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Nominal wage patterns, monopsony, and labour market power in early modern England

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Abstract:
Records of long-eighteenth-century English wage payments exhibit almost absolute nominal wage rigidity over many decades, alongside significant dispersion in wages paid for the same type of work in the same location. These features of preindustrial wage payments have been obscured by the construction of real wage series, which introduce variation in the deflator. In this paper we show that the standard explanations for wage movements in economic history cannot explain the nominal patterns observed in the data. We suggest that these wages indicate an imperfectly competitive labour market characterised by monopsony and employer power. We discuss the implications for the eighteenth-century British economy and research into long-run wages more generally.

I. **Introduction.**

At the Royal Dockyards in the 1770s, a labourer assisting shipwrights received the same wage of one shilling and a penny per day that had been paid for the role before the Restoration of the English monarchy in 1660.[1] To modern eyes, the idea that a nominal wage rate would hold for more than a century violates all

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[1] Richardson, *Wages of Shipwrights* pp. 265-7. In the intervening century there were allowances and overtime payable to skilled shipwrights at certain times, but the rate for a ten-hour day's work did not change.

our expectations about how wages adjust in labour markets. But, as the earliest archival wage historians knew, many nominal day-wage rates in the eighteenth century were extraordinarily rigid over long periods of time. Moreover, this nominal rigidity co-existed with significant and persistent differentials between the wages paid by different employers for what was apparently the same kind of work undertaken in the same town or city.

These rigidities, visible during a period of structural change, modernisation, preindustrial investment, technological innovation, and economic growth, are a puzzling feature of eighteenth-century wage formation. Economic historians, from Thorold Rogers onwards, have noted them.[2] Even Adam Smith highlighted this characteristic of the labour market, commenting that 'customary rates' had not changed for half a century before he wrote *Wealth of Nations* in 1776.[3] And as we will see, in important parts of the labour market there was extreme nominal wage rigidity, despite highly integrated markets for capital, goods and services in the seventeenth and eighteenth centuries.[4]

Labour markets in the long eighteenth century saw a significant increase in labour supply, large-scale internal and external migration, and substantial differences in regional economic growth, most famously evident in the expansion of the industrialising northern counties that closed long-standing wage differentials between north and south.[5] The performance of real wages has been closely analysed and is rightly taken as a key indicator of economic performance in this period, with Crafts noting "in the face of a surge in population growth, slow growth of real wages during the industrial revolution may be seen as a good outcome".[6] The behaviour of nominal wages has not been given similar attention

[2] See Rogers, *History* Vol, VII pp.; Gilboy, *Wages*, pp.23-28; Phelps Brown, Hopkins, 'Building wages' pp.202; Hutchins, 'Notes II' pp.103-104; Schwarz, 'Standard' p.31-32; Boulton, 'Wages' pp.274-276; Hatcher & Stephenson *Seven Centuries* pp.15-69; Woodward, 'Determination of Wage Rates' p.24.
[3] Smith, *Glasgow Edition* p.92, in Rule, *Experience of Labour in Eighteenth-Century Industry*, p.69
[4] Neal, 'Integration of International Capital Markets', pp. 219–226.
[5] Hunt, *Regional Wage Variations*;, 'Industrialization and Regional Inequality', pp. 935-66.; Wrigley, 'Rickman Revisited', pp.721, 734; Wallis et al., 'Structural Change and Economic Growth', pp. 862-903.
[6] Crafts, 'Understanding productivity', p.309.

in economic historical analysis, yet the stagnation of nominal wages in this period is part of why real wages did not grow.[7]

Building on recent literature on modern labour markets, we argue here that eighteenth-century nominal wage patterns indicate that there is a need to look beyond models of perfect competition to understand wage determination in early modern labour markets. Our hypothesis is that imperfect competition, labour market frictions, and employer idiosyncrasies are perennial features of the labour market, and that a framework of monopsony can help explain the long-run nominal wage rigidity within sites, and dispersion across sites, evident in early modern wage records. Acknowledging Manning's point that there may be "no universally right assumption for how rents are shared in the labour market: there are different mechanisms in different labour markets, perhaps even co-existing in the same labour market," the monopsonistic interpretation we set out here implies that we need to be more cautious in how we interpret reported historical wages.[8]

II. Histories of wages

The study of wages in economic history originated in the early economic statistics of the late nineteenth century, where Arthur Bowley used the 'law of one wage' to justify the use of builders' wages to stand for the average working man's wage.[9] He writes, "in spite of this apparent want of connection between the wages of one class of men and another there are very distinct causes which make the following law hold: - at the same time and in the same place the wages for equal effort of men of the same capacity are equal to one another; or more generally, the wages throughout the country of equal degrees of skill are equal at any given time."[10] Bowley's law of one wage rests on assumptions that the market for labour is perfectly competitive, that equally-productive workers can

[7] See Schwarz, 'Standard of living' p.21.
[8] Quote from Manning, *Monopsony in Motion* p. 5.
[9] Bowley, *Wages in the United Kingdom*, 1900 pp.59-60
[10] Bowley, *Wages*, Section III p.18.

choose between comparable work with different employers and move freely between occupations and sectors, and that these market forces determine a single equilibrium wage for a skill level through arbitrage.[11] If this is so, employers are wage-takers and will hire workers up to the point where their marginal revenue product, or the added value their work creates, equals the market wage. Under these assumptions, the wage paid to any worker reflects their marginal revenue product and is determined by the intersection of the supply and demand for labour, where the price struck reflects the relative demand for labour and its scarcity or abundance.

Similar assumptions underpin the use of long-run average skilled or unskilled wage series, including the common reference series compiled by Robert C. Allen and Gregory Clark.[12] These typically take the wages paid to workers in construction or agricultural labouring as representative of wages in general, just as Bowley did over a century ago. These reference series have been a vital tool for economic historians over the years.[13] Faced with a dearth of other data, they have allowed economists to infer real wages, marginal revenue product, GDP per capita, growth rates, and other macroeconomic trends from nominal wage observations, so long as the assumption of a largely competitive market holds.

Economic historians' adherence to the law of one wage is at odds with work in modern labour economics, which increasingly sees labour markets as imperfectly competitive and even monopsonistic, characterised by the market power of employers. The notion of monopsony and its implications were first set out by Joan Robinson in *The Economics of Imperfect Competition* (1933), with the fundamental observation that the labour supply curve is not infinitely elastic and therefore wages do not always equal the marginal revenue product of

[11] The clearest expression of this is: Clark, Gregory, and Ysbrand Van Der Werf., 'Work in progress?'.
[12] Clark, 'Macroeconomic aggregates'; Allen: https://www.nuffield.ox.ac.uk/people/sites/allen-research-pages/.
[13] At the time of writing, Allen, 'The great divergence' is cited by over 1500 other papers. Clark, 'The condition of the working class' is cited by over 600 papers.

labour.[14] In real world terms, Manning argues that both employers and workers face profound frictions in the market for work, due to search costs, firm idiosyncrasies, and imperfect information. These frictions disincentive job separations, resulting in employers having the power to "set wages".[15] In twenty-first century labour markets, monopsony is associated with the exploitative power of employers to supress wages, owing to the size of firms, coercive contracts, and labour's lack of outside options.[16]

The standard evidence presented to demonstrate the existence of imperfect competition in labour markets is dispersion of wages paid for the same work at the same time in the same location, but by different firms.[17] Dispersion of wages for equally productive workers doing the same work across different employers indicates that labour markets are not fully integrated and that individual employers have some wage-setting power. Recent work has sought to identify the scope of monopsony, more specifically, by estimating the elasticity of the labour supply to wages through analyzing the sensitivity of firms' separation rates or recruitment rates to wage changes.[18] In a newly-emerging body of literature, nominal wage patterns such as number bunching in an employer's nominal wage rates or relative nominal wages between employers have also been interpreted as a sign of monopsony, demonstrating wage setting by employers and firm market power.[19]

[14] Robinson, *The Economics of Imperfect Competition,* esp. pp. 243-292.
[15] Manning, *Monopsony* pp. 13, 19; Langhella and Manning, 'Measure' pp. 1491; Abel et al., 'Monopsony in the UK'; Stansbury & Summers, 'Declining worker power'.
[16] Marinescu, 'Fighting Monopsony,' p.55; Azar et al., 'Labour market concentration'.
[17] The classic citations are: Reynolds, 'Wage differences in local labor markets'; Lester, 'Wage diversity and its theoretical implications'; Slichter, 'Notes on the structure of wages'. See: Manning, 'Imperfect Competition' p. 1022 For an accessible discussion, see Manning, *Monopsony* pp. 3-10; Bhaskar et al., 'Oligopsony and monopsonistic competition in labor markets' pp. 155-157.
[18] As described in Langella and Manning, 'Measure of' pp. 2931- 2950.
[19] Naidu, et al., 'Monopsony and Employer Mis-optimization Explain' pp. 27-28; Datta, 'Local market Monopsony'; Bhaskar et al. op cit, pp. 158-162; Dube et al, 'Monopsony in online labour markets'; Falch, 'The Elasticity of Labor Supply at the Establishment'; Staiger et al., 'Is There Monopsony in the Labor Market?'

Although there is a significant literature in economic and social history on wage formation, it has rarely directly intersected with the economics literature on monopsony and imperfect competition. The question of who set wages and how has instead attracted much attention in social history.[20] More relevant is the small but important body of work engaging with monopsony in economic history that has appeared recently, although at present this focuses on extrapolating monopsony from expected wage trends or detecting and quantifying employer collusion.[21] Our approach is also closely related to Huberman's important exploration of early industrialising Lancashire mills through the paradigm of competitive or efficient labour markets, and Fishback's study of monopsony in a single-industry company town.[22]

Attending to monopsony means that economic historians need to focus on the economic mechanisms by which wages were set and employment managed, if we are to understand how labour markets contributed to development and welfare in the long run. We first need to establish whether the market for labour before industrialisation really can be characterised by imperfect competition, and indeed, monopsony, or whether economic historians' traditional neoclassical assumptions are decent approximations. Because we are, as ever, constrained by the evidence available, and because the labour market of 300 years ago was characterised by some different features to those of today (such as a higher proportion of workers in 'casual' work), we conceptualise and explore monopsony both in terms of bargaining power and supply elasticities.

The paper begins in the next section (III) by describing the evidence of nominal wage rigidity and wage dispersion for workers of the same skill over the period

[20] Scholliers & Schwarz, *Experiencing wages*; Hobsbawm, 'Custom Wages and Workload' p. 344; Rule *Experience* pp. 194-201; Johnson, *Making the Market* pp. 90-101; Muldrew and King, 'Economy of Makeshifts' pp. 267-306.
[21] See Gary et al., 'Monopsony Power'; Delabastita and Rubens, 'Collusion'. Older works which discuss the ways in which economists have tested for monopsony include Boal, 'Testing for Employer Monopsony', pp. 519–536; Vedder et al., 'Discrimination and exploitation'; Naidu and Yuchtman, 'Labor market institutions'.
[22] Huberman, *Escape from the Market,* esp. pp. xiii – xv, 1-14; Fishback, *Soft coal, hard choices,* pp. 60-78.

1670 to 1775 and explaining why these nominal patterns of wages have not been analysed before. In Section IV, we explore two traditional economic explanations for nominal wage rigidity which might offer a way to reconcile this evidence with a competitive market for labour: stable prices generating stable nominal wages; and currency and coinage. We then consider two possible explanations that historians have stressed in much literature: the idea of 'custom' wages and the question of coercion. In Section V, we consider whether the patterns can be explained by some classic labour economics adaptations to the competitive model: wage stickiness arising from bargaining frictions and employer wage strategies such as efficiency wages. In Section VI, we discuss the wider question of supply elasticities and the viability of monopsony and employer market power as an explanation, setting out why, with the available sources, it is difficult to quantify in the early modern period, yet may be the appropriate framework for understanding preindustrial labour markets. Section VII concludes by discussing the implications for the study of labour markets in economic history.

III. The nature and extent of rigidity and dispersion in nominal wage payments

III.1 Nominal wages in sources

In the original sources that supply the great majority of wage observations for eighteenth-century England -- day rates paid for building work -- rigidity in the wage paid by any one employer over time, and dispersion between employers, is almost omnipresent.

Perhaps the most abundant body of detailed wage evidence from individual employers in this period survives from institutions in London, Europe's largest city and home to England's greatest concentration of manufacturing and commerce. At St. Paul's Cathedral, the biggest and probably the most labour-intensive site in the city for 35 years, monthly account books indicate that general labourers were (directly) paid the same day rates from 1676 to 1748 – 16d. per day in winter and 18d. per day in summer – despite large changes in the

number of labourers employed. Such a long period without any wage adjustments, over seven decades, is even more puzzling when we consider that wages were able to be changed. In just one instance, the winter of 1676/7, the cathedral briefly experimented with a uniform rate of 14d. per day, a downward adjustment from the winter wage of 16d in place before and long after, Wage adjustment was thus not impossible, but for some reason it was never implemented again.[23]

Likewise, at London Bridge, another essential site of urban infrastructure, the wage paid to workers maintaining the engine or waterwheels under London Bridge was the same for at least four decades from 1722. [24] As with St. Paul's, the number of workers employed varied greatly, with some months when there was no work available. Yet the Bridgemaster rehired the same men on exactly the same wage with little trouble. London Bridge's wages remained rigid in the face of significant market shocks. In the years after the Great Fire of London in 1666, when the demand for construction workers to rebuild the city provoked the relaxation of guild restrictions, the Bridge's rates for carpenters and masons remained exactly the same.[25]

The case of the Royal Dockyards is perhaps the most extreme. The Admiralty set dockyard wages in 1650, and this set of rates for work by the day, the tide, or the night with fixed hours was still in place in 1774. In the intervening 124 years, the Admiralty and the shipwrights long debated the workers' right to take 'chips', or good construction timber, that could be sold for cash or utilised on other jobs, and the case is often cited as evidence that 'perks' could make up for a lack of wage growth. However, the debate over 'perks' should not obscure the absolute rigidity of the time and task-based payments. The Admiralty's demand for shipwrights and labourers fluctuated hugely throughout this period, and they

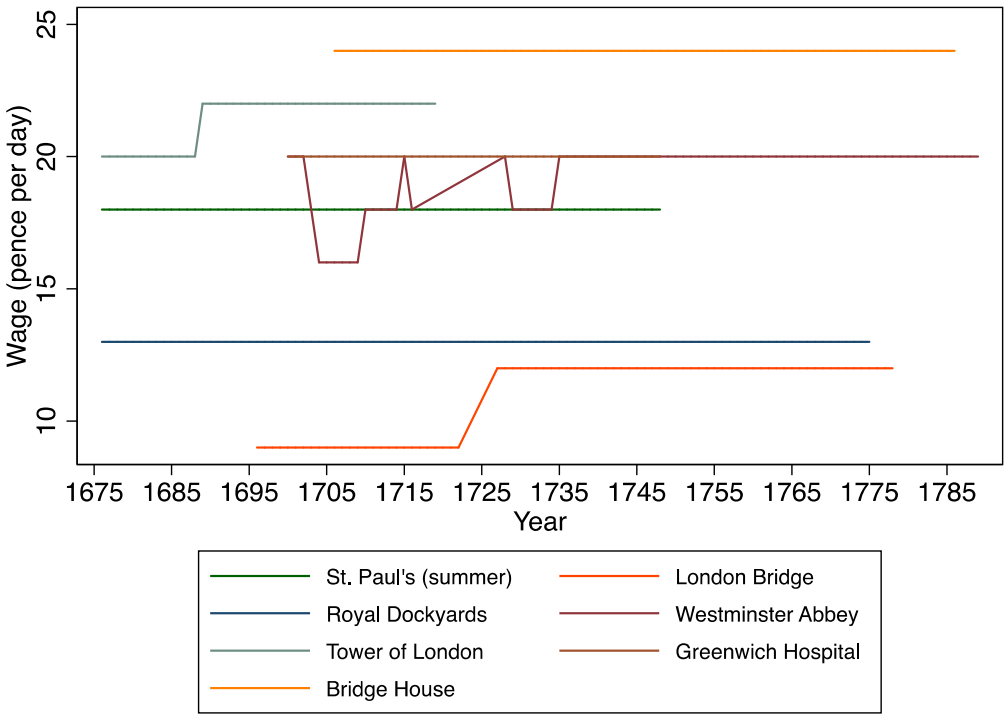
[23] London Metropolitan Archives, CLC/313/I/B/25473.
[24] See Stephenson, *Contracts and Pay,* Chapter 7.
[25] LMA CLA/007/FN/003/ 19a – 24. The Fire Acts (18 &19 C.II.c.7) expressly opened up the London market to, 'foreign' labour and precluded craftsmen from withholding labour for higher rates.

laid off and then rehired labour regularly.[26] Income from chips did not compensate for this variation, and it is unlikely that chips were equally available to all workers.[27] When the shipwrights appealed for an increase in wages they cited higher rates paid in nearby private shipyards.[28] These failed to equalise with or affect wages at the Royal Yards for decades.[29] When the Admiralty moved to impose piece rates in 1774, the shipwrights struck, but alternative workers were found within days, and hired at new rates which the Admiralty saw as advantageous.[30] This case is also probably the best known, and the largest scale example of 'employers setting wages' in the long eighteenth century.

The same story of wages remaining constant for decades -- with evidence that specific projects or skill requirements sometimes led to short-term variation in rates before a return to the persistent wage -- can be found in series of labourers' wages from the Tower of London, Greenwich Hospital, Bridge House, and Westminster Abbey.[31] Figure 1 brings together the nominal wage series for labourers at St. Paul's, London Bridge, the Royal Dockyards, and these additional sites. Wages varied by a small, but persistent amounts across locations, despite all these sites being within an hour's walk of each other. These data provide the best available insight into long-run wage trajectories, clearly demonstrating both long stretches of nominal rigidity at building sites across London and the dispersion in nominal wages for similar work between sites. Unlike Admiralty wages, there is no evidence that they were accompanied by in kind payments or perquisites. It is possible to add further examples. For instance, London porter's rates were set by the Corporation of London in 1646 and remained unchanged until 1712, after which they were fixed until the 1760s.[32]

[26] TNA, ADM 102; Richardson, 'Wages of Shipwrights' pp. 265-274; Knight, 'From Impressment to task work' pp. 1-20.
[27] Haas, 'Introduction' p. 45.
[28] Baugh, *British Naval Administration in the Age of Walpole*, p. 322.
[29] Haas, 'The Introduction of Task Work' p. 45.
[30] Dobson, *Masters & Journeymen*, p. 107.
[31] See notes to sources on figure 1. The pattern found at Westminster Abbey is consistent with a different team of masons hired for a specific contract of specialist works. See Westminster Abbey muniments 34513.
[32] Llewellyn Smith, 'Chapters in the History' pp. 595-597.

Figure 1: Nominal wages for labourers at London sites



***Sources*:** St Paul's: LMA, CLC/313/I/B/003/25473 10-43; London Bridge: LMA, CLA /007/FN/04/001- 7; Westminster: Gilboy 'Wages in England' pp.254, 258, and Westminster Abbey Muniments 34513; Royal Dockyards: Richardson 'Wages of Shipwrights" TNA ADM 102; Greenwich: Gilboy; TNA, ADM 68/4; Tower of London: Hutchins 'Notes' ; TNA WORK 5; Bridge House: LMA, CLA /007/FN/04/001- 7.

These are not new observations. Wage rigidity and dispersion have been recognized since the earliest studies in the late nineteenth century. The foundational source for English preindustrial wage rates and prices, Thorold Rogers' seven volume *History of Agriculture and Prices* , highlights the rigidity of nominal wages over the span of eleven or twelve decades from the end of the English Civil War to the French Revolutionary Wars.[33] For instance, Rogers' recording of wages in the year 1707 shows day-wage dispersion of up to 50% between employers in London alone for the same kind of work.[34] The same rates were still being paid many decades later. Although published a century later, Jeremy Boulton's London wage series makes the same point. [35]

[33] Rogers, *History of Agriculture and Prices* (1866–1902).
[34] Rogers, *History* Volume VII pp. 615-617. Rogers referred to bricklayers' labour in London in 1707 receiving 20d per day. In the same year, rates at St. Paul's were 16-18d per day, at London Bridge 14d, and at the Dockyards 13d.
[35] Boulton, 'Wage labour' pp. 276, 277.

Long-run nominal wage rigidity is also evident in Elizabeth Gilboy's seminal work on building and construction workers' wages in the long eighteenth century. Gilboy observed a 'striking stability' in rates from 1700 – 1787 across the sites she studied, which include several of those shown in Figure 1.[36] Her tables show cases where the same rate for a day's work or per task was unchanged for up to six decades at a time.[37]

That the wages Gilboy and we are discussing relate to a short-list of Britain's most famous religious and secular buildings was not chance. The construction sites for which good nominal wage records survive were unusually large and long-running building and maintenance projects. The exception, the Royal Dockyards, was equally idiosyncratic, as the nation's largest state-owned defence manufacturer. The scale, management, financing, and duration of these projects meant they needed distinctive bureaucratic governance structures. One result of this was the creation and retention of serial wage records. These same characteristics also mean that these institutions may not have approached hiring and pay bargaining in the same way as smaller enterprises within the construction sector, or the economy more generally.[38] Our best sources on eighteenth-century wages are from employers which were, by contemporary standards, large and enduring, and who therefore may have had the ability to pursue different strategies in the labour market to the small firms that were the most common kind of business organization.

A second point follows from this: most of the wages that went into Gilboy's day wage series for building craftsmen and labourers were not paid directly to workers, but were rates that contractors charged to their clients. A margin was then taken before the workmen were paid.[39] Although fragmentary, surviving

[36] Gilboy. E., *Wages in England in the Eighteenth Century*, p. 27.
[37] Ibid. pp. 254-270.
[38] Paker, Stephenson, and Wallis, 'Job Tenure and Unskilled Workers,' forthcoming in the JEH.
[39] Stephenson, 'Real wages?' p. 106. All labourers' wages in our dataset here for St Paul's were directly paid.

records of payments by contractors to workers demonstrate similar rigidities.[40] These records give us some confidence that nominal rigidity was a characteristic of the wages workers actually received, as well as the rates that contractors charged.[41]

Wage rigidity was not limited to London's labour market, however. It is observed in smaller-scale urban projects elsewhere in England. Donald Woodward's classic studies of early-modern construction workers in Northern England found nominal wages that "remained unchanged for years, often for decades".[42] Areas with higher and lower wages co-existed within the region despite the opportunity for labour to move. [43] Wide variations between English counties in wage rates for the same work were also noted by Arthur Young.[44] Similarly, Eccleston identified a "bewildering complexity of local wage bargains" in five industrialising midland counties between 1750 and 1788. He observed "marked differences … in wages paid in parts of the country separated by comparatively short distances", and great rigidity in wage rates, causing him to question the idea that "wage variations will be eroded by the workings of the free market."[45] Similar rigidities appear in wages outside England, too. [46]

Not all forms of labour remuneration show the same features. Changes in the mode of payment did occur. For example, London's tailors notoriously turned from paying their workers day rates to piece rates to cut the costs of labour after 1747.[47] The fragmentary evidence that survives on piece rates indicates that, while in some sectors they were extraordinarily unchanging, in others they

[40] TNA C 106/145. Albeit the records are for no more than a decade, and there is wage dispersion amongst men of the same skill presumably for reasons of specialism or productivity, see Stephenson, 'Real wages?' p. 120.
[41] Stephenson, *Contracts and Pay,* chapter 6.
[42] Woodward, 'The Determination of Wage Rates' p. 22.
[43] Ibid. p. 23; also see Woodward, *Men at work*, pp. 190, 206, 250-287; 'Wage rates and living standards in pre-industrial England', pp. 28-46.
[44] Young, *Six Months Tour Through the North of England*. Young's rates are usefully analysed in Botham, Working Class Living Standards in North Staffordshire, pp. 22, 40-107.
[45] Eccleston, A Survey of Wage Rates in Five Midland Counties p. 91, note 2, 3, pp. 223, 245; Botham, & Hunt, 'Wages in Britain during the industrial revolution' pp. 380–399.
[46] Garcia-Zuniga & Lopez, 'Skills and human capital in eighteenth-century Spain'.
[47] Galton, 'Selected documents', p. 9.

varied. What is not in dispute is that they were set by employers. Burley found that piece rates paid to eighteenth-century spinners varied according to supply and demand but did so because the putting-out merchant he studied set them at a fixed proportion of the par price, so protecting himself from gluts in periods of low demand. Burley also found that weavers' piece rates were fixed, but they bore the risk from changes in the costs of their inputs while the spinners did not.[48] More recently, Humphries and Schneider find that the masters who employed spinners had leverage over their employees, and that putting-out merchants acted as a 'monopsonistic cartel'.[49]

The surviving sources on wages establish that two phenomena that violate the conditions of the 'law of one wage' were widespread in the eighteenth-century labour market: nominal wages that were rigid over the long-run at large employers; and persistent dispersion in wages for the same kind of work across sites. They also demonstrate that large employers were 'wage posting', a method of wage determination where the employer picks a wage and hires who they can, rather than bargaining with workers.[50] This is often taken as an indicator of monopsonistic wage setting. We argue that these preindustrial nominal wage patterns indeed indicate a monopsonistic wage 'set' by employers.

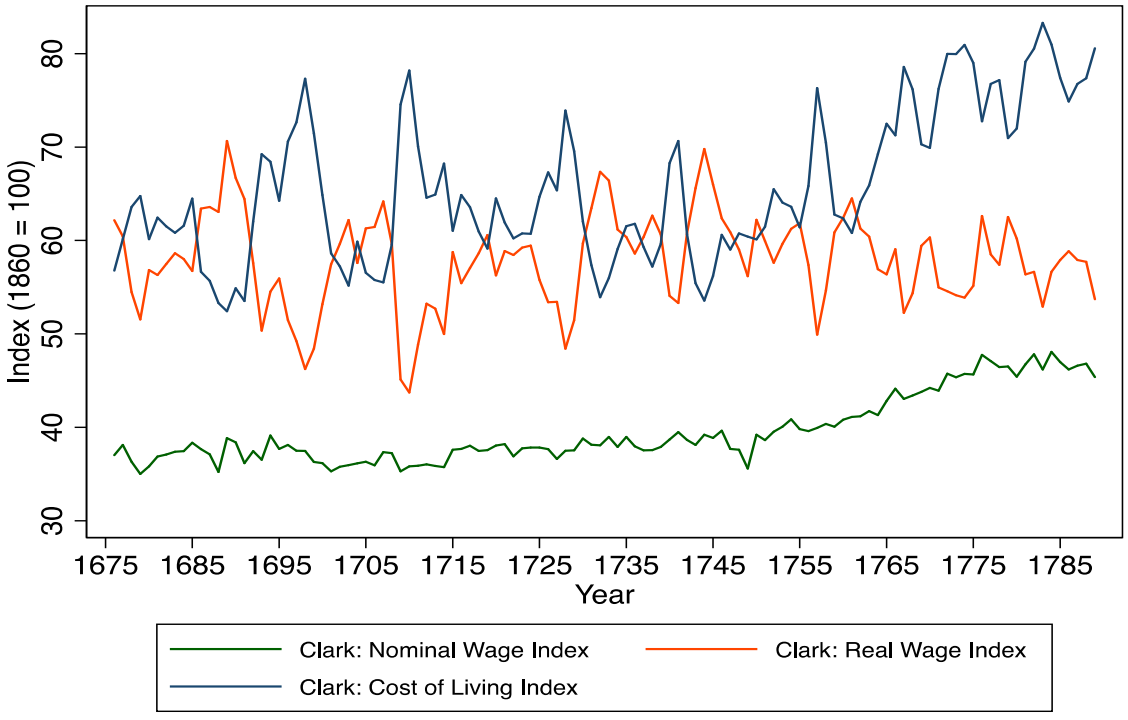
III.2 Why have the obvious nominal patterns of early modern wage rates been neglected?

Since the mid twentieth century and the 'standard of living debate,' the overwhelming majority of academic debate, literature and scholarship has been concerned with real wage series, not nominal ones. Because of the composition of their inputs these show variation almost like modern average wage figures.

[48] Burley, 'An Essex clothier' pp. 293-4. See also: Burley, 'A note on a labour dispute' pp. 222-223; Grassby, 'Rate of Profit in Seventeenth Century England'.
[49] Humphries, & Schneider, 'Spinning the industrial revolution'. See also: Schwarz, 'Custom Wages' pp. 196-7; Rule *Experience* p. 69; Smith, *Wealth*, Book 1 chapter 10.
[50] Manning, Imperfect Competition, pp. 991-997. See Paker et al., 'Job Tenure'; Stephenson *Contracts and Pay,* Chapters 6, 8.

To generate real wages, nominal series of day rates are combined with a weighted basket of consumable goods, the prices of which varied considerably.[51] The resulting real wage series show considerable annual variation, driven by changes in prices and the shifting composition of institutional sources and weightings.[52] The nominal wages can be taken directly from institutional records, such as those just discussed, or derived from regression models fitted to samples of nominal wages by region, year, occupation, and other factors, which tend to introduce further variation.[53] Figure 2 illustrates how the volatility in Clark's influential real wage index is driven primarily by changes in the cost of living, while nominal wages, in this case estimated by regression, are much less volatile and essentially trendless before 1750.

Figure 2: Real wage, cost of living, and nominal wage indices for building laborers (Clark 2014)



[51] On day rates and the nominal wage, see: Stephenson, 'Real' wages?' pp. 106-10, 125-27; idem, 'Mistaken wages' especially pp. 755, 763, 766 and n. 68. For the basket and methods, see: Allen, 'Great Divergence'; Clark, 'Condition of the working class'; idem, 'Long march'.
[52] An excellent summary of the large literature is in: Feinstein, 'Pessimism perpetuated' pp. 626-631.
[53] Clark, 'Long march' pp. 101-103.

Recently, Humphries and Weisdorf have developed a new approach to estimating wage rates in the long run based on annual workers' contracts.[54] This has the advantage of moving beyond a reliance on builders or 'casual' workers' days rates, which may have contained a premium relative to wages for workers on longer-term contracts.[55] However, their wage estimates include the cost of a basket of goods consumed as part of the contract. This means their series fluctuates with prices, and this unavoidably obscures the often small nominal money-wage element.[56] In short, our attention to real wages has overshadowed the striking rigidity and dispersion that characterises the institutional nominal wages in this period.

IV. Standard explanations for nominal wage rate rigidity

IV.1 Rigidity, prices and wages

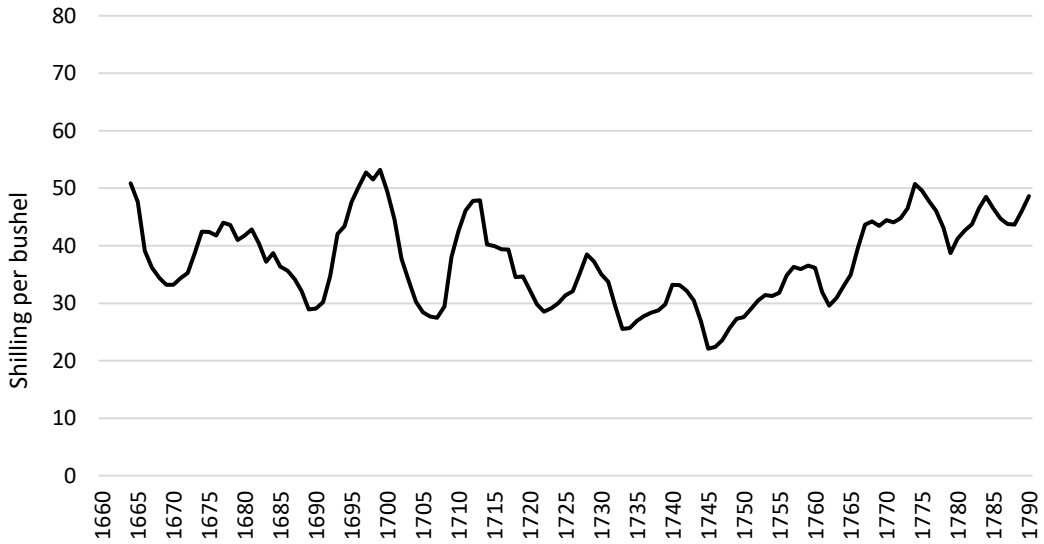
The level of nominal wage rigidity at individual employers over the long eighteenth century stretches credulity to modern eyes that are used to seeing wages adjust to supply and demand, productivity, and prices. In this section we discuss the most obvious potential explanation that could reconcile these wages with a competitive labour market: price stability. Were wages so stable because prices were stable?

At first glance, price stability might seem to offer a viable explanation. The long-terms trends in historical price indices were flat. Prices for consumer goods in the 1740s were comparable to those in the 1660s. However, these trends conceal much short- and medium-term volatility. For instance, wheat was 30s. per bushel in 1676, but in 1678 cost over 52s. per bushel, an increase of almost 75% in two years. Even a smoothed five-year annual moving average of wheat prices, given in Figure 3, shows significant fluctuations. The 1690s are well known as a sharply inflationary decade with much hardship, but even in the first decade of

[54] Humphries & Weisdorf, 'Unreal Wages'.
[55] Also see: Humphries, 'Respectable standards of living'; Richardson, 'Wages of shipwrights' p. 271.
[56] See Humphries & Weisdorf, 'Unreal Wages', appendix II.

the 1700s, when prices were generally falling, there were shocks of twenty percent or more in the price of wheat.[57] As Gilboy put it, "One would expect some greater variation of prices than wages, but such an extreme variation is amazing at first".[58]

Figure 3. Wheat prices five year moving average (Allen 2013)



The volatility of the price of an individual commodity, even one as important as wheat, might largely disappear when absorbed into a wider measure of the price level. There was a period during the mid-to-late twentieth century when economic historians published many competing price series.[59] These series innovated in two regards: the sources that they drew prices from, and the weights that they used when designing their baskets of consumption goods.[60] Today, two robust and thoroughly researched price series are most commonly used, one constructed by Greg Clark in 2010, the other by Robert Allen in 2013.[61] Both are designed to identify long-run trends, and, as a result, use annual or quinquennial averages. Even so, they are highly volatile, as Figure 4 shows.

[57] Waddell, 'The Economic Crisis of the 1690s in England', esp. pp. 283, 288, 289.
[58] Gilboy, 'Wages in England,' p. 23.
[59] The best list is in Clark, 'Price history'.
[60] See Feinstein, Pessimism perpetuated' pp. 626-631.
[61] Clark, 'Macroeconomic aggregates'; Allen https://www.nuffield.ox.ac.uk/people/sites/allen-research-pages/.

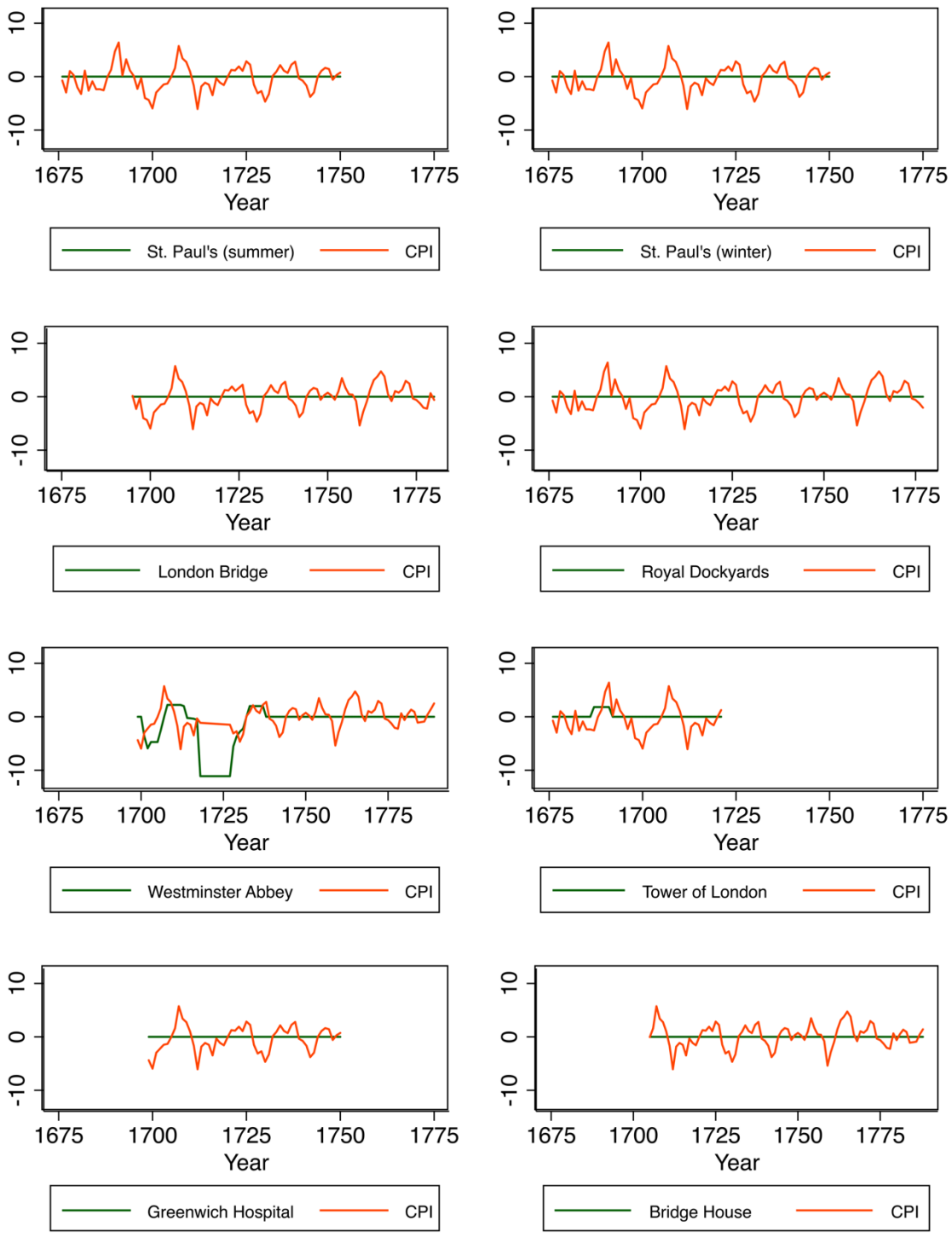
Despite a level trend, year-on-year the price indices move sharply up and down, sometimes by up to 15 percent annually.

Figure 4: London inflation rate (YoY CPI percent change)

To put this in context, the most memorable recent historical example of price volatility in the UK was the 'Great Inflation' of the 1970s, when the inflation rate hit 15% per annum.[62] Though the 1970s are associated with unsustainable and painful wage bargaining, nominal wages generally rose somewhat to meet inflation.[63] In contrast, eighteenth-century nominal wages and inflation appear entirely unrelated. Figure 5 plots the relationship between Allen's consumer price index and the nominal wage series described earlier. We report them by institution to avoid compositional effects on the wage. In all cases, prices are far more volatile than wages and there is essentially no discernible relationship between the two.

[62] Before 2022-3. Delong, 'America's peacetime inflation', fig. 6.1 p. 248.
[63] Wachter, 'The Wage Process', pp. 507-510; moreover, downward wage rigidity then became the predominant concern as inflation slowed.

Figure 5: Wages and inflation in London



Sources: see figure 1; Allen (2013). Note that all series are presented as the five-year moving average of year-on-year growth.

As a simple test of these relationships, we calculated Pearson correlation coefficients between the growth in the consumer price index growth and wages.

In series with complete nominal wage rigidity there can be no correlation. Even in the series with some wage variation, the correlation is very near to zero – 0.039 for Westminster Abbey and 0.145 for the Tower of London.

In this period, employers and representatives of the local and national state, such as overseers of the poor and justices of the peace, did understand that wages must respond to prices if workers were to maintain themselves, and this occurred in the seventeenth century.[64] Yet while eighteenth-century prices were extremely volatile, wages remained nominally rigid.[65] Nominal wage rigidity was thus not due to price stability. Instead, short-run real wages rose and fell significantly, causing large fluctuations in workers' purchasing power. This is particularly problematic to assumptions of competitive markets because it violates the idea that the marginal revenue product of labour accrued to workers.

IV.2 Currency, monetisation, and wages

Financial and social historians have both long highlighted the poor state of England's currency in the seventeenth and eighteenth centuries. It has been influentially argued that the coin supply had a significant impact on economic activity.[66] The coin supply can directly affect wages as well. Jan Lucassen argues that deep monetisation, by which he means a currency with an abundance of small coins in circulation, is a key determinant of the wage and wage labour.[67] Because cash wages can only be paid in the money that is physically available, having small coins in circulation allows wages to adjust at finer increments, preventing rigidities. Therefore, in this section we turn to another potential explanation for wage rigidity and nominal patterns: the coin supply. Were preindustrial English wages nominally rigid because of constraints imposed by the currency?

[64] Boulton, 'Food prices' notes that seventeenth century money wages did adjust to prices over time, p. 474.
[65] Boulton, 'Meaner sort', pp. 310-330
[66] Mayhew, 'Prices in England'.
[67] Lucassen, 'Introduction'; Lucassen & Zuijderduijn, 'Coins, currencies, and credit instruments. Media of exchange in economic and social history' pp. 1-14; Lucassen, *The story of work*, pp. 115-117.

Lucassen's theory matches some other observations about seventeenth and eighteenth-century England. Muldrew has argued that the scarcity of small money in early modern England had a profound influence on the form of the wage. As he notes, daily wage rates in the seventeenth century were commonly set at increments that varied by 2d., suggesting that available coin denominations determined the minimum viable adjustment between wage levels. For example, in St Paul's Cathedral, labourers were paid 16d or 18d per day, but never 17d. This phenomenon is similar to bunching observed in wages today.[68] Although the English minted coins as small as a quarter of a penny, these were notoriously scarce until the introduction of token coinage in 1821.[69]

Coinage might, therefore, offer a way to explain why nominal wages fail to adjust frequently within a competitive labour market. Simply put, changes in nominal wages were restricted to the steps determined by the currency that was available. The unit of work that was measured by employers was also constrained by their administrative capacity: eighteenth-century wage records for both agricultural and construction work use the day as the unit of account. Half-days are sometimes reported, but not hourly work. A 2d. increment equated to 10-16% of the average nominal unskilled day wage. If the smallest possible increase would lift employers' wage bills by over ten per cent, it is easy to see why changes in pay might be rare.

However, while coinage was a source of friction, currency constraints do not provide a convincing explanation for long-run nominal wage rigidity. Firstly, employers were still capable of making adjustments.[70] When employers did make changes, they were predominantly 'bunched' at 2d. amounts, but this bunching did not completely preclude adjustment. Secondly, although the coin supply of early modern England was constrained, the mint was not the only source of currency.[71] It has been suggested that early-modern England was a place where

[68] c.f. Dube et al., 'Monopsony in online labour markets'.
[69] Redish, 'The evolution of the gold standard'.
[70] See Figure 1. Also: Stephenson, 'Working days,' table 3 p. 416.
[71] Palma, 'Reconstruction of money supply' p. 373.

'private money predominated'.[72] There was widespread minting of and use of trade tokens by businesses. Tokens were issued in units of account as large as 5d. and as small as a farthing.[73] By minting their own currency, employers could escape the large steps between available coins.[74] Thirdly, as we saw, workers regularly experienced price changes that exceeded the ten per cent threshold without obtaining a compensating change in their wage rates. These price changes put major pressure on workers' purchasing power. They also generated equivalent increases in (some) employers' earnings that were not being shared with labour.

Fourthly, the use of credit and truck mitigated the impact of the coin supply. The majority of manufacturing and service workers were not paid *on* each day they were hired. Instead, they were paid in larger sums in arrears.[75] In the construction industry, most day labourers were paid at weekly intervals.[76] At the extreme, workers at the Royal Dockyards were paid quarterly, one quarter in arrears.[77] Only a small minority of those employed worked for shorter amounts of time that would have required employers to pay in small coins.

Finally, the coin supply was not entirely fixed during the years in which we observe nominal wage rigidity. According to Palma (2018), the coin stock increased by roughly 50 per cent after the first decade of the eighteenth century. After a further period of stability, it increased sharply from the late 1750s.[78]

In short, the coin supply constraint was far less binding than it may have initially appeared and cannot satisfactorily explain why preindustrial wages went unchanged for so long.

[72] Lucassen & Zuijderduijn, 'Coins, currencies, and credit instruments' p. 12.
[73] Whiting, *Trade Tokens*.
[74] Mayhew, 'Population, money supply, and the velocity of circulation in England'; Sargent, 'England Stumbles toward the Solution' pp. 261–290.
[75] Waddell, 'Economic crisis'.
[76] Stephenson, *Contracts and Pay*, chapter 6.
[77] Richardson, 'Wages of shipwrights', p. 269.
[78] Palma, 'Reconstruction of money supply'.

IV.3 Custom wages

As Donald Woodward said, "'Custom' has always been regarded as an extremely useful concept by economic and social historians since it can be invoked whenever other explanations appear inadequate".[79] Custom, in the sense of shared norms, fulfils an important function in the working of any labour market, where accepted rates or wage differentials provide information that reduce the need for haggling.[80] Economists and historians all generally acknowledge a place for custom, perhaps in the guise of a 'sociological aspect', in the setting of wages.[81]

However, a stronger notion, that before industrialisation wages were determined in a 'moral economy' centred on reciprocity within communities 'not [by] a market calculation', can be found in a number of studies.[82] In a significant essay on custom and wages, Schwarz noted that the "money wage was responsive to changing conditions", but stressed that the money wage was only one part of remuneration, that most of the wage was "paid in credit or in kind."[83] As evidenced above, this former point was generally not the case in the wages economic historians have largely used. Although intuitively the idea that wages were set by custom with varying 'in kind' emoluments seems like it can explain some of the patterns noted above, it is less clear that custom explains the rigidity of the money portion of the wage.

In fact, few historians have discussed the exact mechanisms by which they see custom affecting nominal wages. The honourable exception is Donald Woodward, who wagered that when "money wages became established at a new level, they quickly became 'customary' and workers were reluctant to accept lower rates

[79] Woodward, 'The Determination of Wage Rates' p. 36.
[80] See related section on efficiency wages below.
[81] As mentioned pp. 4-5 above. Piore, 'Sociological theory' pp. 377-8.
[82] Hobsbawm, 'Custom wages and workload' p. 344; Schwarz, 'Custom wages and workload' pp. 154-5.
[83] Schwarz, 'Custom, wages and workload' pp. 171, 191-2. A full explanation of the relationship between custom and credit is explored in Muldrew, *The Economy of Obligation*; also see Muldrew and King, 'Cash, Wages and the Economy of Makeshifts' in England, 1650–1800' and Johnson, 'Making the Market' pp. 89-110.

when prices fell again."[84] This might explain some wage rigidity, though Woodward concluded that the biggest factor in wage determination was 'market forces' or 'supply and demand'.[85] Woodward's idea of custom essentially equates to Keynesian downward wage stickiness, discussed below, and, like that, does not explain long-run rigidities or wage dispersion.

For custom to offer a meaningful explanation for rigid wages, it should define a rate for a role that holds beyond a specific site or employer. That wages for similar work varied between similar sites should be enough to dispel the idea that workers and employers shared an understanding of a customary wage that was generally applicable throughout the labour market.

Rather than a norm that governed nominal wages, custom is better understood as a resource workers used in disputes over conditions, even if most references involve the principle being violated.[86] Interestingly, E.P. Thompson, whose work is most closely associated with popularising the idea of a moral economy, saw the importance of custom in the eighteenth century in disputes over expectations, attitudes and practices around work, not in wage setting.[87] 'Custom' was frequently invoked by those who argued for improved welfare for workers, especially after 1760. Indeed, the word became much more commonly used from the mid-eighteenth century.[88] Rule suggests that 'customary expectation' peaked in the early nineteenth century, when nominal wages were changing regularly; as such, it seems a weak explanation for the earlier period of rigid wages.[89]

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[84] Boulton, 'Wage labour' p. 284, quoting Woodward, n. 73. Woodward, 'the determinants' section 5 deals with how Woodward views the mechanism as having worked in the determination of wages.
[85] Woodward, 'Determinants' section 5.
[86] Schwarz, 'Custom work and wages' p.155 on the limits of custom.
[87] Thompson, *Customs in Common,* Chapter 1 p. 5; Rule, *Experience* p. 194.
[88] A ngram view search for the word, 'custom' in English language publications between 1650 and 2019 shows an almost sevenfold increase in the share of the use of the word between 1712 and 1800, and a decline after that https://books.google.com/ngrams/graph?content=custom&year_start=1650&year_end=2019&corpus=en-2019&smoothing=3.
[89] Rule, 'Experience of' pp. 194-5.

Although custom and social norms play a significant role in the setting of any wage, the persistence of nominally rigid but dispersed wages cannot be assigned to 'custom'.[90] As Hatton describes for a later period, at most custom provided an ordered framework for wage setting, rather than a direct determination of the nominal rate.[91]

IV.4 Coercion and bargaining power.

A significant literature stresses the role of coercion in early modern and preindustrial labour markets.[92] Much of the history that engages with the 'moral economy' and custom, also presents a narrative of emerging class consciousness of labour, which eventually, in the late nineteenth century, led to unionisation and the institutionalisation of worker bargaining power.[93]

In the long eighteenth century, however, labour had few rights and virtually no bargaining power. Since the mid-sixteenth century, Justices of the Peace had the power to set maximum wages. Workers who disputed wages faced an immediate risk of trial and incarceration. The legal framework denied them the right to agitate and punished workers for stopping work.[94] Justices of the Peace who had to rule on a labour dispute had to determine first whether the workers were to be imprisoned for the dispute *before* they could give judgement on any wage issue. Under the law, employers were also disincentivised, through fines or imprisonment, to give wage increases in response to disputes.[95] Legal provisions had the broad effect of handing employers the power to enforce or coerce work whilst undermining any bargaining power for organized labour, and it is clear this power was used.[96]

[90] Piore, 'Sociological Theory' p. 379.
[91] Hatton, 'Institutional change and wage rigidity in the UK', pp. 84-5.
[92] See Rogers, *Six Centuries*, pp. 173-187.
[93] Thompson, *The making*; Joyce, *Visions of the People*, pp. 115-120.
[94] 5 Elizabeth c.4. See: Woodward, The Background to the Statute of Artificers' p. 33.
[95] Kelsall, 'Wage regulation under the Statute of artificers' p. 121.
[96] Rogers, *Eight chapters on the history of work and wages*, p. 66; Hay, 'Master and servant in England', pp. 27-264.; Steinberg, 'Capitalist Development', pp. 445–495; Steinfeld, *Coercion Contract and free labour* p. 42, n. 14; Naidu, S., & Yuchtman, 'Coercive Contract Enforcement: Law and the Labor Market' pp. 107-144.

The impact of the legal framework on wages has been clearly identified by Naidu and Yuchtman, who concluded that 'labour demand shocks need not be directly reflected in wages paid' in this coercive regime. When the legal punishments to withholding labour were withdrawn after 1875, disputes and separations increased, but so did wages.[97]

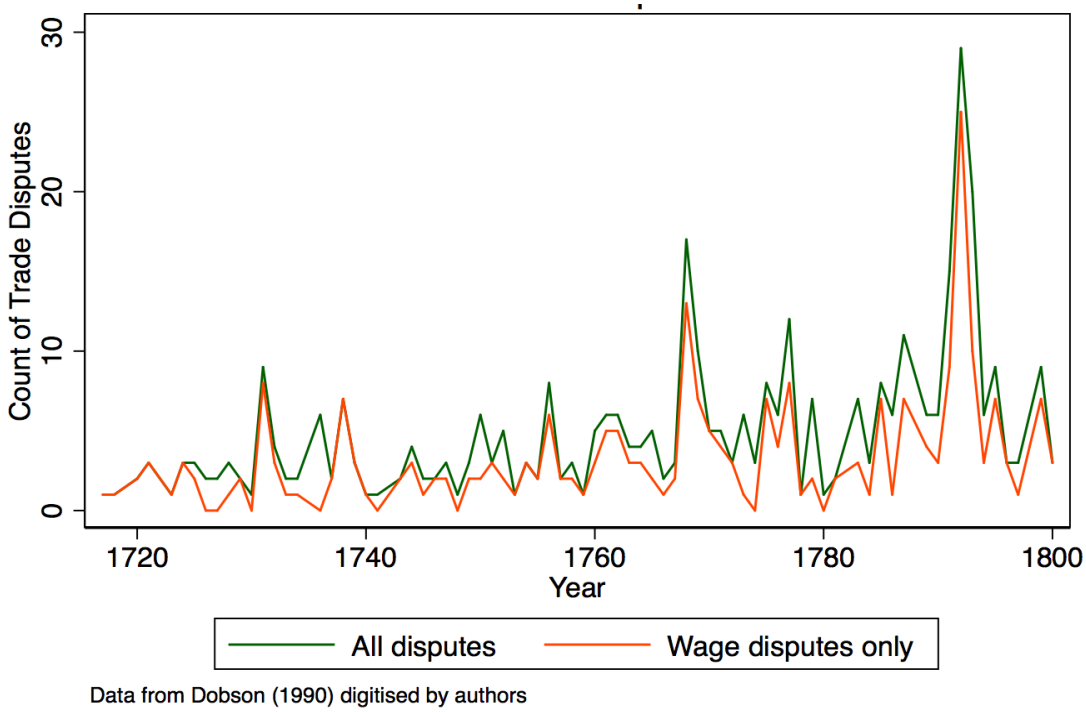
Despite the law, labour did organize and it did strike. Combinations or clubs of journeymen and workers were established, but their interactions with employers were indeterminate at best, and illegal at worst.[98] To approximately measure worker's bargaining power in this period, we digitised and analysed the industrial and trade disputes collected by Dobson, who tracked all disputes recorded in England 1717-1800 in newspaper and court sources.[99]

The number of disputes each year provides a measure of labour unrest and, by implication, gives some indication of the strength of workers' bargaining power.[100] However, this analysis is limited by the lack of information on the number of workers affected by each dispute.

Figure 6 gives the number of industrial and trade disputes each year, as well as the number of disputes where the principal issues was wages. Even though most disputes were about wages, there were relatively few industrial disputes recorded until the late 1760s. By our analysis, Dobson identified fewer than ten disputes per year in most of the period in which we observe nominal wage rigidity.[101] This confirms the view that workers had relatively little bargaining power.

[97] Naidu and Yuchtman, 'Coercive contract enforcement' p. 109.
[98] Chase, *Early trade unionism,* chapter 2.
[99] Dobson, 'Masters & Journeymen'.
[100] Bargaining was not, 'collective' however.
[101] The record is clear that, in most cases, substitute labour was hired so employers' losses from stoppages were not substantial.

Figure 6. Reported industrial and trade disputes, 1717-1800



Overall, in this period, the political and legal framework meant that the bargaining balance of power was forcibly against workers. The profound imbalance in terms of legal powers and wage bargaining might explain why wages did not rise, and they can be clearly associated with holding wages down. They cannot fully explain the nominal rigidity we observe, however. Given their power, why did employers not save on labour costs by cutting day rates in times of low demand, high labour supply, or falling prices? We consider this wage stickiness in the section below.

V. Adaptations to the competitive model

The explanations considered so far can all broadly coexist with the assumptions of a largely competitive labour market. However, while they offer reasons for frictions in wage adjustment, they struggle to account fully for the nominal rigidity and dispersion of wages in the eighteenth century. We now consider other models which adapt the competitive framework: first, following from the previous section, wage stickiness, secondly; employer wage strategies.

V.1 Keynesian downward wage stickiness and worker dispute

Nominal wage rigidity is closely associated with wage stickiness in an extensive literature in economics using Keynesian frameworks.[102] In a Keynesian perspective, nominal wages exhibit downward rigidity or 'stickiness' as employers opt not to cut wages during downturns or demand slumps. Keynes surmised this decision was to avoid unnecessary labour unrest, writing that "a movement by employers to revise money-wage [nominal] bargains downward will be much more strongly resisted than a gradual and automatic lowering of real wages as a result of rising prices."[103] Though there are other reasons downward nominal wage stickiness might arise, such as implicit contracts, efficiency wage policies, or insider/outsider behaviour,[104] it is often understood today in the strict Keynesian sense to arise from a desire for employers to appear fair or to prevent worker action.

In the late nineteenth-century U.S. manufacturing sector, fear of worker action was associated with increased downward nominal wage rigidity.[105] Could this have applied in England in the eighteenth century? This seems unlikely. As we just saw, labour power does not appear to have been strong enough to scare employers into wage stickiness to avoid unrest. Additionally, the eighteenth-century employers whose wages are used by economic historians did not experience the same constraints in employment practices as the modern firms considered in the Keynesian framework. Modern firms hire labourers on long-term contracts, meaning a wage cut might involve a costly revision of contractual terms. In contrast, these eighteenth-century employers did not hire unskilled labourers on long-term contracts. They hired labour casually, usually by the day or week. This should have afforded them more opportunities to adjust wages in response to changing conditions, yet we do not observe this.

[102] For example, Solow, 'Another possible source of wage stickiness' .
[103] Keynes, *The General Theory,* Collected Writings VII p. 264.
[104] Hayley, 'Theoretical foundations' pp. 115-155.
[105] Hanes, 'The development of nominal wage rigidity in the late 19th century' pp. 732-756; Kaur, 'Nominal Wage Rigidity in Village Labor Markets' pp. 3585-3616.

Keynesian wage stickiness cannot fully explain the nominal wage patterns we observe for two other reasons. First, Keynesian price and wage stickiness is typically taken to be a short-to-medium term phenomenon, not something that persists for many decades.[106] Second, and more importantly, Keynesian wage stickiness is asymmetric: it cannot provide a satisfactory theoretical explanation for the *upward* nominal wage rigidity which we also observe.

V.2 A labour management strategy pursued by large employers

In labour markets with significant frictions, including bargaining costs, moving costs, and information asymmetries, employers may pursue wage strategies to manage their labour force and reduce costs.[107] The classic example is an efficiency wage strategy, where wages are set above market rates to encourage productivity. Efficiency wages are typically used to address principal-agent problems such as shirking, reducing monitoring costs and promoting worker productivity and loyalty. Other employer tactics include strategies to minimize turnover costs by discouraging short-term separations, or to overcome information asymmetries associated with adverse selection and unobserved productivity differences.[108] All of these strategies are typically associated with large employers.

Evidence or discussion of efficiency wages before the twentieth century is rare. However, Huberman argued that the high wages offered by employers in early nineteenth-century Lancashire textile mills can be explained as efficiency wages to reduce monitoring costs.[109] Might the wage patterns we observe a century earlier also be explained by efficiency wage strategies?

[106] Wage and price 'spells' of rigidity are typically estimated for modern markets to last under a year in length; see, for example, Dixon & Tian, 'What we can learn' for recent estimates for the UK.
[107] Card, 'Who set your wage?'pp. 1079, 1083-4; Oi et al. pp.2167-9.
[108] Akerlof, 'Labor contracts as gift exchange'; Shapiro and Stigltiz, 'Equilibrium unemployment'; Salop, 'A model'; Weiss, 'Natural rate'.
[109] Huberman, *Escape from the market,* chapter 1.

A strength of this interpretation is that efficiency wages are associated with wage posting, which did characterize the large institutional employers for which we have nominal wage data.[110] In all the cases presented in Section III, the surviving evidence is for low skilled work at large building sites where the wage was posted by the employer, their agents, or commissioners. However, it seems unlikely that these were efficiency wages according to the strict textbook definition because these employers continued to hire at exactly the same nominal wage rate through periods of very high and very low demand, varying market conditions, and volatile prices. Such changes in conditions would have driven a wedge between the nominal and real wage workers were receiving, requiring nominal wages to be sometimes adjusted upwards in order to maintain their efficiency wage effect. Because nominal wages were unvarying, the real wage would often have been too low to meet the key criteria that 'efficiency' wages are higher than the market norm. As a result, the wage would not always have had the capacity to reduce monitoring costs or shirking.

In the early-modern world, unskilled labour operated in an uncertain, casual market subject to high transactions costs.[111] While a strict efficiency wage model does not explain the extreme nominal wage rate rigidity we observe, wage posting might still have been part of a broader strategy to reduce turnover costs or to overcome information asymmetries for large employers. Paker et al. find that St. Paul's wage posting was part of a larger system to reward tenure by giving longstanding workers access to additional income through more days of work and more consistent work. This managed turnover costs by creating implicit contracts with longstanding employees.[112] Similar concerns may also explain the wage posting at the other large building sites for which there is surviving data. These labour-management strategies are only viable within a framework of imperfect competition, where the labour market was characterized by significant frictions, including high turnover costs for employers and costly

[110] Manning, *Monopsony in Motion*, p.136.
[111] Pollard, 'Labour in Great Britain'; Grantham, 'Economic history'; Wallis, 'Labour markets and training'.
[112] Paker et al., 'Job Tenure'.

information asymmetries. These frictions are exactly the preconditions for monopsonistic relationships to emerge.

VI. Monopsony and inelasticity of the labour supply

We have presented evidence of nominal wage patterns, employer wage policies, and employer bargaining power all consistent with a market characterised by profoundly imperfect competition, large information asymmetries and search frictions, and employers with monopsony power. In today's markets, the key evidence for monopsony is a low wage elasticity of the labour supply curve.[113] Unfortunately, for the early modern period, the available data prevent us accurately calculating the elasticity of the labour supply to the wage. On the one hand, the extreme nominal wage rigidity we observe prevents us from estimating wage elasticities using standard models based on hazard rates, as we do not observe nominal wages regularly adjusting. On the other, the absence of reliable measures of the labour supply, including the absence of any unemployment data, make it difficult to estimate true separation and recruitment rates, as only those employed are observed.

Even if the sensitivity of the labour supply to wages cannot be calculated using today's standard econometric methods, the existing evidence suggests the elasticity was low. Intuitively, the patterns observed for labourer recruitment at St. Paul's -- where the Cathedral could hire during periods of rapid demand, mass layoffs, slumps in demand, through conscription, epidemics, inflation and other supply variations at exactly the same wage rates -- suggest that the labour supply to this individual employer was inelastic to an extreme degree.[114] Additionally, the historical consensus is that early modern labour markets were highly idiosyncratic with large information asymmetries and search frictions. Although with the available data we cannot quantify these frictions, the picture

[113] Manning, *Monopsony in Motion* pp. 96-107; Langhella and Manning, 'Marshall lecture' discusses the importance of degrees of this elasticity in Section 4.
[114] Paker et al., 'Job tenure', Fig 1.

that emerges is one in which employers had substantial wage setting power and in which the labour supply could not afford to be fully responsive to changes in those wages.

Our interpretation is bolstered if we consider another key feature of monopsonistic markets, that 'jobs have rents'. Owing to these search frictions and firm idiosyncrasies, under conditions of monopsony workers are not perfectly sensitive to wage changes because they value having a job. Tenure is thus incentivized and rewarded. Keeping in mind the ambiguity of the concept of a 'job' during this period, the evidence from St. Paul's Cathedral suggests this was the case for unskilled workers at the site in the eighteenth century. Unskilled labourers who had a longer 'career' at the Cathedral were rewarded with a higher number of days of work and access to other income earning opportunities, despite the fixed wage.[115] Stephenson has also found fragmentary evidence for a relationship between tenure and the number of days worked for more skilled workers also.[116] Evidence that jobs had rents in the early modern period supports a monopsonistic interpretation of labour markets. As Manning says "when the wages of new recruits are tied to those of existing workers and the wages of existing workers cannot be reduced this could be a powerful source of nominal and cyclical wage rigidity forcing the burden of adjustment to variations in demand onto employment rather than wages." [117] This is exactly what occurred at St. Paul's Cathedral.

Eighteenth-century employers thus appear to have derived their market power to 'set wages' from two sources: first, the natural monopsony that labour market frictions and firm idiosyncrasies created, and second, a legal framework that prevented workers from bargaining for higher rates and severely limited labour power. We suggest that the absolute nominal rigidity found in long run day wage

[115] Ibid.
[116] Stephenson, 'Working days' p. 422-25; Webber, 'Firm Market Power and the Earnings Distribution'.
[117] Manning, *Monopsony in Motion* p. 136.

series was the result of this combination. Employers 'set wages' and labour had no other option but to try to get as much work at that rate as they possibly could.

VII. Conclusion and implications

To summarize, we have observed substantial nominal wage rigidity over decades at large employers in the eighteenth-century, as well as dispersion in wage rates for similar work across sites. Taking into account the historical evidence of low labour power, significant labour market frictions, and an apparent low elasticity of the labour supply to wages -- as well as the insufficiencies of other possible explanatory narratives -- we argue that the most plausible explanation for these nominal wage patterns is that they arose from general conditions of imperfect competition, and specifically employer monopsony. Wages were not bargained nor were they the result of well-functioning competitive markets; rather, the almost absolute rigidity that characterized nominal wages in the eighteenth century suggests that large employers 'set' wages under conditions in which they had substantial monopsonistic market power. This has implications not only for the sites for which we have data, but also for our understanding more generally of the structure and operation of early modern labour markets.

As Manning reminds us, the sources of imperfect competition or monopsony in the labour market are enduring, and not the product of any period or circumstance: "It is ignorance, heterogeneous preferences, and mobility costs that are the most plausible sources of frictions in the labour market."[118] What we know about the preindustrial labour market indicates that these frictions were even more pronounced and prevalent than today. Eighteenth-century employers' market power was more potent and coercive than that enjoyed by any modern firm.

Manning also writes that a monopsonistic perspective on labour markets "does not mean supplanting all existing competitive analysis: in many cases, it simply

[118] Manning, *Monopsony in Motion* p. 4.

adds to it."[119] In this spirit, we suggest that a monopsonistic framework may help to solve several important puzzles about historical labour markets and examine old anomalies in new ways. For example, the competitive framework has never been able to fully explain the dramatic fall in real wages during the long eighteenth century, nor, as we argue, the nominal wage patterns observed for individual employers. If wage determination was the result of wage policies where monopsonistic employers with significant market power set wages, these patterns are more explicable, at least at the large institutions for which data survive. Additionally, recent output-based approaches to estimating macroeconomic performance have found that output records and real wage indicators diverge quite considerably.[120] A monopsonistic framework could provide one explanation for this, as monopsony predicts that employers can offer and pay a lower wage than a worker's marginal revenue product.[121]

By emphasizing the costs of search and rents in the employment relationship, a monopsonistic framework also has broader implications for economic historians' conceptions of wages, skill premiums, and employment contracts. Firstly, if the law of one wage does not hold for our historical sources – and we have found that it does not – then the craftsmen's and labourers' wage series that so much economic history stands on may not necessarily be representative of the average wage, nor the average worker's marginal product.

Second, monopsony offers a complement to human capital theory in analysing the reasons for wage differentials. Research on contemporary labour markets finds that markets for unskilled labour are more monopsonistic, with employers having more power, than those for skilled workers.[122] This has implications for conceptions of the 'skill premium' as the result of investment in human capital or guild rents.[123] A portion of the skill premium may have been the product of

[119] Manning, *Monopsony in Motion* p. 27; also see p. 362.
[120] Broadberry et al, *British economic Growth 1270-1870,* chapter 6.
[121] Broadberry et al., British Economic Growth, Fig. 6.01, p. 251.
[122] Manning, 'Imperfect Competition' p. 994-996.
[123] Van Zanden, 'The skill premium and the Great Divergence'.

differences in bargaining power and labour supply elasticities. Monopsony could also help understand the heterogeneity of returns to human capital and training, particularly for women and children, if the labour supply of these groups to individual firms was less elastic than others, and they had relatively little labour power.[124]

Lastly, a monopsonistic framework can also shed new light on the costs and incentives of different wage contracts, such as the difference between annual service contracts and casual day labouring.[125] If search costs and information asymmetries affected workers' decision to submit to a long contract, this needs to be explicitly modelled when we consider the relationship between the wages in annual service contracts and those for day work. We may not be able to assume that the number of days worked per year was simply equal to the annual wage divided by the day wage. Indeed, the elasticity of the labour supply to wages may have varied considerably between these two distinct forms of the employment relationship, and whether labour supply was added at the extensive or intensive margins would be critically affected by the degree to which markets exhibited monopsony.

This work also adds to larger conversations in economics about today's labours markets. In Card's 2022 Presidential Address, he issued a call-to-action for economists to start "taking questions about wage setting seriously."[126] By studying monopsony in preindustrial labour markets with the attention to data sources, legal frameworks, and historical context that is typical of economic history, we show one way to confront theoretical models of wage determination with evidence on what actually may have happened. Additionally, recent research on monopsony today has often linked monopsony with employer coercion, attempting to highlight moral and economic exploitation in labour markets where 'superstar firms' enjoy market power and inelastic labour

[124] Manning, 'Imperfect Competition' pp. 1026-7.
[125] This is currently dealt with in the framework offered by Humphries & Weisdorf, 'Unreal Wages' pp. 2868-9.
[126] Card, 'Who set your wage'.

supplies allow them to keep wages below marginal product.[127] By examining historical wage policies and contracts with a new lens of monopsony, we place some of these emerging and important questions around freedom and coercion in labour contracts into historical perspective.

More work needs to be done to understand many things about preindustrial labour markets, including how this system of nominally rigid wages broke down, as it most certainly did, throughout the period of the Revolutionary and Napoleonic Wars. An important question arises as to the extent to which labour markets ever became 'competitive', one which touches on many grand theories about industrialisation and capitalism over the last two centuries. In the meantime, understanding the role of monopsony in early modern labour markets offers us the chance to construct new explanations for the problem of how capital and labour shared the gains from production in the long run.

[127] Azar et al., 'Labour market concentration'; Dippel et al., 'Outside Options, Coercion, and Wages'.

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