How Green Was My Valley? Coercive Contract Enforcement in 19th Century Industrial Britain

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Abstract

Under British Master and Servant law, employee breach of contract was a criminal offense between 1351 and 1875, punishable by fines and imprisonment. We examine the economic motivation behind employees' breach of contract, and its prosecution by employers in 19th century Britain. We develop a model of risk-sharing between employers and employees that generates equilibrium contract breach and criminal prosecutions. Then, using data on Master and Servant prosecutions, we exploit exogenous changes in output prices to test predictions about the effects of labor demand shocks on contract breach and its prosecution. Positive labor demand shocks in the textile, iron, and coal industries were strongly associated with prosecution for breach of contract. When criminal prosecution for breach of contract was abolished in 1875, wages increased more in counties that had experienced high levels of prosecutions pre-1875, and the wage response to labor demand shocks increased significantly, consistent with our model's predictions. Our results suggest that a) coercive contract enforcement was actively applied, even in Britain's industrial, urban sectors; b) legal restrictions on labor mobility allowed workers to commit to employers, allowing for risk-sharing contracts that resulted in wages that were lower, but less responsive to transitory fluctuations, relative to spot labor markets; and, c) transitory shocks to labor demand increased prosecutions for contract breach, which served as a substitute for raising wages to retain labor.
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1 Introduction

Master and Servant acts regulated the employment relationship under English common law for 500 years. Eventually transplanted throughout the Empire, the laws of Master and Servant affected employers and employees around the world.[1] Until 1875, when it was repealed, Master and Servant law gave employers the ability to criminally (as opposed to civilly) prosecute and severely punish workers for breach of contract in Great Britain.[2]

Guided by a model of contractual risk-sharing with limited commitment, which generates equilibrium contract breach and criminal prosecutions, this paper examines the economic causes and consequences of criminal prosecutions under Master and Servant law in 19th century, industrial Britain. We use a panel dataset on criminal prosecutions of workers in English and Welsh districts, and exogenous, sector-specific labor demand shocks, to estimate the response of prosecutions for breach of contract to changing labor demand.[3] We find that criminal prosecution of workers, rather than being a vestige of medieval common law, was prevalent and responded positively to transitory labor demand shocks even in leading industrial sectors of 19th century Britain. In addition, we examine the effect of the repeal of criminal prosecutions in 1875. We find that wages in counties with high levels of prosecutions rose faster after repeal than wages in other counties, and that wages were more responsive to labor demand shocks following repeal, consistent with a shift away from long-term, risk-sharing contracts after penal sanctions were abolished.

A large literature has found that the legal institutions underlying a labor market are associated with the responses of employers and employees to labor market shocks (e.g., Botero et al., 2004). In contemporary common-law labor markets, employment is "at will," as contracts can be exited by employer or employee without criminal sanctions.[4] In this context it is natural to expect prices and quantities to adjust quickly to changes in underlying fundamentals (e.g., Blanchard and Katz, 1992). However, in this paper we demonstrate, both theoretically and empirically, that when

[1] See, for example, La Porta et al. (1998) for a discussion of the transplanting of common law, and its economic consequences, and Botero et al. (2004) for a discussion of its legacy for labor market regulation.

[2] Our empirical analysis below will be limited to England and Wales; though Scotland is not part of our analysis, we will use the term "Britain" throughout.

[3] The districts are more disaggregated than British counties. For example, in the county of Oxfordshire, our dataset includes prosecutions in Banbury Borough, the city of Oxford, and the remainder of the county of Oxford.

[4] There are, however, financial consequences of early termination of labor contracts for both parties. Non-compete clauses in contracts, direct descendants of the Master and Servant laws that we study, prevent employees from moving to competitor firms (see Marx et al., 2007). Marinescu (2008a, 2008b) discusses "unfair dismissal" regulations, which can impose costs on employers for (unfair) early termination of contracts.

contract breach is penalized with criminal sanctions, labor demand shocks need not be reflected in wages paid. Instead, employers can respond to potential contract breach by threatening to criminally prosecute employees, rather than renegotiating wages, as they do in models of implicit contracting in the absence of employee commitment (e.g., Harris and Holmstrom, 1982, and Beaudry and DiNardo, 1991).

Economic historians and students of economic development have long studied legal restrictions on labor mobility.[5] Owing to the historical ubiquity of forced labor in agriculture, the overwhelming focus of the literature has been agricultural (see Bobonis, 2008, Naidu, 2008, and Alston et al., 2009 for recent empirical examples).[6] The case of American slavery (and its aftermath) has received extensive study among economic historians, who have documented the extraction of work effort under the slave system, and attempts to preserve cheap labor under the institutions that replaced it.[7] Serfdom in Europe, which legally restricted labor mobility, has also been studied extensively.[8] Development economists have also studied institutions of tied labor, again in agrarian settings.[9] However, the use of legal restrictions on labor mobility in modern, industrial labor markets has not received much scholarly attention, and no quantitative economic history of their use exists.

Perhaps a reason for this gap in the literature is the common belief that free, unconstrained labor markets are prerequisites for industrial development (e.g., Brenner, 1986). However, studies by Steinfeld (1991, 2001), Steinberg (2003), and Hay and Craven (2004) argue that labor market "coercion" – the criminal prosecution of workers for breach of contract, with punishments including imprisonment, forced labor, whipping and orders of specific performance – was commonplace in Victorian Britain. Note that what is meant here by coercion is *ex post* coercion of an employee to remain in a contract, not *ex ante* coercion to enter service. This sort of coercion can be welfare-improving for both employers and employees, as it allows employees to commit to long-term contracts, which may be highly valued. Indeed, Clark (1994) argues that another form of *ex post* coercion, the discipline of workers in factory settings, was productive, and that workers voluntarily

[5] Recent work on the legally-sanctioned use of coercion in labor markets includes Dell (2009) and Acemoglu and Wolitzky (2009).

[6] An exception is the work of Goldin (1976), who studies urban slavery in the American South.

[7] See, for example, Fogel and Engerman (1974), Irwin (1994), Engerman (2000), Ransom and Sutch (1977), Wright (1986, 2006), and Acemoglu and Robinson (2008).

[8] For example, Brenner (1976), Blum (1978), Domar and Machina (1984), Kolchin (1987), and Acemoglu et al. (2009).

[9] For example, Bardhan (1983), Sadoulet (1992), and Mukherjee and Ray (1995).

entered factory jobs because they were well-compensated for the disamenities of factory work.[10]

Coercive contract enforcement in Britain was codified under Master and Servant law, "a complex of legislation and related case law that defined the terms of the individual contract of employment for many hundreds of years, and was distinguished by the use of *penal sanctions, notably imprisonment*, for breach by the servant (but not the master)."[11] Though they had ancient roots, our analysis suggests that coercive restrictions on labor were often applied in 19th century Britain. In Figure 1, we plot the number of prosecutions under Master and Servant law, by year, over the period 1858-1875 for all of Britain.[12] The numbers are substantial, with over 10,000 per year, and the prosecutions show no tendency to decline over time.[13] In Figure 2, we present a map of the distribution of the average prosecutions under Master and Servant law per 1,000 people, per year, across counties, revealing that the use of criminal prosecutions to enforce contracts and ensure labor supply was common across Victorian Britain, though especially prevalent in the industrializing North, and in coal-rich South Wales.[14] Historical evidence of the importance of criminal prosecutions under Master and Servant law can be seen in the attention paid to them by Parliament: Parliamentary Commissions issued reports on Master and Servant law in 1865, 1866, 1874, and 1875.[15]

Steinfeld (2001) argues that employers prosecuted workers more often in response to positive economic shocks and tight labor markets. Following Steinfeld (2001, p. 77), we examine the time series relationship between the average number of Master and Servant prosecutions per capita in British counties and the national unemployment rate. We plot these two series in Figure 3, and the results are quite suggestive: prosecutions and the unemployment rate move in opposite directions throughout the period for which we have data.

[10]The reasons for the organization of labor in the factory system are examined in Marglin (1974) and Landes (1986).

[11]Hay and Craven (1993, p. 175), emphasis added.

[12]Statistics come from *Judicial Statistics, England and Wales*.

[13]Including anti-vagrancy and anti-begging prosecutions, which were also summarily decided criminal cases related to the labor market, pushes the number to over 20,000. To place these prosecution figures into context, Master and Servant prosecutions in 1875 were more common than prosecutions for petty larceny: *Judicial Statistics, England and Wales* reports 14,353 Master and Servant cases and 11,986 cases of larceny of less than 5 shillings.

[14]We use county-level data here because population data from the UK censuses are only available at the county level. The averages are over the period 1858-1875.

[15]That the law of Master and Servant fundamentally shaped relationships within firms was seen by Coase (1937, p. 403), who wrote, "We can best approach the question of what constitutes a firm in practice by considering the legal relationship normally called that of 'master and servant.'" Within the firm, employees obeyed orders within the bounds of their contracts; this was enforced in the 19th century by criminal prosecution under Master and Servant law.

Our theoretical analysis of contracting in the shadow of Master and Servant law and our empirical tests will more rigorously examine the relationship between economic conditions and prosecutions. The model and empirical results we present below suggest that Master and Servant law allowed workers to insure themselves against labor market risk, by allowing them to credibly commit to stay with an employer despite a higher outside wage; when employees did breach their contracts in hopes of higher wages, employers used prosecution to retain labor. The elimination of penal sanctions for breach of contract in 1875 was associated with shorter contracts and higher, but more volatile, wages.

In what follows, we discuss labor law in Victorian Britain in Section 2. We present a model of contracting, contract breach, and prosecution in Section 3. In Section 4, we estimate an empirical model that is motivated by the theory, focusing on the economic determinants of contract breach and prosecution under Master and Servant law. In Section 5, we examine the economic outcomes associated with the elimination of penal sanctions for breach of labor market contracts in 1875. In Section 6, we summarize our findings and conclude.

2 Master and Servant Law in Victorian Britain

Labor market coercion in Britain (both *ex ante* and *ex post*) was first codified in the 1351 Statute of Laborers, following the demographic shock of the Black Death in 1348.[16] Yet Victorian labor law was not merely carried-forward ancient law: between the enactment of the Statute of Laborers and the abolition of penal sanctions in 1875, criminal prosecution of British workers for breaching their contracts had been reaffirmed many times over, and was even extended to cover new categories of employees. The thousands of Master and Servant prosecutions, fines, and imprisonments each year in the 1860s and early 1870s were the product of 19th century laws that were explicitly designed

[16]For histories of British labor law, and the Master and Servant laws in particular, see Steinfeld (2001) and Hay (2004). Contemporary discussions of Master and Servant law include Macdonald (1868) and Holdsworth (1873). Note that throughout the work, we use the term "Master and Servant law" to describe the set of labor laws, legislation, and common law rulings that governed the contractual relationship between employers and employees. Note, too, that Master and Servant laws imposed responsibilities on employers as well as employees; however, these responsibilities – and especially punishment for failure to fulfill them – were not symmetric. Most notably, an employer's breach of contract was treated as a civil offense, while an employee's breach was criminal. We follow existing literature on implicit contracts in focusing on employees' decisions to breach contracts (employers' breach is usually assumed not to occur, often due to a need to maintain their reputations). While it is surely the case that employers breached their contracts, there is historical evidence that they adhered to their obligations under Master and Servant law. For example, rather than lay off workers in downturns, colliery owners allowed "short time working," which provided some insurance against labor market risk. See Church (1986), p. 598.

to enforce labor contracts in growing industries.

2.1 Enactment of Master and Servant Law

The early labor market regulations (the Statute of Laborers and the 16th century Statute of Artificers) most clearly applied to agricultural workers.[17] The development of the industrial economy necessitated a clarification of the legal relationship between employer and employee in new sectors of the economy. Uncertainty regarding the scope of the early labor laws resulted in a series of enactments that extended the penal enforcement of labor contracts (see Table 1 for the timing of important labor law enactments in Britain).[18]

The 19th century saw continued labor law legislation. Most notably, the 1823 Master and Servant Act used "broad language that could be read to cover the overwhelming majority of manual wage workers," and allowed British employers to "have their workmen sent to the house of correction and held at hard labor for up to three months for breaches of their labor agreements."[19] Because of its broad scope and harsh consequences, the 1823 Act was an effective and widely used means of punishment for breach of labor contracts.

Still, in 1844, an attempt was made to further extend (and clarify) the 1823 Master and Servant Act.[20] The proposed reform would have made workers paid by the piece subject to the Master and Servant Act, regardless of their trade. Organized labor moved strongly against the proposed reform; Frank (2004) writes that dozens of workers' meetings were held, and petitions were presented to Parliament against the reform bill, which failed to pass.

Another attempt at revising Master and Servant law was made in 1867; this time, it was successful.[21] The 1867 reform had an ambiguous effect on the severity of punishment for breach of contract. On the one hand, the reform removed some the coercive teeth from the 1823 Act: it made fines the standard punishment for breach of contract, moving labor contract breach toward

[17]The Statute of Laborers is 25 Edw. III st. 2; the Statute of Artificers is 5 Eliz. c. 4.

[18]Master and Servant laws were specifically extended to cover journeymen tailors in 1720, journeymen shoemakers in 1722, woolcombers and weavers in 1725, individuals in the leather trades in 1740, and to a broad range of workers in 1747 (artificers, handicraftsmen, miners, colliers, keelmen, pitmen, glassmen, potters, and others). See Steinfeld (2001, p. 42, n. 14).

[19]Steinfeld (2001), pp. 47-48. Hard labor included work at the treadmill and the crank; whipping was also occasionally used as a punishment. The 1823 Master and Servant Act is 4 Geo. IV c. 34.

[20]The ambiguity in the 1823 Act surrounded its coverage of trades not explicitly mentioned, as well as workers paid by the piece.

[21]Known as Lord Elcho's Act, the 1867 Master and Servant Act is 30 and 31 Vict. c. 141.

civil procedure, and away from criminal. On the other hand, the 1867 law allowed for an order of specific performance of a contract's terms – a magistrate could simply order an employee to go back to work.[22] Moreover, for employees who could not pay their fines, imprisonment was the penalty; severe, coercive sanctions remained a potential consequence of breach of contract by the employee.

2.2 Enforcement of Master and Servant Law

In Victorian times, until 1875, the 1823 Master and Servant Act (and its revision in 1867) governed the relationship between employers and employees who were bound by a legal contract.[23] Steinfeld (2001, p. 50) describes the legal procedure through which workers were prosecuted: "A typical case would begin with an employer filing a complaint against a worker. The worker would be arrested . . . and brought before a justice of the peace. There, a settlement would be arranged. The justice would threaten the worker with penal confinement if he refused to return to his employer, and the worker would usually agree to go back." The goal of a prosecution, then, was to use the threat of incarceration and hard labor to prevent workers from leaving an employer (or shirking), and to punish those who were not deterred.

The threat of Master and Servant prosecution was credible; not only were prosecutions common (see Figure 1), but they were also largely successful: Hay (2004, Table 2.1) provides evidence on the success rate of masters' prosecutions after 1800 from seven different sources; in three of them, masters won all of the cases they brought, and no source shows masters winning less than 70% of their cases.[24]

Frank (2004, p. 418) suggests that the proceedings were far from impartial: "The *Potters' Examiner*," he writes, "objected that 'The powers of the manufacturers will become omnipotent, as the magisterial benches are nearly wholly filled by themselves.'"[25] Steinberg (2003, p. 458) writes that "by the mid-Victorian period the backbone of the judicial system for most workers

[22]This is in contrast with modern law in the United States, where an order for the specific performance of a labor contract is generally viewed as a form of involuntary servitude, and thus a violation of the thirteenth amendment to the U.S. Constitution. See Oman (2009) for a discussion.

[23]The requirements for a binding contract in this period are discussed in Holdsworth (1873); they were not particularly stringent, for example, a contract for service of greater than one year was required to be in writing. Contracts varied in length from two weeks, to one month, to one year, or more. Systematic data on contract length across industries and time would be extremely valuable, though we have not yet found any.

[24]Bringing a prosecution for breach of contract was also relatively inexpensive, requiring just one appearance before a magistrate by the employer and fees of at most 40 shillings. See Macdonald (1868) and Holdsworth (1873).

[25]The quote comes from an article published April 6, 1844.

were the borough magistrates. Unlike the county JPs [justices of the peace], borough court justices were typically from the industrial, commercial, and professional town elite. Workers and their sympathizers frequently bemoaned the elite stranglehold on the law that this created." The *Potters' Examiner*, on June 8, 1872, wrote that "justice is represented to be blind, but when attempted to be administered by employers of labour, it generally has its eyes open, though it does not see straight, but looks obliquely, on the side of capital."[26] Clearly, workers did not view the enforcement of Master and Servant law as the impartial application of a law defining reciprocal obligations between employers and employees. But others shared this view: Lord Elcho's Parliamentary Commission on Master and Servant (in 1866) acknowledged inequality in Master and Servant proceedings, especially in mining.[27]

Prosecution under the Master and Servant Act in Victorian Britain occurred in a wide range of industries, including those most closely associated with the Industrial Revolution. Testimony before Lord Elcho's Commission (1866) often focused on mining, iron production, and manufacturing, and it points to the role that labor market conditions played in the employee's decision to breach a contract and the employer's decision to prosecute.[28] For example, one witness, William Evans, was asked, "[T]o what do you attribute the increase [in Master and Servant prosecutions in the pottery industry]?" He replied, "I attribute the increase to the present prosperous state of trade; the manufacturers bind the men to those annual agreements, and they take every little breach of contract, or even neglect of work, before the magistrates, and punish the men for those breaches of contract."[29] He later describes the outcome of a specific case: "[A worker] wanted to change his employer, but could not do so. The paucity of hands has increased the value of labor, and the workmen can get in many instances more advantageous terms by leaving their present employ, but those [yearly] contracts [in pottery] prevent their leaving."[30]

Historians, too, have discussed the application of penal contract enforcement in modern industry. Frank (2004) writes, "The penal clauses of master and servant law were a particular grievance for miners in Northumberland and Durham, where mine owners used it to support their system of

[26] Cited in Steinberg (2003, p. 470).

[27] Macdonald (1868), p. 184; *Report of the Select Committee on Master and Servant*, (1866).

[28] *Report of the Select Committee on Master and Servant* (1866). Witnesses before the Commission included Thomas Emerson Forster, Esq., President of the North of England Institute of Mining Engineers, Mr. John W. Ormiston, manager of an iron company, and Charles Williams, Secretary to the United Trades Committee, among others.

[29] *Report of the Select Committee on Master and Servant* (1866), p. 60.

[30] *Report of the Select Committee on Master and Servant* (1866), p. 61.

labor contracting and labor discipline. . . . [Breach of contract] meant being hauled before a magistrate, whose interests were often not far removed from the coal trade." Both Steinberg (2003, p. 475) and Steinfeld (2001, p. 67) cite cases involving prosecution of iron workers, and these cases are discussed by witnesses before Lord Elcho's Commission as well.[31] Michael Huberman describes textile mills using Master and Servant prosecutions to retain labor and elicit greater worker effort, writing, "[The Horrockses Mill] regularly prosecuted operatives for quitting work without notice, for absenteeism, and for other acts of indiscipline . . . and many of the leading mills [in Preston] shared its labor market strategy."[32]

Finally, it is important to note that examination of cases reveals that the Master and Servant law's penal provisions were actually enforced by British judges in Victorian times.[33] For instance, in the case of *Unwin and others versus Clarke* (1 QB 417, April 28, 1866), the court decided that imprisonment for breach of contract did not terminate the contract, and that further imprisonment was available as a punishment if a worker did not return to his master's employment. Essentially, the worker was required to serve out his contract, or he would be sent repeatedly to prison.[34] In *Cutler versus Turner and another* (9 QB 502, June 3, 1874), the court made it clear that even after the 1867 reform, indeed, up to the repeal of penal sanctions for breach of labor contracts, imprisonment was seen and used as a legitimate punishment of employees who breached their contracts.[35]

[31] *Report of the Select Committee on Master and Servant* (1866), testimony of Mr. John W. Ormiston.

[32] Huberman (1996), p. 53.

[33] In general, information on Master and Servant cases is not available, as such cases were decided summarily by local magistrates. Information is available on cases that were appealed to higher courts, and here we draw on this limited sample.

[34] The case summary states, "A workman entered into a contract with a master to serve him for the term of two years; he absented himself during the continuance of the contract from his master's service, and under 4 Geo. 4, c. 34, s. 3, he was summoned before justices, convicted, and committed [to prison]. After the imprisonment had expired, and while the term still continued, he refused to return to his master's service, and was again summoned before justices, when he stated that he considered his contract determined by the commitment [that is, he believed his contract was terminated due to his having served time in prison]; the justices found that he bona fide believed that he could not be compelled to return to his employment, and dismissed the summons. Held, that although the servant had not returned to the service, yet, as the contract continued, he had been guilty of a fresh offence, for which, notwithstanding his conviction and imprisonment, he could be again convicted; and that his bona fide belief that he could not be compelled to return to his employment did not constitute a lawful excuse for his absence."

[35] The case summary states "The appellant, in 1871, agreed to serve the respondents as a fire-iron forger for five years. On the 1st of April, 1873, he was summoned under the Master and Servant Act, 1867 (30 & 31 Vict. c. 141), for absenting himself from the respondents' service, and was, on the 13th of May, ordered to pay £11 8s. to them as compensation for the breach of contract, which sum was paid. Not having returned to his employment, the appellant was again summoned and, on the 7th of July, ordered to fulfill his contract and to give security for its fulfillment, and in default to be imprisoned for a term not exceeding three months. The appellant did not comply with the order and underwent three months imprisonment. On his liberation he continued to absent himself, and was again summoned for absenting himself from the respondents' service, and ordered, on the 18th of November, to pay £11 14s. to them

The continued enforcement of coercive labor laws by employers was recognized at the time: though Karl Marx strongly associated capitalist development with free labor markets, he himself wrote that, "The provisions of the labor statutes as to contracts between master and workman . . . [which] permit a criminal action against the contract-breaking workman, are to this hour (1873) in full force."[36] Indeed, we observe the greatest number of criminal prosecutions under Master and Servant law in the final five years they were available to employers (see Figure 1). We now discuss why criminal sanctions were repealed in 1875, near the peak of their application.

2.3 The Legalization of Unions and the Repeal of Criminal Sanctions for Breach of Labor Contracts, 1875

In our theoretical work below, we model Master and Servant law as a mechanism that allowed employees to commit to long-term contracts, which in turn allowed for risk sharing between employers and employees.[37] Thus, our focus is on the voluntary entry into contracts that could be coercively enforced. Indeed, it is clear that in some circumstances, workers demanded long-term contracts, despite their penal enforcement. Church (1986, pp. 260-261) writes of a labor dispute in 1844 in which "the coalowners substituted a monthly contract for the annual bond, to which the miners reacted by proposing a bond of six-months' duration," preferring the greater wage security of a long-term contract.[38] In testimony before Lord Elcho's Parliamentary Commission, Mr. John W. Ormiston reported that when short-term contracts were introduced at an iron works, "men did not like it at all, they did not like to be liable to be turned away at any time."[39] The testimony of Thomas Emerson Forster, before the same committee, stated that employees would not like a system of "minute contracts" (essentially employment at will), because employees "would require greater security for the maintenance of their employment."[40] Long-term contracts insured workers against labor market fluctuations, and strong mechanisms for contract enforcement allowed workers

as compensation. Held, that, upon the true construction of s. 9 of the Act, the orders of the 13th of May and the 7th of July did not annul the contract of service, and were no bar to the subsequent summons and order of the 18th of November; and that that order was rightly made."

[36] Marx (1972).

[37] We do not deny that Master and Servant law served functions other than this one, but they are not our focus here.

[38] Church (1986, p. 261) also describes "[T]he restoration of annual binding in Durham – at the miners' request – during the boom of 1854."

[39] *Report of the Select Committee on Master and Servant* (1866), p. 94.

[40] *Report of the Select Committee on Master and Servant* (1866), p. 68.

to credibly commit to stay with an employer even when labor markets were tight.

But this begs the question: what made these contracts less desirable in the second half of the 19th century, which led employees to push for the repeal of penal sanctions? Additionally, one must ask, why was an effort made to *repeal* penal sanctions, when (in our model, at least) a voluntary decision not to engage in long-term contracting would have vitiated penal sanctions even had they been legal?

The answer lies in the growth of a powerful trade union movement throughout the 1800s, together with the legal devices used by employers to regulate it. The 19th century common law regarding "combinations" (in this case, applied to trade unions) and strikes was often ambiguous: both existed throughout the 19th century, though both were at times harshly treated by the legal authorities.[41] Certainly, unions were never secure, and strikers were threatened with criminal punishment, prior to the unambiguous legalization of unions in the Trade Union Act of 1871.[42] However, despite establishing unions' legality, the 1871 Act was passed alongside the Criminal Law Amendment Act, which criminalized union activity whenever the behavior of the individuals involved was illegal – the criminal breach of contract under Master and Servant law thus was a fundamental challenge to the ability of unions to strike under the Trade Union Act.[43] An early 20th century legal text describes the effect of the 1871 reforms as follows: "[W]hile a strike was lawful, practically anything done in pursuance of a strike was still criminal."[44] While employees could choose to limit the threat of penal sanctions by signing shorter contracts, the criminal punishment of contract breach continued to threaten the legality of union activity; thus, unions had strong incentives to achieve the repeal of Master and Servant law's penal sanctions.

Unions, strengthened by the 1871 Trade Union Act and political reforms such as the Reform Act of 1867, did, indeed, press for the abolition of criminal sanctions under Master and Servant law.[45] It is thus not surprising that the Employers and Workmen Act of 1875, which made breach of labor contracts a *civil* offense, was passed alongside legislation regulating union behavior, the Conspiracy and Protection of Property Act.[46] That members of Parliament saw the repeal of

[41] See Webb and Webb (1902) for a discussion.
[42] 34 and 35 Vict. c. 31.
[43] The Criminal Law Amendment Act is 34 and 35 Vict. c. 32.
[44] Tillyard (1916), page 312.
[45] The Reform Act is 30 and 31 Vict. c. 102.
[46] The Employers and Workmen Act is 38 and 39 Vict. c. 90 and the Conspiracy and Protection of Property Act is 38 and 39 Vict. c. 86.

penal sanctions under Master and Servant law as linked to the regulation of unions is clear from the records of debates: before the laws were passed, Joseph Cowen, MP, asked the Home Secretary, "if it is the intention of the Government to introduce a Bill this Session, to amend the Criminal Law Amendment Act, the Master and Servants Act, and the Law with respect to Conspiracy?"[47] The Lord Chancellor, in the second reading of the Conspiracy and Protection of Property Act, spoke of it in tandem with the Employers and Workmen Act.[48] Thus, the repeal of penal sanctions under Master and Servant law was very much part of the process of legalizing unions throughout the 19th century, though it affected contracting for both union members and non-members.

While the higher wages obtainable by collective action surely raised worker's costs of long term contracting (by removing the mechanism that committed workers to fulfill long term contracts), it is also likely that the benefits of Master and Servant, and other associated forms of employer paternalism, were declining in the second half of the 19th century. Economic changes likely played a role in making risk-sharing contracts less valuable to workers. Though there is debate regarding the timing of wage increases in Britain following the Industrial Revolution, there is broad agreement that real wages rose in the second half of the 19th century.[49] Higher wages should have allowed for greater savings, and decreased the need to insure via long-term contracts. Church (1986) writes that miners shifted away from yearly contracts, toward shorter ones, precisely at this time. The growth of "friendly societies" and trade unions in the 19th century also substituted for the insurance provided by long-term contracts, by providing assistance to workers when they were ill and by covering funeral expenses, among other services (Webb and Webb, 1902).

The rise of wages and the increased availability of insurance through social networks diminished the value of the Master and Servant law's penal sanctions. At the same time, the rise of unions in the 19th century – and the potential application of Master and Servant law's penal sanctions to discourage and break strikes – made Master and Servant law increasingly costly to workers. Importantly, shorter contracts were not an effective response to the latter change: the legalization of unions required the elimination of criminal punishment for breach of contract. In the end, repeal had to be done politically, both because individual employers could not commit *not* to use Master

[47] HC Deb 04 March 1875 vol 222 c1177; accessed via Hansard website, http://hansard.millbanksystems.com/.

[48] HL Deb 26 July 1875 vol 226 cc32-42 32; accessed via Hansard website, http://hansard.millbanksystems.com/.

[49] Allen (2009) provides evidence that real wages finally rose in response to the Industrial Revolution's massive technological progress after 1840, while Clark (2005) dates the increase to the 1820s.

and Servant against union activity, and because criminal sanctions impaired collective action by workers; the collective costs of the latter had to be internalized by politically organized workers.

The Master and Servant Act was a fundamental labor market institution in Britain through much of the 19th century. Indeed, Hay and Craven (1993, p. 176) argue that "[Master and Servant] was arguably the single most important area of contract law (affecting as it did a very large proportion of those in employment) although often ignored by the standard legal commentators." And the importance of the Master and Servant Act to contemporaries is clear from the interest taken in it by Parliamentary Commissions (for example, Lord Elcho's) and by organized labor (for example, the attempt to reform the Act in 1844, and the successful reform in 1875). Yet contracting under Master and Servant law, and the economic causes and consequences of prosecutions under the law, have been largely unexplored. We turn to this task next.

3 A Simple Model of Contracting Under Master and Servant Law

Master and Servant Law bound employees to fulfill their contractual obligations under threat of prosecution and potential imprisonment. Despite this threat, employees did breach their contracts, generally hoping to earn higher wages available elsewhere. We model the choice of initial contractual terms, as well as the possibility of *ex post* breach of contract, prosecution, and punishment for such breach as a simple extension of contracting models in which risk-neutral employers, who can commit to contractual terms, insure risk-averse employees (e.g., Baily, 1974, Azariadis, 1975, Harris and Holmstrom, 1982, and Beaudry and DiNardo, 1991). Unlike the standard models, in which employees can exit firms without penalty, in the simple game we set up, employees face the possibility of criminal prosecution for contract breach (see Figure 4 for a graphical depiction of the game).

3.1 Agents and Timing

We propose a model of contracting between one employer and one employee, with the following structure:

- First, the risk-neutral, profit-maximizing employer, who hires one unit of labor, producing revenue $\pi > 1$, offers the employee a contract specifying a wage $\overline{w}$ to work for one period.

Importantly, we assume that the employer can credibly commit to paying the contractual wage – this allows us to focus on the employee's decision to breach a contract.[50] Alternatively, the employer can choose to hire labor on the spot market at a wage that is uncertain.

- Next, the risk-averse employee decides whether to accept the offered contractual wage, or the (uncertain) spot market wage. The employee maximizes his utility, given by $u(w)$ - c, where w is the wage received and c is a cost borne if the employee is punished under Master and Servant law (this is discussed below). We assume that the function *u()* is increasing and concave, and that $u(0) = 0$. We also assume that the costs of punishment enter an employee's decision-making linearly and separably. Our results depend on the assumption of risk-aversion, and the linearity of punishment greatly simplifies the analysis.

- Next, an observable, exogenous productivity shock determines the wage in the spot market. This is both the employee's outside option as well as the employer's cost of labor on the spot market. The outside wage w is drawn from a uniform distribution over $[0, 1]$.[51] If the employee did not sign the contract (or if no contract was offered), the employee takes the outside wage and the employer hires labor at the outside wage. The employee receives a payoff of *u(w)*, and the employer receives π - w.

- If the employee did sign the contract, he must now, observing w, choose whether to breach it. If he chooses to remain in the contract, his payoff is the utility received from the contractually-specified wage, $u(\overline{w})$. If he *successfully* breaches the contract (the determinants of success and failure will be made clear shortly) this will give him the outside wage, and utility *u(w)*. If he attempts *but fails* to breach the contract, he will receive his contractual wage $\overline{w}$ and face a penalty c_s (this notation indicates the cost to the "servant" of being prosecuted successfully under the Master and Servant Act), and thus utility $u(\overline{w})$ - c_s.[52] The employee suffered his punishment and was then legally obligated to return to work at the contractual wage (see Section 2).

- If the employee chose to breach the contract, the employer must decide whether to prosecute

[50] This follows the implicit contracts literature, e.g., Beaudry and DiNardo (1991).

[51] This choice of distribution is made merely for convenience; the results do not hinge on it.

[52] A "failed" breach of contract in our model is a breach of contract, but a failure to leave the employer due to successful prosecution under Master and Servant law.

under the Master and Servant Act. This involved some cost, which we denote c_m (this notation indicates the cost to the "master" of prosecuting under the Master and Servant Act).[53] It is important to note that prosecution was not always successful; it usually was (see Section 2), but it might be difficult to locate an employee who left, or to prove that a binding contract was agreed to. Thus, we allow prosecution to succeed with some fixed, exogenous probability $q < 1$.[54] At this stage, if the employer chooses not to prosecute an employee who broke the contract, the employee receives the outside wage, and thus *u(w)*, while the employer receives π - w. If the employer chooses to prosecute, the payoffs depend on the success of the prosecution. With probability q, the prosecution is successful: the payoff to the employee is *u($\overline{w}$)* - c_s, while the payoff for the employer is π - $\overline{w}$ - c_m. With probability (1 - q), the prosecution fails: the employee receives *u(w)*, while the employer receives π - w - c_m (he must hire labor at the outside wage w and must also pay the cost of prosecution c_m).

3.2 Optimal Strategies and Equilibrium

The structure of the model suggests that employees and employers will choose their optimal behavior at each stage of the game anticipating optimal behavior by their opponent (and themselves) at all subsequent stages – we thus solve for sub-game perfect Nash equilibrium strategies using backward induction. For the employer, a strategy is of the form $(\textit{offer}, \overline{w}, P(w))$: the employer chooses whether or not to offer a contract, the stipulated wage $\overline{w}$ if a contract is offered, and whether to prosecute for breach of contract as a function of the outside wage w. For the employee, a strategy is of the form $(\textit{accept}(\overline{w}), B(w|\overline{w}))$: the employee chooses whether to accept the contractual offer $\overline{w}$; then, conditional on the contractual offer, the employee will choose whether to breach the contract according to the outside wage and the contractual wage.

[53] Testifying before a county magistrate or justice of the peace required some time, money, and effort.

[54] It is also important to note that while employees only suffered the consequences of prosecution when it was successful, employers paid their cost of prosecution regardless of its success – they spent their time with the magistrate even if their employee was not found. Finally, it is historically accurate to assume that $c_m < c_s$: while employers wasted their time, money, and effort in prosecuting an employee, they were hardly subjected to the pains awaiting a convicted employee.

3.2.1 Choice of Prosecution

The last choice made in the game is by the employer: conditional on the contractual wage, on the outside wage, and on the employee breaching the contract, the employer chooses whether to prosecute. If the employer does not prosecute, he receives a payoff of π - w, since he hires labor on the outside market. If he does prosecute, he receives a payoff of π - $\overline{w}$ - c_m if he is successful, and a payoff of π - w - c_m if he is unsuccessful. Thus, the risk-neutral employer will choose to prosecute if the following holds:

$$\pi - w < q(\pi - \overline{w} - c_m) + (1 - q)(\pi - w - c_m) \tag{1}$$

This simplifies to the following:

$$w > \overline{w} + \frac{c_m}{q} \tag{2}$$

Thus, the employer will choose to prosecute if the outside wage is sufficiently above the contractual wage. The intuition for this result is straightforward: conditional on the employee breaching the contract, the employer decides whether to prosecute by comparing the benefit of prosecution (potentially paying a wage less than the outside wage) with the cost (paying the price of prosecution), taking into account the likelihood of success (note that the cut-off rises as the probability of success, q, decreases). Equation (2) specifies the employer's optimal strategy in the final subgame: $P(w)$ will be *prosecute* if equation (2) holds, and *do not prosecute* if equation (2) does not hold.

3.2.2 Choice of Breach of Contract

Looking ahead to the employer's optimal choice of prosecution, the employee chooses whether to breach the contract conditional on the contractual wage and the outside wage. If the employee chooses not to breach the contract, he receives $u(\overline{w})$, while if he chooses to breach the contract, his payoff will depend on the employer's decision to prosecute $P(w)$, as well as the success of the prosecution.[55] The employee thus chooses to breach the contract if the following holds:

$$u(\overline{w}) < u(w)(1 - P) + u(w)P(1 - q) + (u(\overline{w}) - c_s)Pq \tag{3}$$

[55] $P(w) = 1$ if the employer will prosecute for breach of contract, and $P(w) = 0$ if he will not.

This simply says that if the employee stays, he receives the contractual wage; if he leaves, he receives the utility of the outside wage if the employer does not prosecute, or if the employer's prosecution fails, while he receives the utility of the contractual wage less the cost of being successfully prosecuted if the employer prosecutes successfully.

If the outside wage is less than the contractual wage, the employee never breaches the contract: there is no incentive to do so. Examining equation (2), one sees that there is a range of outside wages above the contractual wage for which the employer chooses *not* to prosecute. In this set of wages, the employee can anticipate the employer's decision not to prosecute, and because the outside wage is greater than the contractual wage, the employee will breach the contract. Thus, the employee will breach the contract if the following holds:

$$\overline{w} < w \leq \overline{w} + \frac{c_m}{q} \tag{4}$$

Thus far, we have described the employee's choice whether to breach the contract if the outside wage is less than the employer's cut-off value for choosing to prosecute. Now we consider what the employee chooses when $P = 1$.

If w is high enough that the employee knows that the employer will prosecute, the employee faces the choice between earning the contractual wage with certainty, and breaching the contract, risking punishment. The employee will choose to breach the contract even when $P = 1$ if the following holds:

$$u(\overline{w}) < (1 - q)u(w) + q(u(\overline{w}) - c_s) \tag{5}$$

Simplifying this yields the following:

$$u(w) > \frac{u(\overline{w}) - q(u(\overline{w}) - c_s)}{1 - q} \tag{6}$$

Thus, the employee chooses to breach the contract if the potential benefit from breach (a higher outside wage, relative to the contractual wage) is large enough, relative to the cost and likelihood of being successfully prosecuted. We can define w_s, the cut-off wage at which the employee decides to breach a contract despite the employer's credible threat of prosecution, implicitly as a function

of $\overline{w}$:

$$u(w_s) = u(\overline{w}) + \frac{qc_s}{1-q} \tag{7}$$

We can now explicitly specify the employee's optimal strategy $B(w|\overline{w})$:

$$B(w|\overline{w}) = \begin{cases} \textit{stay} & \text{if } w \leq \overline{w} \\ \textit{breach} & \text{if } \overline{w} < w \leq \overline{w} + \frac{c_m}{q} \\ \textit{stay} & \text{if } \overline{w} + \frac{c_m}{q} < w \leq w_s(\overline{w}) \\ \textit{breach} & \text{if } w_s(\overline{w}) < w \leq 1 \end{cases} \tag{8}$$

In our analysis of an equilibrium contract, we focus on the case in which $w_s(\overline{w}) > \overline{w} + \frac{c_m}{q}$, though our results do not depend on it.[56]

3.2.3 Determining the Contractual Wage

In order to induce the employee to sign a contract specifying a wage $\overline{w}$, with the risk of prosecution for breach of contract after the outside wage is determined, the employer must offer a wage that makes the employee at least as well off in expectation as he would be by simply taking the outside wage without signing the contract (the inducement to sign the contract *ex ante* is insurance against a bad draw on the spot market). Similarly, the employer must be at least as well off in expectation signing the contract as he would be hiring labor on the spot market.

Given our assumption about the distribution of outside wages (uniform on [0,1]), the employee expects to receive $\int_0^1 u(w)\,dw$ if he does not sign the contract. If he does sign the contract, he receives the following (see Figure 5 for a graphical depiction of the relevant ranges):

- The contractual wage $\overline{w}$ if the outside wage is less than or equal to the contractual wage, and thus expected payoff $u(\overline{w})$.
- The outside wage w, if the outside wage is greater than the contractual wage, but less than the employer's prosecution-decision cut-off.

[56] The employee's cut-off for determining whether to breach the contract may be greater than or less than the employer's cut-off for deciding whether to prosecute. Thus, it may be the case that the employee always breaches the contract for a wage above the contractual wage (if his cut-off for breach is below the employer's), or it may be that there is a range of outside wages above the contractual wage, and above the employer's cut-off, for which the employee remains in the contract despite the higher outside wage. In this case, the employer's credible threat of prosecution induces the employee not to breach the contract.

- If the employer's cut-off is below the employee's cut-off, there will be a range of outside wages greater than the employer's cut-off, but less than the employee's cut-off for which the employee receives the contractual wage $\overline{w}$ with certainty – over this range, the employer would prosecute, and this credible threat keeps the employee from breaching the contract.

- Finally, for outside wages greater than the employer's and the employee's cut-off values, the employee receives the contractual wage less the cost of punishment if prosecution is successful, and the outside wage if it is unsuccessful.

Before proving the existence of a subgame perfect equilibrium, we define several terms, and make a simplifying assumption that allows us to focus on the case in which the employer's prosecution cut-off is less than the employee's breach cut-off.[57]

We denote by $F(w|\overline{w})$ the lottery over *wages* (excluding the costs of being prosecuted) when the contractual wage is $\overline{w}$. We next assume the following:

$$u(\overline{w} + \frac{c_m}{q}) < u(\overline{w}) + \frac{qc_s}{1-q} \tag{9}$$

for any $\overline{w} \in [0, 1]$. This condition, which requires c_m to be sufficiently smaller than c_s, guarantees that $w_s(\overline{w}) > \overline{w} + \frac{c_m}{q}$ for all $\overline{w}$, as it, together with (7) immediately implies that $u(\overline{w} + \frac{c_m}{q}) < u(w_s(\overline{w}))$.

Note that it is, in general, difficult to obtain closed-form expressions for risk premia (with the exception of CARA preferences); thus, we use implicit risk premia throughout. We denote by r_s the risk premium associated with the spot market gamble, and it is defined by $u(\frac{1}{2} - r_s) = \int_0^1 u(w)dw$.

The following proposition establishes the existence of an equilibrium contract.

Proposition 1: Assume (9). If $r_s - (c_m + qc_s) > 0$ is sufficiently large, then there exist a $\overline{w}$ that satisfies the employee's and the employer's participation constraints, and a pure-strategy subgame perfect Nash equilibrium with the employer's strategy (*make offer*, $\overline{w}, P(w)$) and the employee's strategy (*accept*, $B(w|\overline{w})$).

Proof: *See Appendix 1.*

The intuition behind the proof is straightforward. When the risk premium associated with the spot market is sufficiently high, relative to the costs to the two parties of enforcement by

[57] Our results do not depend on this assumption; it merely shortens our discussion of the model and its predictions.

prosecution, then it becomes mutually beneficial to sign a contract *ex ante*. In this case, the employee is sufficiently risk averse that the benefits of insurance under a long-term contract outweigh the potential punishment under Master and Servant law.

A final question is whether reasonable parameter values generate equilibrium contracts, with breach and prosecution – that is, are the assumptions we have made in the model likely to have held in practice in 19th century Britain?

As a back of the envelope evaluation, we consider the case of CRRA utility, with several values of the coefficient of relative risk aversion.[58] We then set parameter values of $q = 0.75, c_m = 0.025$, and $c_s = 0.1$. The value of q is chosen to match the success rate of prosecutions in Hay (2004, Table 2.1). The cost to the employer of at most 40 shillings for a prosecution was perhaps 1-2 weeks of a coal miner's wage, or around 2-4% of a year's salary.[59] Because the average wage in our model is 0.5 on the spot market, one can view 0.025 as a reasonable employer's cost parameter, including his costs of time and effort, plus lost employee effort if imprisoned. The employee's cost could have been three months in prison, though usually it was less severe; a cost of around 20% of the average spot market wage seems reasonable.[60]

Using these parameter values we generate precisely the behavioral patterns described in our model: the cut-off values are as we have assumed them to be; contracts are signed, contract breach occurs when outside wages are high enough, and prosecution occurs as well. Though our model is an extreme simplification of the reality of contracting in 19th century Britain, the basic elements – employee risk aversion; long-term, risk-sharing contracts; breach in response to outside options; and punishment – all seem to have been important.[61]

[58] We considered values of 0.25, 0.5, 0.95, and 1.5.

[59] See Bowley (1900), pp. 107-109. Because Master and Servant cases were summarily decided, legal and time costs to employers bringing cases were low.

[60] In fact, the cost to the employee could have been much lower, if he was merely forced to serve out the contract. As seen above, lower costs of punishment make an equilibrium risk-sharing contract more likely, *ceteris paribus*, so we view our choices of costs as conservative.

[61] Note that we have not analyzed a fully dynamic contracting model between employers and employees, where future sanctions could endogenously enforce contracts; we leave analysis of the impact of Master and Servant law in this case to future work.

3.3 Predictions: Labor Demand Shocks, Master and Servant Prosecutions, and the Consequences of Repeal

We next use our model to generate predictions regarding the relationship between Master and Servant prosecutions and key economic variables: labor demand (in our model, the outside wage) and average wages. We also consider theoretically the consequences of the repeal of Master and Servant law's penal sanctions in 1875.

3.3.1 Labor Demand Shocks, Wages, and Prosecutions

While the relationship between labor demand shocks (outside wages) and prosecutions in our model is clear, the relationship between labor demand shocks and observed wages is ambiguous when penal sanctions for contract breach exist.

Proposition 2: When a Nash equilibrium as defined in Proposition 1 exists, positive labor demand shocks are associated with more prosecutions.

Proof: *See Appendix 1.*

This result can be seen in Figure 5, as prosecutions are observed only when w is sufficiently large that employees are willing to breach their contracts and employers are willing to prosecute.

Now consider the wage response to labor demand shocks.

Proposition 3: When a Nash equilibrium as defined in Proposition 1 exists, the relationship between labor demand shocks and observed wages is non-monotonic in the presence of Master and Servant prosecutions.

Proof: *See Appendix 1.*

Moderate, positive labor demand shocks may result in higher observed wages, as employees breach their contracts, but employers do not find it worthwhile to prosecute. Larger, positive labor demand shocks may result in no change in the observed wage because a credible threat of prosecution can prevent workers from breaching their contracts. Low labor demand results in no change in the observed wage because employees are insured against adverse labor market conditions.

3.3.2 The Consequences of Repeal

The 1875 repeal of Master and Servant law's penal sanctions eliminated the ability of employers to criminally sanction a would-be departing worker and retain his labor via *ex post* coercion.[62] In the absence of such coercion, our model implies that employees cannot credibly stay with the firm in the event of a high wage in the spot market. Thus, binding contracts are not offered in the post-repeal equilibrium, and all labor is sold on the spot market. Our model suggests that after repeal, average wages will rise, as employers are no longer willing to offer contracts that insure risk-averse workers against low wages. Furthermore, wages will follow labor demand shocks more closely, as all wages reflect spot market outcomes, rather than a mix of spot market outcomes and contractual wages.

We do not have a dataset containing information on contract length or breach of contract after 1875. However, that the 1875 repeal reduced the prevalence of long-term, binding contracts is supported by the historical evidence. Steinfeld (2001, p. 227) writes that, "Once reform of contract remedies [i.e., the repeal of penal sanctions] had reduced the ability of employers to enforce labor agreements, they would have less incentive to enter contracts for a term even if labor had then wanted them. . . . [T]he outcome of reform would only be to speed up the movement to employment at will, bringing about the very result that reformers had tried to avoid: the demise of both penal sanctions *and* binding contracts."[63] Tillyard (1916, p. 325) writes that after the passage of the 1875 Employers and Workmen Act eliminated penal sanctions, summary justice by the magistrates no longer included the "powers to enforce performance for unexpired periods of service," and that "contracts of service [were] determinable more and more by very short notice." Thus, we find it reasonable to model repeal as a reduction in the probability that a worker is successfully prosecuted. Specifically, we assume that post-repeal, $q = 0$, and obtain the following proposition.

Proposition 4: When a Nash equilibrium as defined in Proposition 1 exists, then post-repeal (i.e., $q = 0$) no long-term contracts are signed, average wages rise, and the correlation between

[62]The qualitative difference between civil and criminal enforcement of contracts stemmed from several sources. First, arrest warrants were no longer issued for workers who left their employers, making it less likely that an employee would be brought back to his employer; second, orders for specific performance were no longer available under summary justice; finally, the threat of prison was likely much more effective in inducing an employee to return to work than a fine.

[63]Emphasis in the original.

labor demand shocks (the spot market wage) and the observed wage increases.

Proof: *See Appendix 1.*

Long-term contracts are not signed, because it is not in the interest of the employer to offer a contractual wage that is only paid when it is *greater* than the spot market wage (the employee would leave the employer whenever the spot market wage exceeded the contractual wage). Without successful prosecutions, insurance against labor market fluctuations cannot be profitably provided, and the employer will simply hire labor on the spot market. The absence of risk-sharing contracts increases the average observed wage, as employees can no longer accept lower wages in exchange for insurance, and increases the responsiveness of the observed wage to labor demand shocks, as observed wages now completely reflect transitory labor market conditions.

We next turn to the task of empirically testing the predictions our model generated about the effect of labor demand shocks on Master and Servant prosecutions, and the effects of the repeal of penal sanctions on labor market outcomes.

4 Empirics: The Economic Causes of Master and Servant Prosecutions

4.1 The Data

To estimate the relationship between labor demand and Master and Servant prosecutions, we combine data from a variety of historical sources.[64] We use district-level information on criminal prosecutions for labor-market-related criminal offenses (Master and Servant, anti-vagrancy, and anti-begging) in each year from *Judicial Statistics, England and Wales*, covering the years 1858-1875.[65] Prosecutions data are merged to data on county characteristics, such as population, population density, occupational structure, and income, from UK censuses between 1851 and 1911 (downloaded from the U.K. Data Archive (Hechter, 1976)), as well as county-year specific wage estimates (constructed from several series in Mitchell's (1988) *British Historical Statistics*, Church's

[64] For a more detailed discussion of the data used, please see Appendix 2.

[65] Note that while prosecutions for Master and Servant violations were surely significant prior to 1858, disaggregated statistics on them are not available for these years; the end date of the analysis is determined by the abolition of criminal prosecutions under the Master and Servant Act in 1875.

(1986) *The British Coal Industry* and builders' wages downloaded from the U.K. Data Archive).[66] In some specifications we use information on membership in the Amalgamated Society of Engineers as an indicator of union membership at the county-year level.[67] In addition, we use several time series on prices, collected from *British Historical Statistics*, *The British Coal Industry*, and Robson's (1957) *The Cotton Industry in Britain*. In particular, we collected time series of the pithead price of coal, the price of pig iron, and the price of cotton textiles, relative to the price of raw cotton.[68] Finally, we construct dummy variables identifying a district as urban or rural, Welsh, coal-producing, and pig-iron producing.[69]

Because some of the variables used vary at the district level, and others at the county level, we use two datasets in our analysis of the effect of labor demand shocks on Master and Servant prosecutions. The main dataset contains a panel of observations at the district-year level, with county-level control variables being applied to all districts within a given county.[70] The second, used to test the robustness of our results and to examine per capita prosecutions (we have population data only at the county level), contains a panel of observations at the county-year level, with district-level variables (for example, Master and Servant prosecutions) aggregated to the county

[66]The wage index uses 1851 occupational distributions at the county level (from the U.K. Data Archive, study number 4559 (Southall et al., 2004)) to weight wage series for coal miners (at the region-year level, from Church (1986), Table 7.15); agricultural workers (national time series, taken from Mitchell (1988), *Labour Force*, Table 25, "Agriculture/England and Wales"); engineers (national time series, taken from Mitchell (1988), *Labour Force*, Table 25, "Shipbuilding and Engineering"); cotton factory workers (national time series, taken from Mitchell (1988), *Labour Force*, Table 25, "Cotton/Factory Workers"), and builders (at the county-year level, taken from the U.K. Data Archive, study 3710).

[67]These data were collected by H.R. Southall, and were accessed from the U.K. Data Archive, study 3712 (Southall et al., 1998).

[68]We thank Greg Clark for suggesting the use of relative textile prices in our analysis. Using cotton textile output prices alone would confound increased demand for textiles with changes in input prices, which were extreme in the period we study due to the American Civil War. Coal prices come from Church (1986), Table 1.9; iron prices from Mitchell (1988), *Prices*, 20.B; textile output prices (per linear yard) from Mitchell (1988), *Prices*, 19; and cotton input prices (per pound) from Mitchell (1988), *Prices*, 18.B. To calculate the price of cotton textile output in pence per pound, we convert the *British Historical Statistics* price series (in pence per linear yard) using Robson's conversion factor of 5.47895 linear yards per pound of cotton piece good exports.

[69]The coal-producing counties come from Mitchell (1988), *Fuel and Energy*, 3 and *Fuel and Energy*, 5; the pig iron producing counties come from Mitchell (1988), *Metals*, 2.C; these lists counties were compared to 19th century maps and other sources. The coal counties are: Carmarthenshire, Cheshire, Cumberland, Denbighshire, Derbyshire, Durham, Flintshire, Glamorganshire, Gloucestershire, Lancashire, Leicestershire, Monmouthshire, Northumberland, Nottinghamshire, Pembrokeshire, Somersetshire, Staffordshire, Warwickshire, Worcestershire, and Yorkshire. Pig iron counties are: Anglesey, Brecknockshire, Cardiganshire, Carmarthenshire, Carnarvonshire, Cumberland, Denbighshire, Derbyshire, Durham, Flintshire, Glamorganshire, Lancashire, Leicestershire, Lincolnshire, Merionethshire, Monmouthshire, Montgomeryshire, Northamptonshire, Northumberland, Nottinghamshire, Pembrokeshire, Radnorshire, Shropshire, Staffordshire, and Yorkshire.

[70]As the variation in our explanatory variable of interest – labor demand in a particular industry located in a particular place – occurs at the county level, we always cluster standard errors at the county level in the empirical work below. In regressions we omit for brevity, we have also estimated standard errors clustered by year, and our inferences are unchanged (regressions available upon request).

level. Summary statistics of the variables used in our analysis of the link between labor demand shocks and prosecutions, along with their pairwise correlations, are presented in Table 2A.

Our analysis of the repeal of penal sanctions examines the relationship between labor demand shocks and wages, before and after 1875. Because the variables of interest (wages and industry-specific labor demand) are measured at the county level, we use county-year level data in our analysis of the effects of repeal. This analysis will also cover a longer time period, as we are no longer limited to the years for which we observe Master and Servant prosecutions.[71] Summary statistics of the variables used in our analysis of the consequences of repeal, along with their pairwise correlations, are presented in Table 2B.

4.2 Labor Demand Shocks and Master and Servant Prosecutions

The relationship between unemployment rates and prosecutions shown in Figure 3 suggests that Master and Servant prosecutions are closely associated with labor market conditions. However, it is impossible to interpret the relationship between prosecutions and labor demand as causal solely from the time-series evidence.

In order to identify a causal relationship between labor demand shocks and Master and Servant prosecutions, we consider the effects of exogenous, industry-specific labor demand shocks. In our empirical analysis, we use shocks to the price of coal, to the price of cotton textiles, and to the price of pig iron as exogenous changes in the marginal revenue product of labor (i.e., labor demand shocks).[72] The coal prices and iron prices we use are simply the output prices of the coal mining and iron-producing sectors, respectively, and rises in their values increase the marginal revenue product of labor in the relevant sector. The cotton textile price we use is the ratio of the price of cotton textiles per pound (output) to the price of raw cotton per pound (the major non-wage input). Increases in this ratio indicate that textile output prices are relatively high, and thus so is the marginal revenue product of textile workers. Considering our model's predictions, we expect the following consequences of fluctuations in these price series:

[71] While we have prosecutions data only for the 1858-1875 period, we can construct a panel of wages and prices for the period 1851-1905.

[72] The variation in output prices can be seen as exogenous with respect to individual employers (which brought prosecutions) to the extent that output prices were set in competitive markets, and not by small numbers of firms. The coal, iron and textile industries in the second half of the 19th century all seem to have fit this requirement.

- Master and Servant prosecutions should rise in districts in coal-producing counties in response to rising coal prices.
- Master and Servant prosecutions should rise in districts in pig iron-producing counties in response to rising pig iron prices.
- Master and Servant prosecutions should rise in districts located in counties with a high fraction of textile workers in response to rising textile prices.[73]

It is important to note that our data do not allow us to distinguish prosecutions in sectors experiencing increased output prices from prosecutions in other sectors in the same district, perhaps as a response to the rising labor demand in the affected sector. That is, increased labor demand in a particular sector increases the incentive for workers to breach their contracts both in the affected sector and in others. We view increased prosecutions in the affected sector, as well as other sectors, as the aggregate response of contract breach and prosecution to a sector-specific labor demand shock.[74]

We test these hypotheses by estimating the following model:

$$Prosecutions_{dct} = \beta_1 Industry_c \times log(IndustryPrice_t) + \delta_d + \delta_t + \sum_{t=1858}^{1875} \beta_t X_{c,1851} + \beta_2 log(pop_{ct}) + \epsilon_{dct}$$

The dependent variable is the number of prosecutions in district d in county c at time t; the explanatory variable of interest is an interaction between a measure of an industry's presence in county c times the log of the price of the industry's output (recall that county characteristics apply to all districts in the relevant county). The industries are coal mining, for which the measure of presence at the county level is a dummy variable, and the price is the pithead price of coal; textile production, for which the presence measure is the fraction of employed men who were in the textile industry in the 1851 census, and the price is the ratio of the price of cotton textiles to the price of

[73] We use the fraction of a county's workers in textile production in 1851 as an indicator of textile production in a county; we use county-level dummy variables as indicators of production of iron and coal due to the more ambiguous census occupational categories relevant to these industries: coal mining is grouped with other forms of mining, and iron production is grouped with other work related to metals. Our results are, however, robust to other indicators of industrial location. Note that throughout we use the term "textile prices" to refer to the relative output price of textiles.

[74] To the extent that labor demand shocks spill over into districts in counties without the affected industry, our results (which compare prosecutions in districts in counties with the affected industry to districts in counties without) will be biased toward no effect of labor demand shocks on prosecutions.

raw cotton; and pig iron production, the presence of which is indicated by a dummy variable, and for which the price is the price of pig iron. We control for year and district fixed effects, and the log of the population of the county in which the district is located. In some specifications, we add time-varying effects of counties' initial (1851) economic conditions.[75]

In Table 3A, columns 1-3, we present results of estimating the model for each industry individually (without the time-varying controls).[76] In every case positive labor demand shocks are associated with more prosecutions: column 1 shows that a higher cotton textile price, which should increase labor demand in the textile industry, is associated with more prosecutions in counties with a larger fraction of employees in the textile industry. Columns 2 and 3 show that higher output prices in the coal and iron sectors, which should increase the demand for labor in areas where these industries are located, are associated with more prosecutions, precisely in counties where the relevant industry is prevalent. Increases of 3% in coal or iron prices (the median price changes for both industries in our sample) are predicted to increase Master and Servant prosecutions by around 200, just over one standard deviation, in counties where these industries are located, relative to other counties. A 6% increase in the relative price of cotton textiles (the median price change for textiles in our sample) is predicted to increase Master and Servant prosecutions by around one standard deviation, in areas with one standard deviation greater employment in cotton textiles.

One can see the three patterns of industry-specific prices and industry-specific prosecutions in Figures 6-8. These plot the series of coefficients on an industry-presence times year interaction, from a regression predicting Master and Servant prosecutions (conditional on year and district fixed effects and county population), as well as the series of the industry-specific log output price. It is clear from the figures that prosecutions in districts with a given industry are strongly correlated with industry-specific output prices.

One might be concerned that our individual industry regressions merely capture the same effect, in the same counties, three times. For example, one can see in Figures 6 and 7 that iron and coal prices followed very similar patterns, and these industries were often located in the same counties. To check whether each industry-level labor demand shock is associated with increased prosecutions,

[75]The population of county c at time t is linearly interpolated between census years. The time-varying controls for initial conditions are interactions between year dummies and each county's 1851 population density, the 1851 proportion of workers in manufacturing, the 1851 fraction of the county's population that was urban, and a dummy indicating that the county is in Wales.

[76]Including the time-varying controls does not affect our results; we omit them here for brevity.

holding fixed shocks in the other industries, in column 4 we examine changes in the three output prices together, by including industry price-industry presence interactions for all three industries in the same model. We find that all of the coefficients maintain their sign, and all are statistically significant. A joint test of the three labor demand shocks is significant well below 1%. That the relationship between industry-specific prices and industry-specific prosecutions is so strong when three sets of price-county interactions are included is remarkable: our individual results were not merely capturing the same pattern three different times, but were the result of three relationships between industry-specific labor demand shocks and prosecutions.

We next, in column 5, allow for year-specific effects of each county's initial population density, initial fraction of the population working in manufacturing, and initial fraction of the population that is urban, and we allow Wales to experience different year-specific shocks. Again, the labor demand shocks are associated with a significant increase in prosecutions for each industry. Again, the joint test of the demand shocks' significance is highly significant. Finally, in column 6, we include linear, county-specific time trends. All of the demand shocks remain highly significant.[77]

As an additional robustness check, we test whether our results are driven by prosecutions in a small number of counties. To do so, we estimate the regressions reported in Table 3A, columns 1-3, but dropping each individual coal county (in the coal regression), each iron county (in the iron regression), and each county with a high fraction of workers in textile production (in the textile regression). Though we omit these regressions for brevity, it is important to note that prosecutions increase significantly in response to positive labor demand shocks in all of them, and the magnitudes of the coefficient estimates are similar to those without dropping counties.[78]

An important concern with our analysis is that we attempt to link changes in *employer and employee* behavior to changes in labor market conditions. However, we may instead simply be capturing the effect of economic changes on criminal prosecutions in general, or on the behavior of magistrates – the behavior of state actors, rather than private actors, may change in response to economic shocks.[79] If local constables or magistrates changed their behavior in response to economic fluctuations, this might drive changes in Master and Servant prosecutions. Given the

[77] In a specification we omit for brevity, we also allow for district-specific trends in prosecutions, and the labor demand shocks remain positive and highly significant, individually and jointly (regressions available upon request).

[78] Regressions available upon request.

[79] Marinescu (2008a) finds that judges change their decisions in wrongful termination cases in response to economic conditions.

historical evidence, cited in Section 2, that magistrates were often employers themselves, or their agents, it is a particular concern that our results are driven by differential behavior of local law enforcement rather than differences in the extent of contract breach.

We can address concerns of this sort by examining the response of anti-vagrancy prosecutions to the labor demand shocks we have considered.[80] Anti-vagrancy prosecutions, like those under the Master and Servant Act, were mechanisms to increase labor supply that were overseen by local magistrates. Anti-vagrancy prosecutions, like Master and Servant prosecutions, may have been especially useful to an employer when labor markets were tight, as both types of prosecution increased the supply of labor. However, while Master and Servant prosecutions were brought by employers in response to employee breach of contract, anti-vagrancy prosecutions were driven by local law enforcement officials. If either the constabulary's or magistrates' behavior were driving our Master and Servant results, one would expect to see similar responses to labor demand shocks in anti-vagrancy prosecutions.

As a falsification exercise, in Table 3B, we repeat the exercises in Table 3A, but use anti-vagrancy prosecutions as the outcome. If we were to find results similar to those for Master and Servant, one would be concerned that economic shocks affect prosecutions more broadly, or affect magistrate behavior; on the other hand, if anti-vagrancy prosecutions did not respond to labor demand shocks, one would be more confident that the response of Master and Servant prosecutions seen in Table 3A is due to changing employer and employee behavior. Indeed, across specifications (Table 3B, columns 1-6), we find no significant effect of changing output prices on anti-vagrancy prosecutions. In addition, the estimated coefficients on the labor demand shocks are very small. It seems that prosecutions that result from employee and employer behavior respond to labor demand shocks, while those that involve only the local police and magistrates do not.

Although our outcome variables in Tables 3A and 3B are defined at the district level, as a robustness check we estimate several specifications using our county-level panel. As noted above, in this dataset observations are at the county-year level, with district-level prosecutions data aggregated to the county level. One noteworthy difference between this dataset and that used above is that we can now normalize prosecutions by (interpolated) county population. Additionally, as

[80] We always examine anti-vagrancy and anti-begging prosecutions in tandem, but describe the prosecutions as "anti-vagrancy" for the sake of brevity.

we have almost no observations with zero prosecutions at the county-year level, we can use the log of prosecutions per capita as an alternative outcome variable to further test the sensitivity of our results to outliers. We estimate the following equation:

$$Prosecutions_{ct} = \beta_1 Industry_c \times log(IndustryPrice_t) + \delta_c + \delta_t + \sum_{t=1858}^{1875} \beta_t X_{c,1851} + \beta_2 log(pop_{ct}) + \epsilon_{ct}$$

This empirical specification is analogous to that used with the district-level data, but uses county, rather than district, fixed effects (and will use several variations on the outcome variable). In Table 4A, columns 1-2, we present results using the level of prosecutions as the outcome, as we used in district-level analysis. We present results with and without time varying controls, and they are consistent with the district level data: in general we find large and significant effects of labor demand shocks on prosecutions.[81] The only exception is that the coal-industry demand shock is now large and positive, but it is no longer statistically significant in the specification with time-varying controls. The joint test of the labor demand shocks is significant in both specifications as well.

In Table 4A, columns 3-4, we use prosecutions per capita as our outcome variable.[82] In this specification, again, we generally find large, positive and statistically significant effects of positive labor demand shocks on prosecutions. The iron demand shock is not significant without time-varying controls (though it is large and positive). The joint test is significant as well.

Finally, in Table 4A, columns 5-6, we use the log of prosecutions per capita as the outcome. We find similar results to those above: positive labor demand shocks significantly increase prosecutions. As in column 2, the coal demand shock is not quite statistically significant when the time varying controls are included (though it is large and positive).

Next, we examine anti-vagrancy prosecutions using our county-level data. As we argued above, examining anti-vagrancy prosecutions allows us to rule out magistrate behavior, or broad prosecution patterns as causes of the Master and Servant results that we have found. In Table 4B, we estimate the specifications run in Table 4A, but with anti-vagrancy prosecutions in place of Master

[81] Each county contains four districts, on average, so the magnitudes of the coefficients in our county-level regressions are quite comparable to those found in the district-level analysis.

[82] In fact, the outcome is prosecutions per 1,000 inhabitants of a county.

and Servant ones. As we found in the district-level data, we find across specifications that labor demand shocks do not drive anti-vagrancy prosecutions. This is true for levels of prosecutions at the county level (Table 4B, columns 1-2), for prosecutions per capita (Table 4B, columns 3-4), and for log prosecutions per capita (Table 4B, columns 5-6).

Overall, Tables 4A and 4B provide evidence that the effect of industry-specific labor demand shocks on prosecutions in areas where affected industries are located is robust: across specifications we find that positive labor demand shocks drive prosecutions under the Master and Servant laws, but not for violations of anti-vagrancy laws.

4.3 Threats to Identification and Interpretation: Organized Labor, The Business Cycle, and the "Internal Colony"

Given the historical and non-experimental nature of our research design, we cannot rule out all possible alternative explanations for our results. Confounding factors, however, would have to meet strict criteria: they would need to change in years when prices changed; they would need to vary across counties to match industrial composition; and, they would need to affect Master and Servant prosecutions, but not anti-vagrancy prosecutions.

The rise of organized labor in the early 1870s is an important potential confound. For example, Webb and Webb (1902, Appendix V) show that the Durham Miners' Association membership increased from 1,899 in 1870 to 38,000 in 1875, and that other unions also grew rapidly around this time. It is possible that increased organized labor led to increased wages, increased prices, and increased prosecutions, all in the industries (and areas) in which they were located. Note that this story may actually tell us something about the channel through which labor demand shocks generate increased prosecutions: when the marginal revenue product of labor rises, more rents exist over which employers and employees can bargain; labor unrest, prosecutions, and wage increases thus might all be outcomes of a labor demand shock. However, exogenous increases in worker strikes are a concern.

One might be especially concerned that much of our identification comes from the large increase in coal and iron prices beginning in 1872 (see Figures 6-8). This was a period of economic expansion in Britain: if our results were entirely driven by just one business cycle expansion, especially one in which labor market institutions were changing, one would be concerned about the interpretation

of our results.[83]

Thus, we estimate our district-level regressions excluding the 1872-1875 period that followed the passage of the Trade Union Act of 1871, and in which coal and iron prices soared. Because we are especially concerned about the effect of the growth of unions on prosecutions, we additionally control for union membership using membership in the Amalgamated Society of Engineers in each county, in each year.[84] Of course, our model predicts that positive labor demand shocks drive prosecutions; in this specification, we remove from our sample the period of highest output prices – the period in which labor demand was greatest (see also the unemployment rate in Figure 3) – along with one quarter of our observations. Thus, this specification is an extremely rigorous test of our model's hypotheses.

In Table 5A, columns 1-3, we show estimates using industry demand shocks individually. Although the coefficients are smaller than in Table 3A, we still find large and statistically significant effects in all three industries. In Table 5A, columns 4-5, we run the labor demand shocks for all three industries together, with and without time-varying controls. We find that all six labor demand shock coefficients have the correct sign, and four of the six are statistically significant. In both columns, the joint test of the labor demand shocks' effect on prosecutions is significant at the 5% level, despite the smaller sample.[85]

We next wish to confirm that anti-vagrancy prosecutions do not significantly respond to labor demand shocks in the pre-1872 period, controlling for union membership. Thus, we repeat our estimates from Table 5A, columns 1-5, but use anti-vagrancy prosecutions as the outcome variable. As in the entire sample, we find that labor demand shocks do not drive anti-vagrancy prosecutions (see Table 5B, columns 1-5).[86]

The results controlling for union membership, for the pre-1872 period, indicate that our findings in the baseline regressions are both robust and capture the general response of Master and Servant

[83] In work we omit for brevity, we estimated our main specification controlling for county-specific business cycle effects (using a time series of national unemployment rates or a recession indicator interacted with county dummies). Our results are unchanged when we include these controls (regressions available upon request).

[84] We have also controlled for time-varying effects of a county's initial level of union membership; controlled for union membership using the 1858-1875 panel; and estimated our main specification, without a control for union membership, using the 1858-1871 panel. All of these specifications yield similar results (regressions available upon request).

[85] We also find, in work we omit for brevity, that our results using the county-level panel are quite robust to the inclusion of a union membership control and the exclusion of the post-1871 period (regressions available upon request).

[86] This result holds in the county-level panel as well (regressions available upon request).

prosecutions to labor demand shocks – they were driven neither by a single business cycle, nor by the rise of organized labor.

A final question of interpretation is whether our results are driven solely by prosecutions in Wales. English employers were willing to apply extremely harsh measures to enforce contracts in colonies abroad; for example, criminal sanctions under Master and Servant law lasted into the twentieth century in the British Caribbean (Hay and Craven 2004). The Welsh were a culturally and linguistically distinct group, often employed by English masters who may have been more willing to use criminal sanctions against employees who were not English (though Figure 2 makes it clear that there were parts of England where prosecution was commonplace). To claim that our analysis is broadly applicable to understanding the functioning of Master and Servant law, it is important to determine whether our analysis is robust to excluding an area that some have viewed as an "internal colony" of the English.

In Table 5A, columns 6-7, we report estimates from our district-level regression (for the 1858-1875 period), but excluding the Welsh counties (column 7 includes time varying controls, while column 6 does not). In both columns one sees that all three labor demand shocks have a positive and significant effect on prosecutions, and the joint test of the shocks is highly significant. Clearly, our results are not driven by the application of coercion under Master and Servant law in Wales alone.[87]

In Table 5B, columns 6-7, we repeat the analysis using anti-vagrancy prosecutions. Dropping Wales from the analysis produces results identical to those above: while Master and Servant prosecutions respond to labor demand shocks in England, anti-vagrancy prosecutions do not.[88]

4.4 Coercion in Town and Country

Because the literature on labor market coercion has been focused on rural labor markets, in this section we ask whether the coercive contract enforcement we have studied – while taking place in industrial Britain – was strictly a rural phenomenon. To test for differential responses to labor demand shocks between urban and rural areas, we split our district-level sample into two parts: cities and boroughs ("urban") and all others ("rural"). We estimate the models from Table 3A,

[87] This is true using the county-level panel as well (regressions available upon request).

[88] This, too, is true using the county-level panel as well (regressions available upon request).

columns 1-5, on the rural and urban samples separately, and present the results in Table 6A, columns 1-10.

We find that while prosecutions respond more (larger coefficients) and more consistently (more often statistically significant) to labor demand shocks in rural districts, there is a significant effect in urban districts, too. In each of the individual industry regressions, one sees a positive, significant effect of labor demand on prosecutions even in urban districts. In the regressions with all industry shocks included together, textile price shocks are always statistically significant and large; coal is statistically significant without the time varying controls, and all labor demand shocks have the correct sign. The joint tests are significant at 5%.[89] These results are strong evidence that labor market coercion existed not only in rural Britain as it industrialized; but it was also a widely used response to labor demand shocks in urban areas, especially where textile production was located.

As yet another check of our interpretation of the relationship between labor demand and Master and Servant prosecutions, we examine anti-vagrancy prosecutions in rural and urban areas separately in Table 6B, columns 1-10. Though we now see two coefficients that are statistically significant at 10%, they are two of eighteen labor demand coefficients, and none of the joint tests is significant. We view the results here as confirmation that the Master and Servant prosecution behavior observed in town and country was driven by economic choices made by employees and employers, not magistrates or police.

5 The Repeal of Penal Sanctions under Master and Servant Law

In 1875, the penal aspects of Master and Servant law were abolished, leaving employers with only monetary incentives for retaining labor and eliciting worker effort. Our model suggests that without penal sanctions to keep workers in their contracts, average wages should rise, and the responsiveness of wages to labor demand shocks should increase (see section 3). We now consider whether these were, in fact, the consequences of the repeal of criminal prosecutions for breach of contract.

[89] In the rural sample, only one labor demand coefficient is not statistically significant, and the joint tests are significant at 1%.

5.1 Repeal of Penal Sanctions and Average Wages

Because our wage and industry location variables vary at the county level, we use a county-year level panel dataset for our analysis of the repeal of penal sanctions.[90] For each county, we use the log of the average prosecutions per capita over the 1858-1875 period as an indicator of the intensity of use of Master and Servant prosecutions. We expect greater effects of repeal in counties with greater intensity of prosecutions because in these counties a widely used mechanism to keep workers with the firm needed to be replaced, while areas that relied less on Master and Servant prosecutions should have been less affected by the change in law. Cross-sectional variation also allows us to distinguish the effects of repeal of penal sanctions from other changes occurring in the British labor market in 1875.[91] Our first question is whether repeal of penal sanctions increased wages, and whether this effect was concentrated in counties with more intensive use of Master and Servant prosecutions. Thus, we estimate the following model:

$$log(wage_{ct}) = \beta_1 Post1875_t \times log(MeanProsecutions_c) + \sum_{t=1851}^{1905} \beta_t X_{c,1851} + \beta_2 X_{ct} + \delta_c + \delta_t + \epsilon_{ct}$$

We regress log wages for a given county-year on average use of Master and Servant prosecutions interacted with a post-repeal dummy variable; on year-specific effects of 1851 income, 1851 population density, 1851 proportion urban, and a Wales dummy; on interpolated values (between census years) of county population, fraction urban, population density, income and union membership; and on county and year fixed effects. The coefficient of interest is on the average prosecutions times post-repeal interaction: we expect a positive coefficient, which would indicate that repeal had a greater positive effect on wages in higher-prosecution counties.[92]

[90] Because our wage and price data cover a greater span of time than our data on prosecutions, our panel now covers the years 1851-1905.

[91] Most importantly, wages secularly rose throughout the period under consideration – showing that wages grew after 1875 would not be a very demanding test of our hypothesis that some component of wage growth was due to the abolition of penal sanctions under Master and Servant law.

[92] The variation in wages that we identify here relies on initial variation in occupational distributions across counties, which generates different cross-sectional effects of time-series variation in industry wages, as well as variation in those wages for which we have a panel dataset (builders' wages and coal miners' wages). We constructed an alternative wage panel dataset that allows occupational distributions to change over time (using linearly interpolated occupational distributions for each county between census years). This dataset allows us to exploit additional variation (due to shifting occupational shares, in addition to shifting wages), but suffers from the concern that some occupational shifting could be endogenous. All of our results in Tables 7 and 8 are confirmed using this alternative wage dataset (regressions available upon request).

In Table 7, we present results using several specifications. In column 1, we leave out the time-varying and interpolated control variables, using as controls only the log of the county population and county and year fixed effects. The results confirm our model's prediction of the effect of repeal: wages rose, and they rose more precisely where repeal should have had the greatest impact. In areas with one standard deviation greater log prosecutions per capita in the 1858-1875 period, wages rose by around 1% more following the repeal of penal sanctions. In column 2, we include interpolated county control variables; in columns 3 and 4, we control for time-varying effects of initial county conditions – in each case, we see that repeal was associated with higher wages precisely in those areas that used Master and Servant prosecutions most.

In Table 7, columns 5-8, we add the (one period) lagged county wage as a control variable in our analysis. In columns 5 and 6, we run OLS regressions without interpolated or time-varying controls, then with both sets of controls. In column 7, we allow for county-specific recession effects to address concerns that business cycles may affect different counties differently, which could create the appearance of wage differences opening over time.[93] Finally, to address concerns over bias in our fixed-effects, lagged dependent variable model, in column 8, we use the Arellano-Bond GMM estimator.[94] In every case, we find that wages increased more in high-prosecution counties after repeal.

An important concern with our analysis of repeal in high- and low-prosecution counties is that the number of prosecutions in a county was not exogenously determined. One is naturally concerned that wages may have followed different trends in high- and low-prosecution counties, and that our post-repeal interaction is merely capturing these different patterns. Thus, we estimate our empirical model of the effects of repeal, but include interactions between prosecutions and dummy variables for five-year time periods (1851-1855, 1856-1860, etc.), instead of simply an interaction between prosecutions and a post-repeal dummy variable. In Figure 9, we plot the coefficients on these dummy variables around the time of repeal, along with the 95% confidence intervals around them. In the figure, it is clear that a large number of prosecutions in a county is initially not associated with significantly greater wages in any five year period – until the 1876-1880 period just after the

[93] We interact a recession indicator with a set of county dummy variables; the recession indicator is based on the dates of business cycle peaks and troughs from Ford (1981).

[94] See Arellano and Bond (1991).

repeal of Master and Servant law's penal sanctions.[95] Though we cannot rule out the possibility that some unobserved change occurred in high-prosecution counties concurrently with the repeal of Master and Servant's penal sanctions, our results suggest that repeal of penal sanctions did raise wages.

5.2 Repeal of Penal Sanctions and the Effect of Labor Demand Shocks on Wages

Our model predicts that the repeal of penal sanctions should have made wages more responsive to labor demand shocks. Employees had to take spot market wages, which reflected contemporaneous demand, without the insurance provided by binding contracts at a pre-specified wage. To test this hypothesis, we estimate the following empirical model:

$$\begin{aligned} log(wage_{ct}) = \beta_1 Post1875_t \times Industry_c \times log(IndustryPrice_t) + \beta_2 Post1875_t \times Industry_c + \\ \beta_3 Industry_c \times log(IndustryPrice_t) + \beta_4 Post1875_t \times log(IndustryPrice_t) + \\ \beta_5 Post1875_t \times log(MeanProsecutions_c) + \sum_{t=1851}^{1905} \beta_t X_{1851} + \beta_6 X_{ct} + \delta_c + \delta_t + \epsilon_{ct} \end{aligned}$$

This is the model used to examine the effect of repeal of penal sanctions on wages, but we add as explanatory variables our industry-level demand shocks (output prices interacted with industry presence) interacted with a dummy variable for post-repeal (plus the additional lower-level interactions). Our model suggests that labor demand shocks should be more strongly (positively) related to wages after the repeal of penal sanctions than before. Thus, we expect the interaction between the post-1875 dummy and the labor demand shock variables to be positive and significant.[96]

In Table 8, we present the results of estimating the empirical model under several specifications. In columns 1-3, we estimate the change in the wage's responsiveness to each individual industry demand shock (without the interpolated county characteristic controls). We can see that after the

[95] Although the 1876-1880 coefficient is not significantly greater than the three coefficients from the pre-repeal period, it is larger than all of them; the 1881-1885 and 1886-1890 coefficients are significantly greater than the pre-repeal coefficients. Finally, the sum of the three post-repeal coefficients is significantly larger than the sum of the three pre-repeal coefficients. All of these t-tests are available upon request.

[96] Note that we do not estimate the "quadruple interaction" of a post-1875 dummy times prosecution intensity times industry output price times industry presence. There is less reason to believe that the responsiveness of wages to labor demand shocks was increasing secularly around 1875 than that wages were growing; thus, exploiting cross-county variation seems less crucial in testing this hypothesis than in testing for wage growth after 1875.

repeal of penal sanctions, wages responded significantly more to labor demand shocks in the textile and coal industries, though there is no effect of repeal on the wage response to iron industry shocks. In column 4, we examine all three industry shocks together, and find similar results (though iron-industry labor demand shocks appear to affect wages slightly *less* after repeal, the result is only marginally significant). In column 5, we add interpolated controls for county population, income, proportion urban, and population density; again we find an increased wage response to industry-specific labor demand shocks in textiles and coal, and no effect in the iron industry. The results for textiles and coal provide a strong confirmation of our model's hypothesis: county wages did respond more to labor demand shocks after the repeal of Master and Servant law's penal sanctions.[97]

We find an additional interesting result: when one accounts for the effects of increased wage responsiveness to labor demand shocks, one finds that the interaction between prosecution intensity and the post-1875 dummy variable is no longer significantly associated with wage levels (see the last variable in Table 8). This suggests that greater wage growth in response to positive labor demand shocks played an important role in raising wages in areas with high levels of prosecutions after those prosecutions ended.

In sum, we showed that the repeal of penal sanctions under the Master and Servant law was associated with greater wage increases in areas with more Master and Servant prosecutions. We also found that labor demand shocks were associated with a greater wage response after repeal than before; it appears that higher wages after repeal in high-prosecution counties were largely a result of wages rising more in response to positive labor demand shocks. Altogether, our results on the effects of repeal provide further suggestive evidence that Master and Servant law's penal sanctions had a significant effect on British labor markets: both wages and adjustments to labor market shocks responded to the repeal of penal sanctions in 1875.

6 Conclusion

Coercive legal restrictions on labor mobility existed in Britain well into the second half of the 19th century: workers could insure themselves against low wages by signing contracts binding them to

[97] We find that wages were more strongly correlated with labor demand shocks even during periods of recession, suggesting that a strong wage response to labor demand shocks could also work against employees; this was the downside of losing long-term contracts (regressions available upon request).

firms, though the contracts were enforced by the threat of imprisonment and forced labor. This threat was made credible by the tens of thousands of prosecutions under the Master and Servant Act in the 1860s and 1870s.

We document that criminal prosecutions were widely applied by employers in response to labor demand shocks: a high marginal revenue product of labor led to greater numbers of prosecutions. We address concerns about endogeneity by using exogenous industry-specific output price shocks for independent variation in labor demand, and examining the resulting prosecutions specifically in areas where affected industries were concentrated. We find that positive labor demand shocks in the mining, iron, and textile industries all produced increased prosecutions, precisely in counties where those industries were located. Coercive contract enforcement was widely used, even in urban England. We find further evidence suggesting that employers used penal sanctions as a substitute for paying higher wages in response to positive labor demand shocks: average wages in high prosecution counties, and the responsiveness of wages to labor demand shocks, increased after the 1875 elimination of criminal prosecutions under Master and Servant law.

Our results extend analyses of implicit contracts in the context of employment at will, and shed light on a number of issues in historical labor economics. First, the widespread use of criminal prosecutions suggests that, indeed, employers valued the ability to legally bind workers even in a modern, industrial economy. Second, consistent with our model, contract enforcement was a more pressing concern for employers during periods of tight labor markets. Third, the abolition of criminal prosecutions under Master and Servant law eliminated the use of legal coercion as a response by employers to the threat of employee departure; thus, employers switched to raising wages in order to retain labor in response to high labor demand. Employees may have paid a price of their own in the loss of insurance provided by long-term contracts, though they were increasingly protected from risk by expanding trade unions.

Historical labor markets have rarely looked like textbook, perfectly competitive markets. Attempts to manage labor mobility have generated a wide variety of legal institutions, ranging from slavery to employment at will. We believe that the study of intermediate cases, such as 19th century Britain, the American South after the Civil War, and the post-emancipation British Caribbean, illuminates the role of legal institutions in securing the supply of effective labor, and represents a rich area for future work.

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Appendix 1: Proofs of Propositions

Proof of Proposition 1: Recall, in the text we define several terms, and make a simplifying assumption that allows us to focus on the case in which the employer's prosecution cut-off is less than the employee's breach cut-off.

We denote by $F(w|\overline{w})$ the lottery over *wages* (excluding the costs of being prosecuted) when the contractual wage is $\overline{w}$. We next assume the following:

$$u(\overline{w} + \frac{c_m}{q}) < u(\overline{w}) + \frac{qc_s}{1-q} \tag{10}$$

for any $\overline{w} \in [0,1]$. This condition, which requires c_m to be sufficiently smaller than c_s, guarantees that $w_s(\overline{w}) > \overline{w} + \frac{c_m}{q}$ for all $\overline{w}$, as it, together with (7) immediately implies that $u(\overline{w} + \frac{c_m}{q}) < u(w_s(\overline{w}))$.

We denote by r_s the risk premium associated with the spot market gamble, and it is defined by $u(\frac{1}{2} - r_s) = \int_0^1 u(w)dw$. Likewise, we denote by $r_c(\overline{w})$ the risk premium associated with the analogous wage lottery $F(w|\overline{w})$.

We can now prove the existence of a subgame perfect Nash equilibrium when $r_s - (c_m + qc_s) > 0$ is sufficiently large.

We have constructed $B(w|\overline{w})$ and $P(w)$ already to be dominant strategies in each subgame. It remains to be shown that there is a $\overline{w}$ such that the employee will accept the contract, and such that the employer is better off offering a contract at $\overline{w}$ than hiring on the spot market. For the first condition, we require that the employee's expected utility of accepting the contract is greater than his expected utility taking the spot market wage:

$$\int_0^1 u(w)dw \leq \int_0^1 u(w)dF(w|\overline{w}) - qc_s(1 - w_s(\overline{w})) \tag{11}$$

Offering the contract will be profitable for the employer if his expected payoff under the contract exceeds that under the spot market:

$$\pi - \frac{1}{2} \leq \pi - \int_0^1 wdF(w|\overline{w}) - c_m(1 - w_s(\overline{w})) \tag{12}$$

We need to show that there exists a $\overline{w}$ such that both (11) and (12) hold.

We next write the certainty equivalent wage to a wage lottery $F(w|\overline{w})$ as $CE(\overline{w})$, so that $u(CE(\overline{w})) = E[u(w)|\overline{w}] = \int_0^1 u(w)dF(w|\overline{w})$. We can plug our definition of the certainty equivalent of the wage lottery associated with the contract into equation (11), then use the fact that the certainty equivalent of the lottery is the expected wage under the lottery less a risk premium, to re-write the employee's participation constraint as the following:

$$\int_0^1 wdF(w|\overline{w}) - r_c(\overline{w}) - qc_s(1 - w_s(\overline{w})) \geq \frac{1}{2} - r_s \tag{13}$$

As noted above, $r_c(\overline{w})$ and r_s are the risk premia associated with the contract $\overline{w}$ and the uniform wage distribution on $[0, 1]$ in the spot market, respectively.

Equivalently, the employee requires the following:

$$\int_0^1 wdF(w|\overline{w}) - qc_s(1 - w_s(\overline{w})) - r_c(\overline{w}) + r_s \geq \frac{1}{2} \tag{14}$$

The employer's profitability constraint is satisfied if the following holds:

$$\int_0^1 wdF(w|\overline{w}) + c_m(1 - w_s(\overline{w})) \leq \frac{1}{2} \tag{15}$$

Thus, a sufficient condition for both constraints to be satisfied is:

$$\int_0^1 wdF(w|\overline{w}) - qc_s(1 - w_s(\overline{w})) - r_c(\overline{w}) + r_s \geq \frac{1}{2} \geq \int_0^1 wdF(w|\overline{w}) + c_m(1 - w_s(\overline{w})) \tag{16}$$

Suppose the employee's participation constraint is binding; then we require the following condition to hold:

$$\int_0^1 wdF(w|\overline{w}) - qc_s(1 - w_s(\overline{w})) - r_c(\overline{w}) + r_s \geq \int_0^1 wdF(w|\overline{w}) + c_m(1 - w_s(\overline{w})) \tag{17}$$

This can be rearranged to yield the following:

$$r_s - (c_m + qc_s)(1 - w_s(\overline{w})) \geq r_c(\overline{w}) \tag{18}$$

This condition is satisfied if $r_s - (c_m + qc_s)$ is sufficiently large, because $(1 - w_s(\overline{w})) < 1$.

A more intuitive form of the last inequality is the following:

$$r_s - r_c(\overline{w}) \geq (c_m + qc_s)(1 - w_s(\overline{w})) \tag{19}$$

It shows that mutually-beneficial contracts will be signed in equilibrium when the difference in the risk premia between the spot market and the contract is sufficiently high, relative to the costs to the two parties of enforcement by prosecution.

Under the assumptions specified, a $\overline{w}$ exists that leaves both employers and employees at least as well off as entering the spot market. Because, in our model, the employer makes a contractual offer to the employee, the equilibrium contract wage will be the $\overline{w}$ in the set of mutually beneficial contracts that minimizes the employer's expected costs.

This concludes the proof.

Proof of Proposition 2: Proposition 2 follows immediately from the partition of the outside wage distribution induced by $\overline{w}$. If $w > w_s(\overline{w})$ then the worker leaves and the employer prosecutes. Otherwise we see no prosecutions. Note that for $w \in (\overline{w} + \frac{c_m}{q}, w_s(\overline{w})]$ no actual prosecutions occur, because the employee does not leave owing to the credible threat of prosecution.

Proof of Proposition 3: Define the observed wage $w^o(w)$ as a function of the spot market wage w. This is the wage observed on average given a realization of the spot market wage w. Thus we have:

$$w^o(w) = \begin{cases} \overline{w} & \text{if } w \leq \overline{w} \\ w & \text{if } \overline{w} < w \leq \overline{w} + \frac{c_m}{q} \\ \overline{w} & \text{if } \overline{w} + \frac{c_m}{q} < w \leq w_s(\overline{w}) \\ qw + (1-q)\overline{w} & \text{if } w_s(\overline{w}) < w \leq 1 \end{cases} \tag{20}$$

Then Proposition 3 follows immediately from the observation that a labor demand shock that results in a spot market wage between $\overline{w} + \frac{c_m}{q}$ and $w_s(\overline{w})$ results in a *lower* observed wage than the observed wage resulting from a labor demand shock that produces a spot market wage between $\overline{w}$ and $\overline{w} + \frac{c_m}{q}$.

Proof of Proposition 4: If $q = 0$, then employers never prosecute for positive c_m. Thus their

expected wage bill for any contract $\overline{w}$ is $\overline{w}^2 + (1 - \overline{w})(1 + \overline{w})/2$ which is minimized at $\overline{w} = 0$ and gives them an expected wage payment of $\frac{1}{2}$ – exactly the expected wage payment when entering the spot market. Thus employers never profit from contracted labor vis-a-vis the spot labor market, and a new equilibrium arises in which employers go to the spot market, rather than offer a contract.

Note that this implies the two other predictions. First, average wages rise after repeal, as the only wage observed is in the spot market. The average spot market wage is $\frac{1}{2}$, and this must be greater than the average wage when prosecutions were available (under the assumption made that a contract was signed), because the employer's participation constraint implies that:

$$E[w|\overline{w}] < E[w|\overline{w}] + c_m(1 - w_s(\overline{w})) \leq \frac{1}{2} \tag{21}$$

Second, repeal increases the correlation of the observed wage and the spot market wage, and thus the labor demand shock. Note that, trivially, the observed wage (i.e., the spot market wage) responds 1 for 1 with respect to the spot market wage – the correlation of observed and spot market wages is 1 if prosecution is not available to employers. The correlation between observed and spot market wages is strictly less than 1 when prosecutions are available (under the assumption made that a contract was signed), as for any spot market wage less than the contractual wage, the observed wage does not change in response to the change in the spot market wage.

This concludes the proof.

Appendix 2: Data

In Section 4.1, we provide a brief description of the data used in our empirical analysis. Here, we provide a more detailed discussion of the sources of our data as well as the construction of variables.

Prosecutions

The prosecutions of labor-market-related criminal offenses (Master and Servant, anti-vagrancy, and anti-begging) come from *Judicial Statistics, England and Wales*, covering the years 1858-1875. These are recorded for each year at the district level under the headings "Servants, Apprentices, or Masters, Offenses relating to," "Having no visible Means of Subsistence, &c., " and "Begging." We sum district-level data by county to generate county-level prosecutions for each year. The measure of anti-vagrancy prosecutions used in our empirical analysis is the sum of anti-vagrancy and anti-begging prosecutions in a district (or county, in some specifications) in each year.

County Characteristics

Our analysis of sector-specific labor demand shocks requires us to identify districts (in practice, counties) where iron, coal, and textile production were located in the second half of the 19th century. A continuous measure of industry presence is available for textile production: the share of the male labor force in the "textile" category in a county in 1851 (occupational distributions from British censuses are available on the UK data archive website, study 4559 (Southall et al., 2004). Because the census occupational categories that include coal mining and iron production also include employment in other sectors, we use dummy variables to indicate production of coal and of pig iron, respectively. Our list of coal-producing counties comes from counties listed in Mitchell (1988), *Fuel and Energy*, 3 and *Fuel and Energy*, 5, compared with discussion and maps in Church (1986). Counties that produced pig iron are identified from Mitchell (1988), *Metals*, 2. The county characteristics that we use as control variables in our analyses come from several sources. Each county's proportion urban, log income and log population are available for the census years online, at the UK data archive website, study 430 (Hechter, 1976). In our analyses, we either use 1851 values of these county characteristics, and allow them to have year-specific effects, or we linearly interpolate values between census years. To control for the effects of unionization on prosecutions or wages, we use data on membership in the Amalgamated Society of Engineers, measured at the county-year level. County-years with no branch membership listed are assigned values of zero. These data come from the UK data archive website, study 3712 (Southall et al., 1998). Finally,

we generate a recession indicator variable using dates of business cycle peaks and troughs between 1860 and 1914, taken from Ford (1981), and allow recessions to have county-specific effects in some of our specifications.

Prices

We use three price time series to indicate sector-specific changes in labor demand. For the coal sector, we use the log of an index of the coal price at the pithead, taken from Church (1986), Table 1.9. To generate his index, Church uses prices received by eight to twelve collieries (depending on the year) across Britain, for years prior to 1882 (collieries include Middleton colliery, near Leeds, Elphinstone colliery, in Scotland, and Cannock Chase colliery in Staffordshire, among others; details are in Church's table notes). Beginning in 1882, he uses pithead prices compiled in *Mineral Statistics*, an official publication.

For the iron sector, we use the log of the price (in shillings per ton) of Scottish pig iron found in Mitchell (1988), *Prices*, 20.B. These prices were originally collected by Augustus Sauerbeck, and published in the *Journal of the Statistical Society* in 1886 ("Prices of Commodities and the Precious Metals"), then updated thereafter in the same publication. (Cleveland pig iron prices are listed in Mitchell (1988), but only beginning in 1865; prices of Scottish pig iron track those of Cleveland pig iron very closely throughout the period we study.)

For cotton textiles, we use the log of the ratio of the output price of cotton textiles to the price of raw cotton, in order to capture changes in the output price of textiles that were not merely due to fluctuations in cotton prices. The prices of cotton textile output (in pence per linear yard) come from Mitchell (1988), *Prices*, 19. The prices reported are the average value of cotton piece goods exported in each year, not actual prices received by individual textile producers. The original sources for these data are *The Cotton Trade of Great Britain*, by T. Ellison (for prices prior to 1885) and the *Annual Statement of Trade* (from 1885 on). We convert the price per linear yard of textile output into the price per pound of output using Robson's (1957) conversion factor of 5.47895 linear yards per pound of cotton piece good exports (this has no effect on the analysis, but makes the interpretation of the relative output price more straightforward). See Robson (1957), Table A.1, p. 333. The cotton input prices (in pence per pound of "Upland or Middling American" cotton) come from Mitchell (1988), *Prices*, 18.B. The original sources are *Sessional Papers of Parliament* (1903), vol. 68, for years prior to 1903, and Augustus Sauerbeck, "Prices of Commodities and the Precious

Metals," *Journal of the Royal Statistical Society* (1904, then updated), for years after 1902.

Wages

We construct a panel dataset of wages at the county-year level by combining several wage datasets. First, we use a panel of wages at the city-year level taken from the U.K. Data Archive, study 3710 (Southall et al., 1999). These wages were initially collected by Southall, Gilbert, and Gregory from *Rates of Wages and Hours of Labour in various industries in the United Kingdom for a series of years*, a report of the Board of Trade Labour Department. We calculate a wage index for carpenters, painters, and bricklayers and average these to create a single builders' wage index at the city-year level. We then assign to each county-year the average builders' wage index value for the cities in that county in the relevant year.

Coal hewers' wages at the region-year level are taken from an index found in Church (1986), Table 7.15. The regions are the following: Scotland, the Northeast of England, Cumberland, Lancashire and Cheshire, North Wales, Yorkshire, the East Midlands, the West Midlands, South Wales, and the Southwest of England. We assign each coal-producing county in our dataset to one of these regions. The original sources of these data for years prior to 1871 are a variety of official publications and academic publications (for example, a report by the Midland Mining Commission, and several PhD theses). Beginning in 1871, publications from the Board of Trade provide most of the information ("Rates of Wages and Hours of Labor in Various Industries in the United Kingdom, 1850-1905" and "Annual Returns of Rates of Wages and Hours of Labor, 1893-1913"), though Church supplements this material with other information from both official and scholarly publications (for example, a publication by the Royal Commission on Labor).

Time series of agricultural workers' wages, engineers' wages, and cotton factory workers' wages are taken from Mitchell (1988), *Labour Force*, Table 25. The original sources for this table are articles published by A.L. Bowley and G.H. Wood in the *Journal of the Royal Statistical Society* in 1898 and 1899, and A.L. Bowley's *Wages and Income since 1860*.

We convert each wage dataset into an index with value 100 in the year 1900. Then, we combine the several wage indices to produce a panel of wages at the county-year level, using each county's occupational distribution in the 1851 British census (taken from the UK data archive website, study 4559 (Southall et al., 2004)) to weight each index in a given county-year. Specifically, we calculate a wage at the county-year level by weighting each wage index by men's employment in the relevant

industry, relative to men's employment in all of the county's industries for which we have wage data. For example, a coal-producing county for which builders' wages are available would have its coal wage in a given year multiplied by the number of men in that county in 1851 working in mining, divided by the number of men in that county working in mining, agriculture, engineering of various sorts, textiles, and construction in 1851.

As noted in the text, we also constructed an alternative wage panel that allowed occupational shares in each county to vary over time. In this case, a coal-producing county for which builders' wages are available would have its coal wage in a given year multiplied by the *interpolated* number of men in that county working in mining in that year, divided by the *interpolated* number of men in that county working in mining, agriculture, engineering of various sorts, textiles, and construction in that year (where the interpolations are based on census data taken from the UK data archive website, study 4559 (Southall et al., 2004)).

Table 1: Master and Servant Acts and Related Legislation

Year	Act	Coverage or Action
1349/1351	Statute of Laborers (25 Edw. III st. 2)	All but artisans and landholders required to work for set wages
1562/1563	Statute of Artificers (5 Eliz. c. 4)	"
1720	7 Geo. I, stat. I, c. 13	Journeymen tailors
1722	9 Geo. I, c. 27	Journeymen shoemakers
1747	20 Geo. II, c. 19	Artificers, handicraftsmen, miners, colliers, and others
1813	53 Geo. III, c. 40	Repeals wage setting provisions of 1563 statute
1823	Master and Servant Act (4 Geo. IV c. 34)	Codifies the general use of penal sanctions for contract breach
1844	Failed Master and Servant Act Reform	Attempts to extend and clarify 1823 Act
1867	Lord Elcho's Act (30 and 31 Vict. c. 141)	Fines become standard punishment
1871	Trade Union Act (34 and 35 Vict. c. 31)	Officially legalizes unions
1871	Criminal Law Amendment Act (34 and 35 Vict. c. 32)	Makes union activity illegal when individual behavior illegal
1875	Employers and Workmen Act of 1875 (38 and 39 Vict. c. 90)	De-criminalizes contract breach
1875	Conspiracy and Protection of Property Act (38 and 39 Vict. c. 86)	Regulates union behavior

Table 2A: Summary Statistics, Prosecutions Analysis

Variable	Obs	Mean	Std. Dev.	Min	Max
District Panel Data					
Master and Servant Prosecutions	3942	47.72	120.30	0	2342
Vagrancy Prosecutions	3942	60.62	156.30	0	4008
Urban Dummy	3942	0.74	0.44	0	1
County Panel Data					
Master and Servant Prosecutions/1000	936	0.46	0.36	0	3.14
Vagrancy Prosecutions/1000	936	0.62	0.40	0	3.09
Population	936	412.38	595.91	20.2	3478.80
Union Membership	936	52.34	56.29	0	243.75
Cross-Sectional County Data					
Fraction Employed in Textiles in 1851	52	0.05	0.07	0	0.28
Iron County Dummy	52	0.48	0.50	0	1
Coal Producing County Dummy	52	0.38	0.49	0	1
Population Density 1851	52	0.96	4.15	0.1	30.28
Income 1851	52	10.48	2.88	4.38	16.39
Wales Dummy	52	0.25	0.44	0	1
Proportion Urban	52	0.12	0.19	0	1
Time-Series Data					
Log Cotton Price Ratio	18	0.72	0.28	0.18	1.12
Log Coal Price	18	4.04	0.29	3.77	4.78
Log Iron Price	18	4.11	0.25	3.90	4.76

Cross-Sectional County-Level Correlations

Master and Servant Prosecutions/1000	1									
Vagrancy Prosecutions/1000	0.32	1								
Fraction Employed in Textiles in 1851	0.27	0.02	1							
Iron County Dummy	0.33	0.10	0.23	1						
Coal Producing County Dummy	0.49	0.09	0.52	0.43	1					
Population Density 1851	-0.13	-0.15	0.01	-0.14	-0.09	1				
Income 1851	0.15	0.18	-0.07	-0.43	-0.20	0.19	1			
Wales Dummy	-0.08	0.04	-0.25	0.6	0.09	-0.10	-0.54	1		
Proportion Urban	0.04	0.01	0.43	-0.07	0.32	0.68	0.06	-0.33	1	
Union Membership	0.13	0.06	0.50	-0.06	0.34	0.32	-0.02	-0.45	0.71	1

Sources: See Appendix 2.

Table 2B: Summary Statistics, Repeal Analysis

Variable	Obs	Mean	Std. Dev.	Min	Max
County Panel Data					
Log County Wage Index	2860	4.46	0.14	3.84	4.71
Union Membership	2860	63.37	67.85	0	307.33
Population Density	2860	1.41	6.64	0.04	63.55
Proportion Urban	2860	52.34	56.29	0	243.75
Log Income	2860	2.52	0.33	1.48	3.74
Population	2860	476.72	740.14	14.2	4766.40
Cross-Sectional County Data					
Log Average Prosecutions per 1,000 people, in 1858-1875 period	52	-0.98	0.72	-3.03	0.25
Fraction Employed in Textiles in 1851	52	0.05	0.07	0	0.28
Iron County Dummy	52	0.48	0.50	0	1
Coal Producing County Dummy	52	0.38	0.49	0	1
Population Density 1851	52	0.96	4.15	0.1	30.28
Income 1851	52	10.48	2.88	4.38	16.39
Wales Dummy	52	0.25	0.44	0	1
Proportion Urban	52	0.12	0.19	0	1
Time-Series Data					
Log Cotton Price Ratio	55	0.94	0.25	0.18	1.29
Log Coal Price	55	4.03	0.24	3.57	4.78
Log Iron Price	55	3.99	0.22	3.68	4.76

Cross-Sectional County-Level Correlations

Log Average Prosecutions per 1,000 people, in 1858-1875 period	1								
Fraction Employed in Textiles in 1851	0.27	1							
Iron County Dummy	0.21	0.23	1						
Coal Producing County Dummy	0.47	0.52	0.43	1					
Population Density 1851	-0.14	0.01	-0.14	-0.09	1				
Income 1851	0.22	-0.07	-0.43	-0.20	0.19	1			
Wales Dummy	-0.15	-0.25	0.60	0.09	-0.10	-0.54	1		
Proportion Urban	0.09	0.43	-0.07	0.32	0.68	0.06	-0.33	1	
Union Membership	0.21	0.44	-0.06	0.37	0.31	-0.06	-0.42	0.72	1

Sources: See Appendix 2.

Table 3A: Reduced Form Sectoral Shocks on Master and Servant Prosecutions

	(1)	(2)	(3)	(4)	(5)	(6)
Fraction Textiles 1851 X Log(Cotton Price Ratio)	209.7***			158.6***	145.1***	141.1***
	(42.26)			(41.87)	(46.40)	(39.11)
Iron County X Log(Iron Price)		76.03***		52.05**	64.63**	67.32**
		(22.90)		(19.49)	(27.84)	(33.18)
Coal County X Log(Coal Price)			68.32***	41.23***	35.55**	27.37***
			(15.90)	(10.12)	(14.33)	(8.441)
Log(Population)	145.2***	124.8***	73.26*	78.91**	41.67	52.86
	(50.57)	(42.20)	(36.68)	(35.10)	(36.19)	(115.5)
F-statistic p-value on joint significance				0.0000	0.0000	0.0000
District FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Time-Varying Controls	N	N	N	N	Y	Y
County-Specific Trends	N	N	N	N	N	Y
N	3942	3942	3942	3942	3942	3942

Dependent variable is absolute number of master and servant prosecutions. Standard errors, clustered on county, included in parentheses. Time varying controls are year specific effects of 1851 income, 1851 population density, 1851 proportion urban, and a Wales dummy. * p<0.1, ** p<0.05, *** p<0.01

Table 3B: Reduced Form Sectoral Shocks on Vagrancy and Begging Prosecutions

	(1)	(2)	(3)	(4)	(5)	(6)
Fraction Textiles 1851 X Log(Cotton Price Ratio)	7.476			31.79	43.28	22.44
	(85.78)			(77.97)	(74.04)	(66.68)
Iron County X Log(Iron Price)		-26.50		-14.70	12.85	-12.75
		(43.28)		(30.19)	(9.838)	(12.10)
Coal County X Log(Coal Price)			-28.34	-23.10	-11.30	0.914
			(39.44)	(28.48)	(9.008)	(16.33)
Log(Population)	132.6	143.0	166.3	164.5	15.16	91.63
	(80.62)	(93.88)	(120.3)	(117.7)	(19.29)	(117.6)
F-statistic p-value on joint significance				0.841	0.276	0.703
District FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Time-Varying Controls	N	N	N	N	Y	Y
County-Specific Trends	N	N	N	N	N	Y
N	3942	3942	3942	3942	3942	3942

Dependent variable is absolute number of master and servant prosecutions. Standard errors, clustered on county, included in parentheses. Time varying controls are year specific effects of 1851 income, 1851 population density, 1851 proportion urban, and a Wales dummy. * p<0.1, ** p<0.05, *** p<0.01

Table 4A: County Level Robustness: Reduced Form Sectoral Shocks on Master and Servant Prosecutions

	(1)	(2)	(3)	(4)	(5)	(6)
	Number of Prosecutions		Prosecutions Per Capita		Log(Prosecutions Per Capita)	
Fraction Textiles 1851 X Log(Cotton Price Ratio)	1610.7**	1415.1*	0.765**	0.860**	1.801***	1.692**
	(700.1)	(730.0)	(0.367)	(0.391)	(0.639)	(0.762)
Iron County X Log(Iron Price)	187.6**	405.9**	0.293**	0.322	0.350*	0.335*
	(92.11)	(198.8)	(0.122)	(0.194)	(0.182)	(0.181)
Coal County X Log(Coal Price)	233.9***	88.49	0.293***	0.292**	0.325**	0.271
	(78.05)	(86.09)	(0.0906)	(0.120)	(0.139)	(0.172)
Log(Population)	414.0**	173.9	-0.0867	-0.0838	-0.335	-0.406
	(171.7)	(108.4)	(0.223)	(0.252)	(0.385)	(0.440)
F-statistic p-value on joint significance	0.030	0.076	0.000	0.000	0.000	0.004
County FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Time-Varying Controls	N	Y	N	Y	N	Y
N	936	936	936	936	930	930

Dependent variable at the top of each column. Standard errors, clustered on county, included in parentheses. Time varying controls are year specific effects of 1851 income, 1851 population density, 1851 proportion urban, and a Wales dummy. * p<0.1, ** p<0.05, *** p<0.01

Table 4B: County Level Robustness: Reduced Form Sectoral Shocks on Vagrancy and Begging Prosecutions

	(1)	(2)	(3)	(4)	(5)	(6)
	Number of Prosecutions		Prosecutions Per Capita		Log(Prosecutions Per Capita)	
Fraction Textiles 1851 X Log(Cotton Price Ratio)	101.9	306.4	0.430	0.354	0.883	0.903
	(658.7)	(657.6)	(0.425)	(0.510)	(0.670)	(0.793)
Iron County X Log(Iron Price)	-72.20	90.10	-0.0887	0.076	-0.246	0.116
	(146.1)	(79.51)	(0.103)	(0.134)	(0.224)	(0.206)
Coal County X Log(Coal Price)	-59.61	-55.48	-0.00727	0.025	0.0229	0.105
	(92.64)	(48.91)	(0.102)	(0.118)	(0.194)	(0.235)
Log(Population)	555.1	120.6**	0.103	0.050	0.123	-0.0629
	(343.7)	(48.59)	(0.208)	(0.207)	(0.447)	(0.340)
F-statistic p-value on joint significance	0.925	0.579	0.604	0.802	0.375	0.555
County FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Time-Varying Controls	N	Y	N	Y	N	Y
N	936	936	936	936	931	931

Dependent variable at the top of each column. Standard errors, clustered on county, included in parentheses. Time varying controls are year specific effects of 1851 income, 1851 population density, 1851 proportion urban, and a Wales dummy.* p<0.1, ** p<0.05, *** p<0.01

Table 5A: District Level Robustness of Sectoral Shocks on Master and Servant Prosecutions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	1858-1871 subsample					Excluding Wales	
Fraction Textiles 1851 X Log(Cotton Price Ratio)	119.84***			125.13***	117.37**	153.5***	149.6***
	(40.76)			(41.38)	(44.64)	(42.16)	(47.18)
Iron County X Log(Iron Price)		67.64**		66.35**	57.38	63.47**	66.21**
		(29.82)		(31.18)	(42.83)	(27.02)	(27.51)
Coal County X Log(Coal Price)			55.12**	46.38**	1.61	41.65***	36.81**
			(22.79)	(22.61)	(16.97)	(12.12)	(16.82)
Log(Population)	60.72**	52.28**	36.58	41.42*	43.65*	55.96	25.20
	(26.58)	(23.49)	(24.17)	(24.44)	(25.31)	(42.91)	(44.15)
F-statistic p-value on joint significance				0.008	0.049	0.000	0.000
District FE	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y
Time-Varying Controls	N	N	N	N	Y	N	Y
Union Membership Control	Y	Y	Y	Y	Y	N	N
N	3066	3066	3066	3066	3066	3528	3528

Dependent variable is absolute number of master and servant prosecutions. Standard errors, clustered on county, included in parentheses. Time varying controls are year specific effects of 1851 income, 1851 population density, 1851 proportion urban, and a Wales dummy. * p<0.1, ** p<0.05, *** p<0.01

Table 5B: District Level Robustness of Sectoral Shocks on Vagrancy and Begging Prosecutions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	1858-1871 subsample					Excluding Wales	
Fraction Textiles 1851 X Log(Cotton Price Ratio)	-24.28			-31.60	-19.46	33.39	52.21
	(67.65)			(70.48)	(62.33)	(78.35)	(75.11)
Iron County X Log(Iron Price)		-75.98		-75.11	-4.34	-14.96	13.10
		(84.60)		(79.62)	(39.34)	(33.36)	(9.830)
Coal County X Log(Coal Price)			-21.82	-13.26	-3.81	-28.05	-10.33
			(43.86)	(38.73)	(21.69)	(35.26)	(10.60)
Log(Population)	102.59	107.49	111.18	110.74	-21.08	210.0	5.364
	(80.91)	(84.56)	(91.12)	(92.46)	(36.17)	(171.7)	(27.72)
F-statistic p-value on joint significance				0.818	0.986	0.849	0.405
District FE	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y
Time-Varying Controls	N	N	N	N	Y	N	Y
Union Membership Control	Y	Y	Y	Y	Y	N	N
N	3066	3066	3066	3066	3066	3528	3528

Dependent variable is absolute number of vagrancy and begging prosecutions. Standard errors, clustered on county, included in parentheses. Time varying controls are year specific effects of 1851 income, 1851 population density, 1851 proportion urban, and a Wales dummy.* p<0.1, ** p<0.05, *** p<0.01

Table 6A: Reduced Form Sectoral Shocks on Master and Servant Prosecutions (Urban vs Rural Samples)

	Urban Sample					Rural Sample				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Fraction Textiles 1851 X Log(Cotton Price Ratio)	154.8***			136.3***	114.6**	517.4***			342.9**	306.0**
	(48.40)			(45.82)	(44.98)	(142.3)			(132.9)	(133.1)
Iron County X Log(Iron Price)		23.17*		10.76	10.68		203.7***		137.0**	289.3***
		(11.77)		(10.15)	(6.498)		(75.34)		(58.40)	(96.06)
Coal County X Log(Coal Price)			27.48***	18.07**	8.097			203.2***	145.2***	10.44
			(9.405)	(8.399)	(8.089)			(62.56)	(45.78)	(33.35)
Log(Population)	65.58**	57.65*	34.97	34.33	1.769	364.5**	380.4**	208.3*	248.9**	5.379
	(28.90)	(29.10)	(28.18)	(26.61)	(22.58)	(175.6)	(148.6)	(116.2)	(113.7)	(105.6)
F-statistic p-value on joint significance				0.0131	0.0321				0.0025	0.0010
District FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Time-Varying Controls	N	N	N	N	Y	N	N	N	N	Y
N	2898	2898	2898	2898	2898	1044	1044	1044	1044	1044

Dependent variable is absolute number of master and servant prosecutions. Standard errors, clustered on county, included in parentheses. Time varying controls are year specific effects of 1851 income, 1851 population density, 1851 proportion urban, and a Wales dummy. * p<0.1, ** p<0.05, *** p<0.01

Table 6B: Reduced Form Sectoral Shocks on Vagrancy and Begging Prosecutions (Urban vs Rural Samples)

	Urban Sample					Rural Sample				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Fraction Textiles 1851 X Log(Cotton Price Ratio)	0.980			38.35	78.41	-27.69			-34.29	-11.19
	(87.01)			(72.61)	(74.53)	(111.1)			(117.2)	(194.3)
Iron County X Log(Iron Price)		-41.80		-21.53	14.53*		16.37		15.58	8.681
		(59.96)		(39.59)	(7.702)		(20.42)		(20.86)	(36.69)
Coal County X Log(Coal Price)			-44.91	-36.73	-13.49*			7.323	2.441	-17.93
			(55.44)	(40.09)	(7.452)			(21.38)	(22.69)	(27.47)
Log(Population)	137.2	164.9	199.4	200.5	-12.32	171.1**	170.5***	164.3**	169.4***	115.7*
	(109.4)	(140.9)	(177.3)	(179.0)	(14.32)	(64.89)	(62.98)	(61.45)	(61.93)	(61.53)
F-statistic p-value on joint significance				0.764	0.257				0.880	0.901
District FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Time-Varying Controls	N	N	N	N	Y	N	N	N	N	Y
N	2898	2898	2898	2898	2898	1044	1044	1044	1044	1044

Dependent variable is absolute number of vagrancy and begging prosecutions. Standard errors, clustered on county, included in parentheses. Time varying controls are year specific effects of 1851 income, 1851 population density, 1851 proportion urban, and a Wales dummy. * p<0.1, ** p<0.05, *** p<0.01

Table 7: Effect of Repeal on Wages, by Average Prosecutions

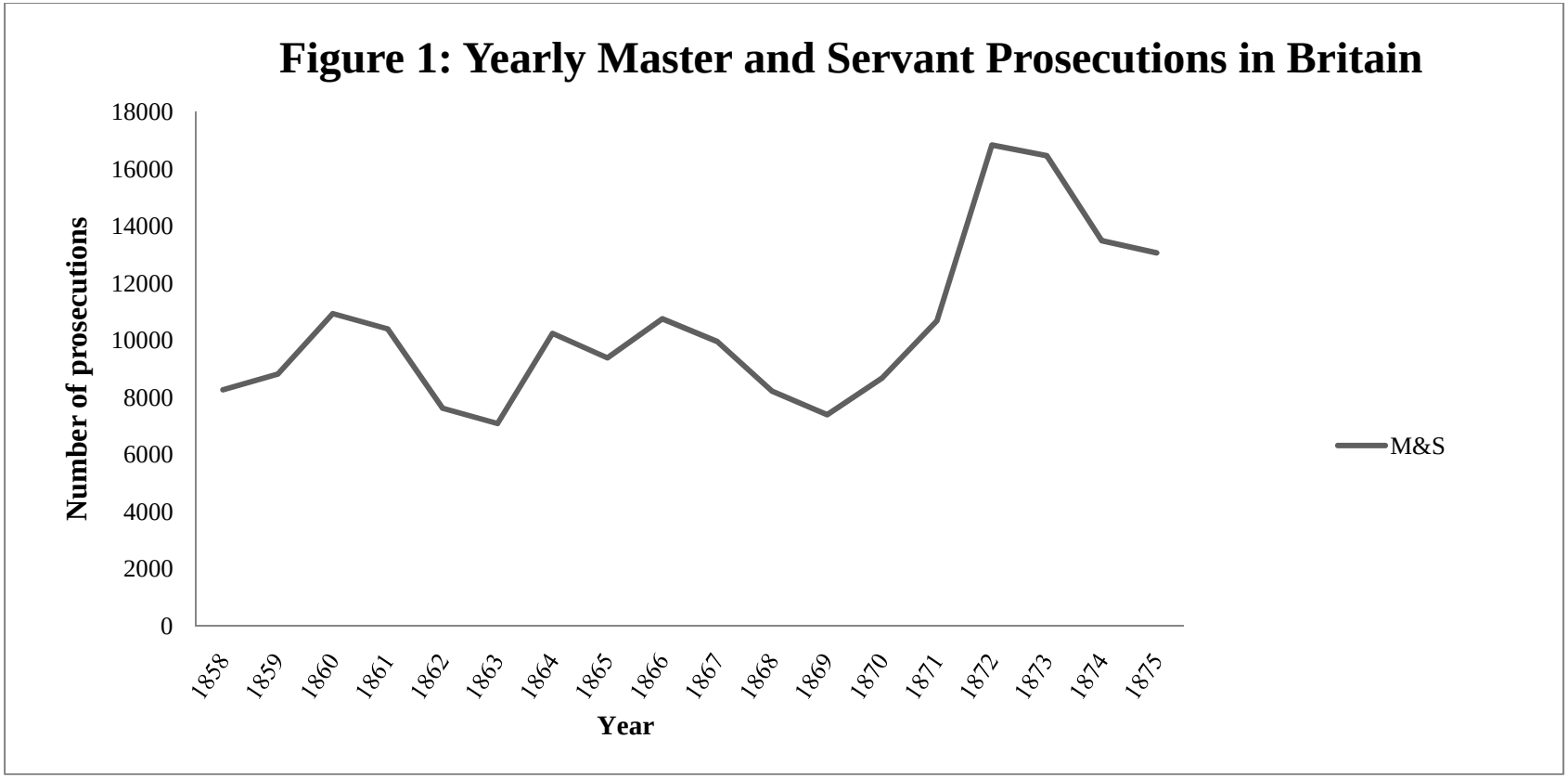
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8) Arellano-Bond
Post-1875 X Log (Average Prosecutions per 1000)	0.0166**	0.0188**	0.0130*	0.0130	0.00271*	0.00345**	0.00526**	0.00693***
	(0.00807)	(0.00817)	(0.00719)	(0.00791)	(0.00137)	(0.00127)	(0.00172)	(0.00158)
Population Density		0.000292		-0.0541		-0.00915	-0.0105	
		(0.00110)		(0.0672)		(0.00919)	(0.00805)	
Proportion Urban		-0.0507		-0.0504		-0.00313	0.0009	
		(0.0401)		(0.0437)		(0.00433)	(0.00218)	
Log(Income)		0.0433		0.0214		0.00445	0.00421	
		(0.0327)		(0.0382)		(0.00536)	(0.00352)	
Log(Population)	0.0834**	0.0897***	0.0559**	0.0896**		0.0137**	0.0177***	
	(0.0258)	(0.0280)	(0.0219)	(0.0430)		(0.00650)	(0.00588)	
Lagged Log(Wage)					0.872***	0.834***	0.849***	0.865***
					(0.0205)	(0.0221)	(0.0125)	(0.0130)
County FE	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Time-Varying Controls	N	N	Y	Y	N	Y	Y	Y
County-specific recession effect	N	N	N	N	N	N	Y	Y
N	2860	2860	2860	2860	2808	2808	2392	2340

Dependent variable is log county wage. Standard errors (in parentheses) are clustered by county, except in the case of the Arellano-Bond estimator, where GMM standard errors are reported. Proportion urban, log income and log population are interpolated between census years. All regressions control for membership in the Amalgamated Society of Engineers, measured at the county-year level. Time varying controls are year specific effects of 1851 income, 1851 population density, 1851 proportion urban, and a Wales dummy. The county-specific effect of a recession is a recession indicator (taken from peaks and troughs between 1860 and 1905 noted in Ford, 1981) interacted with a set of county dummy variables. * p<0.1, ** p<0.05, *** p<0.01

Table 8: Reduced Form Sectoral Shocks on Wages, Pre and Post Master & Servant Repeal

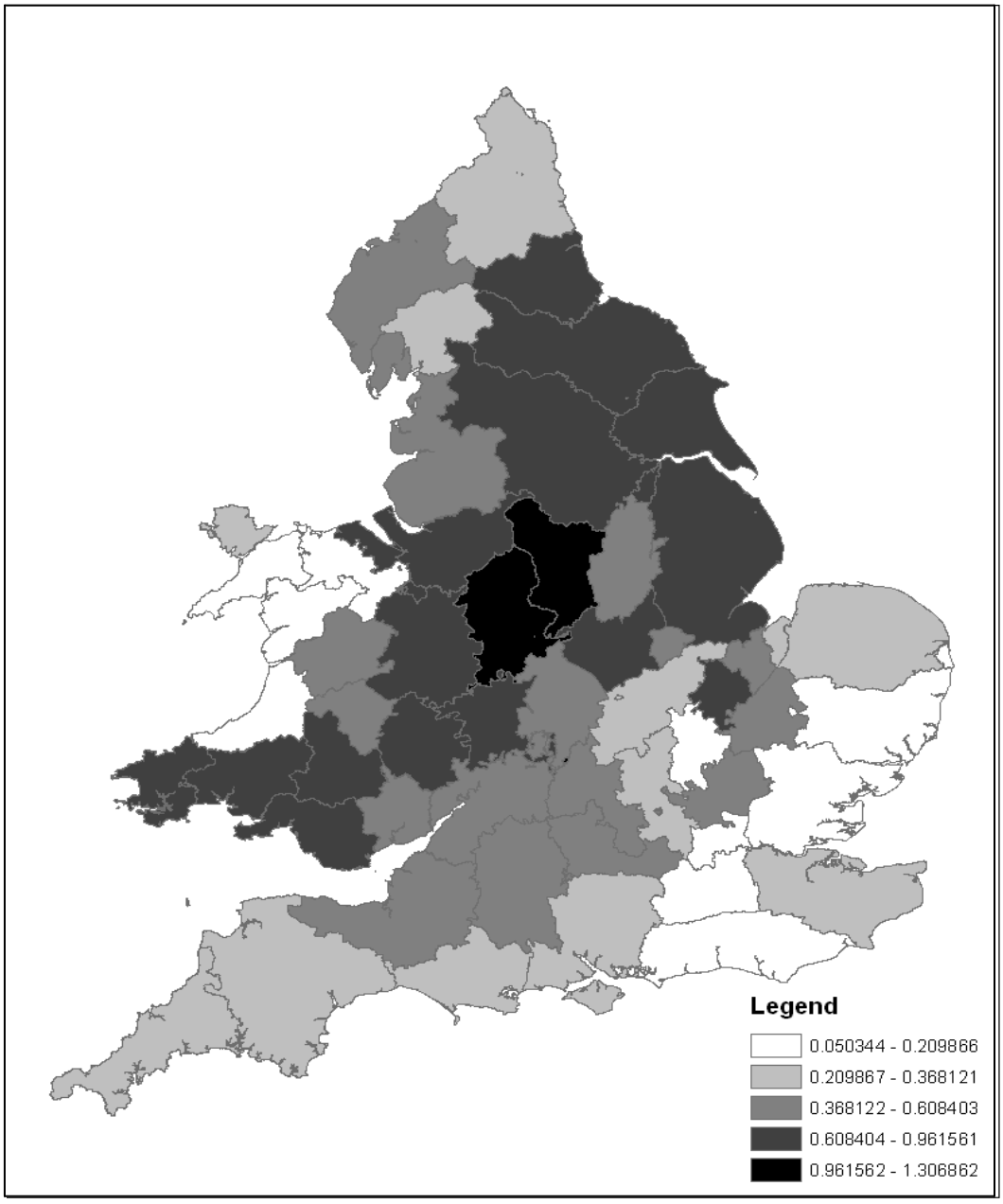
	(1)	(2)	(3)	(4)	(5)
Post-1875 X Fraction Textiles 1851 X Log(Cotton Price Ratio)	0.356**			0.275*	0.295*
	(0.175)			(0.162)	(0.150)
Fraction Textiles 1851 X Log(Cotton Price Ratio)	-0.0397			-0.0315	-0.0241
	(0.103)			(0.103)	(0.101)
Post-1875 X Fraction Textiles 1851	-0.0431			-0.0748	-0.0901
	(0.131)			(0.136)	(0.126)
Post 1875 X Iron County X Log(Iron Price)		-0.00908		-0.0469*	-0.0439
		(0.0172)		(0.0256)	(0.0275)
Iron County 1851 X Log(Iron Price)		0.000175		-0.00550	-0.00561
		(0.0223)		(0.0222)	(0.0218)
Post 1875 X Iron County		0.0802		0.211*	0.199*
		(0.0773)		(0.105)	(0.113)
Post 1875 X Coal County X Log(Coal Price)			0.0963***	0.102***	0.0854***
			(0.0251)	(0.0274)	(0.0253)
Coal County X Log(Coal Price)			0.0181	0.0180	0.0173
			(0.0210)	(0.0204)	(0.0199)
Post 1875 X Coal County			-0.359***	-0.401***	-0.340***
			(0.109)	(0.118)	(0.109)
Post-1875 X Log (Average Prosecutions per 1000)	0.00577	0.00261	0.00178	-0.00361	-0.00113
	(0.00565)	(0.00569)	(0.00615)	(0.00501)	(0.00665)
County FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Time-Varying Controls	Y	Y	Y	Y	Y
Interpolated Controls	N	N	N	N	Y
N	2860	2860	2860	2860	2860

Dependent variable is the log of county wages. Standard errors, clustered on county, included in parentheses. The interpolated controls are interpolated population, income, proportion urban, and population density between census years. All regressions control for membership in the Amalgamated Society of Engineers, measured at the county-year level.
* p<0.1, ** p<0.05, *** p<0.01.



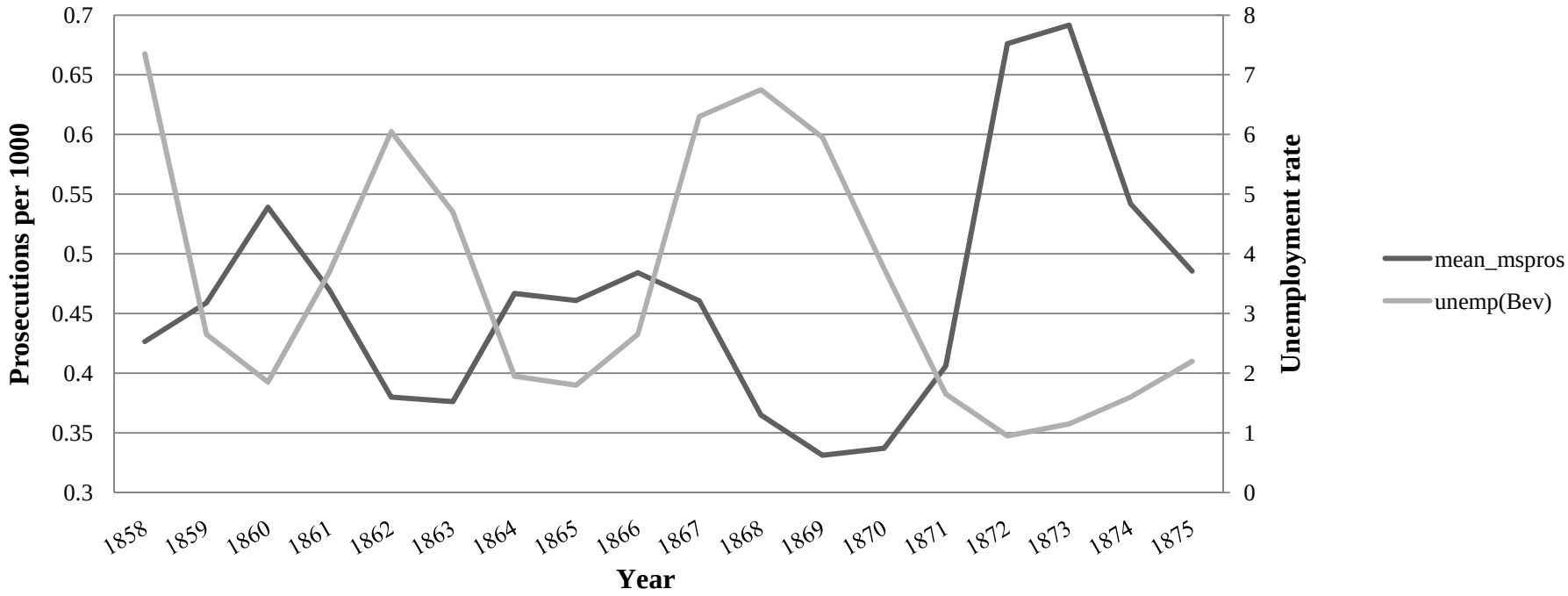
Note: Figure gives the total number of prosecutions under the Master and Servant Act (M&S) for each year. The data are for England and Wales combined, and the source is *Judicial Statistics, England and Wales.*

Figure 2: Distribution of Master and Servant Prosecutions Across British Counties



Note: Values are the average number of prosecutions per 1,000 inhabitants of each county, per year, over the period 1858-1875. The source is *Judicial Statistics, England and Wales.*

Figure 3: Unemployment and Mean Prosecutions per Capita Across Counties



Note: Figure shows the average number of Master and Servant prosecutions per 1,000 inhabitants in English and Welsh counties for each year in the period 1858-1875 (mean_mspros), and the British unemployment rate for each year (unemp(Bev)). The prosecutions data come from *Judicial Statistics, England and Wales* and the unemployment rate data come from the Beveridge unemployment series reported in Steinfeld (2001), p. 76.

Figure 4: Game Tree

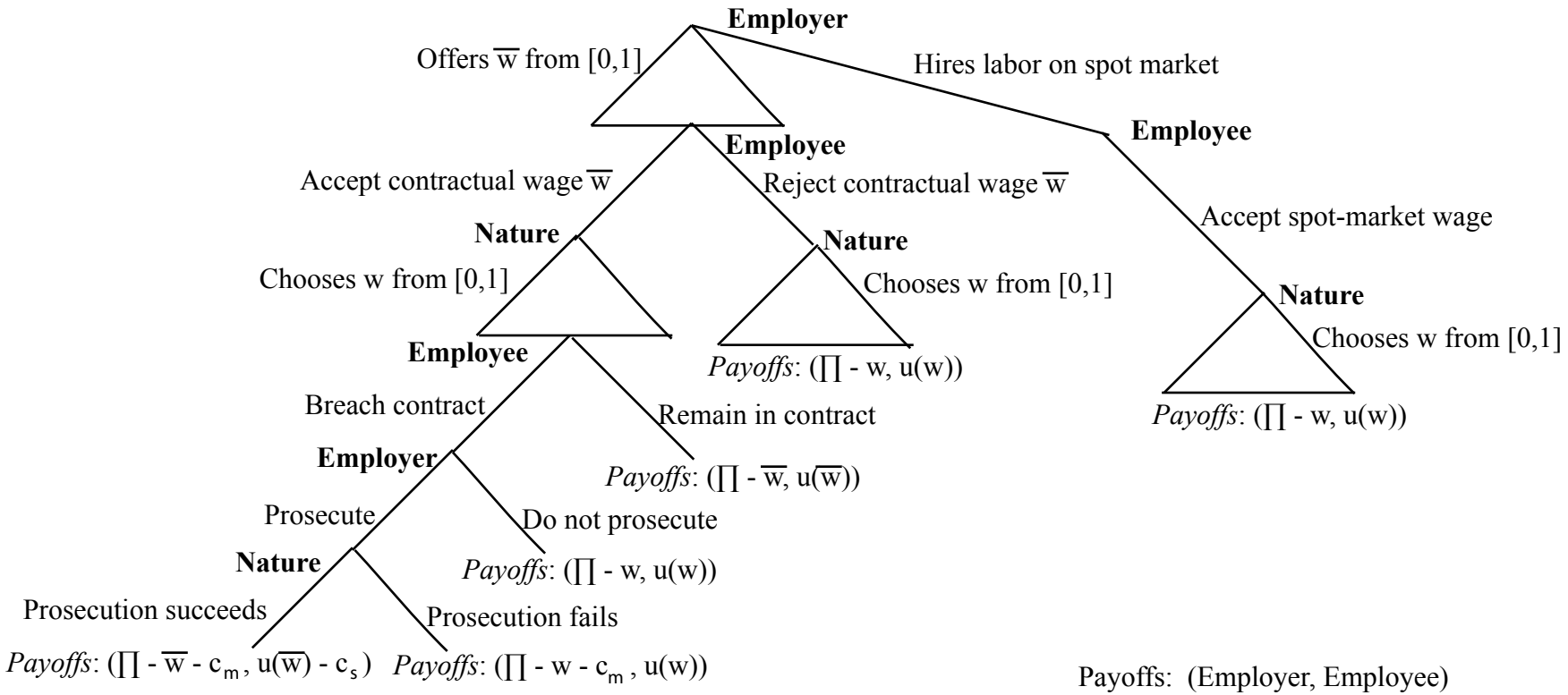
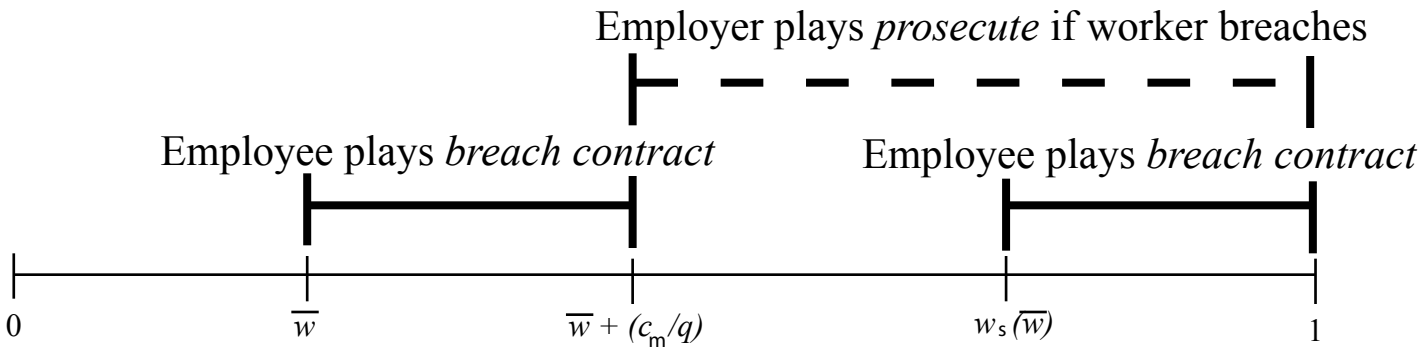
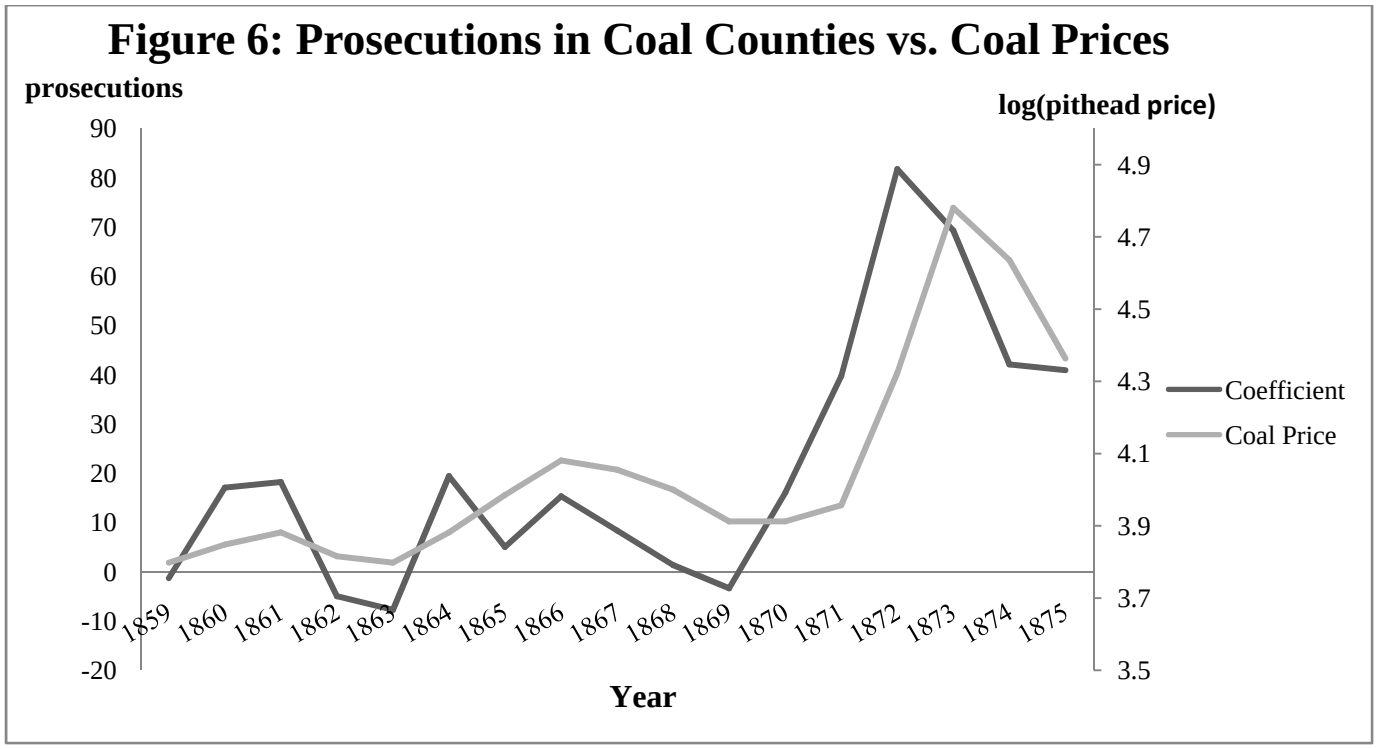


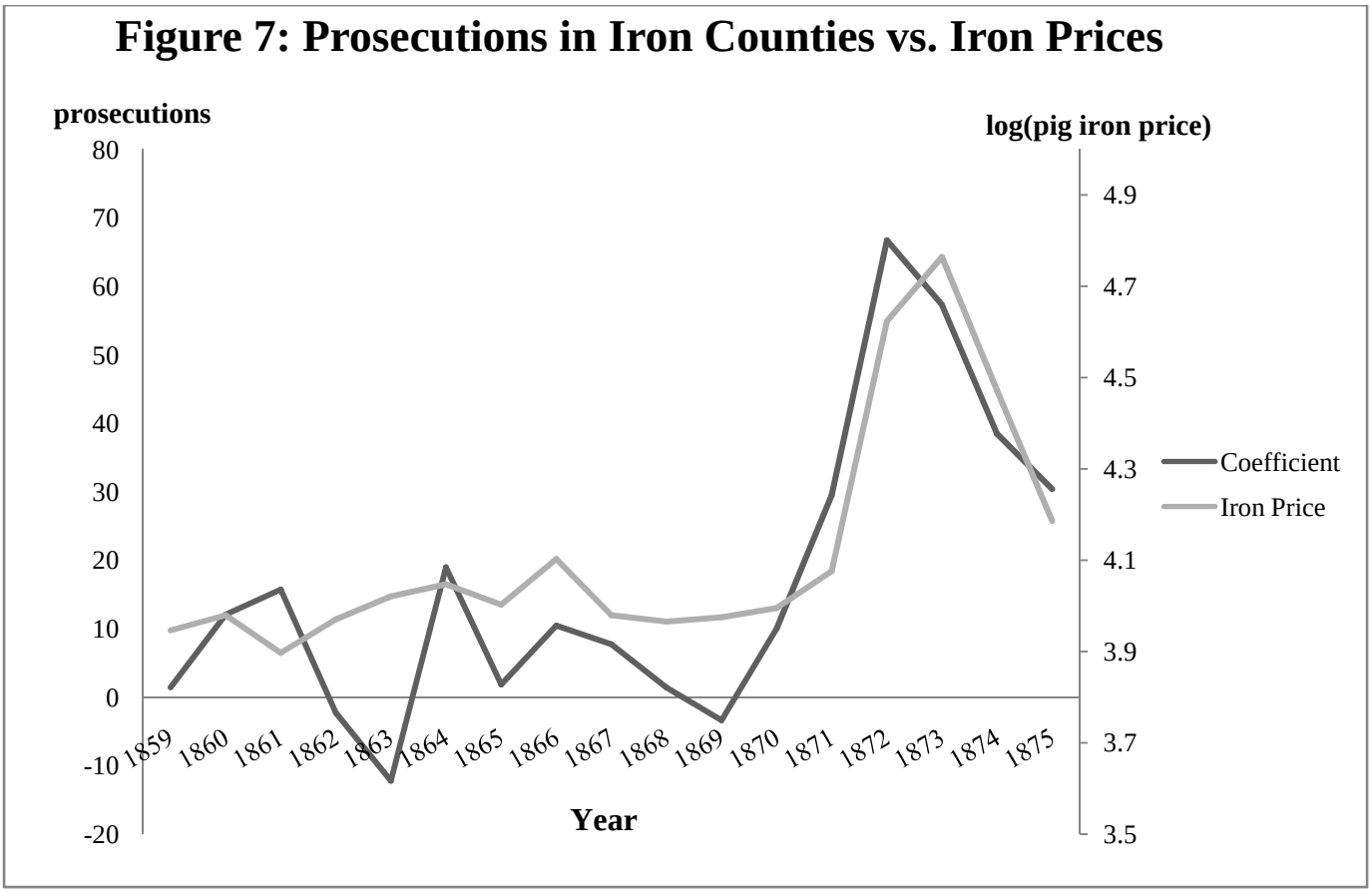
Figure 5: Strategies by level of *w*





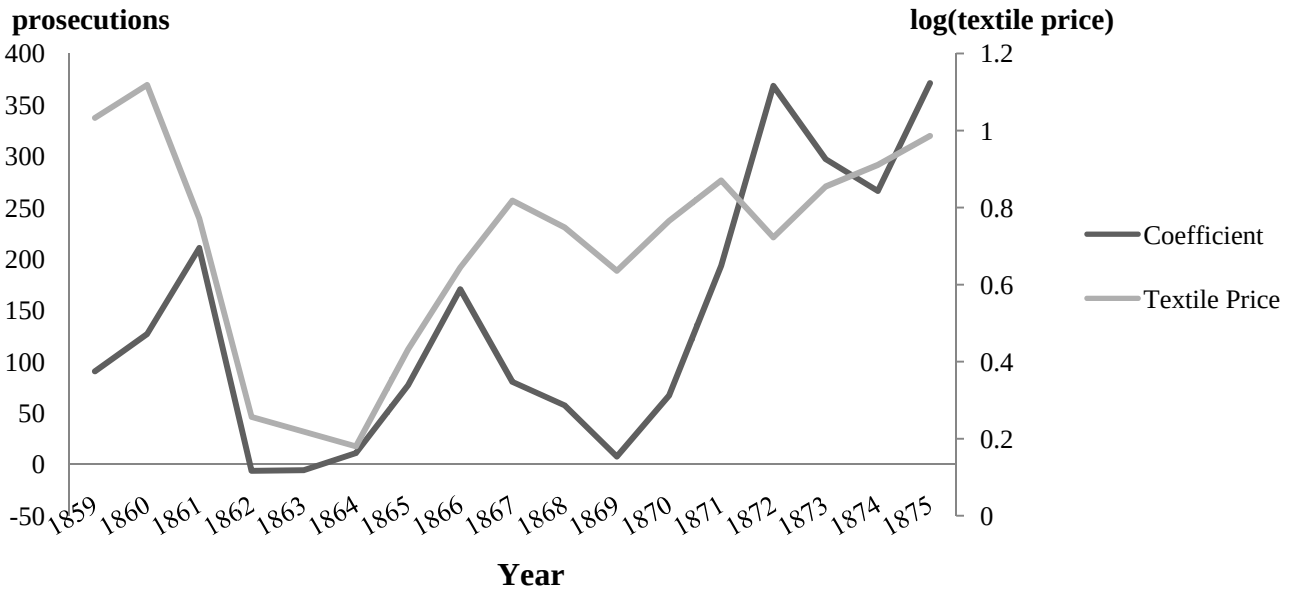
Note: Coal prices are the log of the pithead price of coal taken from Church (1986), Table 1.9. Coefficients are from a regression of Master and Servant prosecutions on district and year fixed effects, log of population, and the interaction between a coal county dummy variable and year fixed effects; the interaction coefficients are plotted above.

Figure 7: Prosecutions in Iron Counties vs. Iron Prices



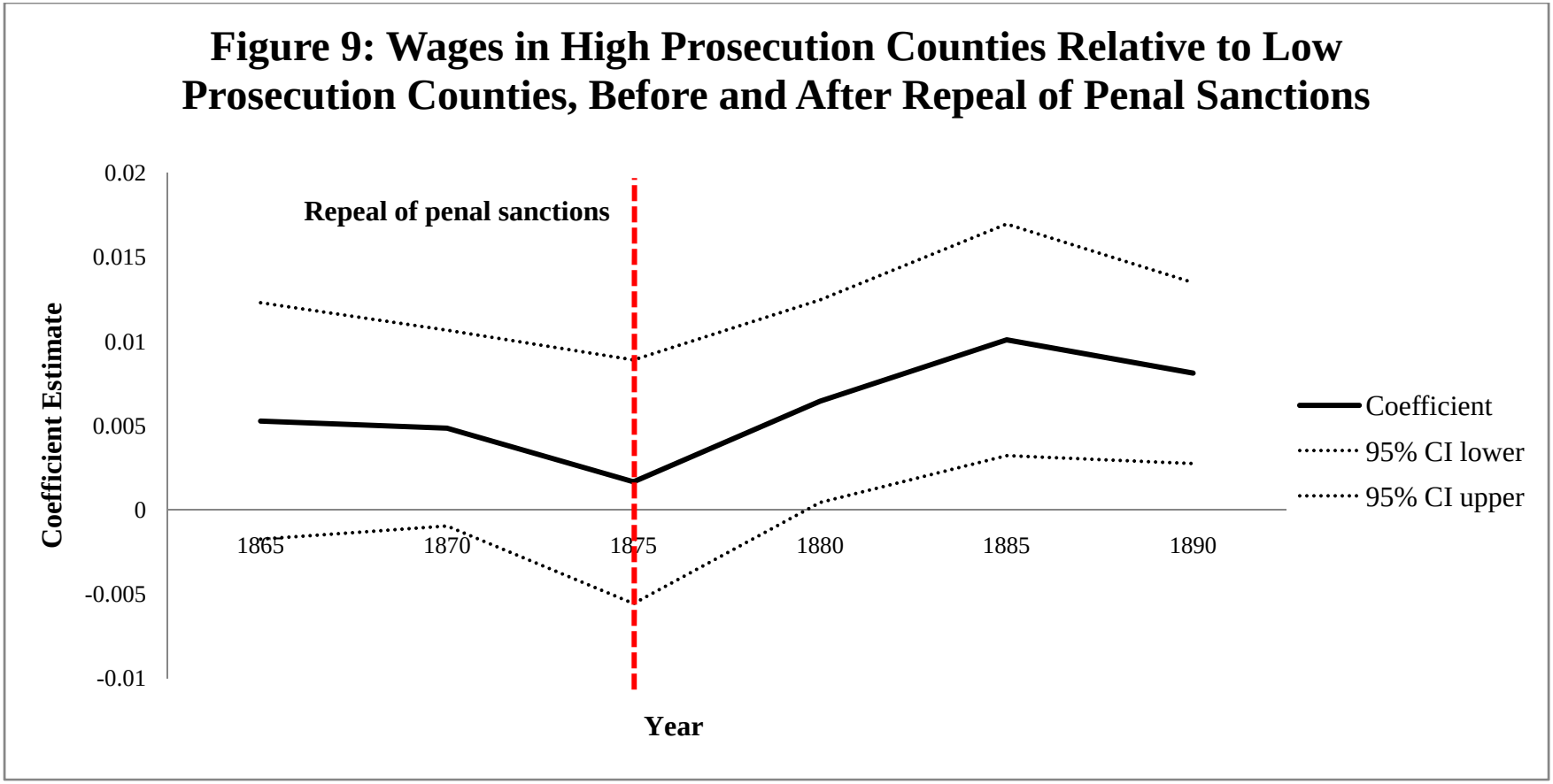
Note: Iron prices are the log of the pig iron price, taken from Mitchell (1988), *Prices*, Table 20.B. Coefficients are from a regression of Master and Servant prosecutions on district and year fixed effects, log of population, and the interaction between an iron county dummy variable and year fixed effects; the interaction coefficients are plotted above.

Figure 8: Prosecutions in Textile Counties vs. Textile Prices



Note: Textile prices are the log of the ratio of the price of cotton textile output (taken from Mitchell (1988), *Prices*, 19, and converted into price per pound of textiles using the conversion factor in Robson (1957), Table A.1) to the price of raw cotton (taken from Mitchell (1988), *Prices*, 18.B). Coefficients are from a regression of Master and Servant prosecutions on district and year fixed effects, log of population, and the interaction between the fraction of the male working population working in textile production and year fixed effects; the interaction coefficients are plotted above.

Figure 9: Wages in High Prosecution Counties Relative to Low Prosecution Counties, Before and After Repeal of Penal Sanctions



Note: Figure plots coefficients (and their 95% confidence intervals) from a regression of wages at the county-year level on interactions between the log of a county's average Master and Servant prosecutions per capita over the 1858-1875 period and dummy variables for five-year time periods. The coefficients from these interactions are plotted. Control variables in the regression are year and county fixed effects, county-specific recession effects, controls for county characteristics (population, population density, proportion of population that is urban, and income all interpolated between census years), year-specific controls for initial county characteristics (population density, income, proportion urban, and a Wales dummy), membership in the Amalgamated Society of Engineers, measured at the county-year level, and one-year lagged wage.