the reproduction of people and their talents, capacities, and consciousness, a much more complex and awesome phenomenon even than the production of commodities" (Foley 1986, 44). The development of human capital also includes the reproduction of cultural, educational, and societal norms consistent with and supportive of the capitalist economic system.

2.2 Coordination Problem of Capitalists

The coordination problem of capitalists resembles the classic "tragedy of the fishermen" which is also described as the prisoner's dilemma (see table 2). Like hypothetical gangsters in a holding cell, competing firms will try to maximize their individual payoffs in a way that ultimately results in lower profits. The reason why competitive firms cannot cooperatively decide upon the length of the working day is due to the incentive structure which makes deviating from the "short" 10-hour day the dominant strategy for all firms.

If all competing firms agreed to have their factories open for shorter hours, they would all realize a certain level of profits, denoted here as α in the upper left (UL) corner of the payoff matrix. If the typical firm deviates from the 10-hour day and adopts a 12-hour day, it will realize higher profits, γ while firms that stay at 10 hours will realize lower profits, δ . Because the incentives are structured so that: $\gamma > \alpha > \beta > \delta$, the incentive structure makes the 12 hour day the dominant strategy for all firms. Deviating from the 10-hour day

is the only strong Nash equilibrium. When all firms keep their factories open for longer hours they will all realize even lower profits, denoted as β in the lower right (LR) corner. Simply put, a shorter day is superior to the longer day in terms of profitability, but firms have the individual incentive to stay open longer in an attempt to gain higher relative profits. The incentive structure for firms presents a coordination problem for deciding how long to keep the factories open.

		All Other Firms	
		10 Hour Day	12 Hour Day
Typical Firm	10 Hour Day	α, α	δ, γ
	12 Hour Day	γ, δ	β, β

Table 2: The Capitalist Firm’s Dilemma

Numerical examples can help illustrate the underlying logic in the capitalist firms’ dilemma. Suppose that, in the scenario shown in the upperleft (UL) corner of the payoff matrix, all firms choose a “short day” of 10 hours. In this case, three hours of work pays for the workers’ wages, and the remaining seven hours are surplus labor. In this scenario, all firms are open for 10 hours and all firms pay a wage rate of 0.3 (3/day). In this case, all firms realize a profit of $\alpha = 7$, assuming that the productivity is 1 unit per hour of work.

In the lower right (LR) corner, we see that when the “typical firm” deviates from the 10-hour day and keeps the factory open for 12 hours, the firm can increase output and realize higher profits. Firms must offer higher wages so that workers will agree to work longer hours. In this case, we estimate that wages paid by the deviating firms increase to 3.75, making the wage rate 0.31. In the last two hours of a 12-hour day, workers are less productive than in the first ten hours of work. They are less productive because they are exhausted, less focused, and more apt to making mistakes that compromise output. This means that in the 12-hour day, a factory will produce 11 units, and realize a surplus of 7.25, $\gamma = 7.25$. In this same scenario, all other firms do not deviate from the 10-hour day, but they will raise wages slightly in order to stay competitive as employers. Workers in a factory that is open for 10 hours will be paid 3.10 for 10 hours of work, which will keep the wage rate equal across both deviating and non-deviating firms. This will lower the surplus realized from the non-deviating firm to $\delta = 6.90$. In the upper right (UR), we see the mirror image of the lower left, as all other firms deviate but the typical firm stays with a 10-hour day. In either case, firms are motivated to deviate from the 10-hour day, as it is the dominant strategy.

For this reason, we can see that all firms will be motivated to work a 12-hour day to earn higher profits. However, once all firms adopt this strategy, as in the lower right (LR) corner, the effect of lower labor productivity per hour will cause the wage to rise to 4.5 for a 12-hour day, or a wage rate of 0.37. The increased wage is the result of decreased labor productivity. As all firms adopt the longer working day, they all experience lower productivity per hour. The reduction in labor productivity will mean that it will take more

	Hours	Wage	Surplus	$\frac{Output}{Day}$	$\frac{Output}{Hour}$	Wage Rate
UL, Typical Firm	10	3	$\alpha = 7$	10	1	0.3
UL, Other Firms	10	3	$\alpha = 7$	10	1	0.3
LL, Typical Firm	12	3.75	$\gamma = 7.25$	11	0.91	0.31
LL, Other Firms	10	3.10	$\delta = 6.90$	10	1	0.31
UR, Typical Firm	10	3.10	$\delta = 6.90$	10	1	0.31
UR, Other Firms	12	3.75	$\gamma = 7.25$	11	0.91	0.31
LR, Typical Firm	12	4.5	$\beta = 6.5$	11	0.91	0.37
LR, Other Firms	12	4.5	$\beta = 6.5$	11	0.91	0.37

Table 3: Wages and Productivity in the Capitalist Dilemma

time to produce the means of subsistence which regulate the wage. In this case, wages will rise, which will lower profits to $\beta = 6.5$.

The main mechanism that contributes to making the 12-hour day inferior to the 10-hour day in terms of profitability is the effect of lower productivity per hour on raising the wage. An overworked labor force will result in a decrease in productivity per hour. When there is a widespread decrease in labor productivity per hour, there will be an increase in the necessary labor-time required to produce the means of subsistence. This will increase the wage, which will lower profits.

From this explanation, we can see that a short day of ten hours is superior to the long day of 12 hours, as the firms realize higher profits in the short day. However, deviating from the 10-hour day and choosing a 12-hour day is the dominant strategy for both agents. All firms deviating and choosing the 12-hour day is the only strong Nash equilibrium. In this case, while the mutual cooperation of a 10-hour day yields a better (more profitable) outcome, it is not rational at the individual level. Table 1.3 contains numerical examples for wages and productivity in the capitalists' dilemma.

2.3 Coordination Problem of Workers

On the other side of the wage-labor relationship, workers face their own social coordination problem. Unlike fish being plucked from a pond, in order to be part of the capitalists' dilemma, workers in capitalism freely offer their labor services on the market. For this reason, we must also explore the reasons why they do so, particularly if and when it results in overexploitation. If the male wage is below a family wage level, then it may be necessary for women and children to work for additional family income. A household's budget will increase as more family members, such as women and children, enter into formal employment. However, the increase in labor supply will also put downward pressure on male wages. As more families send more members to work, the male breadwinner's pay will deteriorate below the level of a family wage, making it *necessary* for all members

to work to earn a subsistence level for the household.

The deterioration of the male wage will eventually *necessitate* increased labor supply from the family. This framework is consistent with historical analysis that documents that women and children were both contributors to household income, as well as competitors in the labor market. According to Humphries (2013) children supplemented inadequate family incomes, “but as added workers they increased the amount of labour available, promoted deskilling, and reduced pay further” (411). In addition, “breadwinner fragility” was caused by high rate of mortality for adult males and desertion, both of which meant that many families lacked a male head of household (Humphries 2013, 413).

The coordination problem of the working-class can be understood as a non-cooperative game (see table 4). If only male breadwinners worked for pay, then they must be paid a family wage. However, from historical analysis we know that in 19th century England, the actual male wage, x , was not enough to support a family. For this reason, women and children had a strong incentive to work for wages. The additional income gained through women and children’s labor force participation is ω . Because women and children earn less than men, $x > \omega > 0$. ϵ is a measure of the deterioration of the male wage and is assumed to increase as more women and children join the workforce. As a greater the labor supply puts downward pressure on wages, η , the total household income when men, women, and children have all joined the formal labor force in large numbers, suffers from even greater wage degradation. For this reason, the incentive structure of households’ labor supply decisions is: $x + \omega - \epsilon > x \geq \eta > x - \epsilon$.

		All Other Households	
		Male HoH Works	Adults & Minors Work
Household 1	Male HoH Works	x, x	$x - \epsilon, x + \omega - \epsilon$
	Adults & Minors Work	$x + \omega - \epsilon, x - \epsilon$	η, η

Table 4: How Much Labor Will a Household Supply to the Market?

Depending on the strength of the strategic complementarity, the household’s labor supply dilemma could be formalized as either an assurance game (when $\omega < \epsilon$) or a prisoner’s dilemma (if $\epsilon < \omega$).⁵ Numerical examples may also help illustrate how the household’s game can be formalized as either a prisoner’s dilemma or an assurance game.

For the purpose of this paper, we will assume that $\omega < \epsilon$, meaning that gains from additional household members working for pay was less than the deterioration of the male wage. In this case, the formulation represents an assurance game, meaning that there are two pure strategy Nash equilibria. In this case, the upper left denotes an equilibrium

⁵A prisoner’s dilemma may be appropriate in a different historical case, such as the increase in women’s labor force participation in economies with an established family wage.

		All Other Households	
		Male HoH Works	Adults & Minors Work
Household 1	Male HoH Works	3, 3	1.5, 4
	Adults & Minors Work	4, 1.5	2, 2

Table 5: Household Labor Supply Decision as Prisoner's Dilemma, $\omega = 2.5, \epsilon = 1.5$

		All Other Households	
		Male HoH Works	Adults & Minors Work
Household 1	Male HoH Works	3, 3	1.5, 2
	Adults & Minors Work	2, 1.5	2, 2

Table 6: Household Labor Supply Decision as Assurance Game, $\omega = 1.5, \epsilon = 2.5$

best described as the male-breadwinner family wage model, and the lower right denotes an equilibrium in which men, women, and children in all households engage in wage labor, but at lower wage rates.

We can express the frequency with which households supplied more than only the male head of household to the market for wage-labor as between 0 and 1. It is difficult to discern how weak or strong the strategic complementarity was on a household level, even with the aid of historical analysis.⁶ Most importantly, the decision of one or more households to send additional family members to the labor market interacts with other households' decisions by depressing wages (an increase in ϵ). In our case, the assurance game is a social interaction model with strong strategic complementarity. The typical household's best response has a slope bigger than 1. The system is then unstable, which means that any small deviation will lead the system to one or the other equilibrium point. The male family wage may be the socially coordinated solution from the perspective of workers, and the universal exploitation of women and children's labor would be the other equilibrium.

2.4 Unwaged Household Labor as an Externality

There are a number of necessary conditions to ensure social reproduction. The most obvious is a sufficient wage that ensures at least a subsistence level of consumption. If wages are insufficient, then workers will suffer from hunger, deprivation, and this can threaten the reproduction of the working class. While classical political economy assumes that

⁶It is important to note that the family wage was an ideal that was achieved, through labor struggle and legislation in the 19th century, not something that necessarily existed for the working class prior to this time period. In fact, historical accounts demonstrate that the transition to the factory system represented a disruption of earlier patterns of family labor and women's informal work. According to Secombe (1986), women began to seek employment outside the home in factories because there were less opportunities to earn additional income through market work performed inside the home (such as small-scale baking or sewing).

wages are regulated by subsistence, there are many cases throughout history with below subsistence-level wages. In such cases, increasing the wage-level through cash or in-kind assistance becomes the purview of social policy.⁷ A second necessary condition for social reproduction is to ensure safety. In the case of the Factory Acts, occupational safety and hygiene were among the provisions included in some of the legislation.⁸ The third necessary condition to ensure social reproduction is sufficient time away from work.

While there is often a focus on “leisure” time in neoclassical economics and “rest” in Marx’s writing, this is only part of the story. During so-called leisure or resting time, workers must care for their bodies as well as those who are dependent upon them for their survival; this care entails unwaged tasks. Heterodox economists are fond of analytical abstractions of simple commodity production in which workers are paid in corn, as utilized by Ricardo (1821), Marx (1867), and Sraffa (1960). However, in reality, most workers in capitalist societies cannot eat their wages. Instead, workers must transform the money commodity into the means of subsistence. The transformation of wages into consumption, and of consumption into social reproduction, requires time. For many, if not all members of the household, this time is spent performing additional, unpaid labor.

In a capitalist-patriarchal society, the sexual division of labor assumes that women will provide unpaid, domestic labor, including being the primary caregivers to young children, whereas men will perform paid, market work. Feminist economists have studied the issue of time-use and household labor as an egregiously neglected area of economic activity.⁹ Far from being unrelated to capital accumulation, Marxist feminists such as Federici (2012) argue that women’s unpaid housework and domestic labor serves as the basis of the industrial economy. This labor is necessary for workers to “reproduce themselves” from one day to the next, and also in terms of one generation caring for the next (and previous) generation of workers. This labor, while essential to capitalism as there would not be a labor supply without it, is typically unwaged. It is therefore not reflected in the price of labor.¹⁰

When domestic labor is performed privately and for no pay, the time and work effort is not factored into the decisions made by firms nor is it reflected in wages, making social reproduction of the working-class family an externality of the wage-labor bargain. In other words, the cost of reproducing the labor-power commodity is not completely covered by the wage, making it an externality at the intersection of the capitalist and

⁷Speenhamland in late 18th and early 19th century England, or a negative income tax, such as the Earned Income Tax Credit (EITC) in the United States is an example of a policy that addresses when wages are below subsistence level. Another contemporary U.S. example is the Supplemental Nutrition Assistance Program (SNAP, formerly Food Stamps).

⁸While sufficiently high wages and occupational safety is not the focus of this paper, they are both important aspects that could be the subject of future study.

⁹For recent analysis, see *Feminist Economics*, Special Issue: A Special Issue on Unpaid Work, Time Use, Poverty, and Public Policy, Volume 17, Issue 4, 2011.

¹⁰For a discussion of the contemporary shift of “caring” labor from unwaged to waged work, see Folbre and Nelson (2010).

worker coordination problems. While a family wage is ostensibly enough income for a male breadwinner to support a wife and children, the price of the labor of the female caregiver is obscured. From the capitalist point of view, this is a positive externality, as they gain the use of labor in the next period without fully paying for its reproduction, as the price of labor does not fully capture the cost of reproducing it. But for the worker, this is a negative externality, as the social cost of reproducing labor-power exceeds the wage.

As women represent a specific component of the reserve army of labor they are often pulled into the workforce when there is a boom in production. When women, who supply the bulk of unwaged labor, are employed outside the home, it can make it difficult for the family's social reproduction needs to be met. Because women are the main source of unpaid, domestic labor, social reproduction is vulnerable to crisis during periods of economic expansion, as well as collapse. This can threaten the survival of the individual members or of the family unit, which contradicts the intended purpose of engaging in wage-labor. It also gives us insight into why social legislation and gender are intrinsically linked. It is for this reason that policies that develop at times when female labor force participation is high will normally be connected to the issue of time. The state's role may be to absorb some of the responsibility of social reproduction (such as through the public provision of social welfare, in the form of public schools or daycare, for example), or in the case of English factory legislation to aid in social reproduction of the working-class by shortening the length of the working day. In our case study, industrialization and the incorporation of women and children into the textile industry threatened social reproduction.

3 The Consequence of the Coordination Problem

The overexploitation of labor, which can be understood as the expansion and degradation of the labor supply, had a number of consequences on class and sub-class interests. First of all, overexploitation threatened both workers' survival and capitalists' profits. There was also an increase in social and labor movements, as well as the development of civil society that articulated and advocated for labor and capital with respect to the issue of the length of the working day. Social conflict over the length of the workday can be interpreted as evidence of Polanyi's (1944) thesis that capitalist markets and protective policy develop in tandem.

Accounts of the factory system, and arguments made in favor of the reform, can be interpreted as the warning of an already erupting social reproduction crisis that could threaten productivity and profitability. The labor market contains a pool of externalities for capitalists, as no individual capitalists control the effects of their profit-seeking actions. The pool of externalities includes the reproduction of the working class family, but is expressed as concern for children's health, maternity, family, gender roles, disability, as well as secular and religious education, among other issues. Nevertheless, firms opposed

efforts to limit the length of the working day, and were hostile to unions. Employing the ideas of political economists to argue against the reforms, firms organized around the principles of free market liberalism and *laissez-faire*.

3.1 Family Labor Supply, the Deterioration of Real Wages, and Economic Insecurity

The increased demand for child and female labor in the textile industry was due to a number of factors, including technical change, labor market segmentation and pay differentials, the deterioration of the male wage, and the reaction to developing social policy. As discussed by Hutchins and Harrison (1903), prior to the widespread use of the steam-power engine, textile production was located in valleys with available sources of water, but where labor was scarce. Manufacturers brought in orphan “pauper” children who were employed as apprentices under the Poor Law. Once the steam-engine was more widely adopted, manufacturers shifted production to more populated cities, and were able to hire so-called “free” children, rather than Poor Law apprentices who had to be housed, fed, and clothed by the employer, and whose hours of work were limited under the “Health and Morals of Apprentices Act” of 1803.¹¹

Mechanization and the division of labor increased the productivity of and demand for children in factory work (Humphries 2013, 395). Children and women could be substituted for adult men due to the use of machinery, which required less physical strength than previous production methods, and due to the mechanization which divided the production process into specific tasks.

Labor market segmentation and pay differentials also made hiring women and children attractive to firms. During the industrial revolution, the male-female wage ratio in textile factories was between 0.32 to 0.70, depending on the year, occupation, and location (Burnette 1997, 259). In our historical example, we see that women and children made up roughly three-fourths of workers in the textile industry, see Table 1.7 (Hutchins and Harrison 1903, 110). Indeed, female employment in factories in the United Kingdom increased 131 percent to 387,826 in 1856 from 167,696 in 1835 (Ward 1970b, 183).

¹¹According to Hutchins and Harrison (1903), the process of legislating the legal maximum of the working day, in addition to health and safety standards, began as an extension of the Elizabethan Poor Laws, rather than the “conscious assumption of control over industry” (2). The Health and Morals of Apprentices Act of 1802 only applied to a small number of “child paupers” in the textile industries, who as orphans usually under ten years old, were made apprentices of a trade by the Poor Law of 1601. Nevertheless, the Act of 1803 was the first English Law to legislate a 12-hour working day, prohibit night work, instill a crude system of enforcement, as well as set basic health, sanitary, and safety standards. Introduced by the 1st Baronet Sir Robert Peel (1750-1830), it passed without major opposition or controversy, as the “child paupers” were already considered wards of the state under the Poor Laws. The legal regulation of their work, which had been mandated and facilitated by law, did not represent a major shift in the paternalistic relationship between the state and destitute children. As a means to skirt the protection of Poor Law apprentices, factories began to employ children who were not covered by the 1803 Act (Hutchins and Harrison 1903, 16-18).

Table 7: Percent Employed in Textile Industries by Age and Sex

Year	Children (< 13)	Young Persons (13-18)	Adult Women	Adult Men
1838	5.9	16.1	55.2	22.8
1850	6.1	11.5	53.9	26.5
1856	6.6	10.6	57	25.8

Source: Hutchins and Harrison 1903, 110.

It is widely agreed, and consistent with economic theory, that the increase in the pool of labor through the commodification of female and child labor put downward pressure on men's wages. This was observed as early as the mid-19th century. In a letter written in 1850 by Angus Reach entitled 'The Cloth Districts in Yorkshire' it was observed that while women's wages tended to increase the more women were employed in factories, the opposite was true for men (Ward 1970a, 163). According to Allen (2007), while the effect of industrialization on real wages is debated as "one of the great questions in economic history," the most recent analysis of wages and cost of living support the "pessimistic" view that real wages did not grow for workers in the English industrial revolution. The standard of living for working-class households decreased during the first half of the 19th century, with 1825-1850 marking the lowest point in real wages (Allen 2007, 13).

Humphries (2013) argues that there were a number of contributing sources of economic insecurity which were both the cause and the effect of an increase in household labor supply. First, male breadwinners may have "top-sliced their wages" for their personal consumption, reducing what was available for the household. Second, technical change was biased towards unskilled factory work, which reduced the demand and eliminated the pay premium associated with traditional skilled trades and crafts, putting downward pressure on wages. Third, even outside of the professions eliminated or undermined by technical change, wages did not rise. Fourth, demographic growth increased the dependency ratio of families with many young children. Fifth, male breadwinners' wages tended to be cyclical, resulting in unemployment and underemployment (Humphries 2013, 412). According to Allen (2007), the reduction in real wages caused most working-class families to reduce their consumption of necessary goods, especially in urban areas. Caloric consumption is believed to have decreased from 1800 to 1850. Together with overwork, overcrowding, poor sanitation and other public health problems, these factors resulted in reduced average heights and life-expectancies in working-class families (Allen 2007, 13).

3.2 Population, Health, Disability, and the Family

The poor living standards of child-workers and the children of adult factory workers, including inadequate housing, poor diets, insufficient clothing, contributed to a number

of infectious diseases that threatened their survival. Poor living and working conditions threatened the ability of the children to grow up to be healthy and productive adult workers (Engels [1845] 1968, 169).

The issue of child and industrial health was tied closely to growing awareness about disability. In the 1840s, William Dodd, who referred to himself as “a factory cripple,” wrote a series of letters to Lord Ashley, about the condition of life in the factories and its effect on workers ([1842] 1967).¹² While the opposition often questioned the veracity of Dodd’s descriptions of the factories he visited in Northern England, the content was corroborated by physicians’ reports. Dr. Loudon’s Report, based on information from two surgeons from Leeds, observed “peculiar twisting of the ends of the lower part of the thigh bone” in approximately 35,000 patients, most of them children between the ages of eight and 14 years old, who were all believed to have worked in factories. Engels describes Manchester as having high rates of disability that were visible by walking through town (Engels [1845] 1968, 172). The Factories Enquiry Commission’s second report published in 1833 detailed flat-footedness, swollen joints, varicose veins, abscesses in the thighs and shins, and disabilities involving the spine, hips, and legs. Physicians, factory inspectors, and Dodd attributed these ailments to excessively long hours of work and continual standing (Engels [1845] 1968, 174). An earlier report hypothesized that the disabilities in children’s legs and knees were the result of injuries sustained from using one’s knees to stop the machine (Ward 1962, 16). It was also believed that these ailments affected women more than men, due to structural differences in the body (Engels [1845] 1968, 181). While the explanatory power of 19th century medicine was limited, physicians, factory inspectors, and advocates documented alarming rates of poor health and disability attributed to factory work that threatened the viability of the labor supply.

Women’s work in factories had very important implications for maternal and child health. Physicians such as Dr. Hawkins, who collected information on behalf of the Factories Enquiry Commission, as well as midwives, reported that women-workers experienced difficult childbirths, miscarriages, and poor health in general. Pregnant women were known to work up until the last “hour of their confinement” as they could not afford the lost wages of leaving work or due to fear of being fired. Stories of women returning to work the day after giving birth, or even giving birth on the shop-floor were not uncommon (Engels [1845] 1968, 182).¹³ The overwork of pregnant women workers was believed to cause maternal and infant mortality. Drawing on information provided by a physician, Dodd reported to Lord Ashley that the long hours of standing in the factory were the cause of difficult births, induced abortions to save the life of the mother, and infant

¹²Lord Ashley was later known as Lord Shaftesbury. Ashley’s humanitarian efforts were informed by Dodd, who was especially concerned with the effect of factory work on children who developed physical disabilities as he had. According to Johnson (1968), Lord Ashley “was moved by the sight of human misery and his whole object was to lessen it” (101).

¹³Engels cites the Reports of Commissioners Drinkwater, Power and Loudon, Second Report, 1833.

mortality (Dodd [1842] 1967, 29).¹⁴

Public health reports, as analyzed by Marx, Dodd, and others, reported high rates of infant mortality of the children of women-workers. It was believed that infant mortality was the result of women-workers being unable to properly care for newborns and infants, as they would return to the factory soon after childbirth and leave the infants in the care of a young girl or old woman (Marx [1867] 1990, 521). Paying for this child-care was a financial burden for the household with a working mother, and also did not necessarily provide appropriate care. In 1844, Lord Ashley reported that female factory workers and their newborns suffered from being separated and therefore unable to nurse for long stretches of time. In Parliament, Lord Ashley conveyed graphic testimony of female workers lactating through their clothes in the factory.¹⁵ Dodd was concerned about the nutritional consequences for newborns, writing, "The child, from the want of its natural nourishment, soon begins to languish, and, if death does not step in to relieve it from its misery, it becomes a weak, sickly, delicate child" (Dodd [1842] 1967, 29).

Female and child labor not only threatened social reproduction from the perspective of public health or in terms of mortality, but also in terms of the reproduction of the working-class family. The incorporation of women and children into the workforce, and the subsequent deterioration of the family wage, also disrupted traditional gender norms, the sexual division of labor, and therefore the working-class family as a patriarchal unit of society. The effect of female and children's factory work on family hierarchal structure were considered particularly alarming if the male head of household was unable to find work.¹⁶ As reported by both Dr. Hawkins, the medical commissioner who reported on Lancashire, in the Factory Enquiry Report, and Lord Ashley in his speech on March 15, 1844, the authority of the male-breadwinner as head of household was challenged by women and children's work outside the home (Engels [1845] 1968, 165). In one such example, an unemployed man wrote to Richard Oaster to let him know that he, like hundreds of other men, were responsible for household duties while their wives worked for pay (Engels [1845] 1968, 162).

The employment of unmarried women and girls also raised concerns about the future

¹⁴Dodd letter from Bradford, October 2, 1841, "Many of them work these hours in an advanced state of pregnancy, and until they are obliged to give it up: some, who live near the mill, go to work till the last month, day, and I have conversed with two who stayed till the last hour of their time" (Dodd [1842] 1967, 37). In a letter from Leeds on September 30, 1841, he wrote, "Many women, both married and single, work in a far advanced state of pregnancy; the consequences of which is sometimes fatal to the infant or its mother." (Dodd [1842] 1967, 27).

¹⁵One woman reported to Lord Ashley that because she is away from her baby and unable to nurse, "My breasts have given me the most shocking pain, and I have been dripping over with milk" (Lord Ashley citation in Hansard, 3rd series, 1844, vol 73, col. 1094, quoted in Engels [1845] 1968, 161).

¹⁶According to Ward (1962), "[I]n particular periods some sections suffered substantial falls, as economic and industrial conditions varied. And handworkers had difficulty in obtaining alternative employment: the factories required women and children mainly. By 1830 the only labour for many men was to carry their children to the spinning mills, to earn the family's livelihood" (13).

reproduction of the working-class family. According to Dr. Hawkins, a young girl who had been working in the factory was unfit to become a mother and wife. He testified, "*She has had no time, no means, no opportunities of learning the common duties of domestic life; and even if she had acquired the knowledge she has still no time to practise them*" (quoted in Engels [1845] 1968, 166. Emphasis added). Lack of time to learn or perform domestic work can be observed in changed family consumption and expenditure habits, as women purchased substitutes for the domestic work such as sewing or mending that they no longer had time to perform themselves (Marx [1867] 1990, 518, Footnote 39).

Taken together, these concerns can be read as a warning of a potential crisis in social reproduction, in terms of both population and demographics, and also of the reproduction of the patriarchal working-class family. While a potential crisis in social reproduction certainly had humanitarian, moral, and political implications, it can also be viewed in economic terms. If the working-class was unable to reproduce individual workers or family units, this could undermine a sufficient labor supply for industrial production, or harm productivity due to deterioration of workers' health. If healthy and productive workers became scarce due to high rates of mortality, morbidity, disability, and poor health, there could be an insufficient pool of labor, which would put upward pressure on wages. As social reproduction required sufficient time away from work, the labor market can be interpreted as containing a pool of externalities. Individual capitalists do not individually control the effect of their actions on the reproduction of the working-class.

3.3 The Double Movement: Civil Society and Worker Struggle

Concerns over the health and wellbeing of the individual worker and of the family were expressed through a constellation of growing opposition to the effects of industrialization and demands for protective policy. In what can be described as a Polanyian "double movement," the commodification of female and child labor was met with growing opposition by both civil society, or the emergence of middle class ideals and societal values, and also of the emergence of working-class demands for labor, civil, and political rights.

The poor health and living conditions due to long hours and overwork of textile workers brought to mind comparisons with slavery in the United States. In a provocative 1830 essay published in the influential Northern journal *Leeds Mercury* entitled "Yorkshire Slavery," Richard Oastler, one of the founders of the Factory Movement, compared child workers to slaves in the Americas. Along moral lines, Oastler criticized the hypocrisy of English industrialists who worked children in conditions "more horrid" than in the "hellish system of 'colonial slavery'" (Ward 1970b, 73-74). This comparison served an important rhetorical point as it revealed the harsh treatment and physical abuse of workers who were not legally bound to their employers and therefore had freedom that slaves who are bought and sold as commodities were denied.¹⁷

¹⁷As Engels argued, the "freedom" of the wageworker means that the employer is not responsible for the

The living conditions of women and children also caught the attention of humanitarians, philanthropists, and business people which became more publicly known due to public health reports and factory inspections. As interest grew in social sciences, economics, the educational movement, as well as health and sanitization, the lives of factory children became of moral and medical interest to humanitarians and philanthropists (Hutchins and Harrison 1903, 11). The 682-page Report of Michael Thomas Sadler's Select Committee brought 87 witnesses that told the story of the dangerous and strenuous conditions faced by child-workers in the textile industry. This report was controversial, as opponents argued it was untrue or exaggerated, but it was still influential in shaping the early Factory Acts that limited the hours of work of children (Ward 1970b, 70). The Factory Act of 1833 also appointed four paid inspectors whose reports would provide valuable information about factory conditions. As additional study and scrutiny of factory system came about, there was more ability for reformers to demonstrate how it was affecting society.

Reformers in favor of the Factory Acts were concerned not just with the survival of the working class, but with the reproduction of their human capital, or abilities and cultural norms. The movement for a reduction in hours of work was intimately tied to the movement both for secular education of the working class, as well as for religious education and observance of the Sabbath. The educational movement was taking shape at the same time that there were restrictions made on child labor. Religious leaders criticized manufacturers for working on Sundays and "lamented that long hours precluded any religious instruction" (Ward 1962, 19). There was also concern expressed about the "moral delinquency" and lascivious behavior of young men and women (Ward 1970b, 19). Such moralistic concerns have been analyzed by Reick (2015) as attempts to control female sexuality, and fear that the commodification of female labor would turn into the commodification of the female body. From the perspective in this paper, concerns over the moral degradation of young women can be interpreted as concern about reproduction of the working-class human capital in a way that is socially desirable for the capitalist class and state.¹⁸

Another consequence of overexploitation, from the perspective of the firm, was working class movements including the Ten Hours Movement, Chartism, and campaigns against the Poor Laws (Ward 1962). In the 1830s, "Short Time Committees" organized petitions, canvassed local officials, and orchestrated large-scale campaigns. The movement for shorter hours included workers, with the support of northern Anglican priests, doc-

worker's food, shelter, or other basic needs. This "freedom" comes with additional burdens for the worker, which is arguably agreeable to the employer (Engels [1845] 1968, 93). Without condoning slavery, Engels' point cuts to the issue at hand: that "free" workers in capitalism also must shoulder the responsibilities and associated risks of their own reproduction.

¹⁸The rise of public schooling had direct benefits for productivity and profitability. For an analysis based on the U.S. example, see Bowles and Gintis *Schooling in Capitalist America: Educational Reform and the Contradictions of Economic Life* (New York: Basic Books, 1976).

tors, and some merchants. Firms aggressively fought against workers' efforts for shorter hours. Workers who organized were often fired and blacklisted (Ward 1970b, 66).

The Ten Hours Movement, lead by workers as well as sympathetic manufacturer-politicians such as Richard Oaster and Lord Ashley, had hoped that limiting the hours of children would also limit the hours of adult work, as children were often employed as helpers for adult male workers. The Act of 1833 allowed children to be worked in two eight-hour shifts, enabling what came to be known as the "relay system." Workers and reformers met this with opposition and disappointment. However, because the 1833 Act allowed two shifts of child-workers, adults could still be expected to work a 16-hour day. Following the 1833 law, more women were hired because they were paid a lower wage than men, and could work longer hours than children, eventually making up the majority employed in textile industry (Hutchins and Harrison 1903, 83). At this point, reformers demanded restriction on when manufacturers could use their machinery in an attempt to shorten the working day for all workers.

By 1841, the popular movement conceded that a restriction on the hours of machine use was not "within the sphere of practical politics." Deciding this, from 1841-1847, the struggle over the length of the working day focused on restricting the hours of women's work (Hutchins and Harrison 1903, 65). This was because restricting hours of adult men's labor, or legislating when to use machinery, contradicted the principles of free market liberalism. Efforts to restrict female labor were more politically palatable as paternalist attitudes towards women prevailed at a time when restricting male labor or capital inputs was a non-starter. Male unions were concerned that women workers were displacing adult males in the factory. Rose (1988) argues that male union leaders, motivated by "class conflict and gender antagonism," pushed to exclude working-class women from the labor market so as to restore a male breadwinner-female caregiver sexual division of labor (207).

The Factory Act of 1844 was the first law to limit the working hours of women, which gave them the same treatment as "young persons" aged 13 to 18. Women were considered "less free agents" than men, in the same sense as children and adolescents, and also physically weaker so therefore not capable of working long hours (Hutchins and Harrison 1903, 84). These concerns played a role in the organizing of union efforts to curtail female labor by shortening their legal hours. Arguments in the 1840s and 1850s to restrict women's labor even went so far as to try to restrict all women in factories and return them to the home (Hutchins and Harrison 1903, 65). However, according to some interpretations, women were the "stalking-horse" for the attempt to limit all labor, including men's (Cooke Taylor 1894, 107). From 1844 to 1878, including the "Ten Hours Bill" of 1847, women were regulated the same as "young persons" or adolescent workers.

3.4 Capitalist Obstruction and the Expansion of Regulation

Although the degradation of the working class could threaten productivity, reduce the supply of available labor, put upward pressure on wages, legitimize strikes and worker organizing, and lower the moral standing of industrialists in society, firms did not easily accept regulation of the length of the workday. In fact, the history of the Factory Acts demonstrates that although overexploitation could harm capitalist class interests, the individual incentives of firms to continue to work long hours, made them oppose, obstruct, or ignore new legislation. Competitive pressures faced by firms can help explain the development of factory legislation.

Compliance and enforcement of the laws can also help us understand the role of competition between different classes of manufacturers. The Factory Act of 1831 was generally followed by larger factories in the “great towns” that agreed among each other that due to the social and industrial unrest, compliance was in their interest. In this case, we observe that compliance with the reforms of 1831 represented strategic complementarity for a certain sub-class of large, urban factories. For these manufacturers, the laws were not difficult to follow, as the laws often legislated what had already become common practice for large factories. However, small factory owners in the countryside were much less likely to comply with the law (Engels [1845] 1968, 192; Nardinelli 1985, 430). According to some interpretations, such as Marvel (1977), the Factory Act of 1833 benefitted large mill-owners, who were also responsible for enforcing the acts. The judges who ruled on labor violations tended to be the owners of large mills who were able to comply with the new laws without suffering a reduction in production or competitiveness (Nardinelli 1985, 429-430). On the other hand, small manufacturers were less able to absorb any losses resulting from the shortened working day. For this reason, the owners of small mills in remote areas were more likely to violate the laws and be fined.¹⁹ In other words, “The magistrates were therefore not convicting themselves or their peers; they were convicting their smaller, less scrupulous, competitors” (Nardinelli 1985, 429). The history of prosecution of non-compliance can be interpreted as using the enforcement mechanism to advantage larger, more politically powerful firms over the smaller, politically weak firms.

How firms, political economists, and the early business lobby argued against the Factory Acts politically can give us insight into why, from their perspective, overexploitation was necessary or desirable. Firms generally argued their case against the Factory Acts by appealing to economic arguments. Manufacturers argued that limiting hours would reduce wages, impoverish parents, raise prices, reduce exports, create unemployment,

¹⁹While the average fines for violating the labor legislation were not especially high, magistrates could fine the same factory multiple times for a given violation. This made it possible for very steep economic penalties to be imposed on the smallest manufacturers. With a few exceptions, even a relatively large fine on a major textile manufacturer would not have represented a major cost. In fact, the total amount of fines collected over ten years of factory legislation was less than the average net annual income of a large textile manufacturer. In other words, even in the rare case that a large mill-owner was fined, the cost did not represent the same kind of economic burden as it may have for a smaller manufacturer (Nardinelli 1985, 429-430).

and harm business and international competitiveness (Ward 1962, 37).²⁰ In a 1832 letter to Sir Hobhouse, a manufacturer wrote that limiting child labor (at that time to those nine and older) would be an “invasion of the rights of the parent over the child” and increase poverty by causing the working class to have an “idle, unprofitable family” (Ward 1970b, 142). Another manufacturer, Robert Hyde Greg wrote in 1837, that restricting the hours of labor would not only destroy English competitive advantages but also “hand them over to the enemy” (Ward 1970b, 144). Classical political economists, in particular Nassau Senior’s 1837 “Letter on the Factory Acts,” gave the intellectual rationale behind manufacturers’ politics with the economic ideas of laissez-faire and free trade (Ward 1970b, 146). Senior’s essay argued that the net profit is derived from the last hour of employment, and that England’s competitive advantage could be threatened by foreign competition if hours were reduced.²¹

To strengthen their opposition to the factory legislation, firms organized one of the earliest historical examples of a business lobby. As discussed by Anderson and Tollison (1985), from 1838 to 1846 the Anti-Corn Law League was led by manufacturers and other businessmen to make the case for free trade and against labor legislation. At its time, the League was England’s most effective political organization, on behalf of its solid source of funding, distribution of free trade and anti-labor law propaganda, and large staff, which in 1843 employed over 800 people. Manufacturers supported overturning the Corn Laws as a way to lower the cost of domestic labor, as cheapening the cost of grain would allow firms to lower nominal wages while maintaining a given level of consumption. While the name of the organization implied a focus on the Corn Laws, a significant source of the organization’s funding came from cotton manufacturers which ensured that much of its political efforts were focused on curtailing factory legislation in the cotton industry and repealing taxes on raw cotton. The political coalition of cotton manufacturers and other capitalists interested in free trade and lowering the cost of labor made the Anti-Corn Law League more effective (Anderson and Tollison 1985, 198-210). The history of the Anti-Corn Law League demonstrates firm behavior in response to policies that affect production costs and profitability. As argued by Moudud (2014), firms are not “passive policy-takers” who will accept new legislation regulating the production process, but instead “play a very active role in molding, reshaping, or even blocking” policies that are “deemed antithetical to business interests” (4). The Anti-Corn Law League is a demonstration of how firms will organize coalitions among shared interests, especially towards reducing the cost of labor. It is also an example of how moneyed interests are not always the same, as the landlord class and agricultural producers were in favor of the Corn Laws that protected their profits by putting a duty on foreign grains and agricultural products.

Firms are necessarily driven by profits, but their specific preferences may change throughout the business cycle. While the Ten Hour Act was fervently debated and fought,

²⁰ According to Engels, “There is something in these arguments, but they merely prove that the industrial greatness of England rests simply upon the barbarous treatment of the workers,” (Engels [1845] 1968, 199).

²¹ Senior’s “last hour” argument is widely considered a fallacy in theoretical terms.

by the time it has passed in 1847, the textile industry was in the midst of the major economic crisis. At this time, manufacturing suffered, hours were cut, and most factories were not operating at full capacity utilization. The response of capitalists to the economic crisis of 1846-1877 supports the discussion in Moudud (2014) that in times of crisis, business attempts to capitalize on the crisis to “mold policies to their advantage” (Moudud 2014, 5). Due to a lack of work, workers had less negotiating power. Firms pressured workers with threats of being fired to sign petitions arguing for a repeal of the Ten Hours Act. Despite capitalists’ efforts to overturn the Ten Hours Act, it was fully implemented by May 21, 1848 (Hutchins and Harrison 1903, 99).

In addition to organizing opposition and capitalizing on the crisis, firms simply disregarded laws that they considered to be inconvenient for capitalist production or untenable to capital accumulation.²² Despite the implementation of the Ten Hours Act, factory inspectors reported that as early as 1847, manufacturers found ways to skirt the Ten Hours Act by employing the relay system which employed shifts of child workers, which was illegal, but difficult to prosecute (Hutchins and Harrison 1903, 100-103). Capitalists found more ways to limit workers’ time off, particularly in “pilfering” minutes of their breaks for meals or recreation (Marx [1867] 1990, 352). Lack of compliance with the laws highlights the unwillingness of capitalist firms to shorten the working day. In addition, Hutchins and Harrison (1903) discuss how lack of compliance and the relay system is why in the 1850s the “normal” working day was created. The Factory Acts of 1850 and 1853 established a normal working day for women, adolescents, and children by requiring that their work be completed between 6 am and 6 pm, with 1.5 hours for meals and breaks. While this was a 30-minute increase from the short-lived 10-hour day established in 1847, it essentially ended the relay system and night work. The establishment of a normal working day allowed for greater enforceability. It also meant that the maximum working day now de facto applied to men as well, as female and young labor were usually complements, rather than substitutes, for male labor (100-103).

From 1860 onwards, the factory legislation was spread to different industries, as well as to different scales of production. From 1860 to 1878, the Factory Acts were extended to other industries, both related to textiles such as bleach and dye, as well as unrelated such as pottery, paper, tobacco, and other products. The Factory Acts Extension Act of 1867 extended the existing laws to all factories employing more than 50 workers, and to specific industries regardless of size. The same year, the Workshops Regulation Act of 1867 extended existing worker protections to workshops that employed fewer than 50 workers in homes. The “generalization” or spread of labor legislation was accomplished in part because large-scale industry argued that smaller firms and other industries should have to comply with the same rules. The spread of policy is partially in response to firm behavior, as large-scale industry experiences competition from within and between sec-

²²This was evidenced first in the hiring of non-Poor Law apprentices in reaction to the Act of 1803, as well as the more advanced Factory Acts.

tors. Larger employers argued that it was unfair that smaller manufacturers in various industries were not subject to the same labor legislation. Indeed, in March 1855, after a meeting of manufacturers, their spokesman Mr. Grey said that either mill owners should not be subject to laws and inspection, or all manufacturers should be (Hutchins and Harrison 1903, 115). This is what Marx describes as, “the cry of the capitalists for equality in the conditions of competition” in which they demanded “equality of restraint on the exploitation of labour” (Marx [1867] 1990, 621).²³

By 1878, factory legislation was extended to apply to all trades and production sizes. The Factory Act of 1878 raised the minimum working age to 10, and legislated that children aged 10-14 could only be employed for half days. Women were only to work a maximum of 56 hours a week (Hutchins and Harrison 1903, 185).

4 The Solution to the Coordination Problem

The labor market contains a dual social coordination problem which encapsulates both the capitalists’ demand and the workers’ supply of labor. We have discussed evidence of overexploitation and its consequences, from the perspective of both labor and capital. For this reason, we can interpret the Factory Acts as a means to address both aspects to this dual social coordination problem.

Following the discussion in Bowles (2004), we can see that the essential difference between capitalist’s dilemma of labor demand, and workers’ assurance game in deciding how much labor to supply, rests upon the Nash equilibrium of the desirable and undesirable states. For the capitalists, overexploitation of workers is the only Nash equilibrium. This will require a permanent change to the “rules of the game” (such as minimum ages of work or maximum length of the workday) which will restructure the payoff matrix. For workers, both the desirable outcome (a family wage) and the undesirable outcome (overexploitation) are equilibrium points. In this case, “the challenge to governance is limited to the less challenging *how to get there* problem rather than also having to solve the more demanding *how to stay there* problem” (Bowles 2004, 44).²⁴ In the case of the English factory legislation, shorter hours, along with safety standards and other measures, addressed both the capitalist’s dilemma and also the workers’ assurance game. In both cases, the intervention that shortened the length of the workday aided the labor market towards achieving a Nash equilibrium that involved less household labor supply.

²³By April 1855 the “Factory Law Amendment Association” merged into the “National Association of Factory Occupiers” with the stated goal of preventing additional laws that restricted their production, although it was believed that their actual goal was to repeal the Factory Acts (Hutchins and Harrison 1903, 116).

²⁴However, the payoff matrix for workers can be restructured through various changes such as a deterioration of the family wage, social or economic conditions which encourage female employment (including 20th century feminist movements), and others. These changes could convert the workers’ assurance game to a prisoner’s dilemma, which complicates the policy response.

4.1 Effect on Productivity, Profitability, and Survival

Despite the initial resistance of firms, the Factory Acts did not decrease production, as they had feared and argued. Output and productivity increased during the 1830s and 1850s, when factory legislation made significant changes. From this data, it seems that the factory legislation did not undermine growth in the textile industry (Nardinelli 1985, 430). In fact, output per worker grew more substantially in the second half of the 19th century, once factory legislation had spread throughout the English manufacturing sector. While output per worker is estimated to have grown by 46 percent between 1780 and 1840, output per worker increased by 90 percent from 1840 and 1900 (Allen 2009, 419).

The fact that capitalists were able to increase labor productivity under the Factory Act has important implications for capital accumulation. According to one industrialist, “we produce more in the same time” (quoted in Marx [1867] 1990, 606). The increase in productivity might be attributed to a more rested and healthy workforce resulting from a shortened working day. If this were the case, then shortening the workday would not decrease profitability and would have no adverse effect on capital accumulation or the level of employment (Booth 1978, 153).²⁵

Another possible interpretation for why productivity did not decrease after the shortened workday is that manufacturers found ways to increase the intensity of work by employing more machinery. According to some accounts, the factory legislation encouraged mechanization and capitalist accumulation. This interpretation is based on the claim that the Factory Acts required industrialists to invest in more machinery in order to keep up productivity. In other words, once legal limits were established on the labor of women and children, more machinery was employed to increase productivity during the shorter working day (Marx [1867] 1990, 604-605). If this is accurate, then we can interpret the Factory Acts as both a consequence and a cause of greater mechanization and a higher capital/labor ratio.

The effect of the factory legislation on working-class survival is difficult to parse out, as there were a number of factors, overwork along with low wages, overcrowding, poor diets and sanitation, that affected workers’ health and mortality. However, the period following the factory legislation did experience an increase in life expectancy and populations in England’s cities, see Tables 8 and 9. While the life expectancy of textile towns such as Manchester continued to be below the national average, they did show improvement during the course of the 19th century (Szreter and Mooney 1998, 88-93). Likewise, the growing population of England, while not only attributable to the factory legislation, can certainly be considered one improvement in industrial living standards from the point of view of both the capitalist and working class.

²⁵If wages were already at the minimum level of subsistence, then a decrease in labor hours could not decrease the wage (Booth 1978, 153).

Table 8: Expectation of Life at Birth in England's Largest Cities

City	1801-1850*	1851-1860	1861-1870	1871-1880	1881-1890
Bristol	29	39	40	42	46
Sheffield	-	36	35	37	40
Newcastle/Gateshead	-	35	35	38	41
Leeds	-	36	35	38	40
Bradford	-	37	36	38	42
Birmingham	-	37	37	39	42
Manchester	25.3	32	31	34	37
Liverpool	25.7	31	30	34	36
London	36.7	38	38	40	43
England & Wales	-	41	41	43	45

Source: Szreter and Mooney 1998, 88-93. * contemporary calculation

Table 9: Population of Administrative Cities (in Thousands)

City	1841*	1851-1860	1861-1871	1871-1881	1881-1891
Bristol	124	169	195	215	278
Sheffield	111	213	263	305	353
Newcastle/Gateshead	90 (b)	160	194	242	299
Leeds	152	233	284	339	399
Bradford	67	126	165	200	248
Birmingham	183	320	373	440	500
Manchester	235	345	346	423	525
Liverpool	286	469	523	592	601
London	1,875.5	3,029	3,535	4,014	4,389
England & Wales	-	21,389	24,343	27,488	30,648

Source: Szreter and Mooney 1998, 88-93.

*contemporary calculation, b Newcastle only

4.2 The Problem with the Solution: Intersection Between Class and Gender Struggle

The solution to the labor market's dual social coordination problem is not a remedy to *all* the problems within capitalist society. Our historical case study highlights that while a desirable economic equilibrium from the perspective of capital and labor may be found through the regulation of working hours, this does not guarantee that the solution will solve all of society's ills. Indeed, the solution to one social coordination problem will likely create new or exacerbate old social problems.

The history of English factory legislation demonstrates that the regulation of women's work is at the intersection between class and gender struggles. Two women economic historians, Hutchins and Harrison (1903) wrote at length about how in the late 19th century, political pushback against the Factory Acts came not only from manufacturers, but also from the movement for gender equality. By 1876 both "working women and philanthropic ladies" protested state regulation of any adult work, in particular women's (Hutchins and Harrison 1903, 189). At the same time, the women's unions were led by Mrs. Emma Patterson, who supported sanitary conditions and limitations on children's factory work, but believed that limiting women's hours would harm their ability to find gainful employment. Hutchins and Harrison (1903) argued that middle and upper-class women took issue with women factory workers being classified as "minors" due to their efforts to alter the perception of women as mentally or physically inferior to men, particularly in the workplace (183). Motivated by their own professional aspirations, middle and upper-class women regarded the employment of working-class women as important for achieving gender equality, "when it probably only meant that it was cheaper to employ women than men" (Hutchins and Harrison 1903, 184). The gender politics of sameness and difference created an alliance between proponents of women's rights and opponents of labor legislation during the 19th century. The relationship between women's empowerment and wage-labor was and still is contentious, with no clear solutions for critics of capitalism or patriarchy.

Feminist historians and social scientists continue to debate the meaning and effect of the regulation of female work in 19th century England. Rose (1991) argues that "the state contributed to the gendering of industrial capitalism, and to the social construction of gender difference" by institutionalizing the view that men, but not women, were capable of negotiating labor contracts as free agents (46). Similarly, Reick (2015) argues that regulations on female labor, rather than serving as an "opening wedge" for all workers, had an "underlying discriminatory agenda" based on an "essentializing logic of reproductive duty, moral vulnerability, and economic marginality" (22). Valverde (1988) argues that the Shorter Hours Campaign "designated women workers as a threat to male unionized jobs" and "contributed to the development of an ideal of working-class domesticity" (629). These critical accounts of the effect of the factory legislation can be read through the lens of Fraser (2013) who discusses the "feminist ambivalence" towards social protection

that reinforces gender oppression, sexual hierarchy, and therefore undermines women's emancipation. As noted by Foley (1986), undoing paternalistic "protection" of women's labor is double-edged, as it allows women to enter the labor market without additional restrictions, but also expands the total labor time that they provide (53).

This paper has argued that factory legislation can be understood as a solution to the social coordination problem of overexploitation, not gender equality or women's liberation.²⁶ The economic meaning of regulating women's work, from the standpoint of this paper, is tied to understanding that unwaged domestic work represents an externality of the wage-labor bargain. This does not invalidate the critiques of feminists, both historical and contemporary, but it does offer an explanation of why social policy may ease one societal problem while worsening another. While the family wage may be the desired equilibrium from the point of view of working-class households in terms of their income and labor supply, it still does not actually pay the true cost of a nonworking partner's labor. Instead, it allows a family to forgo the potential labor income that the caregiver could earn (which depending on the labor market structure may be low) and still meet their subsistence needs (which are realized through unwaged labor). Fundamentally, within the family wage bargain, the caregiver only has access to money through the breadwinner's wages. Strictly applied, the "socially desirable" equilibrium therefore necessitates heterosexual marriage for women's material survival, putting them at risk of severe economic, social, and political vulnerabilities. It also constricts women's aspirations and influence outside the home. From both social and economic standpoints, there are great costs to a system which curtails half of the population's potential.

It is certainly not necessary that social reproduction be the sole purview of women. The existence of the externality of unpaid, domestic work need not be interpreted as a rationale for institutionalizing a traditional, patriarchal sexual division of labor. Contemporary policy solutions (such as universally applied maximum hours of work and paternity leave available to either parent) offer another approach to solving the dual social coordination problem over time, that depending on other factors, could help institutionalize a more equitable division of household and care-taking responsibilities. However, women's role in social reproduction is not arbitrary, but rather the result of *both* socially constructed gender norms and biological sex. Crucial biological aspects of social reproduction such as the gestation of new human life cannot, as yet, be outsourced to men. For this reason, even the most enlightened social policy formation will have to address women's difference with regards to their biological role in the reproduction of the working-class, whether they are to be included or excluded from the formal labor market.

²⁶This paper also does not claim that the problems of sexism or gender inequality could be appropriately formalized using this same framework.

5 Conclusion

In opposition to mainstream economic theory, this paper has argued that the labor market is inherently incapable of self-regulation, as profit-driven firms, under competitive pressures, will attempt to use labor to the point that it threatens social reproduction. As the true cost of social reproduction is not reflected in the wage, firms are unaware of the effect of activating female and child labor until a social reproduction crisis is eminent. Because of capitalist competition, business needs to be legislated, for the survival both of the capitalist and working classes.

While social and labor policy are often under the guise of helping workers, the state must make these policies on behalf of the best interest of the capitalist class in the long-term, but not necessarily the short-term. From this vantage point, we can think of the state as the parent who must enforce an early bedtime for a small child. The child may throw a tantrum in the short-term, as the business lobby is liable to do when there are policies that shorten the working day or otherwise threaten to reduce surplus labor extraction. Just as a child's best interest have been served by the parent, the relationship between the state and the capitalist class can be thought of as "business paternalism." It is necessary so that firms do not over-exploit labor and cause a social reproduction crisis that could affect capital accumulation.

In the case of 19th century industrial England, factory legislation was used to limit how much labor workers are willing to supply. This tells a very different side of the story than the focus of contemporary social policy which assumes that it is necessary to "activate" workers.

The state must mitigate the class conflict over the length of the working day by finding different regimes that solve the capital accumulation - social reproduction problem. The length of the working day must strike a particular balance between the needs of social reproduction and capital accumulation in order to ensure that the excessive demand for workers' time does not extinguish the labor supply.

This analysis of the political economy of social and labor policy offers an alternative to both mainstream and heterodox theories as it offers an endogenous view of social policy. By conceptualizing protective policy as the solution to a dual social coordination problem caused by conflicting interests among heterogeneous firms and workers, this paper extends the Polanyian framework with an explicit theory of exploitation based on the classical theory of competition and the feminist emphasis on social reproduction and unwaged labor.

This paper has discussed the struggle over time in the context of industrial England, but the struggle over the length of the working day continues in the post-industrial world. Since the 1970s, female labor force participation has increased throughout the advanced capitalist world, which has repeated many of the patterns we observed in 19th century England including wage suppression and social reproduction difficulties. At the time of writing, the conflict over time has reached new political heights. Both major political par-

ties in the United States made accommodating women workers a cornerstone of domestic policy promises in the 2016 presidential race. Paid sick and family leave, overtime pay, and boundaries over what contemporary people call “work-life balance” have become important political and economic issues. Social reproduction crises are on the verge in a number of advanced industrialized countries, with record low fertility in countries like Italy, Greece, and Japan, rapidly aging populations, and chronically stressed family life. The larger aim of this paper is to create a framework for analyzing other struggles in the regulation of time and labor policy, such as the example of post-industrial U.S. society.

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