Structural Transformation and Value Change: The British Abolitionist Movement

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Abstract

What drives change in a society's values? From Marx to modernization theory, scholars have identified a connection between structural transformation and social change. To understand how changes in a society's dominant mode of production affect its dominant values, we examine the case of the movement for the abolition of slavery in the late 18th and early 19th century Britain, one of history's most well-known campaigns for social change, which coincided temporally with the Industrial Revolution. We argue that structural transformation alters the distribution of power in society and enables groups with distinct values and weak economic interest in the status quo to mobilize for change. Using data on anti-slavery petitions, MP voting behavior in Parliament and economic activity, we show that support for abolition was strongly connected to manufacturing at the aggregate and individual level. We rely on biographical data and the analysis of parliamentary speeches to show that industrialists were relatively less reliant on income from slavery and were characterized by a universalist worldview that distinguished them from established elites. Together, our findings suggest that both values and economic interest play a role in driving social change.

Keywords: values, structural transformation, social change, slavery, abolition.

1 Introduction

Value systems – mappings from actions to moral valuations – vary both across societies and over time (Haidt, Koller and Dias 1993; Haidt 2012). Occasionally, behaviors and practices supported by a society's dominant values have changed rapidly (Appiah 2011). Footbinding, a custom prevalent in China for close to a millennium, became stigmatized and faded away in less than a hundred years (Mackie 1996). Laws and attitudes towards homosexuality shifted radically during the 20th century, and in some instances displayed discrete jumps; between 1990 and 2020, the proportion of Americans who approved of sexual relations between same-sex adults increased from 20% to 60% (Fernández, Parsa and Viarengo 2019).

Social change is often triggered by changes in material conditions, such as the external environment (Bazzi, Fiszbein and Gebresilasse 2020), technological change (Fernández-Villaverde, Greenwood and Guner 2014), wars (Fernández, Fogli and Olivetti 2004) or epidemics (Fernández, Parsa and Viarengo 2019). Most scholars link material to social change through a channel of changed payoffs to particular actions. Behavioral change then shifts beliefs and associated social norms or cultural equilibria. A changing payoff structure also affects the incentives of parents to transmit specific preferences to their children, leading to intergenerational change.

In this paper, we highlight a complementary mechanism that links social change to changes in material conditions. Structural transformation – the development of a new dominant sector of economic activity – can trigger changes in the distribution of power within a society. Groups associated with the growing sector become more able to mobilize and enact reforms that align with their values and economic interests. Change is most likely to be initiated by ascending groups that have little economic interest in the existing status quo and whose values and ideology are distinct to those of entrenched elites. Mobilization of these rising social strata can enable mobilization from less powerful groups with aligned values, creating a cascade of participation in reformist agitation that can bring about social change and shift the existing moral paradigm.

We document this mechanism in the case of the movement for the abolition of slavery in late 18th and early 19th century Britain, one of history's most well-known campaigns for social change. The anti-slavery movement was initiated by Quaker activists, but quickly grew to find support among the broader British population, culminating with an estimated 20% of British men over 15 years of age signing pro-abolition petitions in 1833 (Drescher 1982). Temporally, the shift in perceptions of slavery from a fundamental institution of the British Empire to morally repugnant, coincided with the First Industrial Revolution and Britain's radical structural transformation from an agrarian to a capitalist economy. Historians have debated over the precise link connecting capitalism to abolitionism. Some have focused on economic factors, emphasizing the declining importance of the colonial sugar trade for the British economy as the industrial sector rapidly expanded (Williams 1944). Others have placed more emphasis on cultural explanations (Ashworth et al. 1992), observing that abolitionism was a social movement with mass participation from the middle classes, which mobilized not

only against slavery, but also in favor of several other reformist causes (Drescher 1986). But while most supporters of abolition belonged to the middling strata of craftsmen, artisans and professionals, some views hold that anti-slavery primarily reflected the ideology and interests of a rising industrial elite, whose attacks on the institution of slavery served to legitimize a new capitalist order reliant on free labor (Davis 1975).

We contribute to this debate by providing a conceptual framework and systematic empirical evidence, which jointly help reconcile prominent economic and cultural explanations for the link between industrialization and abolitionism. First, we put forward a simple model in which the decision to mobilize for social change depends on both values and economic interests. Power to mobilize is a function of income, which can originate from different economic activities. Groups differ in their values, economic activities and overall power. In this setup, social change is most likely to be initiated by groups that have strong progressive values, weak economic interests in the status quo, and sufficient power to act on their values and interests. In the context of late 18th and early 19th century Britain, rising income from industry increased the power of industrialists (Fresh 2020), a group characterized by liberal values aligned with the abolitionist cause and low reliance on slavery-based income. Because the cost of mobilization is declining in the rates of participation in the movement, mobilization by industrial elites could facilitate mobilization by less powerful segments of the middle classes who shared the same liberal values.

This framework fits three key stylized facts of the abolitionist movement: early abolitionist activists, such as the Quakers, had particularly strong anti-slavery values rooted in their religious beliefs; the movement displayed an S-shaped dynamic of participation over time; and at its peak, it spread to large segments of the middle classes, which embraced liberal ideals of the Enlightenment, but remained excluded from the formal political process. Additionally, the model is broadly consistent with prominent historical explanations for abolition: the decline in relative terms of the importance of sugar for the British economy as the country industrialized may have weakened incentives to defend the colonial system among all groups that saw their share of income from industrial activities increase. However, not all groups mobilized for abolition to the same extent. The model assigns a key role to groups that had both weak ties to slavery and an ideology that aligned with abolition, a configuration that applies well to the middle classes. Among the middle classes, it was the groups with greatest power, deriving from rising income from industrial activities, that should have assumed a central role in the movement and enable other aligned groups' broad participation. Importantly, mobilization in our framework is not only a function of groups' links to slavery income, but also of ideology. Groups with conservative values may not mobilize for reform even when their reliance on slavery income is low. This is consistent with the defense of the institution of slavery by conservative elites, even those that did not draw their income primarily from the colonies (Taylor 2020).

To support this theory, we proceed in two steps. First, we establish a link between industrial interests, at both the aggregate and individual level, and abolitionist mobilization outside Parliament. Next, we turn attention to the voting behavior of MPs, to confirm the

link between industrial interests and anti-slavery and provide additional evidence on the role of economic and ideological motivations behind this connection.

We begin by examining the development of the extra-parliamentary manifestations of the abolitionist movement. This part of our analysis aims at establishing the key observable implication of our framework: a link between industrialization and abolitionism at the aggregate level, mediated by a central role for industrialist elites. We compile a dataset of approximately 12,000 petitions against the slave trade and slavery submitted by towns to Parliament between 1788 and 1833. We conduct analyses at the parish level ($N = 9,134$) and construct two time-varying measures of industrialization following existing literature. The first one interacts subterranean coal deposits with a trend in coal consumption across England (Fernihough and O'Rourke 2021; Esposito and Abramson 2021; Fresh 2020); the second interacts the presence of fifteenth century water mills with an index of industrial output in England, building on the demonstrated connection between early use of hydraulic energy and the first stages of industrialization (Mokyr, Sarid and van der Beek 2022). Both these approaches allow us to keep fixed time-invariant unobservable characteristics of parishes, and to estimate the change in petitioning activity resulting from a quasi-exogenous change in industrialization. The link between industrial activity and anti-slavery petitions is strong, and not driven by the time-varying effect of characteristics such as location and geography.

We corroborate these aggregate results using an IV strategy that relies on basic principles of hydraulics to predict locations of maximum hydropower in which an early water mill would likely have been built. This strategy uses the interaction of flow accumulation – the amount of upstream area draining into a site – and elevation differential at a site to predict water power potential, conditional on a site's average flow accumulation and slope. Locations that combine high flow accumulation with a sloped terrain were more likely to have a water mill in the fifteenth century and to register higher petitioning activity against slavery as industrialization in Britain took off.

Opposition to slavery was but one element of the values of industrialists and the middle classes. The broader liberal ideology characterizing these social strata consisted of other progressive ideas related to social reform and the expansion of rights. Consistent with the theoretical argument that, as income from industrial activities increases, mobilization should increase in support of any cause aligned with the values of industrialists, we observe that industrialization was indeed connected to broader agitation for political and social reform. Industrializing parishes filed more petitions on average, and were more likely to petition Parliament on parliamentary reform and on the extension of political rights to religious minorities.

The aggregate connection between industrialization and petitioning for abolition could be driven by middling social strata or even by the working class (Drescher 1986). To better understand whether industrial elites played a distinct role in petitioning campaigns, we exploit one of the few surviving anti-slavery petitions, which was produced in 1806 in the industrial city of Manchester. The petition document lists the names of signatories. A subset of these names were linked to trade directories by the Manchester and Lancashire Family History Society, allowing us to identify the occupations of these individuals. Because of the way in

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which signatures were collected, which did not rely on door-to-door canvassing, we can use the order of signatures as a proxy of an individual's centrality in the abolitionist movement (Makovi 2019). Manufacturers were the largest group of signatories, and they signed the petition earlier than individuals of other occupations, including other upper middle class occupations such as merchants or attorneys.

To gain some understanding on whether abolitionism in industrializing areas reflected primarily economic concerns or ideology, we turn to newspapers. We scrape all articles mentioning slavery that were published between 1787 and 1833 from the British Newspaper Archive and link them to their place of publication, at the level of the census registration district ($N = 624$). We use structural topic modelling (Roberts et al. 2014) to examine differences in the themes connected to slavery in industrial compared to non-industrial districts. The patterns are consistent with a role for liberal ideology underlying support for the abolitionist cause. Publications in industrial locations were more likely to feature articles presenting humanitarian arguments against slavery, emphasizing the natural right to freedom, as well as Christian values. Reflective of a weaker economic interest in the slave trade and slavery, topics of an economic nature were overall less prevalent in industrial locations. Taxation, duties and the trade in sugar were discussed at equal rates across districts, while other financial and legal aspects of slavery were less common in industrial districts.

The second part of our empirical analysis turns to analyzing mobilization against slavery through institutional means. In 1833, Parliament debated the abolition of slavery in the colonies and the conversion of enslaved persons to apprentices. We combine information from biographical dictionaries and from the *Legacies of British Slavery* database (Hall et al. 2014) to identify MPs' economic interests, including links to manufacturing and plantations in the West Indies. Industrialist MPs were significantly more likely to display an anti-slavery stance in parliamentary divisions (roll-call votes) on abolition, supporting low compensation for slave owners and better apprenticeship conditions for freed slaves. This effect is not driven by MPs' political orientation, religion, education, social class, or by characteristics of their constituency. Beyond the behavior of industrialists, voting on abolition broadly followed MPs' economic interests. Slave owners were significantly more likely to oppose abolition. MPs with an aristocratic title were also less supportive of the abolition plan, though not significantly so. Other groups, like merchants and the gentry held a more neutral stance.

We next examine in more detail whether MPs' voting behavior aligned with their economic interests and values in accordance with our theoretical argument. By computing the share of different groups – industrialists, merchants, the gentry and the nobility – that is mentioned in the database of British slave owners, we verify that industrialists had the weakest direct ties to slavery, with only one manufacturer MP linked to plantations in the colonies. 30% of MPs with merchant interests, 15% of MPs from the gentry and 7% of MPs with a nobility title were linked to slave ownership. This ranking suggests that income from slavery was an important, but not the only determinant of voting behavior. In the latter case, we would expect to observe a stronger opposition to abolition on the part of merchants and a weaker opposition among the nobility.

To probe whether MPs' values played a role in their voting behavior, we turn to speeches delivered in Parliament in 1832-1833. To characterize MP ideology in a way that captures the liberal orientation of progressive segments of society in Victorian Britain, we rely on Moral Foundations Theory (Haidt 2007; 2012), which partitions moral values into foundations, each emphasizing a different principle as a guideline for what constitutes a morally correct action. We focus on "universalist" and "communal" morality, a partitioning of values that aligns with modern-day differences across liberals and conservatives (Haidt 2012; Enke 2020). Universalism is defined by an emphasis on non-harm and fairness as guiding moral principles, while communalism prioritizes ingroup loyalty and respect to traditional authority. We identify terms associated with each set of foundations in the speeches of MPs relying on the Moral Foundations Dictionary[1]. MPs with industrial interests were more likely to employ universalist moral terms. Importantly, industrialists were more universalist in their broader discourse, and not only in their speeches on the topic of slavery. This supports an interpretation of industrialists as distinct value "types," rather than one in which language adjusts to each debate depending on an MP's stance on the topic. Universalist discourse is not explained by political orientation or religious affiliation, but is correlated with economic interests. The ranking of universalism among different groups of MPs helps explain their voting on abolition, which was not fully explained by their economic interests. MPs from the aristocracy were significantly less universalist than others, while the gentry, merchants and planters were not characterized by either universalist or communal moral rhetoric.

Consistent with an interpretation of universalism not as higher altruism, but as altruism that declines less rapidly with social distance (Enke, Rodríguez-Padilla and Zimmermann 2020), we find no higher prevalence of generic morally charged words in the discourse of industrialists, and no higher prevalence of words associated to the moral foundation of *sanctity/degradation*, which is more closely associated with spiritual and religious understandings of morality. MPs from dissenting Protestant denominations were more likely to employ words associated with this foundation, which serves as a sanity check for the validity of our approach to apply a dictionary built on contemporary language to the discourse of 19th century parliamentarians.

In the final part of our empirical analysis, we rule out a number of alternative explanations for the voting behavior of MPs. The first is direct material gain from abolition. Our argument is that industrialists had little to lose, but not that they stood to gain directly from ending slavery in the colonies. Adam Smith and Erik Williams both argued that a material motive for industrialists to oppose slavery was that the system of monopolies which supported the colonial economy was a direct drain on resources and limited the market for British industrial goods. We find no evidence that positions on free trade were a significant driver of MPs' votes for abolition. We also find no differential voting behavior among MPs with involvement in textile manufacturing, whose production depended on imports of raw material. Given that

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[1]https://moralfoundations.org/other-materials/

Britain was not a major producer of cotton after the loss of its North American colonies, there was no economic incentive for textile manufacturers to oppose abolition. We also show that anti-slavery positions of MPs were not influenced by support for abolition in their constituency and do not appear to be have been used as means to attract voters. While anti-slavery votes in general were responsive to labor unrest, lending some support to the argument that the popular cause of abolition was used as a way to deflect domestic grievances, such strategic motives were equally important for MPs with industrial interests and others.

Our paper makes three broad contributions. First, we demonstrate a link between structural transformation and social change in the context of one of the most prominent historical examples of both processes: the abolitionist movement in Britain of the Industrial Revolution. Second, we provide evidence in favor of a specific mechanism connecting industrialization and social change, the rising power of social groups with weak economic interest in preserving old institutions and values aligned with change. Third, we document a role for both material payoffs and values in mobilization for social change, in support of work emphasizing the feedback between culture and structural conditions, rather than the primacy of one's influence over the other. We review the related literature in more detail in Section 2. Section 3 discusses the historical background of abolitionism and industrialization in Britain and prominent theories linking the two. Section 4 presents our theoretical argument in a simple formal model. Section 5 describes our data. We provide our main empirical analysis of industrialization and the abolitionist movement outside Parliament in Section 6 and of abolitionist votes of industrialist MPs in Parliament in Section 7. Section 8 concludes.

2   Literature review

At the broadest level, our paper speaks to scholarship in the social sciences that links material conditions to social and cultural change. Since Marx ([1859] 1970), a materialist line of thought that sees culture as part of a superstructure which derives from an economy's material base has been extremely influential among scholars of culture both within and outside the Marxian tradition (Gramsci 1992; Althusser 2014; Nisbett 2004; Alesina, Giuliano and Nunn 2013; Talhelm et al. 2014). Yet the relationship is not unidirectional, as, beginning with Weber ([1905] 1958), values have been shown to exert an independent influence on economic and social trajectories. Our argument allows both economic incentives and values to influence social change. As such, it is in line with work theorizing feedback loops between culture and structural conditions (Greif 1994; Bisin and Verdier 2017; Acemoglu and Robinson 2021).

Our study focuses specifically on structural transformation as a driver of social change. The most prominent theory on the cultural effects of structural transformation is modernization theory (Lerner 1958; Lipset 1959). Modernization refers to a host of material changes experienced by societies as they transition from agricultural to industrial production, which include economic growth, urbanization, exposure to mass media and the diffusion of education to large segments of the population. These deep structural changes have been thought to reflect in changing values, described variously as post-materialist (Inglehart 1977; 1990), liberal

(Inglehart and Flanagan 1987) or human-centric (Bürklin, Klein and Russ 1996). Broadly, such values are oriented towards more respect of fundamental human rights, as well as a greater emphasis on civil liberties, individual freedom and self-determination. Modernization scholars have emphasized the role of wealth in shifting the importance placed on non-material goals (Inglehart 1977).[2] We add to this literature by bringing systematic quantitative evidence on the connection between industrialization and social change in a prominent historical case, and by highlighting the mechanism of changing distribution of economic power within society as a driver of changing values.

Emphasis on the latter mechanism connects our study to work examining how economic change leads to political transformation through elite turnover. Changes in the distribution of economic power do not need to reflect in changes in de facto political power (Acemoglu and Robinson 2006a) and the persistence of entrenched elites, even in the face of change, is well documented (Dal Bó, Dal Bó and Snyder 2009; Querubin 2011; Clark and Cummins 2014). Yet, specifically in the case of Britain, Fresh (2020) demonstrates that industrialization reduced dynastic persistence and increased the political power of industralist MPs. We show that this same development brought about changes in the dominant ideology and values, which themselves had important ramifications on Britain's economy and institutions.

A number of recent studies have empirically examined the relationship between slavery and economic structure. Heblich, Redding and Voth (2022) demonstrate that slaveholding in Britain led to increased wealth and a move from agricultural to industrial production as early as 1792. We show that, despite the fact that they may have profited from slavery, industrialists still had the highest incentive to oppose it among other groups in Britain, partly owed to their liberal ideology. Masera and Rosenberg (2021) find that loss of comparative advantage in cotton drove the decline of pro-slavery political attitudes in the US Antebellum South. Seyler and Silve (2021) show how electoral support for emancipation in Brazil depended on districts' relative reliance on slavery versus immigration as an alternative source of labor force. Relative to studies that concentrate only on material incentives to explain the decline of the institution of slavery, our work also calls attention to the values and ideology of groups whose economic incentives were aligned with the cause.[3]

Our paper also contributes to empirical work on cultural change. In this literature, emphasis has been placed on changed incentives for adopting particular values or beliefs, triggered by changes in external conditions (Nunn and Wantchekon 2011; Voigtländer and Voth 2012; Acharya, Blackwell and Sen 2016).[4] A related strand of theoretical literature has focused on

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[2] See Enke, Rodriguez-Padilla and Zimmermann (2021) for a political economy model formalizing moral values as a luxury good.

[3] Part of the mechanism reducing support for slavery in Masera and Rosenberg (2021) is the demise of planter elites and the clientelistic relationships they maintained with the non-planter white population as the relative profitability of cotton dropped. In the UK context, we emphasize the rise of a new elite characterized by different ideology and interests, rather the decline of the old one, though the outcome, in relative terms, is the same.

[4] A much broader literature in economics has empirically linked values, as well as other elements of culture, such

socialization incentives of altruistic parents, who respond to changes in the environment by changing the values they instill to their children (Tabellini 2008; Doepke and Zilibotti 2008; Fernández-Villaverde, Greenwood and Guner 2014). Our study highlights a complementary mechanism through which material change drives value change, that of a changing distribution of power across "value types", that increases the mobilization capacity and influence on social change of particular ideological profiles in a society. Our focus on economic elites as leaders of the abolitionist movement complements previous work on anti-slavery leadership (Dippel and Heblich 2021).[5]

Our analysis suggests that the ideological types of industrialist elites correspond closely to a universalist morality, as defined by the Moral Foundations Theory (Haidt 2007; 2012). Our paper thus connects to a literature that has examined differences in moral foundations between liberals and conservatives (Graham, Haidt and Nosek 2009; Enke 2020), as well as studies on the concept of moral universalism, which captures the extent to which altruism extends beyond a narrow in-group (Enke, Rodríguez-Padilla and Zimmermann 2020; Enke, Rodriguez-Padilla and Zimmermann 2021; Alexander, Enke and Tungodden 2023). Though our data does not allow us to provide direct empirical confirmation, our findings are compatible with the assumption made in Enke, Polborn and Wu (2022) that moral values are a luxury good. Industrialists characterized by a universalist morality may have been both more able and more willing to act on their moral values as their income and social influence grew.

Finally, and most broadly, our paper adds to a literature in historical political economy that studies the great economic and political transformations that occurred in Europe in the 18th and 19th centuries. This literature has linked economic modernization to the rise of representative democracy (e.g., Boix and Stokes 2003), the broader circulation of newspapers to the development of party-centered government (e.g., Cox 2005), and urbanization to the decline of vote-buying and the establishment of the secret ballot (e.g., Aidt and Jensen 2016). In the case of 19th century Britain, the major political transformation was the Great Reform Act of 1832, whose causes continue to be debated (e.g., Lizzeri and Persico 2004; Acemoglu and Robinson 2006; Aidt and Franck 2015; Cox, Fresh and Saiegh 2020). We complement this literature by drawing attention to the social ramifications of these major economic and political changes.

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as beliefs and social norms, to material conditions. See for instance Alesina, Giuliano and Nunn (2013); Galor and Özak (2016); Fouka and Schläpfer (2020); Buggle and Durante (2021).

[5]Though we do not examine this empirically, elite values can be adopted by lower social strata through status-based transmission and transmitted from parents to children, making this mechanism compatible with models of socialization (Bisin and Verdier 2001). Davis (1966) and Nenadic (1991) discuss the status-based social influence of industrialists on lower middling strata and Quirk and Richardson (2010) hypothesize that industrialists influenced the values of factory workers, including in the direction of anti-slavery.

3 Historical background

3.1 British slavery and the abolitionist movement

During the first decade of the 19th century, the yearly volume of the Atlantic slave trade amounted to over 60,000 enslaved persons per annum (Drescher 1986, p. 6). Britain was the dominant player in this market – more than half of enslaved persons transported against their will between 1791 and 1805 were carried by British ships. Slave labor was the main input for the production of sugar in the West Indies, and British colonies in this region (such as Jamaica and Trinidad) produced more than half of the world's sugar in 1805 (Drescher 1977, p. 15-37).

The initial effort to put abolition on the parliamentary agenda in Britain came from the Quakers in 1783 and was grounded on religious principles, but was quickly dimissed. What historians have termed the "abolitionist movement" began a few years later, in 1787-8, with the foundation of the Society for Effecting the Abolition of the African Slave Trade and ended in 1833-8 with the abolition of slavery and the end of the apprenticeship system in the British Caribbean (Drescher 1986, p. 3).

Table 1. Timeline of abolitionist movement

1774	Quakers expel members engaged in slave trade
1783	Quakers petition Parliament against slave trade.
1787	An anti-slavery society is formed in London.
	Petition campaign in Manchester.
1792	Second abolitionist campaign.
1806	Resurgence of abolition societies.
1807	Abolition of slave trade.
1823	Anti-Slavery Committee formed in London.
	Mass petition campaign is launched.
1831	Petition campaign for immediate emancipation of the enslaved.
1833	Mass petition campaign for emancipation.
	Parliament passes the Emancipation Act.
	Slave owners in the West Indies are compensated £20 million.
1838	The apprenticeship system is abolished.

A key strategy of the abolitionists was the use of campaigns that produced bursts of petitions flowing to Parliament (Jones 1999; Huzzey 2019). These were mass campaigns. The 1788 petition from Manchester had 11,000 signatures, representing a fifth of the town's population (Makovi 2019, p. 628). Popular campaigns for abolition can be grouped in three broad stages: episodic campaigns for the abolition of the slave trade between 1788 and 1807, campaigns for improving the living conditions of enslaved persons in 1823, and mass national campaigns for the emancipation of the enslaved in 1830-3 (Drescher 1986, p. 58). From 1778 to 1833, Parliament received at least 12,124 petitions (documented in the Journals of the House of Commons, 1778-1833). In 1814 and again in 1833, 20 percent of the British adult population signed one of these petitions (Drescher 1986, p. 92).

Changes in policy largely mirrored the changes in popular mobilization. The timeline of

events is summarized in Table 1. The slave trade (but not slavery itself) was abolished in 1807. In 1833, Parliament made all enslaved persons in its West Indies colonies paid apprentices, and then finally freed them immediately in 1838.

Abolition was costly to Britain. The apprenticeship bill of 1833 compensated slave owners for £20 million, an amount which represented 5% of British GDP and was only fully paid off in 2015. Kaufman and Pape (1999, p. 636-640) estimate the overall economic cost of anti-slavery efforts to British society at approximately 1.78 percent of national income per year from 1808 to 1867. Besides the compensation to planters, this estimate includes the naval, legal, and diplomatic costs of suppressing the slave trade, lost customs revenue, lost income from the slave trade, reduced exports to West Africa and the British West Indies, the lost sugar-carrying trade, and higher sugar prices for British consumers of an average of approximately £5 million per year from 1835 to 1846. On top of the economic costs were the national security costs of losing profitable business to the Americans and French, and the loss of life, mainly from disease, of members of the Royal Navy in charge of enforcing the ban on the slave trade (Kaufman and Pape 1999, p. 634-635).

3.2 The Industrial Revolution and structural change

In tandem with popular mobilization, Britain was experiencing rapid economic change. The Industrial Revolution that began in England circa 1750 radically transformed a wide range of economic sectors, including textile production, metallurgy, and transportation. As a consequence, England rapidly transitioned from being an agricultural nation into an industrial and capitalist economy. Rural-to-urban migration, the rise of industrial labor, and better standards of living ensued (Clark 2008; Allen 2000).

In less than a century, from 1780 to 1870, Britain's real gross domestic product per capita doubled, putting it 70 percent ahead of its continental neighbors in France and Germany. Simultaneously, the proportion of the labor force employed in agriculture halved to 22.7 percent while around a third of the population was employed in manufacturing (Crafts 1998, p. 195). Britain became the "workshop of the world" (Crafts 1998, p. 193). The population of the new industrial cities specializing in cotton, Manchester, Birmingham, and Sheffield, grew more than ten-fold between 1750 and 1850 (Brezis and Krugman 1997).

Industrial activity was geographically concentrated (Crafts and Wolf 2014), and this altered the economic and social geography of England. By the Victorian era, England had two distinct middle classes: a relatively wealthier and capital-intensive one based on commerce in London, and a labor-intensive one based on manufacturing in the North (Rubinstein 1977).

The new industrialists had distinctly middle class origins. This is well-documented in Doepke and Zilibotti (2008) who cite the conclusion of Crouzet (1985) that "neither the upper class nor the lower orders made a large contribution to the recruitment of industrialists" (Crouzet 1985, p. 68). Crouzet's analysis of the social origins of a sample of major industrialists between 1750 and 1850 shows that 85% of them had a middle-class background, with almost half of them coming from low-middle-class families, such as "shopkeepers, self-employed craftsmen and artisans, cultivators of various kinds" (Crouzet 1985, p. 127). These

rising middle classes were also characterized by distinct preferences. Doepke and Zilibotti (2008) have emphasized their strict work ethic and disdain for leisure, with roots in their earlier occupations and long periods of apprenticeship during which they developed their skills. Those same values derived not only from their occupational origins, but also from their religious beliefs. Early industrialists were often to be found among religious dissenters, who embraced both a Protestant work ethic as well as enlightened ideas about human liberty and freedom from oppression. Examples include pottery maker Josiah Wedgwood and ironmaster Richard Reynolds, both prominent abolitionists.[6]

As a result of their economic success, the social and political influence of industrialists was important at the regional level: "coal and iron masters in South Wales, mill owners in Yorkshire and Lancashire, engineers and shipbuilders in Liverpool and Scotland. By the early Victorian period these men of business and industry had founded dynasties" (Harrison 1979 cited in Nenadic 1991, p. 66). Industrialists also occupied a crucial position in society because they were arbiters of social relationships with the industrial workforce —an increasingly large portion of the working population. "In the eyes of the middle class, manufacturers possessed moral authority" (Nenadic 1991, p. 80).

3.3 Capitalism and abolition

The temporal coincidence between the rise of industrial capitalism and the growth of the abolitionist movement has generated a wide variety of theories among historians attempting to link the two phenomena. Broadly, these theories can be divided into two main groups: those emphasizing changing economic interest and those granting a more dominant role to changing ideology.

Most prominent in the first group, and the first work to directly connect industrialization with the end of the slave trade and slavery was Eric Williams's *Capitalism and Slavery* (1944). Williams argued that the Atlantic slave trade was fundamental for the initial stages of England's capitalist development, and that capital accumulated from the slave trade was invested in early industrial undertakings. However, as England's industrial sector grew exponentially and overshadowed every other form of economic activity including trade in sugar, the importance of the West Indies as a trading partner declined and mercantilism became an obstacle to the expansion of the market for British products. As new suppliers of sugar, such as St. Domingue and Brazil, appeared in the world market, the profitability of colonial sugar also declined and excess production in the colonies had to be subsidized. Progressively, planters lost support among the bourgeoisie, who became increasingly hostile to colonial monopolies.

While some aspects of Williams's argument, such as the declining profitability of the sugar trade, have been disputed, others, such as the role of wealth from the slave trade for early

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[6]It is telling that scholars like Joel Mokyr, who have emphasized the role of culture and ideas for industrial Britain's growth miracle, attribute those industrialists' anti-slavery positions entirely to their enlightened ideas and not to economic interest (Mokyr 2016, p.277).

industrialization have found support in recent research (Heblich, Redding and Voth 2022).[7] What is central in the thesis of Williams is the role of the *relative* rather than absolute contribution of the slave trade and slavery to the British economy. As industrialization took off, income from the colonies became an ever decreasing part of British GDP. Defense of colonial monopolies became less and less sustainable in Britain, particularly among groups that drew an increasing share of their income from the country's expanding industrial sector.

A second group of scholars links industrialization to abolitionism by means of ideology.[8] Drescher (1986) established that the anti-slavery movement was primarily a middle class phenomenon, propelled by social strata such as artisans and miners who were threatened by the emerging system of capitalist labor relations. These workers' moral values were offended by slavery, and they associated the conditions under slavery with their own dispossession in the factory system. "Abolition was not charity at a distance but a preemptive strike against the aristocracy at home" (Drescher 1986, p. 143). These groups, excluded from the political system, channeled their demands via extra-institutional means, like public petitions to Parliament.

A related argument by historian David Brion Davis (1966), also emphasizes ideology, but assigns a central role to the industrial bourgeoisie. This rising elite based its existence and ascendance on a new system of labor relations, whose cornerstone was free labor. In ideological terms, slavery represented the antithesis to this new economic order. Industrialists opposed the institution of slavery as part of an ideological crusade, which was not motivated by narrow concerns of profitability. Davis's argument holds that, though aligned with the economic interest of rising elites, abolitionism is better understood as part of a broader worldview, reflecting a new economic, social and moral paradigm imposed by rising new strata on the rest of society.[9]

In what follows, we propose a model that accommodates both sets of explanations for abolition, by assigning a role to both economic interest and ideology in driving mobilization for social change. Consistent with Williams (1944), our model suggests that the rising importance of income sources unconnected to slavery, in this case income from industry, was

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[7]The most notable critique of Williams's argument is Seymour Drescher's *Econocide* (1977) which focuses on establishing that Britain abolished the slave trade against its economic interest. Prior to the evidence provided in Heblich, Redding and Voth (2022), Eltis and Engerman (2000) argued that colonial slavery, though profitable, was not central to Britain's early industrialization.

[8]It is worth pointing out that early historiography on the abolition of slavery in Britain was entirely focused on ideological explanations, but not ones related to industrialization. This work primarily emphasized the role of leaders of the abolitionist movement, such as William Wilberforce and Thomas Clarkson, and their humanitarian ideals.

[9]Intermediate accounts also exist. Some scholars acknowledge that the leaders of the abolitionist movement were middle class industrialists and religious dissenters, but see the role of industrialization as helping those leaders' ideas spread to the rest of the population and foment a mass movement. For instance, Quirk and Richardson (2010) highlight the role of rapid urbanization in permitting the creation of networks and organizations that could spread new ideas fast. Other theories have also been articulated on the connection of capitalism and abolition, for instance a link between exposure to market activity and internalization of the welfare of distant others (Haskell 1985).

crucial for ending the slave trade and slavery. However, the mechanism for its effect is more aligned with the theory of Davis (1966): consistent with that account, rising industrial wealth enabled the rise to power of groups with distinct values, which were aligned with abolition and other progressive causes. Finally, and consistent with the account in Drescher (1986), our model provides an explanation for why the participation of industrialists in the abolitionist movement enabled the mass mobilization of broader segments of the middle classes, who shared progressive values, but lacked the political power to effect reform.

4   Conceptual framework

In this section, we present a simple model of mobilization for social change in which both ideological and material factors drive mobilization decisions. The model is purposefully stylized and aims to provide a precise illustration of our core argument: that social change can ensue when groups with low stakes in the status quo and an ideology supportive of change rise in power. The model is also designed to capture some of the stylized facts that characterized mobilization for abolition in 18th century Britain: (i) participation in the abolitionist movement followed an S-shaped pattern over time, (ii) the first abolitionists were activists with a high degree of moral commitment to the fight against slavery, often driven by their religious values, and (iii) the movement reached high levels of popular participation by 1833, with most of its supporters coming from the middle classes (Drescher 1986).

We consider a society that consists of groups denoted by subscript g. Each group is characterized by its ideology or set of values v_g and by its power to effect social change. Here we focus specifically on mobilization against the slave trade and slavery, though the bundle of values we consider is broad and may also align with other reformist causes. Power derives from both economic and extra-economic sources, such as a group's size or political and social connections that can be mobilized for a given cause. For simplicity, we focus on the role of income and denote power as a function of income $p(y_g)$ with $p' > 0$. A group's income consists of a component y_g^s that originates from slavery-related activities, such as participation in the slave trade or plantation ownership, and a component y_g^o that comes from other sources.

In each period t, a group decides whether or not to mobilize against slavery. Mobilization can happen through petitioning, campaigning, lobbying representatives or, if group members have a seat in Parliament, directly through voting. Participation in such efforts entails a cost which is decreasing in the size of the population that participates in mobilization, $c_t = c\left(\sum_{i \in S_t} \sigma_i\right)$, $c' < 0$, where S_t denotes the set of groups that mobilize and σ_i is the size of group i. If mobilization is successful, the group reaps a benefit equal to $v_g - y_g^s$: abolition aligns with the group's values, but deprives it of the portion of its income that comes from slavery. If mobilization efforts fail, the group gets zero payoffs. We assume that successful abolition gives zero moral benefits to a group that has not participated in the movement. Expected utility from participation for group g is given by:

$$U_g = \pi(v_g - y_g^s) - c \tag{1}$$

If a group participates, mobilization succeeds with probability π_t^P, which is a function of the number and power of groups participating in the movement. For simplicity, but consistent with participation dynamics in our data, we assume myopic agents, who predict the probability of other groups' mobilization in each period t with their participation rates in the previous period. For a group that did not mobilize in $t-1$ this is given by:

$$\pi_t^P = \pi\left(\sum_{i \in S_{t-1}} p_i + p_g\right)$$
$$\pi_t^{NP} = \pi\left(\sum_{i \in S_{t-1}} p_i\right)$$

where π_t^{NP} is the probability of success if the group does not mobilize. S_{t-1} is the set of groups that participated in mobilization efforts in $t-1$ and $\pi' > 0$. Participation then requires that pro-reform values exceed a threshold given by:

$$v_g \geq y_g^s \frac{c_t}{\pi^P - \pi^{NP}} \tag{2}$$

This expression makes clear that four forces determine a group's mobilization against slavery: high anti-slavery values v_g, low reliance on slavery income y_g^s, low cost of participation c and a big contribution of the group's participation to the success of the movement $\pi_t^P - \pi_t^{NP}$. This implies that groups are more likely to join if many other groups have also joined in the past and if their own power is high enough.

We next apply this setup more directly to Britain in the late 18th and early 19th century. During this period, values and ideas conducive to anti-slavery agitation were becoming popular among broad swaths of the population, particularly the commercial and professional middle classes. With limited franchise, these groups were excluded from the political process and had little power to bring about change through institutional means. Economically and politically more powerful groups were either more conservative in their values – such as the landowning aristocracy – or, as was the case for traders and West Indian planters, heavily reliant on slavery income. In Section 7.2 we provide evidence supportive of such differences in values and links to slavery across groups during the period.

Against this backdrop, the steady increase in industrialization which began in 1750 had two effects. It reduced the relative importance of slavery vs non-slavery income and thus increased the incentives of any social group to support abolition. This development is consistent with the view of Williams (1944) that Britain's declining comparative advantage in sugar precipitated the end of the slave trade and found support even among groups who had in the past benefited from slave wealth. At the same time, it increased the relative power of groups that relied on income from industry. Fresh (2020) shows that industrialization led to increased political turnover, disrupting existing political dynasties and leading to the election of more MPs

with interests in manufacturing.[10] This rising manufacturing elite, with roots in the middle classes (Crouzet 1985), was characterized by progressive values that aligned with abolitionism. Mobilization by industrialists increased the probability of a successful movement and pushed other groups above the threshold for participation, starting with those groups with the most progressive values and lowest reliance on slavery income.

This framework closely matches three features of the abolitionist movement. First, as per the expression in (2), the first movers in the anti-slavery struggle had to be characterized by a combination of strong anti-slavery values, relatively high mobilization power and low reliance on slavery-based income. This configuration applies well to the Quakers and other early abolitionists. Quaker anti-slavery ideology was a unique mix of religious criticisms of the slave trade and ideas of humanitarianism and universal human rights that had become influential in their circles since the mid-18th century (Jones (1999), p.17). Anti-slavery ideas became so prominent among the Quakers that they led members of the Society of Friends on both sides of the Atlantic to disavow slave trading activities and punish those who engaged in them by disowning them from the Society.[11] The Quakers were also characterized by high mobilization capacity in the form of strong networks, which they harnessed during the first petitioning campaigns against the slave trade in 1787-90 and 1791-92.

Second, the movement displayed an S-shaped dynamic of diffusion over time, with participation rates in each period increasing in participation in the previous period. This can be observed in the right panel of Figure 1, which tracks the cumulative number of petitions against the slave trade and slavery between 1787 and 1833. Finally, prior to its eventual success in abolishing slavery in the colonies in 1833, the movement reached high levels of popular support, with an estimated 20% of males over 15 years of age having signed a petition for abolition (Drescher 1982). As most sources confirm, the base of this broad mobilization consisted of middling and professional social strata, who had embraced the ideas of the Enlightenment, but who were largely excluded from the formal political process (Drescher 1982; Jones 1999).

Table 2 and the left panel of Figure 1 below illustrate the dynamics predicted by the model in a stylized example. We distinguish between groups of low power, which broadly encompass all the middle classes, and high power, which include the landed elites and West Indies plantation owners. The middle classes are characterized by more progressive values

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[10]Economic change does not necessarily lead to political or social change. Entrenched elites may attempt to limit the influence of rising social strata in order to maintain power (Acemoglu and Robinson 2006a). Even when elites are replaced, existing institutions and incentive structures may dictate the choices of new elites leading to path dependence (Michels 1915; Acemoglu and Robinson 2008; Robinson 2012; Carvalho and Dippel 2020). As our model illustrates, in early 19th century Britain, abolition happened partly because it aligned with the economic interests of the new elite. The fierce resistance of planter interests and their broad network of allies to the abolitionist movement has been documented in detail (Taylor 2020).

[11]This implies that income from slavery may have been endogenous to values. The behavior of the Quakers speaks against the argument that values and ideology always adjust to match an individual's behavior (Festinger 1957; Acharya, Blackwell and Sen 2018). It is, of course, possible, that industrialists and other social classes with low reliance on slavery income were more likely to adopt an anti-slavery ideology. However, our empirical analysis suggests that there was not a one-to-one connection between economic links to slavery and abolitionist ideas.

than the elites, with certain groups among them (Quakers) having particularly extreme pro-abolition ideas. Finally, we distinguish between three levels of reliance on slavery income: high (planters), intermediate (landed elite), and low (all others).

Table 2. Model parameters applied to abolitionism in Britain

Group	v_g	y_g^s	y_g^o	$p(y_g^o + y_g^s)$
Quakers	High	Low	Low	Low
Industrialists	Intermediate	Low	Low $\rightarrow$ High	Low $\rightarrow$ High
Middle classes	Intermediate	Low	Low	Low
Landed elite	Low	Intermediate	High	High
Planters	Low	High	Low	High

In this setting, strong enough anti-slavery values guarantee that Quakers will be the first to mobilize against slavery in period $t = 0$. Industrialization in $t = 1$ shifts the non-slavery income, and thus power, of the segment of the middle classes that engages in manufacturing activity. Participation by the industrialists pushes other groups with relatively high v_g and low y_g^s above the threshold for mobilization in $t = 2$. For high enough levels of mobilization, and as industrial income becomes an increasing share of total income for other groups, even groups with some links to slavery may end up supporting abolition, assuming that their values are progressive enough. Groups with sufficiently low v_g or a very high y_g^s will always oppose abolition.

Figure 1. Dynamics of mobilization against slavery
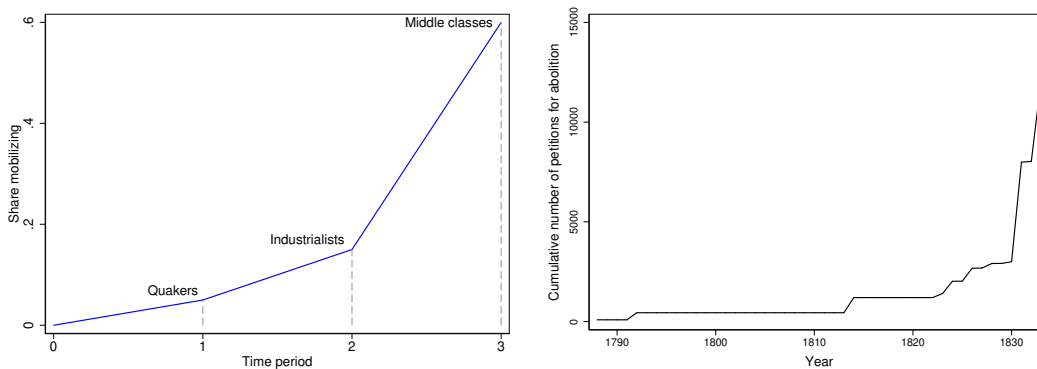
Notes: The plot on the left displays the share of the total population that mobilizes against slavery in each period assuming parameter values displayed in Table 2. We assume that the Quakers and industrialists are a (small) subset of the middle classes. The plot on the right displays the cumulative number of petitions against the slave trade and slavery submitted to the House of Commons between 1787 and 1833.

In our framework, both economic interest and ideological factors play a role in mobilization for social change. This interplay allows us to derive two testable implications. First, a leading role in the abolitionist movement should have been played by groups that combined progressive values with a rising reliance on sources of income unrelated to slavery. The rest of the paper provides evidence that industrialists fit this description well, being distinguished by a universalist ideology and few direct links to slave ownership. As a result, they mobilized

against slavery both in Parliament and through extra-parliamentary means. Second, material incentives alone may not have been enough to lead a group to mobilize against slavery, if the group's ideology did not align with the cause. In Section 7.2 we show that influential groups with weak links to slavery income, but conservative values, such as the landed gentry and nobility, did not support the abolitionist movement.

5   Data

We combine multiple data sources to establish an association between industrialization and abolitionism and examine the mechanisms linking the two, with an emphasis on the leadership role and ideology of industrial elites. We conduct two main sets of analyses: one at the level of a parish or census registration district (CRD) and one at the level of the individual member of Parliament (MP). Section A.3 in the Appendix lists descriptions and sources for all variables used in our analysis. Tables A.3 and A.4 provide summary statistics.

5.1   Measuring support for abolition

Petitions for abolition. To measure support for abolition at the aggregate level, we rely on petitions submitted to Parliament. Information on the topic, date, and town of origin of all petitions submitted between 1788 and 1833 is available in the indices of various editions of the *Journal of the House of Commons*. We geocoded the towns of origin of all petitions for the abolition of slavery, as well as petitions on two other salient issues of the period, Parliamentary reform and Catholic rights. We use the petitioning town's geographic coordinates to assign each petition to one of approximately 9,000 parishes in England and Wales.[12] Our analysis examines a total of 12,124 anti-slavery petitions during years in which petitioning campaigns took place (1788, 1792, 1814, and 1823-1833). Petitions filed before 1807 called for the abolition of the slave trade. All petitions filed after that year called for gradual or complete abolition of slavery.

Figure 2 displays the spatial and temporal evolution of anti-slavery petitions sent to Parliament during the four main stages of the abolitionist movement. Consistent with our theoretical framework, petitioning activity is growing at an accelerating rate (see also Figure 1). The abolitionist cause had few adherents in 1787, but became extremely popular at the national level by 1833.

Signatories of the 1806 Manchester petition. Because petitioning activity could be driven by multiple social groups in industrial areas, we use individual-level data to more directly connect industrial interests to support for abolition. A fire in 1834 destroyed most of

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[12]We use the boundaries of parishes enumerated in the 1851 census for England and Wales based on digital maps produced by Kain and Oliver (2001) and converted into GIS data by Burton and Carter (2004). Further details on the construction of the petitions dataset are provided in Section A.1.

Figure 2. Spatial distribution of anti-slavery petitions over time
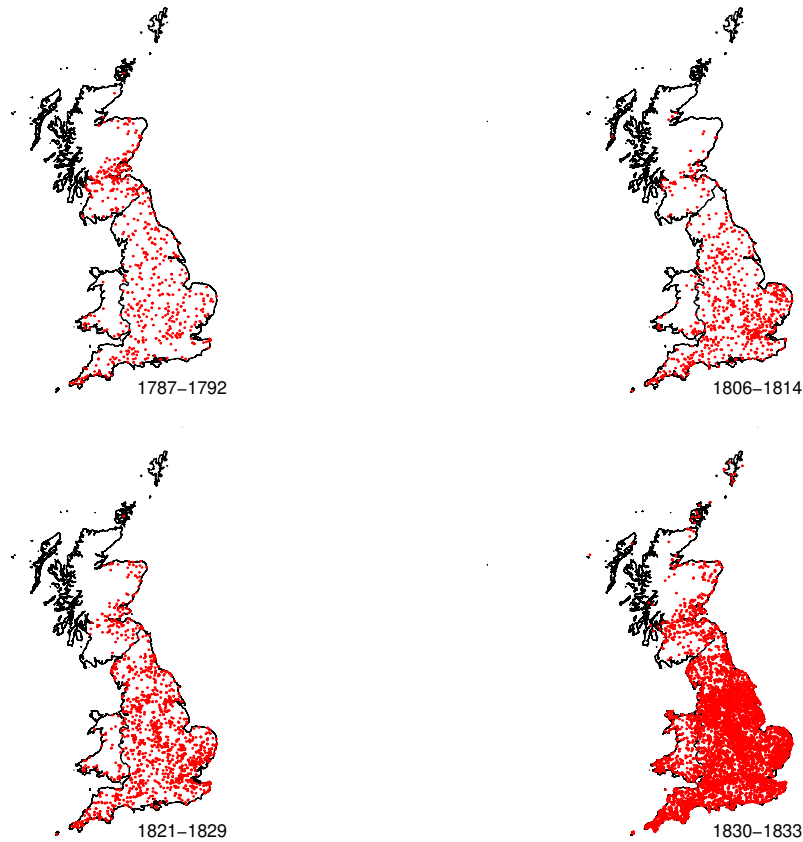
Notes: Each observation is a petition against the slave trade or slavery submitted by a town to Parliament. Source: *Journal of the House of Commons.*

the palace of Westminster and with it many parliamentary records, including petitions to the House of Commons. One of the few surviving documents is an anti-slavery petition filed in 1806 by the town of Manchester to the House of Lords, with a total of 2,348 signatures. We use the transcript of the petition produced by the Manchester and Lancashire Family History Society (MLFFS). MLFS has matched petitioners to trade directories, providing information on their occupations. Because signatures on petitions in Britain were not collected through door-to-door canvassing, but after public display of petitions in various locations across a town, we follow Makovi (2019) and use the order in which petitioners signed as a measure of the centrality of their role in the movement.

Voting behavior of MPs. We start from a list of elected MPs in the 1832-1833 Parliament, based on data from Eggers and Spirling (2014) and code an MP as being opposed to slavery in the colonies if he voted for limiting the period of apprenticeship and for minimal compensation to planters in at least one of the parliamentary divisions (roll-call votes) on the Slavery

Abolition Act of 1833. For this, we used information from parliamentary debates.[13] Our approach to measuring anti-slavery positions follows Gross (1980) and Franzmann (1994).

5.2 Measuring economic interests and ideology

Industrial activity. Our analysis focuses on the period 1787-1833, during which a time-varying measure of industrialization at the local level is not available. We overcome this challenge using two variables generally thought to have influenced the location and development of industry during the Industrial Revolution.

The first one is the availability of coal. Coal was a major driver of industrialization in England (Pomeranz 2021) and its location, at least during the earlier stages of the Industrial Revolution, was a constraint to the spatial allocation of industrial activity. As Crafts and Wolf (2014) argue: "if there was a necessary condition for having a cotton textiles mill in 1838, a cheap source of power is the nearest candidate" (p. 1131). We construct a time-varying proxy of industrialization by interacting a measure of local coal supply with the trend in the importance of coal as a source of energy at the national level (Fernihough and O'Rourke 2021; Esposito and Abramson 2021; Fresh 2020). We use data on coal-bearing bedrock from the *British Geological Survey* and measure the availability of coal at the CRD or parish level as the area of the spatial unit that overlaps with coal-bearing bedrock or the distance from a unit's centroid to the nearest coal deposit. We then interact this measure of coal supply with the total coal consumption in England from Warde (2007).

Mokyr, Sarid and van der Beek (2022) have demonstrated that industrialization crucially relied on upper tail human capital and mechanical abilities, emphasizing the role of mill-wrights in determining the location of industry during the Industrial Revolution. Relatedly, Kelly, Mokyr and Ó Gráda (forthcoming) have pointed out that the mechanization of the textile industry relied primarily on hydraulic energy and that water power still made up 70% of industrial power by 1800. Given the prominence of water power for early industrial development, we construct an alternative measure of industrialization relying on the location of water mills between 1399-1477 from the Inquisitions post Mortem, compiled by Heldring, Robinson and Vollmer (2021). We interact the logarithm of the number of water mills with an index of industrial production in England from Crafts and Harley (1992).[14]

Figure C.1 in the Appendix depicts the location of coal-bearing bedrock and fifteenth century water mills in England and Wales. We verify the validity of these measures as proxies of industrial activity in Table C.1. The presence of both coal and water mills strongly predicts the share of all male workers employed in manufacturing in 1831 conditional on the entire set of controls used in our baseline analysis (described in Section 5.3).

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[13] Available online at http://hansard.millbanksystems.com

[14] According to Allen (2009, p.173), coal overtook water as the most important stationary power source in Great Britain after 1830. Between 1760 and 1830, the period in which our analysis is centered, the importance of water doubled, but that of coal grew by a factor of 32.

Newspaper articles on slavery. To examine the contribution of ideology in the abolitionist movement at the aggregate level, we use newspaper articles. This measure allows us to study the content of discussions surrounding slavery in industrial and non-industrial locations and the relative emphasis placed on the economic benefits of slavery and moral arguments against it. We scrape all articles containing the words "slave" or "slavery" from the British Newspaper Archive (BNA) and construct a corpus of 12,421 articles published between 1787 and 1833. These articles were published in 121 different newspapers of diverse political leanings.[15] Figure B.1 in the Appendix plots the total number of articles on slavery over time and shows that news interest on the topic closely tracks the growth in petitioning activity. To examine differences in content between industrial and non-industrial districts, we rely on the location of newspapers listed on BNA. Because a newspaper likely reached audiences in multiple parishes, we conduct this analysis at the level of the CRD ($N = 624$).

Economic interests of MPs. We compile data on MPs' economic interests from several sources. We rely on Stenton's (1976) biographical dictionary *Who's who of British members of Parliament* to code an indicator for MPs with industrial (i.e. manfacturers) and commercial interests (i.e. merchants).[16] To measure an MP's economic stakes in the institution of slavery, we use data from the *Centre for the Study of the Legacies of British Slavery* (Hall et al. 2014). This project, led by researchers at University College London, has compiled an Encyclopaedia of British Slave-ownership which contains information on all slave owners in the British Caribbean, Mauritius or the Cape at the moment of abolition in 1833, as well as all slave-owners, attorneys, mortgagees and legatees linked to estates in the British Caribbean in the period 1763-1833. We code as 'slave owner' any individual listed in this database.[17] We code as members of the gentry those MPs whose name was preceded by "Sir," "Arm," (for armiger), Baronet or "Esq" (for esquire). As shown by Heldring, Robinson and Vollmer (2021), landed gentry played an important role in the Industrial Revolution, among other ways as investors in industrial projects. We code as nobility those MPs whose name was preceded by a title (e.g. "Lord", "Viscount" or "Marquess").[18] We also construct indicators for an MP's political leaning (conservative, liberal or radical) relying on Stenton (1976) and Thevoz (2018).[19] To capture MPs' educational background, which could have affected their ideology, we rely on biographical data to code an indicator for those who attended Oxford

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[15] We were able to identify the political orientation of 73 newspapers, out of which 30 were conservative and 43 were liberal, socialist, or radical.

[16] A sample biography is displayed in Figure A.1.

[17] The basis for this database are the records of the Slave Compensation Commission, set up to manage the distribution of compensation to slave owners after abolition. Information on other individuals linked to estates in the West Indies ensures that we are also capturing indirect links to slaveholding interests.

[18] Peers of the realm served in the House of Lords and were ineligible to serve in the House of Commons. MPs with aristocratic titles in our data are either sons of peers or held titles of nobility that were not high enough to qualify one for the House of Lords.

[19] Given that modern political parties did not exist at the time, most historians infer the political leanings of MPs from their roll-call votes. We rely instead on information from biographies.

or Cambridge. Finally, we rely on biographical information compiled by Salter (1953) and Bebbington (2009) to code an indicator for MPs who were Protestant dissenters (i.e. Quakers or Unitarians).[20]

Parliamentary speeches. To more precisely characterize the ideology and values of MPs, we analyze the content of parliamentary speeches. We examine speeches delivered in 1833-34, available from Eggers and Spirling (2014). Out of 7,798 speeches, 368 were delivered by industrialist MPs. Eggers and Spirling (2014) have coded titles for each Parliamentary debate, allowing us to identify debates on slavery, by tagging those that include the token "slave."

5.3 Control variables

We collect a number of control variables at the parish, CRD and constituency level. We measure the distance from a spatial unit's centroid to London and to the nearest point on the coastline, port (Alvarez-Palau and Dunn 2019), and navigable river (Satchell, Shaw-Taylor and Wigley 2017). We include a control for latitude to account for broad differences in geography and patterns of industrialization between the North and South of England. We compute measures of average elevation, slope and terrain ruggedness from the U.S. Geological Survey's GTOPO30 data set (EROS 1996), which provides information at a resolution of 30 by 30-arc second grid cells (or approximately one squared kilometer). We compute suitability for wheat production using data at the same resolution from the Food and Agriculture Organization's (FAO) Global Agro-Ecological Zones (GAEZ) data portal. We also construct two time-varying controls. To proxy for the intensity of campaigning for abolition at the local level, we control for the log number of Quaker meeting houses. We digitized these data from Butler's *The Quaker Meeting Houses of Britain* (1999, volumes I and II). To proxy for class structure and account for the fact that industrialization was precipitated by the rise of the gentry (Heldring, Robinson and Vollmer 2021), we include an estimate of the log number of gentry in each parish each year, exploiting a large genealogical database provided by Cummins (2017).

For the MP-level analysis, which focuses on a single cross-section, we control for log population at the constituency level in 1831 from Dod (1832) and log population density. We also control for an index of market integration, measuring the travel distance between any given constituency and all other constituencies weighted by population, and for the distance from the nearest urban center, defined as a city of over 20,000 persons from Bosker, Buringh and Van Zanden (2013).

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[20]There were 13 MPs who were religious dissenters: a Quaker (Joseph Pease), a Wesleyan, a Bible Christian, and ten Unitarians. Thomas Fowell Buxton, the leader of the abolitionist movement in parliament, had a Quaker mother, but we do not count him as a religious dissenter.

6 Abolitionist mobilization outside Parliament

Our central argument is that industrialization raised the power of industrialists and enabled them to act on their economic interests and values by mobilizing for abolition. This in turn, enabled mobilization by other, less powerful, groups with anti-slavery values. The observable implication is a link between industrialization and abolitionism at the aggregate level and a link between involvement in manufacturing and anti-slavery mobilization at the individual level. In this section, we provide evidence for these patterns through the analysis of abolitionist mobilization outside Parliament. We will turn to the abolitionist stance of industrialist MPs in Section 7.

We begin by demonstrating that industrializing parishes submitted more petitions to Parliament against the slave trade and slavery. Next, and consistent with mobilization for broader social change aligning with progressive values, we show that industrializing parishes also petitioned more on other issues related to reform and religious freedom. Third, we provide evidence for the individual-level involvement of industrialists in these petitioning campaigns by analyzing signatures in a rare surviving petition against the slave trade submitted by the town of Manchester in 1806. Finally, we exploit newspaper articles to highlight the prominent role of anti-slavery ideology in industrializing locations.

6.1 Anti-slavery petitions

Panel analysis. We begin with an analysis of aggregate support for abolition at the parish level. Variation over time in petitions and our proxies of industrial growth allow us to examine how changes in industrial activity affected changes in petitioning while keeping fixed any time-invariant unobservable characteristics of parishes. Our baseline specification is

$$Log \ number \ of \ petitions_{it} = \beta_1 I_i \times G_t + \theta_i + \lambda_t + u_{it} \tag{3}$$

where $Log \ number \ of \ petitions_{it}$ is the natural logarithm of the number of anti-slavery petitions sent to Parliament from parish i in year t.[21] I_i is a cross-sectional measure of propensity to industrialize (either the proportion of a parish's area that is over coal-bearing bedrock or the logarithm of fifteenth century water mills) and G_t is a time-varying nationwide proxy of industrialization in year t (either total coal consumption or an index of industrial output in England). θ_i and λ_t are parish and year fixed effects. The coefficient of interest is β_1, which measures how petitions respond to changes in industrialization at the local level.

Estimates from this specification are presented in Columns 1 and 4 of Table 3 and indicate that, as districts became more industrial, they sent more anti-slavery petitions to Parliament. Magnitudes are very similar across measures of industrialization. The estimate in column

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[21]There are zero petitions in some parishes and years. We construct the dependent variable as log(1+petitions), but our results remain robust to an inverse hyperbolic sine transformation (Appendix Tables C.2 and C.3).

1 implies a 19.4% differential increase in the number of petitions sent by parishes with the largest area share over coal deposits compared to those without coal over the period of study. In Column 4, this difference amounts to 21% between parishes without water mills and those with the maximum number of water mills (4) over the entire period.

In Columns 2 and 5 we account for the possibility that parishes with coal deposits or water mills were different in other dimensions, and it was those differences that drove increases in petitioning over time. We interact year fixed effects with a number of geographic controls, allowing parishes to be on different trends depending on their terrain and soil conditions (ruggedness, elevation, slope, suitability for wheat) and their location (latitude, distance to London, to nearest port, nearest coastline and nearest navigable river). The time-varying effect of coal supply and water mills is somewhat reduced, but remains large and significant. In Columns 3 and 6 we control for the log number of gentry and the log number of Quaker meeting houses. The latter is possibly endogenous, as Quakers likely centered their campaigns in rapidly industrializing locations. However, including a measure of Quaker meeting houses allows us to control for the growing influence of religious dissenters at the local level. These controls do not significantly change the estimated effect of industrialization.

Tables C.2 and C.3 in the Appendix show that these results are not sensitive to the definition of the main variables. Industrialization continues to predict petitioning activity when access to coal deposits is measured as the distance from the nearest coal-bearing bedrock and when reliance on water power is measured as the distance from the nearest water mill. Results additionally remain robust to using an inverse hyperbolic sine transformation of variables instead of logarithms.

Table 3. Industrialization and support for abolition

Dependent variable	Log number of petitions					
	(1)	(2)	(3)	(4)	(5)	(6)
Coal area × Coal consumption	0.380***	0.256***	0.255***			
	(0.0375)	(0.0357)	(0.0356)			
Log watermills × Industrial output				0.00655***	0.00523***	0.00522***
				(0.00103)	(0.000958)	(0.000953)
Observations	127876	127876	127876	127876	127876	127876
R-squared	0.347	0.391	0.391	0.346	0.391	0.391
Mean dep. variable	0.0488	0.0488	0.0488	0.0488	0.0488	0.0488
Year FE × Controls		✓	✓		✓	✓
Time-varying controls			✓			✓

Notes: The table reports OLS estimates from equation 3. Time-invariant controls include ruggedness, elevation, slope, latitude, wheat suitability, log distance to London, log distance to nearest port, log distance to the coastline, log distance to nearest navigable river, log distance to nearest urban center and index of market integration. Time-variant controls include the log of Quaker meeting houses and the log number of gentry. Robust standard errors, clustered at the parish level, in parenthesis. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Instrumental variables analysis. Coal and watermills capture different aspects of industrialization. Coal was most important as a source of cheap energy for the development of metalworking (Kelly, Mokyr and Ó Gráda forthcoming), while water mills capture the use

of water power and presence of related mechanical skills that were deployed in textile manufacturing (Mokyr, Sarid and van der Beek 2022). Parishes with an early presence of water powered industry and upper tail human capital prior to the Industrial Revolution could be different than other parishes in unobservable ways.[22] As industrial activity strictly increases over time, we cannot rule out that petitioning activity is driven by the growing influence of these unobservables, rather than the effect of industrialization. One concrete concern is that parishes with medieval water mills may have been more developed already before the Industrial Revolution, in ways that our set of controls does not fully capture. How this may bias petitioning activity is a priori unclear: while higher development may imply faster urbanization and more petitioning, it is also possible that parishes that developed earlier and in which new industry was closely linked to pre-existing proto-industry experienced less turnover in their social structure and as a result remained more conservative in their values and less likely to agitate for reform. To address this concern, we use an instrumental variables analysis which relies on the fact that the locations of early water mills were constrained by features of the physical environment.

In the thirteenth century, textile manufacturing shifted to hilly locations in the northern and western countryside, where specialized mill wrights were present and where the topography was appropriate for mill construction (Mokyr, Sarid and van der Beek 2022). The main geographic feature that determined the early and persistent location of mills was the water power potential of locations. Basic principles of hydraulics suggest that the maximum hydropower that can be generated from a waterwheel or turbine is a function of the *flow* and *head* available at a site. Head is the elevation differential between where water enters and exits the wheel or turbine.[23] Gordon (1983) applies this principle to identifying locations with high water power potential in Britain and approximates potential with the product of a river's flow and fall in each point of a drainage basin. We follow the same approach and instrument the location of medieval water mills with the product of average flow accumulation and terrain slope in a parish.

We use data on flow accumulation at the 30-arc second grid cell level from the U.S. Geological Survey's GTOPO30 dataset (EROS 1996). Flow accumulation is the accumulated number of upstream cells flowing into a given cell and is thus a measure of water flow potential of a drainage basin.[24] We average flow accumulation at the parish level and interact it with the

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[22]Figure C.1 shows that most medieval water mills were located in the richer southern part of England and closer to London. Though we control for this distance, as well as latitude, our controls may not fully capture baseline levels of development which enabled the construction of early mills, such as access to capital or agricultural development.

[23]Specifically, maximum water power generated at a site is given by $P = m \times \text{g} \times \text{H} \times \eta$, where m is the mass flow rate, H is the net head, g is the gravitational constant and η is the product of efficiencies of the components of the hydraulic system. As g and η are the same across locations, differences in potential water power in our case are determined by the product of mass flow rate and net head.

[24]We verify that flow accumulation correlates positively with average mean river flow from the UK's National River Flow Archive (NRFA) (Figure C.2). We rely on flow accumulation rather than observed river flow for

average terrain slope index (in degrees). Throughout, we independently control for average flow accumulation and slope, so that water power potential is predicted only by the product of these two variables. This means that e.g. among parishes with high upstream drainage areas, only those with a steep terrain will be assigned a high water power potential. Figure C.3 reveals a strong first stage in the parish cross-section.

Table 4. Industrialization and support for abolition, IV results

Dependent variable	Log number of petitions		Log water mills		Log number of petitions	
	OLS	Reduced form	First stage		2SLS	
	(1)	(2)	(3)	(4)	(5)	(6)
Log water mills×Industrial output	0.0105***				0.215***	0.154***
	(0.00174)				(0.0430)	(0.0342)
Flow×Slope×Industrial output		0.00148***	0.00687***	0.00700***		
		(0.000146)	(0.00125)	(0.00128)		
First stage effective F-stat					30.215	29.513
AR CIs					[0.152,0.339]	[0.106,0.161]
Observations	127876	127876	127876	127876	127876	127876
R-squared	0.349	0.349	0.933	0.934	-0.303	-0.161
Mean dep. variable	0.0488	0.0488	0.395	0.395	0.0488	0.0488
Year FE × Additional controls				✓		✓

Notes: All columns include parish and year fixed effects, as well as interactions of year fixed effects with flow accumulation and terrain slope. Additional time-invariant controls include ruggedness, elevation, latitude, wheat suitability, log distance to London, log distance to nearest port, log distance to the coastline, log distance to nearest navigable river, log distance to nearest urban center and index of market integration. We report the first stage effective F-statistic following Olea and Pflueger (2013); the critical value for a maximum 10% relative bias is 23.109. Robust standard errors, clustered at the parish level, in parenthesis. Significance levels: *** $p< 0.01$, ** $p< 0.05$, * $p< 0.1$.

Table 4 presents the results of the IV analysis for the panel of parishes.[25] For ease of comparison, column 1 displays the OLS estimate of the time-varying effect of water mills conditional on parish slope and flow accumulation (both interacted with year fixed effects). Column 2 presents the reduced form effect of the proxy of water power potential on petitions. The estimate is large and significant. Consistent with the cross-sectional correlation in Figure C.3, columns 3 and 4 show that the first stage is strong. The magnitude of the first stage coefficient is stable after including additional controls, which suggests that our proxy of water power potential is not correlated with other observable characteristics of parishes. Columns 4 and 5 present 2SLS results. Following the suggestions in Andrews and Sun (2019), we report the effective first stage statistic from the robust weak instrument test in Olea and Pflueger (2013) as well as identification-robust Anderson-Rubin confidence intervals. Both

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the IV analysis because contemporary river flows are likely to be endogenous to industrial activity.

[25]Table C.4 in the Appendix presents a cross-sectional analog of Table 4, using the total number of petitions between 1787 and 1833 as the dependent variable. Results are qualitatively very similar to the panel analysis, confirming that our findings are not driven by the fact that both instrument and endogenous regressor are multiplied by the time-varying index of industrial output.

statistics suggest a strong first stage. The second stage coefficient is stable to the inclusion of the full list of parish controls interacted with year fixed effects, which is encouraging for the excludability of the instrument.

The 2SLS estimate is an order of magnitude larger than OLS. This is consistent with omitted variable bias whereby the presence of water mills is driven by unobserved factors correlated to early development. In this scenario, mills may be present in wealthier areas with stronger ties to landowning elites and more conservative values.[26] Another possibility, which we consider likely in our case, is a local average treatment effect (LATE). Parishes that only had a water mill if their topographic and hydrological profiles were suitable for it are the ones most likely to harness those mills for industrial development and thus most likely to reflect the industrialization dynamics we aim at capturing.[27] All in all, we consider the 2SLS results supportive of the findings in the OLS analysis and of our interpretation of the effect of industrialization on mobilization.

6.2 Petitions on other issues

According to our argument, as income from industrial activities increases, mobilization for causes more aligned with the values of industrialists should increase. Abolitionism was but one component of the broader ideology of the manufacturers and other middle classes. More rapidly industrializing parishes displayed more intense petitioning activity not only on the question of slavery, but also on other issues broadly associated with reform and the expansion of rights to minorities.

To establish this, we turn to petitioning campaigns that occurred during the same period as those against slavery. We focus on two of the largest campaigns of the time, those on parliamentary reform and on Catholic rights. Campaigns for parliamentary reform aimed at the extension of the franchise and more balanced representation. They effectively requested redistribution of political power from small constituencies dominated by wealthy patrons (the "rotten boroughs") to towns that had grown in size due to industrialization, but were not represented in Parliament. Campaigns on Catholic emancipation were focused on the repeal of restrictions on religious minorities (Catholics and Dissenters), including restrictions on holding public office.

Figure 3 displays coefficient estimates for $I_i \times G_t$ from specifications like the one in equation 3 using our two different time-varying proxies of industrialization, but replacing the dependent variable with the log number of petitions on different issues.

The first thing to note is that industrial activity increased the overall propensity to send

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[26]In our analysis of MP data in Section 7.2, we show that landed elites had stronger ties to slavery and less liberal ideology.

[27]To these explanations one can also add measurement error, as the information on medieval mills captures but a snapshot of water power usage in England in the fourteenth century, while terrain and hydrological profile data measures water power potential more accurately.

petitions to Parliament, consistent with higher urbanization rates and increased associational activity creating fertile ground for "mass politics" (Quirk and Richardson 2010; Tilly 2015). Figure 3 also reveals that industrializing parishes had different petitioning priorities from other parishes. The positive association between industrialization and the propensity to petition for the rights of religious minorities is reflective of the same liberal attitudes that motivated agitation against slavery. Industrialization also positively predicts petitions for parliamentary reform. This pattern is consistent with economic change leading to demand for reform in a direction aligned with the values and ideas of rising social strata. It supports the findings in Fresh (2020) as well as a mechanism in which structural transformation drives both political and social change.

Figure 3. Industrialization and other petitioning campaigns
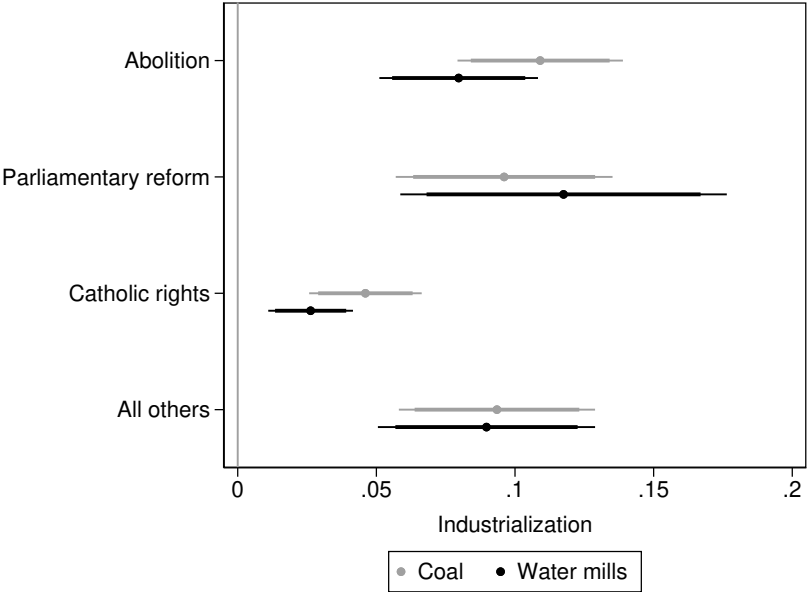
Notes: The figure displays estimates of the coefficient on $I_i \times G_t$ from specifications as in Column 2 in Table 3. Standardized beta coefficients reported. Thick and thin lines represent, respectively, 90 and 95% confidence intervals. Underlying (non-standardized) estimates are displayed in Table C.5 in the Appendix.

6.3 The role of industrialists in petitioning campaigns

Our results so far establish a link between industrializing locations and the growth of the abolitionist movement. However, the aggregate nature of the correlations presented does not allow us to distinguish what role different social classes played in the abolitionist drive. To identify a more direct link between industrialists and anti-slavery mobilization, we turn to individual-level data.

One of the few anti-slavery petitions that survived the Westminster fire of 1834 was produced in 1806 in Manchester, the major industrial city of nineteenth-century Lancashire. As the world's first industrial city, Manchester offers a good setting for studying industrial lead-

ership.[28] The surviving petition, signed by 2,348 individuals, was encouraged by abolitionist leader Thomas Clarkson in response to an anti-abolitionist petition presented to the House of Lords. We use the transcript of the petition produced by the Manchester and Lancashire Family History Society (MLFHS). MLFHS manually matched petitioners to three contemporaneous trade directories: *Scholes's Manchester and Salford Directory* (1797), *Bancks's Manchester and Salford Directory* (1800) and *Dean's Trade Directory of Manchester and Salford* (1808). Unambiguous matches were found for 312 individuals, 281 of which had an occupation listed.[29] Figure 4 displays the ten most frequent occupations of the 281 signatories that could be merged to the trade directories. Manufacturers are the most common occupation (43 petitioners), followed by textile workers such as weavers, spinners, and dyers (42 petitioners), merchants (23 petitioners), dealers (19 petitioners), warehousemen (17 petitioners), and tailors (15 petitioners).[30]

Figure 4. Top 10 most frequent occupations of Manchester petition signatories
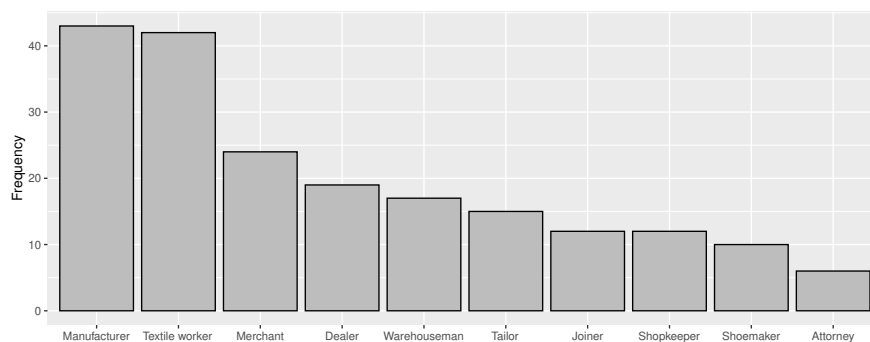
Notes: The figure displays the frequency of the most common occupations among the 218 signatories of the 1806 Manchester anti-slavery petition that could be matched to trade directories.

The numbers of petitioners presented in Figure 4 are not normalized by the total number of individuals in each occupation in the city. Since Manchester was an industrial center, it is perhaps not surprising that manufacturers and textile workers make up the bulk of petitioners in the 1806 campaign. What stands out is that textile workers – who almost

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[28]De Tocqueville describes his impression of Manchester in 1835 in his "Journeys to England and Ireland" as "The great manufacturing city for cloth, thread, cotton ... Thirty or forty factories rise on the tops of the hills I have just described. ... Here humanity attains its most complete development and its most brutish; here civilisation works its miracles, and civilised man is turned back almost into a savage." de Tocqueville (1958, pp.104-107). Engels wrote "The Conditions of the Working Class in England" in Manchester, and Marx and Engels wrote the material that later ended up being published as the Communist Manifesto during their time in Manchester.

[29]The remaining had an address listed, but no occupation. The matching is conservative. In our communication with MLFHS, they confirmed that they "only added details when absolutely sure there was no ambiguity" about whether the person had signed the petition. The final number of petitioners matched to directories is similar to Pinarbasi (2020), who matched 290 individuals to Bancks 1800 and Dean 1808.

[30]Three individuals are merchants and manufacturers, so they are counted twice here.

certainly represented a broader group than factory owners – and manufacturers have signed the petition in equal numbers. This indicates that industrial elites were over-represented among abolitionist petitioners relative to industrial workers.

Figure 5. Signature order by occupation in the 1806 Manchester petition
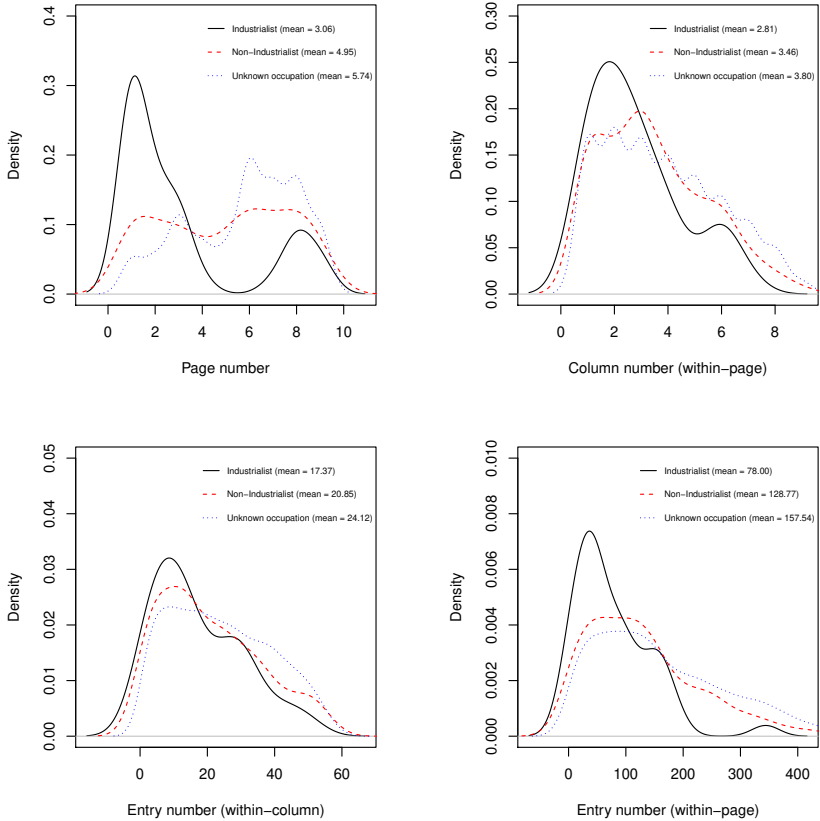
Notes: The figures display the distribution of four different measures of the order of signatures in the 1806 Manchester petition against the slave trade.

As an additional measure of centrality in the abolitionist movement, we use the order of signatures. A big part of signature collection on petitions in Britain was not done through door to door canvassing, but through the posting of petitions in central locations of a town, such as inns, shops or churches (Makovi 2019; Huzzey and Miller 2020). Individuals would then have to walk to these locations to sign the petition, making the order of signatures an informative measure of the degree of involvement to the movement. The 1806 Manchester petition comprises nine sheets of parchment stitched together as a five-meters-long roll.[31] Each sheet contains several columns, each consisting of multiple signatures. With the exception of the first page, which bears the text of the petition, some uncertainty exists as to whether the

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[31]Figure C.4 in the Appendix depicts the petition document.

remaining sheets of paper were stitched together in order, or haphazardly. For this reason, we use four alternative proxies of signature order: (1) the number of the page where a petitioner signed, (2) the column number within its corresponding page, (3) the entry number within its corresponding column, and (4) the entry number within its corresponding page.

Figure 5 displays the distribution of each of the four variables for three subgroups of the data: industrialists (solid black curve), non-industrialists (dashed red curve), and petitioners with unknown occupations (dotted blue curve). Across measures, the distribution of the order of entries by manufacturers is consistently to the left of the respective distribution for other occupations, indicating that industrialists signed the petition earlier than others. Table 5 confirms this pattern for average signature order. The difference between industrialists and other signatories of known occupations is consistently large and significant at the 1% level.

Table 5. Signature sequence in the Manchester petition

Dep. variable	Page number	Column number (within-page)	Entry number (within-column)	Entry number (within-page)	Average order
	(1)	(2)	(3)	(4)	(5)
Industrialist	-2.672***	-0.989***	-6.744***	-79.54***	-0.690***
	(0.428)	(0.264)	(2.021)	(10.55)	(0.0952)
Non-industrialist	-0.788***	-0.340**	-3.259***	-28.77***	-0.243***
	(0.182)	(0.137)	(1.015)	(6.722)	(0.0449)
P-value difference	0.000	0.0253	0.1156	0.000	0.000
Observations	2348	2348	2348	2348	2348
R-squared	0.0307	0.00589	0.00765	0.0153	0.0295
Mean dep. variable	5.613	3.750	23.66	153.2	-5.43e-09

Notes: OLS estimates reported. The sample consists of individuals who signed the 1806 Manchester petition. Each dependent variable is a different measure of signature order. The dependent variable in column 5 is the standardized average of the four measures in columns 1-4. *Industrialist* is an indicator for individuals with known occupation whose occupation was listed as "manufacturer." *Non-industrialist* is an indicator for individuals with any other known occupation. The base category are signatories who were not linked to trade directories by MLFHS and whose occupation is unknown. *P-value difference* is the p-value from a t-test for the equality of coefficients on *Industrialist* and *Non-industrialist*. Robust standard errors in parenthesis. Significance levels: *** p< 0.01, ** p< 0.05, * p< 0.1.

In Figure 6, we break down the difference in average signature order by occupation, for the 10 most frequent occupations among petitioners. Two patterns can be observed. First, middle class elites have a relatively prominent position in this petitioning campaign. Industrialists, merchants and dealers sign the petition earlier than textile workers on average. Second, the data suggests a leadership role for industrialists and merchants, the two occupational categories who are on average most likely to sign the petition first. The difference in signature order between the two groups is not statistically significant, but the tendency is for industrialists to have a lower signature order on average, and according to three out of the four measures used. The pattern if overall supportive of a central role for manufacturers. No clear pattern emerges for other skilled occupations, with the variation in signature order

being substantive, both across occupations and sequence measures.

Figure 6. Effect of occupation on signature order

Difference in average signature order relative to unknown occupation
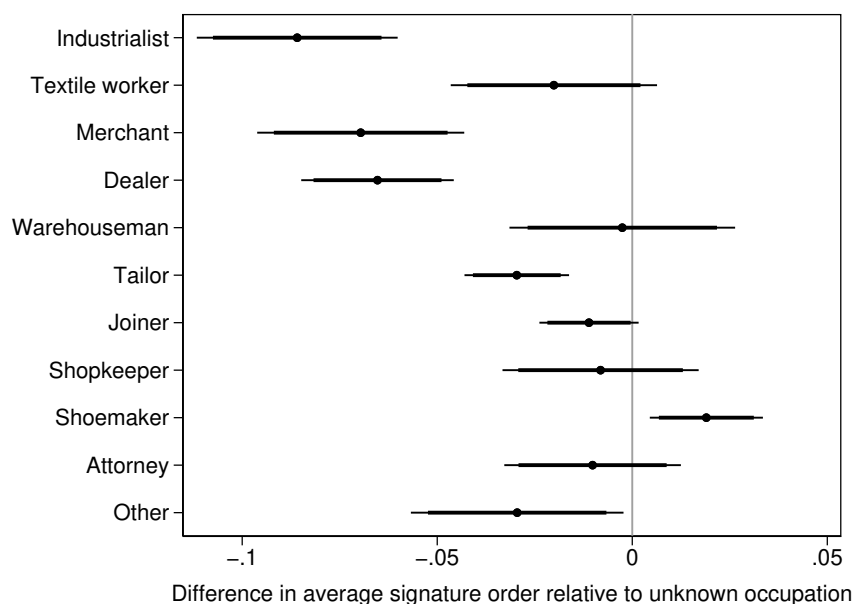
Notes: The figure displays standardized point estimates from a regression of the standardized average of the four different measures of signature order on indicators for the occupations listed on the y-axis. Thick and thin lines display, respectively, 90% and 95% confidence intervals. The base category is signatories with an unknown occupation. Underlying regression results are provided in column 5 of Table C.6 in the Appendix.

These results indicate that manufacturers held a prominent position among participants in petitioning campaigns. While industrialization could have led to mass support for abolition through other channels, such as higher associational activity, urban density and general agitation for reform, the evidence also supports a leading role of industrial elites in the movement, consistent with their different ideology and weaker links to slavery income. In Section 7.2, we will provide more direct evidence for these features of industrialists relative to other social groups by turning to the analysis of data on MPs.

6.4 Anti-slavery in the press

A first step towards understanding the role that values and economic interest played in driving mobilization against slavery in industrial locations is to examine how the topic of slavery was discussed in the press and the centrality in these discussions of moral considerations versus concerns over the loss of slavery income. To this end, we turn to the corpus of newspaper articles published between 1787 and 1833 that appear in the British Newspaper Archive (BNA) and make reference to slavery.

We estimate a Structural Topic Model (Roberts et al. 2014; Roberts, Stewart and Tingley 2019) to detect the overarching themes present in newspaper articles on slavery and how these varied by characteristics of the publication location. We discuss details of model selection and

estimation in Section B of the Appendix. We present results from a model with 30 topics. Expected topic proportions and words associated with each topic are displayed in Figure B.2.

Figure 7 compares, for a selection of meaningful topics, the estimated topic prevalence for articles in newspapers located in industrial and non-industrial districts. Results are broadly similar regardless of whether we proxy for industrialization by the share of the district over coal-bearing bedrock (left) or the log number of water mills (right).[32]

Two things are worth noting. First, articles published in industrial districts are more likely to center around abolitionist groups and anti-slavery petitions, consistent with the results of Table 3. Second, the prevalence of different topics is consistent with our hypotheses on the values and interests of industrializing locations. Topics relating to the economic aspects of slavery are overall less prevalent in industrial districts. This includes articles relating to the legal and financial aspects of slave property as well as articles on the sugar trade, though the latter difference is not statistically significant. Neutral references to the slave trade (as captured by words like *vessel, ship, trade, coast*) are also less likely to appear in the industrial press. Articles on taxes and duties on the sugar trade appear at similar frequencies in industrial and non-industrial districts. Taken together, the patterns in Figure 7 a lower centrality of economic considerations around slavery in industrial districts, consistent with a lower relative reliance of those districts on slavery income.

Figure 7. Topics of articles on slavery by location of publication
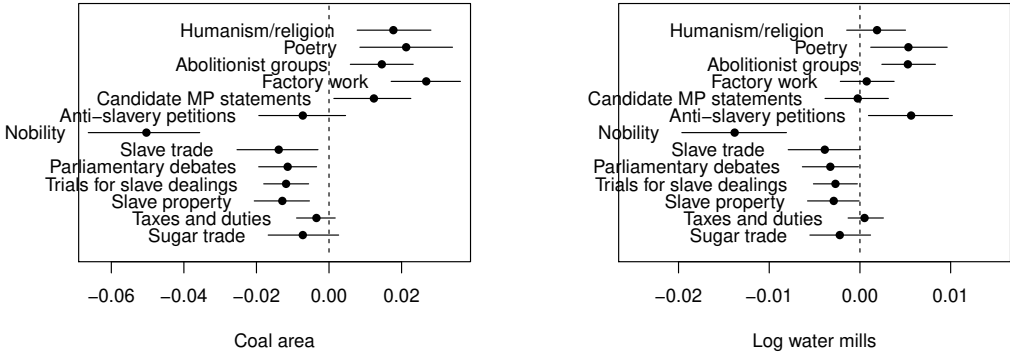
Notes: The figure displays the estimated difference in the prevalence of different topics across districts by share of area over coal-bearing bedrock (left) or the log number of fifteenth century water mills (right).

Instead, the topics with the highest prevalence in industrial publications are reflective of anti-slavery values. The topic we label "Humanism/religion" captures articles in support of abolition whose arguments draw both from Christian theology and from humanist and

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[32]Different definitions of the measures of industrial activity (distance to nearest coal deposit or water mill and share of employment in manufacturing in 1831) yield comparable results (Appendix Figure B.3).

Enlightenment ideas such as individuals' inalienable right to freedom, equality, and fraternity among humans of different origins.

For instance, an article published in multiple newspapers in April 1833, reprints a letter from the Society of Friends which attacks slavery as follows: "'Thou shalt love thy neighbor as thyself,' under which term we believe are comprehended our fellow creatures of every nation, tongue and colour. ... Can there be a greater violation of his righteous law, than to buy and sell our fellow men, to claim a right of property in them and their offspring, to hold in perpetual bondage those for whom, as for us, Christ died!" An article from November 1832 prints a candidate MP statement that contains a similar argument: "The right of the slave to be raised from the level of the brute creation, to which he has been sunk through no fault of his own, and to be restored to that of human nature, in which he was created by his Maker, can be denied by none, as an universal rule or maxim..."

The topic we label "Poetry", is dominated by poems against slavery, frequently imbued by the same humanist principles and condemning the institution as brutal and repugnant. An example from the Derby Mercury published in April 1823, is titled "Appeal to Britain – On the Slave Trade" and reads as follows:

> Though thy name may be quoted again and again,
> As a nation of freemen, a kingdom of men;
>
> Yet a stain will be on thee, will tarnish thy name,
> And a spot of dishonour will sully thy fame,
> The blood of the slave thy fair honour shall stain.

This particular poem appealed to British exceptionalism as well as to a sense of honor, which scholars like Drescher (2002) and Appiah (2011) have identified as crucial for the change in attitudes on slavery.[33]

These differences across industrial and non-industrial districts are not driven by systematic differences in the political orientation of newspapers published in each type of district. Table C.7 in the Appendix shows that, regardless of the proxy of industrialization used, newspapers published in more industrial CRDs were not more liberal than newspapers in less industrial districts.

For our argument, two conclusions are important to highlight. First, all topics with higher prevalence in publications of industrial districts were largely pro-abolition. Second, topics capturing economic arguments around slavery were less prevalent, and topics making moral arguments against slavery were more prevalent in industrial locations. This supports an

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[33]That abolition was cast as a matter of national honor for Britain, especially after the loss of the American colonies, has been highlighted by several scholars. In the aftermath of the defeat, abolition was a means for the British Empire to regain its legitimacy through displaying its moral virtue (Brown 2012).

argument in which not only economic interest, but also ideology plays a role in mobilization for social change.

7 Abolitionist mobilization in Parliament

In this section, we turn to MP-level data, in order to more directly examine the link between values, economic interest and mobilization against slavery. Our dataset consists of MPs elected in the 1832 reformed Parliament, who had the opportunity to vote on the Ministerial Plan for the Abolition of Slavery which led to the enactment of the Slavery Abolition Act of 1833. Biographical information allows us to distinguish groups of MPs with different class backgrounds and economic interests. Data from parliamentary speeches delivered by MPs in 1832-1833 allows us to measure MPs' ideology. Relying on this information, we proceed in three steps: first, we verify that MPs with industrial interests were more likely to vote in favor of the abolition of slavery. Second, we show that this behavior is consistent with economic interests and ideology in the way that our framework predicts: industrialist MPs were characterized by weak direct ties to slavery wealth and by a distinct "universalist" ideology which manifested in their broader discourse and not only on the issue of slavery. Finally, we rule out a number of alternative scenaria that could have driven industrialist MPs' abolitionist stance in Parliament, such as constituents' direct demands or grievances.

7.1 Votes for abolition

The first step in our analysis of MP-level data is to verify that the link between industrial interests and opposition to slavery that we identified in petitioning campaigns can also be observed in Parliament. We estimate variations of the following equation:

$$\text{Anti-slavery vote}_i = \alpha + \gamma_1 \text{Industrial interests}_i + \gamma_2 \mathbf{P}_i + \gamma_3 \mathbf{C}_i + u_i \qquad (4)$$

where i indexes MPs, $\text{Anti-slavery vote}_i$ is an indicator for MPs who voted at least once with the anti-slavery party in the parliamentary discussion of the Slavery Abolition Act of 1833, and $\text{Industrial interests}_i$ is an indicator for industrialist MPs. $\mathbf{P}_i$ and $\mathbf{C}_i$ stand for vectors of MP and constituency characteristics, respectively. We progressively add those individual-level and constituency-level controls in more stringent specifications.

Column 1 of Table 6 displays the results. There is a strong positive correlation between MP economic activity and voting behavior. Industrialist MPs were, on average, 36.2 percentage points more likely to have voted at least once with the anti-slavery party in Parliament during the discussion of abolition than MPs without industrial interests. Column 2 controls for the MP's direct involvement in slavery, his commercial interests, whether he was a member of the gentry or aristocracy, his political leaning, religion and education. As expected, links to the West Indies significantly reduced support for abolition. Equally unsurprising is the strong positive correlation between opposition to slavery and Liberal and Radical leanings. As Kaufmann and Pape (1999) show, both Whigs as well as Radicals and other reformists

were clearly united in their anti-slavery stance between 1770 and the early 1800s, while Tory positions on the issue were more mixed. Consistent with the historical view that Protestant dissenters were leaders in the abolitionist movement, we find that religious dissenter MPs were more likely to support abolition. Finally, we find no correlation between attitudes towards abolition and being a merchant, a member of the landed elite or aristocracy or having attended Oxford or Cambridge.

In Columns 3 and 4, we control for constituency-level characteristics.[34] The number of Quaker meeting houses is the only constituency-level variable that consistently predicts MPs' anti-slavery positions. This is unsurprising, as religious dissent and anti-slavery sentiment were closely connected at the local level (Quirk and Richardson 2010). Industrial interests remain a strong and significant predictor. All told, the results in Table 6 suggest that industrial interests are not confounded with party positions, background characteristics like religion or education, or constituency-level factors. Industrial interests have similar predictive power for MPs' anti-slavery stance as political orientation and religious views.

The link between industrial interests and a pro-abolitionist stance is present in earlier periods as well. Data on MP nominal votes on the question of the slave trade are not available, but we are able to infer MP positions on the issue through speeches in the 1792 and 1806-07 parliamentary debates.[35] We rely on *The History of Parliament Online* to identify the economic interests of MPs. In 1792, two industrialist MPs expressed their views in Parliament. Both were in favor of the abolition of the slave trade. In contrast, 21 out of 42 (50%) of non-industrialist MPs expressed a pro-abolition stance. In 1806-07, three out of four MPs with industrial interests who spoke in the debate supported abolition, compared to 30 out of 46 non-industrialist MPs (65%).[36]

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[34]We cannot compute constituency-level variables for MPs elected in the two non-territorial constituencies of Oxford and Cambridge. Electors in these constituencies were all the graduates of each university.

[35]The 1792 speeches are available in Cobbett. The Parliamentary History of England. Vol 29. Pages: 3250-259, 1055-1158, 1203-1293. The 1806-7 speeches are available in Cobbett. Parliamentary Debates. Vol 6. Pages: 597-599, 805, 917-919, 1027-1029; Cobbett. Parliamentary Debates. Vol 7. Pages: 31-34, 227-236, 580-603, 801-809, 1142-1145; Cobbett. Parliamentary Debates. Vol 8. Pages: 257-259, 431-432, 601-602, 612-618, 657-672, 677-683, 691-693, 701-703, 717-722, 945-995, 1040-1053; and Cobbett. Parliamentary Debates. Vol 9. Pages: 59-66, 114-140, 168-170.

[36]The sole industrialist MP who opposed the abolition of the slave trade in 1806 was the conservative Sir Robert Peel, who made a large fortune out of cotton-spinning and who perceived the trade as central to the textile industry's survival. All industrialist MPs who opposed the slave trade in 1806-07 were not involved in textiles. This is consistent with higher income from slavery-based activities lowering industrialist MPs' propensity to mobilize for abolition.

Table 6. Industrial interests and MP voting behavior

Dependent variable	Voted in favor of abolition			
	(1)	(2)	(3)	(4)
Industrial interests	0.361***	0.265***	0.350***	0.271***
	(0.0924)	(0.0883)	(0.0919)	(0.0867)
Slave owner		-0.204***		-0.212***
		(0.0606)		(0.0606)
Merchant		0.0352		-0.0187
		(0.0837)		(0.0859)
Gentry		-0.00102		-0.0143
		(0.0581)		(0.0587)
Aristocracy		-0.0844		-0.105
		(0.0670)		(0.0693)
Liberal		0.153***		0.129***
		(0.0450)		(0.0473)
Radical		0.369***		0.342***
		(0.0547)		(0.0558)
Protestant dissenter		0.194*		0.201
		(0.117)		(0.122)
Oxbridge graduate		0.00706		-0.0168
		(0.0420)		(0.0431)
Log distance to port			-0.0213	-0.0252
			(0.0197)	(0.0193)
Log distance to London			0.0337	0.0204
			(0.0312)	(0.0308)
Log distance to river			-0.0116	-0.0105
			(0.0167)	(0.0165)
Log distance to coast			0.00382	0.00683
			(0.0216)	(0.0215)
Latitude			-0.0293	-0.0316
			(0.0250)	(0.0248)
Ruggedness			0.00928	0.00548
			(0.0128)	(0.0124)
Elevation			-0.000121	-0.000147
			(0.000563)	(0.000533)
Slope			-0.156	-0.0954
			(0.167)	(0.161)
Wheat suitability			-0.00373**	-0.00213
			(0.00170)	(0.00166)
Log population			0.0131	0.0162
			(0.0298)	(0.0288)
Log population density			0.0179	0.00982
			(0.0158)	(0.0152)
Market integration index			0.00682	0.00949
			(0.0178)	(0.0179)
Log distance to urban center			0.0140	0.0147
			(0.0214)	(0.0211)
Log Quaker houses			0.114***	0.116***
			(0.0398)	(0.0385)
Log number of gentry			-0.0311	-0.0345
			(0.0262)	(0.0247)
Observations	546	544	546	544
R-squared	0.0243	0.130	0.0892	0.186
Mean dep. variable	0.375	0.377	0.375	0.377

Notes: The table reports OLS estimates from equation 4. For variable definitions see Sections 5 and A.3. Robust standard errors in parenthesis. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Figure 8. Support for abolition by group of MPs
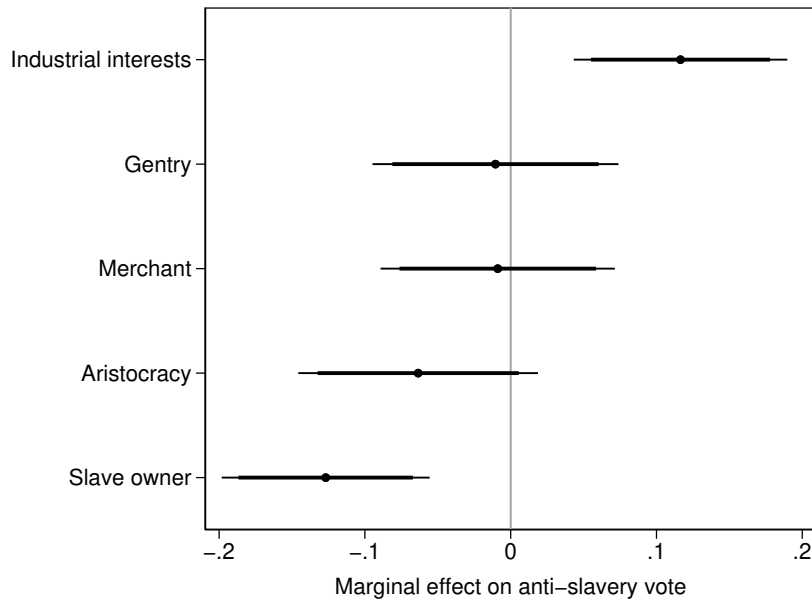
Notes: The figure displays coefficient estimates from the regression in Column 4 of Table 6. Thick and thin lines represent, respectively, 90 and 95% confidence intervals.

Figure 8 displays the implied ranking of support for abolition among different socioeconomic groups as it is reflected in the estimates of column 4 of Table 6. Industrialists emerge as the main supporters of abolition, and slave owners as its main opponents, consistent with each group's reliance on slavery income. The nobility is associated with a lower support for abolition, even though the estimate narrowly misses statistical significance. Merchants and the gentry do not register differential support. We next attempt to interpret this ranking, by providing more direct evidence that not only economic interest, but also values drove MPs' voting behavior.

7.2 Economic interests and values

We begin with characterizing MPs' direct links to slavery income. 51 out of 550 elected MPs in our data are mentioned in the Encyclopaedia of British Slave-ownership as either owners of or otherwise directly linked to plantations in the West Indies. Figure 9 displays the share of MPs with direct links to slavery among four different socioeconomic groups, as coded through MPs' biographical information. MPs with industrial interests have the weakest direct links to slavery, with only one manufacturer appearing in the list of British slave owners. Among other groups, those coded as having commercial interests are most closely tied to West Indian plantations, with the landed elite following suit. The gentry's links to slavery are stronger than those of the nobility with only 8% of MPs with an aristocratic title appearing among West Indian planters. The ranking of groups in Figure 9 in terms of reliance on slavery income is consistent with industrialist MPs' voting behavior and with manufacturers' central role in the abolitionist movement revealed in Section 6.3. However, if links to slavery were the only

driver of voting behavior, we would expect to observe more opposition to abolition among the merchants and gentry as compared to the nobility. The patterns in Figure 8 imply the opposite.

Our hypothesis is that mobilization against slavery was not driven only by low reliance on slavery income, but was also enabled by values that aligned with abolition and other reformist causes. To measure the values of different groups of MPs we analyze their speeches in Parliament. To guide our examination of whether industrialists differed in their values, we need some means of systematically classifying values and mapping that classification onto speech. We choose to rely on Moral Foundations Theory (Haidt 2007; 2012) which posits that human moral concerns can be partitioned into four moral foundations, each emphasizing different principles as guidelines for what is right or wrong. Two of these foundations are "universalist", relying on fairness and equal treatment (*fairness/reciprocity*) or on compassion and care for the weak and vulnerable (*harm/care*) as central moral considerations. Two foundations are "communal", relying instead on commitment to the country or family (*in-group/loyalty*) and respect for authority, order and social traditions (*authority/respect*). The relevance of these foundations varies widely by culture and social class (Haidt, Koller and Dias 1993; Haidt 2012). While the exact number of partitions is debated in the psychological literature, the distinction between universalist and communal values is widely accepted (see references cited in Enke 2020, p. 3690).

Figure 9. Links to slave income among British MPs
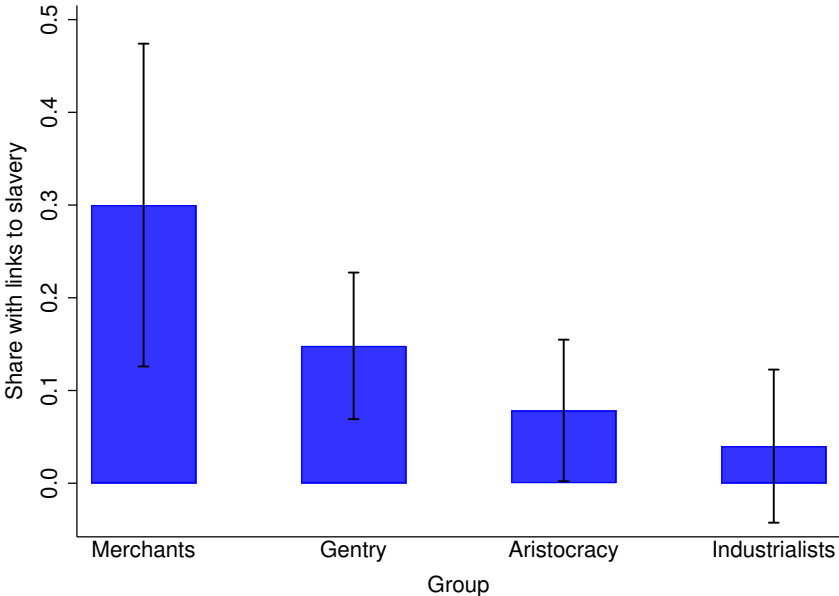
Notes: The figure displays the proportion of MPs belonging to each of the groups indicated on the x-axis who were listed in the Encyclopaedia of British Slave-ownership compiled by the *Centre for the Study of the Legacies of British Slavery* as having links to slavery.

Even though Moral Foundations Theory has been developed and empirically supported

with modern-day data, the application to British MPs in 1833 is not far-fetched. Universalist values readily correspond to progressive and human-centered ideals introduced by the Enlightenment that were not foreign to 19th century British elites and middle classes. Furthermore, universalist moral foundations intuitively match the moral values behind arguments against slavery identified in news articles of industrial districts.

It is also important to highlight that universalist values do not imply higher altruism or a stronger overall morality. Rather, universalism more closely corresponds to the rate at which altruism declines with social distance (Enke, Rodríguez-Padilla and Zimmermann 2020) or the extent to which one's moral obligations extend equally to everyone (Alexander, Enke and Tungodden 2023). This definition closely matches Quakers' and abolitionists' ideals of equal right to freedom for everyone, including the enslaved. It can be contrasted to other positions on slavery which reflected communal values, such as for instance the argument – expressed by conservatives and some Radicals – that the English people should be given priority over the enslaved in terms of policy focus. That universalism does not equal altruism is also consistent with two facts. First, many abolitionist manufacturers were willing to tolerate more or less subtle forms of exploitation in the factory system.[37] Second, abolitionists did not equate the campaign for emancipation with the pursuit of equality for enslaved Africans. In fact, they regarded the rightful position of emancipated slaves somewhere in the bottom of society, equal to that of "grateful peasantry" (Taylor, p.113).[38]

To identify universalist values in MP speeches we use the Moral Foundations Dictionary, compiled by Haidt and Graham in 2009 and available online. The dictionary is a list of terms characteristic of each foundation and has recently been used in a political economy application by Enke (2020). We use this resource to examine the extent to which speeches of industrialist MPs revealed a higher prevalence of universalist values.

We begin by computing a measure of the distinctiveness of different words of the speeches of industrialist MPs. Distinctiveness captures the extent to which a given word is more likely to be found in speeches of one MP type than in MP speeches on average and is computed as follows for industrialists and for each word w:

$$D_w = \frac{\sum_{s \in S_I} \mu_{sw} / \sum_{s \in S_I} \sum_v \mu_{sv}}{\sum_s \mu_{sw} / \sum_s \sum_v \mu_{sv}} \tag{5}$$

where μ_{sw} denotes the number of occurrences of a specific word w in speech s and S_I denotes the set of speeches by industrialist MPs.[39] Values larger than 1 indicate that a word

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[37]See Davis (1975, pp.460-461) for a description of the autocratic fashion in which famed abolitionist Josiah Wedgewood ran his Etruria mill.

[38]This is true of even the most prominent leaders of the abolitionist movement. The quote above belongs to William Wilberforce, who, when hosting a dinner for the African and Asiatic Society, served his guests of color behind a screen (Taylor (2020), p.113). Zachary Macaulay, one of the founders of the Anti-Slavery Society, was against racial mixing in the colonies.

[39]We use words appearing in speeches at least 5 times to avoid results driven by rare words.

is more likely to be used by an industrialist than a non-industrialist. Figure 10 displays the 20 words most (left) and least (right) typical of industrialist speeches. It is immediately apparent that speeches characteristic of industrialists are more likely to capture universalist values, while those least frequent – relative to their overall occurrence – in industrialist speeches reflect communal moral foundations.

Figure 10. Words distinctive of industrial MPs
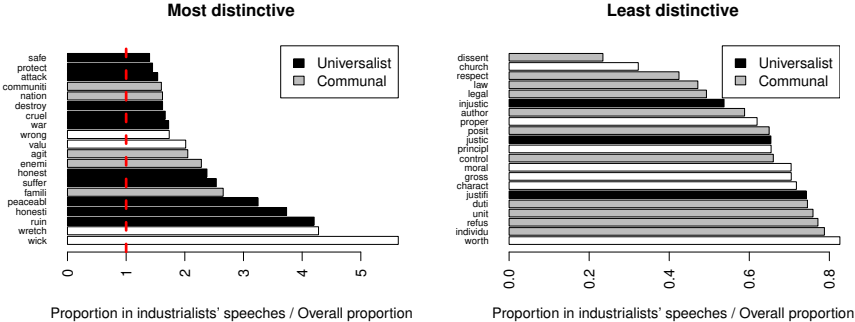
Notes: The figure displays the measure of distinctiveness of industrialist speeches defined in (5) for the 20 most (left) and least (right) distinctive words. Words are labeled as universalist or communal following the Moral Foundations Dictionary. Words shaded white do not belong to any moral foundation.

Next, we turn to a more systematic investigation of whether industrialist MPs used universalist moral terms in their speeches and whether this tendency differed by topic. We compute an index of universalism for each MP speech s as:

$$Universalism_s = Universalist\ moral\ words_s - Communal\ moral\ words_s$$

and use it as dependent variable in a regression of the form:

$$Universalism_{sdi} = \alpha + \beta \mathbf{P}_i + \delta_d + u_{sdi} \tag{6}$$

where i denotes MPs, d denotes debates and s denotes speeches. $\mathbf{P}_i$ is a vector of MP characteristics. We cluster standard errors at the MP level. Column 1 of Table 7 displays estimates from this regression without debate fixed effects. We find that industrialist MPs are significantly more likely to be universalist in their speeches. The only other MP characteristics that are positively correlated with universalism are radical political orientation and education in Oxford or Cambridge, but none of the two relationships is statistically significant. Most notably, neither liberal MPs nor Protestant dissenters are characterized by more universalist words in their speeches. The patterns points to a type of discourse that was characteristic of industrialists, and not confounded with political leanings, religion, or education.

Figure 11 displays the estimates of marginal effects on universalism associated with each socioeconomic group of MPs. The ranking that emerges suggests that industrialists expressed universalist values in their speeches, while the nobility expressed communal values. None of the other three groups is significantly associated with more or less universalist discourse.

Interestingly, slave owners are not less universalist than the rest. This speaks against the notion that values always adjust to align with economic interest and that industrialists adopted universalist values because of their low reliance on income from slavery.

Jointly, the ranking of values and direct links to slavery presented in Figures 9 and 11, respectively, are consistent with the patterns of support for abolition displayed in Figure 8. Industrialists had both strong anti-slavery values and a low reliance on slavery income and, accordingly, were most likely to oppose slavery. Slave owners were almost entirely reliant on income from slavery. Their economic interest was the main driver of their voting behavior. Other groups serve to illustrate the tradeoff between values and economic interest in support for social change: despite their weak direct ties to slavery, the nobility defended the institution because of its significantly more communal values. Merchants and the gentry owed some of their income to slavery and did not have values particularly aligned with the abolitionist cause. However, these groups did not display significant opposition to abolition. Our model suggests an explanation: as industrialization increased the reliance of all groups on sources of income unrelated to slavery, the incentive to defend the institution weakened even for groups with less strong anti-slavery values. Indeed, approximately 20% of MPs with commercial interests were also involved in manufacturing. For such groups of neutral moral values and mixed economic interests, support for abolition becomes harder to predict.

Table 7. Universalism by MP characteristics and debate

Dependent variable	Universalism			General morality			Purity		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Industrial interests	0.0206***	0.0232***	0.0114	0.0000586	0.000116	0.000134	-0.000155	-0.000130	0.0000691
	(0.00682)	(0.00678)	(0.00750)	(0.000142)	(0.000130)	(0.000138)	(0.000123)	(0.000124)	(0.000129)
Slave owner	-0.00242	-0.00425	-0.00839	0.0000395	0.0000360	0.000182	-0.000259**	-0.000274**	-0.0000304
	(0.0122)	(0.0117)	(0.0145)	(0.000185)	(0.000189)	(0.000138)	(0.000113)	(0.000117)	(0.0000966)
Merchant	-0.000105	-0.000479	-0.00657	-0.0000136	-0.00000281	0.00000454	-0.000431***	-0.000478***	-0.000307***
	(0.0117)	(0.0106)	(0.0128)	(0.000171)	(0.000177)	(0.000168)	(0.0000957)	(0.0000880)	(0.0000644)
Aristocracy	-0.0352*	-0.0369*	-0.0437**	-0.000221*	-0.000223*	-0.000823***	-0.000529***	-0.000542***	-0.000314***
	(0.0209)	(0.0213)	(0.0198)	(0.000125)	(0.000122)	(0.000136)	(0.000154)	(0.000156)	(0.0000773)
Liberal	-0.00248	0.00297	0.00288	-0.000434	-0.000504**	-0.000431**	0.000151	0.000134	0.0000676
	(0.0183)	(0.0183)	(0.0187)	(0.000263)	(0.000242)	(0.000201)	(0.000162)	(0.000167)	(0.000117)
Radical	0.0109	0.0151	0.0168	-0.000301	-0.000362	-0.000240	0.000114	0.000116	0.0000988
	(0.0178)	(0.0171)	(0.0181)	(0.000278)	(0.000259)	(0.000215)	(0.000141)	(0.000150)	(0.000114)
Protestant dissenter	-0.00708	-0.00669	0.00598	-0.0000271	-0.0000650	-0.000235	0.000522***	0.000522***	0.000231**
	(0.00826)	(0.00733)	(0.00995)	(0.000219)	(0.000219)	(0.000223)	(0.000142)	(0.000145)	(0.000104)
Gentry	-0.00956	-0.00552	-0.0225*	-0.000170	-0.000193	-0.000131	-0.000115	-0.000124	0.000104
	(0.0129)	(0.0131)	(0.0126)	(0.000211)	(0.000205)	(0.000145)	(0.000116)	(0.000120)	(0.0000755)
Oxbridge graduate	0.0177	0.0195	0.0268*	-0.000496***	-0.000526***	-0.000587***	-0.0000619	-0.0000669	-0.000296***
	(0.0163)	(0.0164)	(0.0158)	(0.000186)	(0.000182)	(0.000166)	(0.000137)	(0.000141)	(0.0000863)
Observations	7757	7471	7471	7757	7471	7471	7757	7471	7471
R-squared	0.00193	0.00207	0.191	0.00399	0.00463	0.191	0.0204	0.0218	0.355
Mean dep. variable	0.00196	-0.00495	-0.00495	0.0116	0.0116	0.0116	0.00346	0.00351	0.00351
Debate FE			✓			✓			✓
Drop slavery debates		✓	✓		✓	✓		✓	✓

Notes: The table reports standardized beta coefficients from OLS models. The sample consists of speeches delivered in Parliament between 1833 and 1834, from Eggers and Spirling (2014). *Universalism* is an index computed as the difference between universalist (harm, fairness) and communal (ingroup, authority) words in the Moral Foundations Dictionary (MFT). *General morality* and *Purity* are the number of words in the MFT related to, respectively, general morality and purity, divided by the number of non-stopwords. Regressions in columns 4-9 are weighted by the number of non-stopwords in each speech. Robust standard errors, clustered at the MP level, in parenthesis. Significance levels: *** p< 0.01, ** p< 0.05, * p< 0.1.

One possibility is that the association between industrial interests and universalist dis-

Figure 11. Universalism by group of MPs
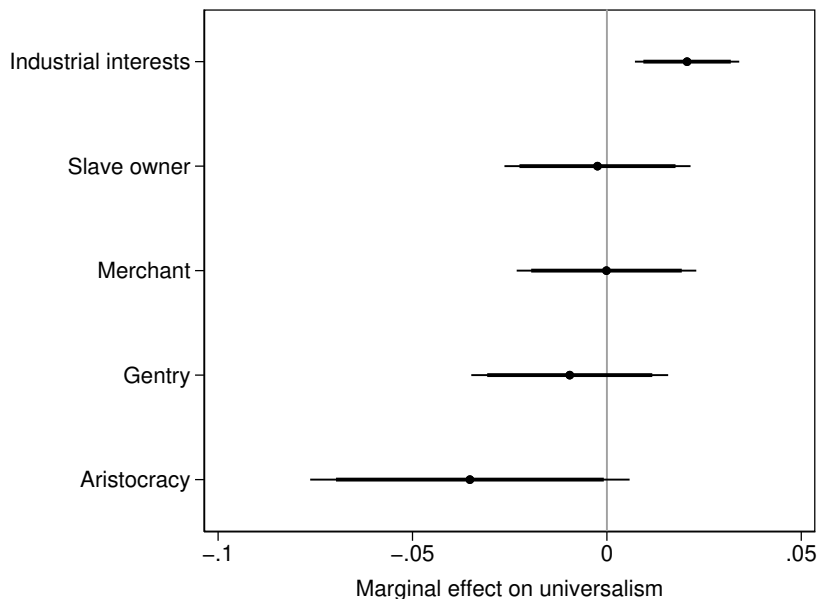
Notes: The figure displays coefficient estimates from a regression of the index of universalism on MP characteristics. Universalism is computed as the difference between universalist (harm, fairness) and communal (ingroup, authority) words in the Moral Foundations Dictionary (MFT). Standard errors are clustered at the level of the MP. Thick and thin lines represent, respectively, 90 and 95% confidence intervals. Underlying estimates are displayed in Column 1 of Table 7.

course is driven by the fact that industrial MPs emphasize different topics in Parliament. Specifically, if industrialists are more likely to participate in debates on slavery, and slavery is a topic that invites more universalist discourse – for instance because of the prevalence of terms related to rights, equality or harm – then it is likely that industrial interests would predict universalism even if those MPs' stance on slavery was not particularly progressive. Columns 2-3 in Table 7 show that this is not the case. Column 2 drops debates related to slavery. Industrialists continue to be characterized by more universalist discourse also in remaining debates. Column 3 includes fixed effects for the topic of each parliamentary debate, as coded by Eggers and Spirling (2014). There are 1,002 distinct debates, which significantly limits power, but the estimate on industrial interests remains positive and larger in magnitude than any other MP characteristic. Other MP characteristics remain largely uncorrelated with universalism and the ranking of groups in terms of universalist values does not change, though the association with membership in the gentry becomes larger and more significant when differences across debates are accounted for.

Importantly, the analysis of speeches also demonstrates that universalism is distinct from both general morality and religious values. The Moral Foundations Dictionary contains a separate category for words loaded with moral content, but that do not belong in any of the four foundations of harm, fairness, ingroup loyalty or authority. We compute the relative frequency of such words – for instance, words like "righteous", "moral", "proper" or "correct" – in MPs' speeches and report regressions of this variable on MP characteristics in columns

4-6. To account for the fact that we divide with the number of non-stopwords, which may lead small speeches to have a disproportionate contribution to our estimates, we weigh regressions by the number of non-stopwords. The results show no association between industrial interests and a general emphasis on moral character. Words emphasizing general morality are more prevalent in the speeches of conservative MPs and less prevalent in speeches of MPs with a nobility title or an Oxford or Cambridge education.

In columns 7-9 of Table 7, we repeat this exercise using as dependent variable the relative frequency of purity-related words. These words are associated to a fifth moral foundation, that of *sanctity/degradation*. According to Haidt and Graham, this foundation "underlies religious notions of striving to live in an elevated, less carnal, more noble way." The religious association of purity-related words is evident in parliamentary speeches, with dissenters using purity-related words at significantly higher frequencies. However, no consistent correlation exists between purity and industrial interests.

Why did the values of industrialists, as they emerge from their rhetoric in Parliament, differ from those of other MPs? Our data does not allow us to pinpoint the determinants of universalist ideas among those involved in manufacturing. However, the social background of industrialist MPs supports the evidence provided in Crouzet (1985) that industrialists came from the middle classes and had weak links to the established aristocracy. Table 8 compares MPs with industrial interests to others and shows that manufacturers had weak ties to the landed elite and were less likely to have Oxford or Cambridge education. They were more likely to be nonconformist in their religious affiliation, have a radical political orientation and support free trade. These differences are consistent with the picture of industrialists painted by other accounts, such as the one in Doepke and Zilibotti (2008) which attributes the rise of the manufacturing elite to their distinct values and preferences, deriving partly from their religion and pre-capitalist occupational origins.

Table 8. Backgrounds and orientation of industrialists compared to other MPs

	Other			Industrial interests			t-test	
	Mean	Std. Dev.	N	Mean	Std. Dev.	N	Diff.	*p*-value
Oxbridge graduate	0.372	0.48	521	0.080	0.28	25	-0.29	0.003
Protestant dissenter	0.017	0.13	521	0.160	0.37	25	0.14	0.000
Liberal	0.501	0.50	519	0.400	0.50	25	-0.10	0.325
Radical	0.245	0.43	519	0.400	0.50	25	0.16	0.081
Free Trade	0.081	0.27	521	0.240	0.44	25	0.16	0.006
Corn Laws	0.142	0.35	521	0.160	0.37	25	0.02	0.802
Merchant	0.046	0.21	521	0.240	0.44	25	0.19	0.000
Gentry	0.155	0.36	521	0.000	0.00	25	-0.16	0.033
Slave owner	0.096	0.29	521	0.040	0.20	25	-0.06	0.348
Aristocracy	0.098	0.30	521	0.000	0.00	25	-0.10	0.101

7.3 Ruling out other alternatives

In this section, we probe the plausibility of other likely explanations, some of which proposed by the historical literature, for the abolitionist stance of industrialist MPs. One economic-centered explanation for manufacturers' opposition to the slave trade and slavery was that the colonial system of sugar and cotton production was subsidized and directed resources away from more productive domestic investment. This view was best expressed by Adam Smith, who in *The Wealth of Nations* stated that "The prosperity of the English sugar colonies has been, in great measure, owing to the great riches of England, of which a part has overflowed ... upon those colonies" (Smith [1776] 2013, p.302). Smith not only believed the sugar economy to embody those artificial restrictions of free market activity that he opposed, but also saw the system of slavery on which this economy relied as inefficient, since "A person who can acquire no property, can have no other interest but to eat as much, and to labor as little as possible" (Smith [1776] 2013, p.207). Abolition of slavery and the dismantling of the sugar monopoly would free up capital to the benefit of domestic industrial production. This scenario does not contradict our main argument, but implies that industrialists may have expected direct gain – and not only a smaller loss relative to other groups – from the abolition of slavery.

If an anti-mercantilist stance was the main driver of support for abolition, we would expect MPs' views on free trade to be predictive of their votes and soak up part of the effect of industrial interests. Yet this is not the case. Column 1 of Table 9 replicates the specification with full controls in column 4 of Table 6 for comparability. Column 2 includes controls for MPs' positions on free trade and on the Corn Laws, as recorded in their biographies. As Table 8 demonstrates, industrialists were on average supportive of free trade and not significantly different from non-industrialists in their positions on agricultural tariffs, but neither of these positions significantly correlates with anti-slavery votes; controlling for them barely affects the estimate on industrial interests.

We also examine whether variation in the extent to which industrialists depended on raw material from the colonies influenced their stance on slavery. Textile manufacturers relied on raw cotton imports, and may have been more aligned with planter interests and supportive of slavery as an institution. Earlier parliamentary debates on the abolition of slavery provide some suggestive evidence in favor of this argument. In 1806-07, the only industrialist who expressed a pro-slavery stance in Parliament was a textile manufacturer.[40] However, column 3 of Table 9 reveals no significant difference between textile manufacturers and other industrialists in terms of voting behavior in the case of the abolition of slavery.

An alternative explanation for MPs' voting behavior is that they responded to demands

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[40]Given that the West Indies were not major producers of cotton, textile manufacturers would have had more economic reason to oppose the abolition of the slave trade – which guaranteed the perpetuation of slavery in the cotton-producing US colonies – than that of slavery. Nonetheless, it is possible that reliance on raw material produced by slave labor would have made that group ideologically more aligned with the institution in general.

Table 9. The role of anti-mercantilism

Dependent variable	Anti-slavery vote		
	(1)	(2)	(3)
Industrial interests	0.271***	0.266***	0.278***
	(0.0867)	(0.0867)	(0.0886)
Free trade		0.0675	
		(0.0662)	
Corn laws		0.00498	
		(0.0588)	
Textile manufacturer			-0.0391
			(0.219)
Observations	544	544	544
R-squared	0.186	0.188	0.186
Mean dep. variable	0.377	0.377	0.377

Notes: The table reports OLS estimates from a specification following equation 4. All regressions include MP- and constituency-level controls from Column 4 of Table 6. Robust standard errors in parenthesis. *Free Trade* is an indicator for MPs who supported free trade and *Corn Laws* is an indicator for MPs who supported the Corn Laws. *Textile manufacturer* is an indicator for MPs who owned a textile factory. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

from below. If manufacturers were more likely to represent constituencies with a larger working class population, they may have merely being channeling in Parliament the broader anti-slavery sentiment present among their constituents (Gross 1980). Though catering to voters was not as central a driver of MP behavior in England during a period of limited franchise as it is in modern democracies, Table 10 investigates this possibility. In columns 2 and 3 we control, respectively, for the share of a constituency's area that lies over coal-bearing bedrock and the log number of water mills, as proxies of the constituency's reliance on industry. The presence of coal is a significant predictors of an MP's vote, but it does not eliminate the influence of individual involvement in industry. In column 4 we control for the presence of textile mills in the constituency, to account for the possibility that textile manufacturing interests may have been driving MPs to oppose abolition. This variable comes from a census of industrial mills ordered by Parliament in 1838. Textile manufacturing had no independent effect on MP voting behavior over and above the individual MP's involvement in industry. Columns 5 and 6 include controls for petitioning activity in the constituency. Neither overall petitions, nor petitions in the peak year of abolitionist campaigning significantly predict MP behavior or affect the estimate on industrial interests. In column 7, we include an indicator for MPs who ran unopposed and its interaction with industrial interests. If competition for votes was a significant predictor of industrial MPs' stance in Parliament, we would expect anti-slavery votes to differ depending on whether or not the MP faced competition for his seat, but this is not the case. Column 8 accounts for all of these possible sources of political pressure from below simultaneously confirming that, while industrialization at the constituency level increases the probability that an MP votes against abolition, the MP's industrial interests remain the strongest predictor of his voting behavior.

Table 10. The role of constituency pressures

Dependent variable	Anti-slavery vote								Pledged to abolish
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Industrial interests	0.271***	0.244***	0.273***	0.270***	0.275***	0.274***	0.247***	0.234**	0.00512
	(0.0867)	(0.0894)	(0.0879)	(0.0867)	(0.0871)	(0.0860)	(0.0952)	(0.0978)	(0.0920)
Coal area		0.226**						0.218**	
		(0.100)						(0.101)	
Log water mills			0.0535					0.0509	
			(0.0334)					(0.0338)	
Log textile mills				-0.00920				-0.0131	
				(0.0357)				(0.0348)	
Log petitions overall					0.0226			0.0156	
					(0.0347)			(0.0342)	
Log petitions 1833						0.0228			
						(0.0359)			
Ran unopposed							-0.0365	-0.0489	
							(0.0453)	(0.0451)	
Industrial interests × Ran unopposed							0.0959	0.0604	
							(0.219)	(0.252)	
Observations	544	544	544	544	544	544	548	544	544
R-squared	0.186	0.194	0.190	0.186	0.187	0.187	0.186	0.200	0.159
Mean dep. variable	0.377	0.377	0.377	0.377	0.377	0.377	0.378	0.377	0.237

Notes: The table reports OLS estimates from a specification following equation 4. All regressions include MP- and constituency-level controls from Column 4 of Table 6. *Pledged to abolish* is an indicator for MPs who pledged to abolish slavery if elected in the anti-slavery journal *The Tourist.* Robust standard errors in parenthesis. Significance levels: *** $p< 0.01$, ** $p< 0.05$, * $p< 0.1$.

Finally, in column 9, we examine a dependent variable that more closely proxies for MPs' electoral incentives than post-election behavior in Parliament. The popularity of the abolitionist movement led some MP candidates to pledge to abolish slavery, if elected (Gross 1980, p. 81). In the 1832 election, lists of candidates who took part in these pledges were published by the anti-slavery journal *The Tourist.* At least 130 elected MPs had pledged to support abolition before the election. MPs who pledged to abolish slavery in *The Tourist* may have been driven by the desire to attract votes rather than by true commitment to the abolitionist cause.[41] Consistent with this interpretation, industrial interests do not predict pre-election pledges.

As a last step, we examine the possibility that industrial elites promoted abolition to divert attention away from calls for domestic reform and for the alleviation of inhuman conditions for the working poor in England's factories. This argument is similar in spirit to theories of franchise extension as reforms in the face of popular revolt (Acemoglu and Robinson 2000). Many abolitionist industry leaders were intensely preoccupied with labor discipline and labor management and the anti-slavery movement developed in the backdrop of increasing social unrest driven by enclosures and the proletarianization of the rural poor (Davis 1975, p. 358, 455-462). It is conceivable that abolitionist efforts were more pronounced where such preoccupations were stronger. We rely on Horn and Tilly (1986) for a measure of labor unrest,

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[41]A noteworthy example was Radical William Cobbett, a staunch anti-abolitionist, who pledged to abolish slavery when he ran for Parliament in Manchester, an industrial city with broad popular support for abolition.

based on the number of contentious gatherings between 1828 and 1833 in which the major issue was either wage demands or issues concerning labor organizations.[42] This measure is only available at the county level ($N = 83$). Columns 2–5 of Table 11 show that labor unrest over the 1828-1833 period is positively, but not significantly correlated with MPs' anti-slavery votes, but that any correlation is not specific to industrial MPs. This is evidence against the argument that it was factory owners in particular who would benefit from supporting abolition to deflect the grievances of the working class. In columns 6 and 7 we consider whether MPs reacted to any type of popular grievance by examining the role of Swing riots, disturbances that occurred between 1830-31 and that were shown by Aidt and Franck (2015) to have precipitated democratization in Britain.[43] We find no evidence that the Swing riots affected abolitionist votes, either in general or specifically for industrialist MPs.

Table 11. The role of domestic order

Dependent variable	Anti-slavery vote						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Industrial interests	0.271***	0.262***	0.283*	0.263***	0.251**	0.278***	0.299***
	(0.0867)	(0.0869)	(0.152)	(0.0878)	(0.118)	(0.0881)	(0.0947)
Log labor incidents 1828-1833		0.0283	0.0291				
		(0.0212)	(0.0223)				
Industrial interests × Labor incidents 1828-1833			-0.0112				
			(0.0658)				
Log labor incidents 1833				0.0278	0.0253		
				(0.0409)	(0.0454)		
Industrial interests × Labor incidents 1833					0.0161		
					(0.0845)		
Log Swing riots						0.0409	0.0416
						(0.0259)	(0.0259)
Industrial interests × Swing riots							-0.107
							(0.148)
Observations	544	544	544	544	544	544	544
R-squared	0.186	0.189	0.189	0.187	0.187	0.191	0.191
Mean dep. variable	0.377	0.377	0.377	0.377	0.377	0.377	0.377

Notes: The table reports OLS estimates from a specification following equation 4. All regressions include MP- and constituency-level controls from Column 4 of Table 6. *Labor incidents* is the number of contentious gatherings in a county, compiled by Horn and Tilly (1986) from news articles and Hansard. *Swing riots* is the number of Swing riots in a constituency from Aidt and Leon-Ablan (2022). Robust standard errors in parenthesis. Significance levels: *** p< 0.01, ** p< 0.05, * p< 0.1.

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[42] Horn and Tilly (1986) define contentious gatherings as "an occasion on which a number of persons gather in a publicly-accessible place and visibly, by word or deed, make claims that would, if realized, affect the interests of some person or group outside their own number." Counts of contentious gatherings come from newspapers and Hansard.

[43] The number of Swing riots by constituency is from Aidt and Leon-Ablan (2022).

8 Discussion and conclusion

This study examined the connection between structural transformation and social change in the context of one of modernity's largest campaigns for social change, the abolitionist movement in late 18th and early 19th century Britain. We provided a framework of mobilization for social change in which both values and economic interests play a role and in which change is enabled by the rise in power of groups with weak economic interests in the status quo and values most conducive to reform. We found evidence for this mechanism in the abolitionist movement. We documented a robust correlation between industrialization and anti-slavery petitions at the local level, as well as a role for industrialists at the individual level, both in petitioning campaigns and in voting for abolition in Parliament. Newspaper articles on slavery suggest a role for liberal humanist ideology underlying support for abolition in industrial districts and industrialist MPs' speeches in Parliament reveal a distinct, universalist moral language, which extends beyond slavery to other topics of debate. Beyond industrialists, the analysis of MP economic interests and ideology provides evidence that both economic interest and values determined their stance on abolition. Opposition to abolition came both from groups with a high reliance on slavery income such as planters as well as groups with conservative values such as the old aristocracy. Taken together, our analysis is consistent with a view of industrialists as distinct ideological types, whose values rose to prominence through the process of England's structural transformation and altered the moral status quo.

Our results help reconcile contrasting views in the voluminous historical literature on British abolition. While we do not explicitly test the argument of Eric Williams (1944) that the slave trade and slavery were abandoned when they stopped being profitable to Britain, our framework and results allow a role for economic interests in driving opposition to slavery. Consistent with Williams (1944), by reducing relative reliance on slavery income, industrialization may have facilitated a transition away from colonial slavery for all economic groups in Britain that relied increasingly on income from industrial activities. Our study emphasizes differences across such groups, deriving not only from sources of income, but also from ideology. Our findings are supportive of the arguments in Davis (1966), who saw abolition as a change mainly instigated by industrialists. In his account, ending slavery was an ideological tool used by industrialists to legitimize the new world order that had raised them to elite status and that was reliant on free labor. We cannot test this motivation – which historians believe was not even an explicit goal of industrialists, but rather a subtle psychological motive (Davis 1966; Ashworth et al. 1992) – but our findings are consistent with it. Our results are also in accordance with the argument of Drescher (1986) that the abolitionist movement was a middle class phenomenon. Given the large volume of anti-slavery petitions it is clear that more groups than just manufacturers joined in the abolitionist fervor. Our argument is that mobilization by any group that shares liberal values becomes less costly once leading groups – those with greater power deriving from rising income – mobilize first.

Several questions are left open. Perhaps most prominently, we have no answer as to why industrialists were more universalist than other groups. Industrialist MPs had distinct social

backgrounds reflective of a less elite upbringing and religious non-conformism. This can explain why their values and ideology were different, but not why they had the values that they did. It is possible that normative positions on different issues and individual economic characteristics like occupation or sector of employment are jointly determined by deeper personality traits, or that people adjust their values to correspond to their behavior, as proposed by theories of cognitive dissonance (Festinger 1957; Acharya, Blackwell and Sen 2018). However, both the historical record and quantitative evidence suggest a more nuanced correspondence between values and economic interests. Quaker abolitionists chose to disassociate themselves from slave trading activities and disavowed members that continued to be involved in them. This may have been enabled by the progressive involvement of Quaker businessmen in more industrial undertakings, which loosened their economic ties to the slave trade, and is consistent with our model in which both economic interests and values determine mobilization for a social cause. In our data, we also find that slave owner MPs were not less universalist than others, inconsistent with a theory in which values are perfectly determined by behavior.

The rise to power of industrial elites may have changed the moral paradigm on slavery and other issues in ways additional to the ones we emphasize. One channel is highlighted in the cultural framework of Acemoglu and Robinson (2021), who see shocks to material conditions as giving rise to critical junctures at which social change is possible. Yet the direction and shape of change is crucially shaped by "cultural entrepreneurs", who compete for influence over the larger society.[44] Political power can tilt the balance in favor of specific ideological paradigms or bundles of values. A concrete way in which this can be achieved is by a change in institutions, which can then serve to perpetuate the ideological and moral narrative of the elite that established them. In the case of slavery, abolition was the institutional change that condemned the old state of affairs as immoral and unjust.

Another mechanism for value diffusion is social in nature. Elites, or individuals of high social status, are imitated at a higher frequency, and exert a disproportionate influence on societal norms. The process of prestige-based transmission plays a big role in evolutionary models of culture (Boyd and Richerson 1985; Chudek et al. 2012) and status has been identified as a crucial driver in many well-known instances of rapid social change (Mackie 1996; Appiah 2011).[45] The role of status-based transmission of industrialist values to the lower social strata was emphasized by Davis. Elite ideology was adopted by the broader population

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[44]This is similar to the concept of "political entrepreneurs" used by Tilly to describe figures who were able to mobilize the population for political causes during Britain's period of "mass politics," the same time period in which the abolitionist movement took off (Tilly, 1995, p.147). Urbanizing, industrializing Britain was a favorable environment for such entrepreneurs to sway large segments of the population.

[45]The diffusion of elite values is also consistent with models of intergenerational transmission and endogenous preference formation, in which partly or fully altruistic parents instill adaptive values that can help their offspring perform well in a given environment (Bisin and Verdier 2001; Tabellini 2008). Compliance with the values of influential elites may be in the best interest of children growing up in a world in which economic and social power is shifting.

through a process of "ideological hegemony".[46] Social strata with prospects of upward mobility, like skilled craftsmen and artisans, became abolitionists in an attempt to find their place in a rapidly changing world (Davis in Ashworth et al. (1992)). Ideological hegemony may have also been achieved through means other than imitation. Quirk and Richardson (2010) suggest that we should not "ignore the influence of non-conformist captains of emergent British industries to promote among their employees values consistent with both anti-slavery and improving industrial productivity. Such values included church attendance, sobriety and temperance, time discipline, and personal responsibility (Thompson, 1968: 385–98)."[47] A better understanding of the process of diffusion of new elite values to the rest of the population can paint a fuller picture of how structural transformation leads to social change, and is a fruitful avenue for future research.

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[46]This notion has its roots in Gramsci. Tilly (2015) refers to the related concept of "imposed consciousness" as one of the means to explain popular mobilization for various political causes in Britain during the early 19th century.

[47]This does not mean that elite influence was the only driver of the working class's views on slavery. In fact, the stance of the working class, and the extent to which its position in the new industrial British economy made it more or less supportive of an anti-slavery ideology, is an interesting topic of further research. Radicals like William Cobbett challenged the abolitionists by continuously drawing attention to the plight of England's poor. In November 1822, during a particularly rainy week, Cobbett's entry in his documentation of his journeys on horseback across England stated "I pity none but the poor English creatures, who are compelled to work on the wool of this accursed week, which has done so much mischief to England. The slaves who cultivate and gather the cotton, are well fed. They do not suffer." (Cobbett 1830). At the same time, Radicals generally supported abolition and the cause had mass appeal among lower social strata. Scholars like Appiah (2011) hypothesize that opposition to slavery was a means for English working class members to reclaim a sense of honor, by elevating the status of laborers in the West Indies whose conditions of life were not much different to their own.

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Appendix

A Data construction

A.1 Petitions

Data on petitions comes from the *Journal of the House of Commons.* We focus on petitions submitted to the Commons that requested either the abolition of the slave trade (before 1807) or the gradual or immediate abolition of slavery (between 1807 and 1833). Each petition listed mentions a place of origin. The petitions were associated with 7,573 unique places. We first geocoded 2,724 places using exact matches to parishes in the *GB1900 Gazetteer*, elaborated by the Great Britain Historical GIS Project at the University of Portsmouth. The places geocoded with the gazetteer represent 47 percent of the petitions in our sample. We then manually cleaned the remaining place names and geocoded them using an automatic geocoding routine that exploits the OpenStreetMaps API. Overall, we geocoded 7,449 places and 13,883 petitions. In our analysis, we only focus on the set of 12,124 petitions submitted from towns in England and Wales. To check the accuracy of the automatic geocoding, we manually searched for the coordinates of 5% of the petitions in our sample. In this sample, the median distance between the manual and automatic coordinates is less than 1km; and in 75.4% of the cases the automatic and manual coordinates are within 5km of each other and fall within the same parish.

Table A.1. Coding accuracy

	Automated			Manual			t-test	
	Mean	Std. Dev.	N	Mean	Std. Dev.	N	Diff.	p-value
Coal area	0.100	0.247	603	0.106	0.250	603	-0.005	0.681
Water mills	0.280	1.216	603	0.275	1.215	603	-0.004	0.94

To ensure that any remaining error in geocoding is only contributing to noise and not adding any systematic bias, we use the 5% sample of petitions to compare our cross-sectional proxies of industrial activity across parishes assigned by either the automated or manual geocoding. Table A.1 shows no systematic correlation between divergence in parish assignment and parish-level industrialization, suggesting that any misattribution in the origin of petitions reflects only classical measurement error.

A.2 MP data

We examine the voting behavior of MPs elected in the 1832-1833 Parliament using data from Eggers and Spirling (2014). We begin with a dataset of 562 MPs from England, Scotland, and

Wales, from which we exclude nine repeated observations (William Robert Clayton, Robert Gordon, Charley Grey, Douglas G. Hallyburton, Thomas F. Kennedy, Stephen R. Glynne, Henry Labouchere, R. Palmer, and C.H. Tracy). We also exclude two MPs for whom we lack biographical information because they served only for a short period of time. John C. Hodhouse resigned in March of 1833; and David Pugh's election was declared void in April 1833. This leaves us with a dataset of 550 elected MPs who served in the 1832-1833 Parliament, for whom biographical data is available and who participated in the vote on the abolition of slavery. Out of these MPs, four represented two constituencies: T.B. Macaulay represented Leeds (123,393 people) and Calne (4973 people); C.P. Thomson represented Manchester (316,213 people) and Dover (11,924 people); Viscount Lowther represented Cumberland (77,707 people) and Westmorland (35,041 people). Finally, Hon William Francis Spencer Ponsonby represented Dorsetshire (159,252 people) and Knaresborough (6,253 people). To avoid double-counting the votes of these MPs, whenever we include constituency-level controls we only consider the largest of the constituencies that they represented. Our results remain qualitatively unaffected if we consider each constituency separately or if we weigh constituencies by the number of electors.

We are able to identify economic interests, education, religion and class status for all MPs who participated in the vote on the 1833 Ministerial Plan for abolition. Figure A.1 displays an example biography from Stenton (1976). We code Mark Philips as a merchant and manufacturer of liberal political orientation.

Figure A.1. Example MP biography

PHILIPS, Mark. The Park, Lancashire. Snitterfield, Warwickshire. Brooks's, Windham, and Reform. Eld. s. of Robert Philips, Esq., of The Park, Lancashire, and of Snitterfield Park, Warwickshire. B. 1800. A Merchant and Manufacturer. A Reformer, in favour of the vote by ballot, triennial Parliaments, and free trade. Sat for Manchester from 1832 until he retired in 1847. Sheriff of Warwickshire 1851. Died 23 Dec. 1873.   [1847]

Source: Stenton (1976).

We lack information on the political orientation (liberal, conservative, radical) of two MPs. Table A.2 confirms that missingness is not systematically correlated with any of the MP characteristics we have complete information on.

Table A.2. Missingness of MP characteristics

	Other			Missing political leaning			t-test	
	Mean	Std. Dev.	N	Mean	Std. Dev.	N	Diff.	*p*-value
Industrial interests	0.046	0.21	544	0.000	0.00	2	-0.05	0.757
Merchant	0.055	0.23	544	0.000	0.00	2	-0.06	0.733
Slave owner	0.094	0.29	544	0.000	0.00	2	-0.09	0.650
Gentry	0.149	0.36	544	0.000	0.00	2	-0.15	0.555
Aristocracy	0.094	0.29	544	0.000	0.00	2	-0.09	0.650
Protestant dissenter	0.024	0.15	544	0.000	0.00	2	-0.02	0.825
Oxbridge graduate	0.358	0.48	544	0.500	0.71	2	0.14	0.678
Free trade	0.088	0.28	544	0.000	0.00	2	-0.09	0.661
Corn laws	0.143	0.35	544	0.000	0.00	2	-0.14	0.564

A.3 Variable descriptions and sources

Parish-level variables

Petitions to Parliament. Number of petitions on different topics (abolition, parliamentary reform, Catholic rights) sent from parish j in year t. This variable was created using the indices of various editions of the Journal of the House of Commons (1788-1833). The town or village of origin of each petition was geocoded using the *GB1900 Gazetteer*, elaborated by the Great Britain Historical GIS Project at the University of Portsmouth and also using the OpenStreetMaps API in R. After assigning coordinates to each petition, the petitions were assigned to parishes from the 1851 census for England and Wales based on digital maps produced by Kain and Oliver (2001) and converted into GIS data by Burton and Carter (2004).

Coal area. Proportion of parish j's area that overlaps with coal-bearing bedrock according to shapefiles from the *British Geological Survey*.

Coal distance. Distance (as the crow flies) from the centroid of parish j to the nearest coal deposit according to shapefiles from the *British Geological Survey*.

Water mills. Number of water mills in parish j in the fifteenth century. Data is from Heldring, Robinson and Vollmer (2021), who relied on Inquisitions Post Mortem in the period 1399-1477. Inquisitions Post Mortem recorded the lands held at their deaths by tenants of the Crown. Five volumes of the printed calendars were digitized by the University of Winchester and the Department of Digital Humanities at King's College London and are available at https://inquisitionspostmortem.ac.uk/.

Share manufacture Share of parish j's male population in 1831 employed in manufacture. We relied on the digitized 1831 English Census, which has identifiers that allow merging with

the parishes in the 1851 shapefile. The census data was generously provided to us by the Cambridge Group for the History of Population and Social Structure.

Flow accumulation. The average flow accumulation in parish j, constructed using a raster of elevation from the U.S. Geological Survey's GTOPO30 data set (EROS 1996), which provides information at a resolution of 30 by 30 arc-second grid cells. We compute, for each cell in the raster, the number of other cells that drain water to it. We then assign cells to parishes and take the average across cells to obtain a measure of average flow accumulation for each parish.

River flow. Daily mean river flow in parish j (in m^2/s). We rely on the UK's National River Flow Archive (NRFA), which collects hydrometric data from gauging stations across the country. We use daily mean flow from the gauging station nearest to a parish's centroid, as well as an average of daily mean flow across the five nearest gauging stations.

Time-series variables

Coal consumption. Total coal consumption in England in year t in exajoules, according to Warde (2007).

Industrial output. Index of industrial production in Britain, taken from Crafts and Harley (1992). The index is normalized such that a value of 100 represents the total industrial output in 1913.

Parish and constituency controls

Elevation Average elevation of the terrain in parish or constituency j. We used a raster of elevation from the U.S. Geological Survey's GTOPO30 data set (EROS 1996), which provides information at a resolution of 30 by 30 arc-second grid cells. The average elevation of parish j is the average of the elevation of all the cells in the raster that fall within the boundaries of j.

Slope Average slope of parish j (in degrees). We used a raster of elevation from the U.S. Geological Survey's GTOPO30 data set (EROS 1996), which provides information at a resolution of 30 by 30 arc-second grid cells. The average slope of parish j is the average of the slope of all the cells in the raster that fall within the boundaries of j.

Ruggedness Average terrain ruggedness index in parish j computed following Nunn and Puga (2012). Underlying elevation data is from the U.S. Geological Survey's GTOPO30 data set (EROS 1996), which provides information at a resolution of 30 by 30 arc-second grid cells.

Latitude. Latitude of the centroid of parish j.

Wheat suitability. Average index of suitability for wheat production (rainfed, low input) of parish j, computed using raster data from FAO's Global Agro-ecological Zones Data Portal version 3.0 (GAEZ). The underlying raster resolution is 30 by 30 arc-seconds.

Distance to London Distance (as the crow flies) from the centroid of parish or constituency j to London (in km).

Distance to coastline Distance (as the crow flies) from the centroid of parish or constituency j to the nearest point on the coastline (in km).

Distance to nearest port Distance (as the crow flies) from the centroid of parish or constituency j to the nearest port (in km). Data on the location of ports is from Alvarez-Palau and Dunn (2019).

Distance to nearest navigable river Distance (as the crow flies) from the centroid of parish or constituency j to the nearest navigable waterway (in km). Data on navigable rivers is from Satchell, Shaw-Taylor and Wigley (2017).

Distance to nearest urban center. Distance from the centroid of parish or constituency j to the nearest city of over 20,000 persons in 1800 (in km). Data on towns is from Bosker, Buringh and Van Zanden (2013).

Index of market integration. Sum of the populations of other districts, weighted by the distance between each parish or constituency j. Parish population data is from the 1831 census and constituency population data is from Dod (1832).

Log Quaker meeting houses Log number of Quaker meeting houses in district, parish or constituency j in year t. We digitized the Quaker meeting houses active in each year from Butler (1999), geocoded them, and assigned them to parishes and constituencies..

Log number of gentry Log number of members of the gentry alive in year t associated with a location within the boundaries of parish or constituency j. Data is from a geocoded genealogy compiled by Cummins (2017). The genealogy contains biographical information on thousands of upper-class individuals in England, Scotland, and Wales. We limited his sample to Tree number 2: *Peerage, Baronetage, and Landed Gentry Families*, and kept individuals with nobility titles of Baronet or lower (i.e., Baronet, Knight, Esquire, and Gentleman.)

MP-level variables

Anti-slavery vote Dummy variable indicating that MP voted at least once with the anti-slavery party in a division on the Slavery Abolition Act of 1833. In the Emancipation

Act of 1833, most positions on amendments were not recorded. It is possible to identify MPs who voted to limit the period of apprenticeship or reduce monetary compensation to planters. We constructed this variable using the list of divisions provided in Hansard [XIII, XIV, XVIII, XIX, and XX] (available online here: https://api.parliament.uk/historic-hansard/volumes/3/index.html). We take this definition of anti-slavery attitudes from Gross (1980) and Franzmann (1994).

Political leaning Dummy variable indicating the political leaning of MP i according to the Stenton (1976) biographical dictionary. Political leanings include Conservative, Liberal, and Radical. We count "Reformers" as Liberals. Missing data on political attitudes from Stenton (1976) was filled in with data from Thevoz (2018)

Industrial interests Dummy variable indicating that MP had industrial interests according to the Stenton (1976) biographical dictionary. MPs with industrial interests are those who are manufacturers or sons of manufacturers (e.g., steel, brewers, textiles etc).

Slave owner Dummy variable indicating that the MP appears in the Encyclopaedia of British Slave-ownership, compiled by the *Centre for the Study of the Legacies of British Slavery* (Hall et al. 2014). The database includes information on slave owners in the British Carribean, Mauritius or the Cape at the time of abolition in 1833, as well as slave owners, attorneys, mortgagees and legatees linked to estates in the British Carribean during the period 1763-1833.

Merchant. Dummy variable indicating that the MP was a merchant according to the Stenton (1976) biographical dictionary.

Protestant dissenter. Dummy variable indicating that MP was a religious dissenter, from Salter (1953) and Bebbington (2009).

Gentry. Dummy variable indicating that the MP was belonged to the gentry. We coded as gentry all the MPs whose names were preceded by "Sir", "Arm", "Baronet", or "Esq."

Aristocracy. Dummy variable indicating that the MP had a nobility title. We coded as aristocracy all MPs whose names were preceded by "Lord", "Viscount", or "Marquess".

Oxbridge Dummy variable indicating that the MP attended Oxford University or Cambridge University, according to the Stenton (1976) biographical dictionary and Wikipedia biographies.

Free trade Dummy variable indicating that MP supported free trade according to the Stenton (1976) biographical dictionaries.

Corn laws Dummy variable indicating that MP supported the Corn Laws according to the Stenton (1976) biographical dictionaries.

Textile manufacturer Dummy variable indicating that MP owned a textile mill according to the Stenton (1976) biographical dictionaries.

Ran unopposed Dummy variable indicating that MP ran unopposed in 1832 election, from Eggers and Spirling (2014).

Pledged to abolish Dummy variable indicating that an MP appears as having pledged to abolish slavery in the anti-slavery journal *The Tourist*.

Speech-level variables

Universalism. Data on speeches delivered in the House of Commons in 1833-1834 was compiled by Eggers and Spirling (2014). We compute universalism as the total number of words associated with "universalist" moral foundations (harm, fairness) minus the total number of words associated with "communal" foundations (ingroup, authority), as per the Moral Foundations Dictionary.

General morality. Data on speeches delivered in the House of Commons in 1833-1834 was compiled by Eggers and Spirling (2014). For each speech, we compute a measure of general morality defined as the total number of words that belong to the "general morality" category of the Moral Foundations Dictionary, divided by the total number of non-stop words in the speech.

Purity. Data on speeches delivered in the House of Commons in 1833-1834 was compiled by Eggers and Spirling (2014). For each speech, purity is defined as the total number of words listed under the *purity* category of the Moral Foundations Dictionary (associated with the sanctity/degradation moral foundation), divided by the total number of non-stop words in the speech.

Constituency-level variables

Log population in 1832 In the cross-section of parliamentary constituencies, the population of constituency j according to Dod (1832).

Textile mills. The number of textile mills in constituency j in 1838. We digitized the *Return of All the Mills and Factories*, a report of factory inspections commissioned by Parliament, which lists all industrial establishments in Britain in 1838.

Labor incidents 1828-1832. Number of "contentious gatherings" between 1828 and 1833 in which the major issue was either wage demands or issues concerning labor organizations. County-level data from Horn and Tilly (1986), coded from newspapers and Hansard. Parish j was assigned the number of contentious gatherings of its corresponding county.

Swing riots. The Number of Swing riots in constituency j according to Aidt and Leon-Ablan (2021).

A.4 Summary statistics

Table A.3. Summary statistics, parish and district-level data

Variable	Mean	Std	Min	Max	N
Parish panel					
Petitions for abolition	0.088	0.537	0	49	127876
Petitions for Catholic rights	0.023	0.250	0	25	127876
Petitions for parliamentary reform	0.011	0.199	0	31	127876
Number of gentry	0.470	3.032	0	156	127876
Number of Quaker houses	0.048	0.232	0	5	127876
Parish cross-section					
Share of area on coal-bearing bedrock	0.027	0.139	0	1	9134
Distance from centroid to nearest coal	79.172	62.788	0	243.486	9134
Water mills	0.069	0.340	0	10	9134
Distance to nearest water mill	9.802	7.243	0	94.003	9134
Share in manufacturing	0.019	0.073	0	0.857	9127
Elevation	77.157	55.935	1	511.376	9134
Slope	0.520	0.557	0	5.971	9134
Ruggedness	5.718	6.353	0	70.512	9134
Wheat suitability	3719.930	1423.105	0	7615	9134
Latitude	52.159	1.064	49.933	55.783	9134
Distance to port	21.413	16.013	0.079	73.104	9134
Distance to London	161.974	90.169	0.094	492.299	9134
Distance to river	6.788	6.457	0	64.876	9134
Distance to coastline	37.287	30.157	0.038	119.154	9134
Distance to urban center	51.292	36.026	0.087	317.672	9134
Market integration index	107867.7	60899.891	32251.268	550634.5	9134
Flow accumulation	173.483	820.317	1	19234	9134
River flow (closest station)	4.089	10.876	0.011	111.627	9134
River flow (5 closest stations)	4.365	7.074	0.060	82.860	9134
Census registration district (CRD) cross-section					
Share of area on coal-bearing bedrock	0.069	0.194	0.000	1.000	625
Distance from centroid to nearest coal	70.118	65.555	0.010	238.523	625
Share in manufacturing	0.058	0.121	0.000	0.668	624
Water mills	1.024	2.041	0.000	19.000	625
Distance to nearest water mill	14.377	16.043	0.000	114.866	625
Time series variables					
Coal consumption	638.671	163.052	275.000	785.200	14
Industrial output	9.279	2.593	4.160	12.200	14

Table A.4. Summary statistics, MP and constituency-level data

Variable	Mean	Std	Min	Max	N
Constituency					
Elevation	91.311	68.871	1.166	366.997	333
Slope	0.880	0.765	0.009	3.833	333
Ruggedness	10.148	9.258	0.077	57.133	333
Wheat suitability	30.800	14.496	0.000	72.969	333
Latitude	52.908	1.897	50.103	60.297	333
Distance to London	255.400	178.426	1.983	981.299	333
Distance to port	36.231	55.409	0.168	501.866	333
Distance to river	24.703	57.905	0.006	505.398	333
Distance to coast	33.656	31.332	0.014	207.233	333
Distance to urban center	54.657	48.777	0.215	353.421	333
Market integration index	6.922	2.777	4.477	22.754	333
Log population	10.203	1.347	7.819	14.122	333
Population density	0.006	0.065	0	1.134	333
Quaker meeting houses	1.682	3.475	0	40	333
Number of gentry	17.087	32.262	0	261	333
Textile mills	1.453	7.398	0	89	333
Petitions overall	39.769	66.099	0	729	333
Petitions 1833	13.246	23.384	0	229	333
Labor incidents 1828-1833	4.327	7.345	0	29	333
Labor incidents 1833	0.673	1.902	0	7	333
Swing riots	6.381	21.041	0	167	333
MP characteristics					
Abolition (roll-call)	0.375	0.485	0	1	546
Industrial interests	0.046	0.209	0	1	546
Slave owner	0.093	0.291	0	1	546
Merchant	0.055	0.228	0	1	546
Gentry	0.148	0.356	0	1	546
Aristocracy	0.093	0.291	0	1	546
Liberal	0.496	0.500	0	1	544
Radical	0.252	0.434	0	1	544
Protestant dissenter	0.024	0.153	0	1	546
Oxbridge	0.359	0.480	0	1	546
Free trade	0.088	0.283	0	1	546
Corn laws	0.143	0.350	0	1	546
Textile manufacturer	0.009	0.095	0	1	546
Ran unopposed	0.278	0.449	0	1	546
Pledged to abolish (The Tourist)	0.236	0.425	0	1	546

B   Topics in news articles

We estimate a structural topics model using the package *stm* in R (Roberts et al. 2014). Our dataset consists of 12,443 articles mentioning the terms "slave" or "slavery" and published between 1788 and 1833 in 121 newspapers. Most of the articles were published after 1814 and relate to the abolition of slavery, though many articles also refer to topics unrelated to slavery in the colonies.[48]

Figure B.1. Anti-slavery petitions and mentions of slavery in news articles
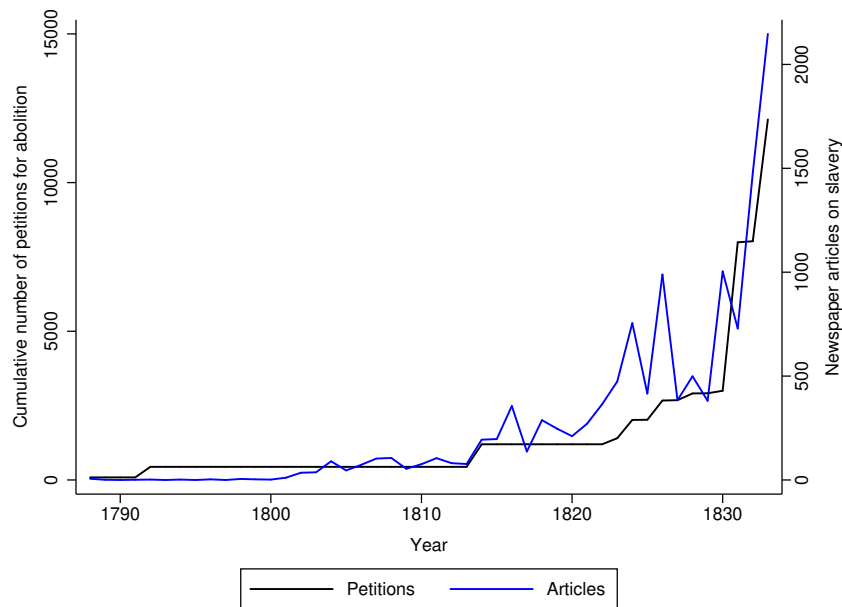
Starting from this corpus, we implemented a standard set of pre-processing steps, by removing stop-words, numbers, punctuation, words shorter than two letters, and words used less than 10 times across all articles. Structural topic modelling requires selecting the number of topics to estimate combining information from various performance metrics with manual assessment. We followed a procedure similar to the one in Roberts et al. (2014). We first estimated a series of structural topics models varying the number of topics from 15 to 50, in increments of 5. We then restricted attention to models on the semantic coherence-exclusivity frontier. Semantic coherence captures topics' internal consistency and exclusivity captures the extent to which topics can be differentiated from each other. Semantic coherence decreases with the number of topics and displays sharper drops between 20 and 25 and 30 and 35 topics. We manually inspected models with 20 and 30 topics, and concluded that the latter number captures a wider range of meaningful topics, including those of substantive interest to us, namely topics related to Enlightenment and religious values.

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[48] For instance, mentions of slavery are included in discussions around factory labor in England, as well as in articles on the Greek War of Independence.

Figure B.2. Topics of articles on slavery

Governance of colonies: coloni, measur, govern, west, adopt
Anti–slavery petitions: petit, present, lord, earl, pray
Bill on abolition: bill, hous, committ, move, motion
House of Lords: say, hear, hous, question, hon
Figures: appear, mani, year, time, number
Morality and character: men, everi, moral, natur, mean
Foreign relations and war: franc, french, war, power, nation
American independence: state, treati, govern, paper, receiv
Humanism/religion: human, nation, christian, feel, let
Slave trade: vessel, ship, trade, coast, board
Sugar trade: west, trade, india, sugar, increa
Slave property: law, case, properti, island, act
Factory work: labour, negro, work, master, children
Candidate MP statements: reform, vote, support, parliament, cheer
Poems unrelated to slavery: man, take, young, women, make
Low OCR quality lie, ami, tie, tin, tile
Catholics and Irish: peopl, constitut, liberti, england, countri
Poetry: thi, heart, thou, freedom, land
Reports on British fleet/Naval intelligence: arriv, sail, command, island, day
Abolitionist groups: meet, societi, rev, hold, chair
Trials for slave dealings: court, charg, prison, case, evid
Publications on slavery: letter, paper, publish, public, write
Low OCR quality: end, fur, bad, hit, hare
Compensations: pay, money, amount, sum, bank
Obituaries mentioning slavery: john, esq, last, year, sir
Nobility: lord, majesti, king, royal, duke
Battle of Navarine: town, mile, water, feet, build
Sales of ships: sell, price, sale, market, good
Taxes and duties: tax, land, poor, relief, distress
Low OCR quality: tbe, ihe, aud, ofth, ibe

Expected Topic Proportions

Notes: Expected topic proportions for a model with 30 topics estimated following Roberts et al. (2014).

Figure B.2 displays the expected topic proportions from a model with 30 topics. We label topics after manual inspection of articles highly associated with each topic. Most topics have a straightfoward interpretation. Topics we label *Low OCR quality* collect articles that do not have meaningful content, due to the low quality of OCR conversion. BNA provides text versions of newspaper images, produced using OCR software. The OCR technology used by BNA is superior to any single commercial OCR software, such as ABBYY FineReader, so we would not have been able to improve on the quality of the text by independently converting the underlying image files to text.

Figure B.3. Topics of articles on slavery, alternative measures of industrialization
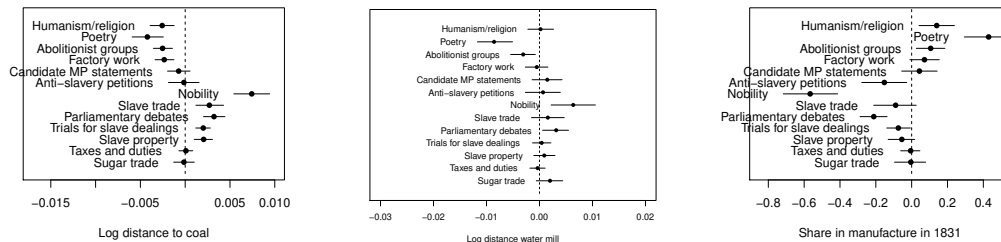
Notes: The figures display the estimated difference in the prevalence of different topics across parishes by log distance to nearest coal bedrock (left), log distance to nearest fifteenth century water mill (middle) and share of male employment in manufacturing in 1831 (right).

Structural topic modelling allows for the estimation of relationships between topical content and various metadata. We use the function *estimateEffect* to estimate differences in

topical prevalance across districts by various proxies of industrialization. Results are displayed in Figures 7 and B.3.

C   Additional Figures and Tables

Figure C.1. Coal-bearing bedrock and fifteenth century water mills
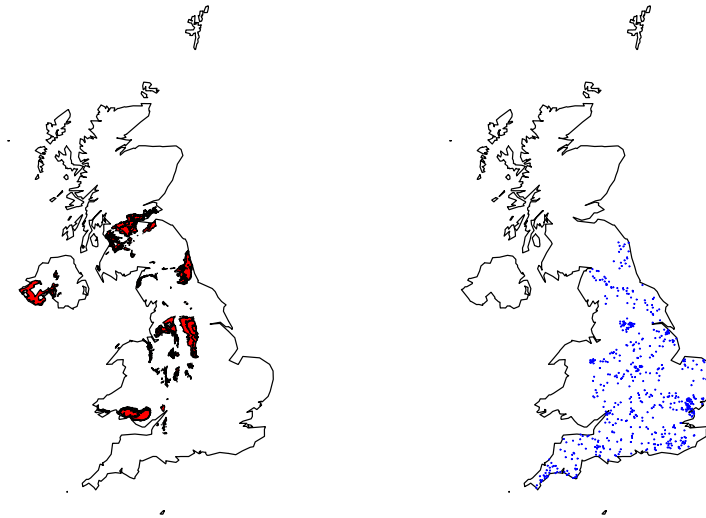
Notes: Data from the *British Geological Survey* (left) and Heldring, Robinson and Vollmer (2021) (right).

Figure C.2. Flow accumulation and observed river flow
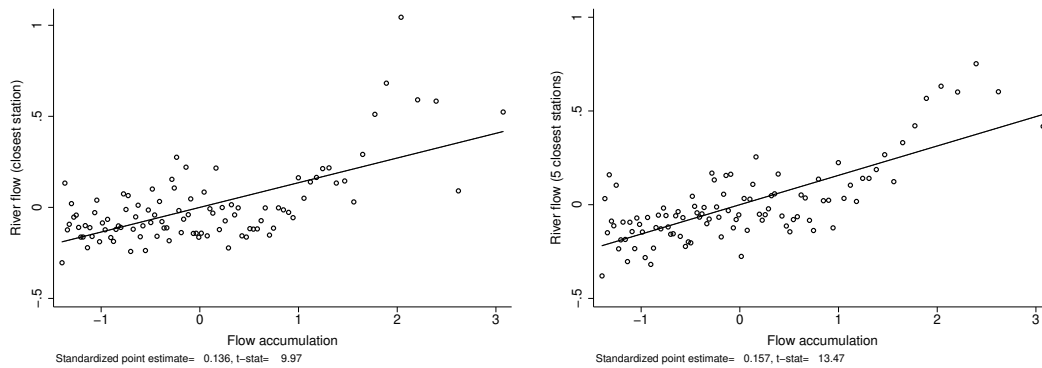
Notes: The figure displays binned scatterplots of daily mean river flow from the closest (left) and five closest (right) gauging stations to a parish's centroid and average flow accumulation at the parish level. Data on river flow is from the UK's National River Flow Archive and on flow accumulation is from the U.S. Geological Survey's GTOPO30 data set.

Figure C.3. First stage

Standardized point estimate= 0.053, t–stat= 5.46
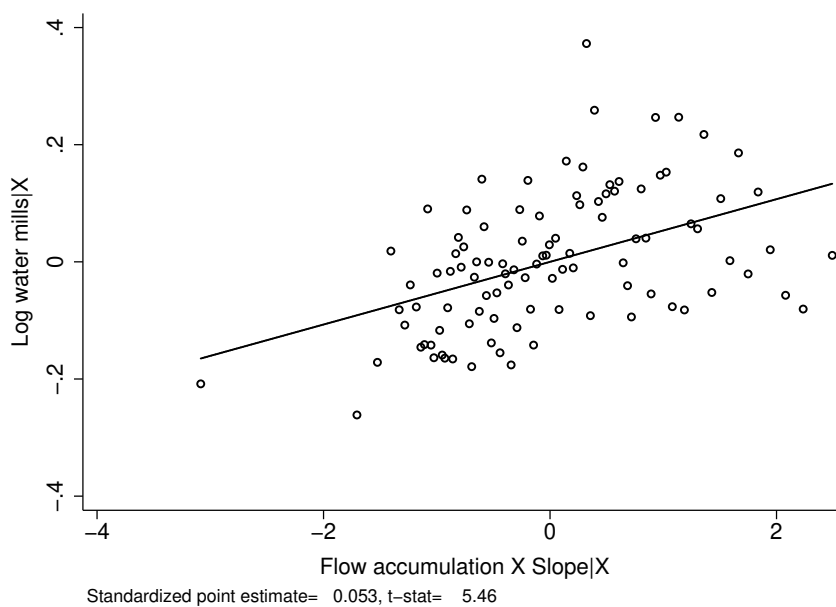
Notes: The figure displays binned scatterplots of residualized values of *Log water mills* and *Flow×Slope* after controlling for flow accumulation, terrain slope and all controls from column 4 of Table 4.

Figure C.4. Document of 1806 Manchester anti-slavery petition

Table C.1. Coal, water mills and industrial employment

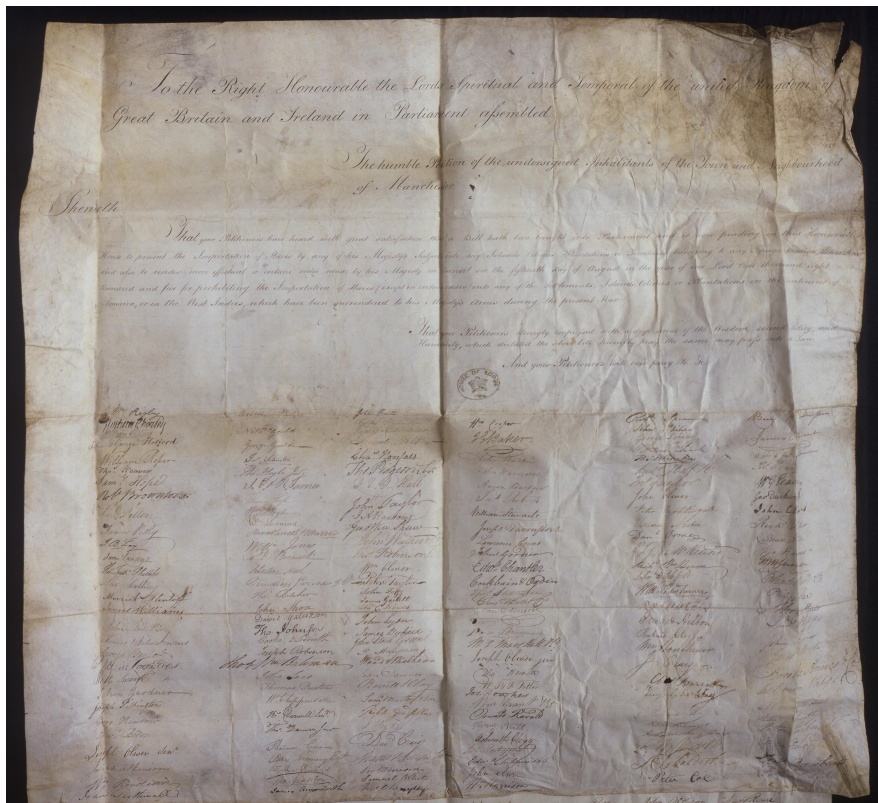| Dependent variable	Share in manufacturing in 1831							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Coal area	0.106***	0.0563***						
	(0.0115)	(0.0111)						
Log distance coal			-0.0160***	-0.00706***				
			(0.000924)	(0.00119)				
Log water mills					0.0251***	0.0240***		
					(0.00653)	(0.00582)		
Log distance water mill							-0.00152***	-0.00214***
							(0.000467)	(0.000441)
Log distance to London		0.0173***		0.00954***		0.0195***		0.0194***
		(0.00154)		(0.00179)		(0.00161)		(0.00160)
Log distance to river		-0.00980***		-0.00958***		-0.0102***		-0.0104***
		(0.000814)		(0.000839)		(0.000835)		(0.000839)
Log distance to coast		0.00836***		0.00607***		0.00860***		0.00835***
		(0.000805)		(0.000874)		(0.000805)		(0.000802)
Log distance to urban center		-0.0189***		-0.0180***		-0.0210***		-0.0209***
		(0.00175)		(0.00186)		(0.00171)		(0.00171)
Latitude		-0.00211***		-0.00168**		-0.00132*		-0.000890
		(0.000775)		(0.000775)		(0.000786)		(0.000782)
Ruggedness		0.000379		0.000316		0.000506		0.000517
		(0.000628)		(0.000626)		(0.000625)		(0.000628)
Elevation		0.000105***		0.0000972***		0.000120***		0.000125***
		(0.0000219)		(0.0000225)		(0.0000228)		(0.0000230)
Slope		0.000911		0.000181		-0.000960		-0.000968
		(0.00795)		(0.00793)		(0.00792)		(0.00796)
Wheat suitability		-0.00202***		-0.00212***		-0.00229***		-0.00236***
		(0.000577)		(0.000581)		(0.000583)		(0.000581)
Market integration index		-0.0291		-0.0906***		-0.0248		-0.0215
		(0.0274)		(0.0254)		(0.0280)		(0.0279)
Observations	9127	9127	9127	9127	9127	9127	9127	9127
R-squared	0.0417	0.138	0.0803	0.134	0.00422	0.132	0.00182	0.131
Mean dep. variable	0.0195	0.0195	0.0195	0.0195	0.0195	0.0195	0.0195	0.0195

Notes: OLS estimates reported. The unit of observation is a parish in England and Wales. For variable descriptions see Section 5 and **??**. Robust standard errors in parenthesis. Standardized beta coefficients reported. Significance levels: *** p< 0.01, ** p< 0.05, * p< 0.1.

Table C.2. Alternative measurement: Coal

Dependent variable	Log number of petitions			IHS petitions		
	(1)	(2)	(3)	(4)	(5)	(6)
Coal area×Coal consumption	0.256***			0.328***		
	(0.0357)			(0.0458)		
Log distance coal×Coal consumption		-0.0163***			-0.0209***	
		(0.00404)			(0.00522)	
IHS distance coal×Coal consumption			-0.0166***			-0.0213***
			(0.00371)			(0.00479)
Observations	127876	127876	127876	127876	127876	127876
R-squared	0.391	0.390	0.390	0.390	0.390	0.390
Mean dep. variable	0.0488	0.0488	0.0488	0.0627	0.0627	0.0627

Notes: IHS is the inverse hyperbolic sine transformation of the respective variable. All columns include parish and year fixed effects as well as controls from column 2 of Table 3 interacted with year fixed effects. Robust standard errors, clustered at the parish level, in parenthesis. Significance levels: *** p< 0.01, ** p< 0.05, * p< 0.1.

Table C.3. Alternative measurement: Water mills

Dependent variable	Log number of petitions				IHS petitions			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: OLS								
Log water mills×Industrial output	0.00876*** (0.00161)				0.0113*** (0.00203)			
IHS water mills×Industrial output		0.00678*** (0.00124)				0.00873*** (0.00157)		
Log distance water mills×Industrial output			-0.000882** (0.000347)				-0.00114** (0.000446)	
IHS distance water mills×Industrial output				-0.000814*** (0.000294)				-0.00105*** (0.000378)
Observations	127876	127876	127876	127876	127876	127876	127876	127876
R-squared	0.390	0.390	0.390	0.390	0.390	0.390	0.389	0.389
Mean dep. variable	0.0488	0.0488	0.0488	0.0488	0.0627	0.0627	0.0627	0.0627
Panel B: 2SLS								
Log water mills×Industrial output	0.154*** (0.0342)				0.200*** (0.0444)			
IHS water mills×Industrial output		0.120*** (0.0268)				0.156*** (0.0348)		
Log distance water mills×Industrial output			-0.0363*** (0.00816)				-0.0473*** (0.0106)	
IHS distance water mills×Industrial output				-0.0301*** (0.00666)				-0.0392*** (0.00866)
Effective F-stat	29.798	29.450	30.943	32.290	29.798	29.450	30.943	32.290
AR CIs	[0.101,0.250]	[0.0786,0.195]	[-0.059,-0.0237]	[-0.0482,-0.0198]	[0.132,0.325]	[0.103,0.254]	[-0.077,-0.031]	[-0.063,-0.026]
Observations	127876	127876	127876	127876	127876	127876	127876	127876
Mean dep. variable	0.0488	0.0488	0.0488	0.0488	0.0627	0.0627	0.0627	0.0627

Notes: IHS is the inverse hyperbolic sine transformation of the respective variable. All columns include parish and year fixed effects as well as controls from column 2 of Table 3 interacted with year fixed effects. In Panel B we also control for flow accumulation interacted with year fixed effects. The reported effective F-statistic follows Olea and Pflueger (2013). *AR CIs* are identification-robust Anderson-Rubin confidence intervals. Robust standard errors, clustered at the parish level, in parenthesis. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table C.4. Industrialization and support for abolition, cross-sectional IV results

Dependent variable	Log number of petitions		Log water mills		Log number of petitions	
	OLS	Reduced form	First stage		2SLS	
	(1)	(2)	(3)	(4)	(5)	(6)
Log water mills	0.380***				10.46***	8.364***
	(0.0486)				(1.950)	(1.627)
Flow×Slope		0.0719***	0.00687***	0.00700***		
		(0.00501)	(0.00125)	(0.00128)		
Flow accumulation	0.0122	-0.0186*	-0.00935***	-0.00879***	0.0792***	0.0384**
	(0.0104)	(0.0102)	(0.00169)	(0.00174)	(0.0189)	(0.0161)
Slope	-0.0693	-0.0149	0.0134***	0.0223	-0.155**	-0.257*
	(0.0631)	(0.0152)	(0.00484)	(0.0159)	(0.0652)	(0.146)
Effective F-statistic					30.205	29.755
AR CIs					[7.6016,16.0927]	[5.98059,13.0659]
Observations	9134	9134	9134	9134	9134	9134
R-squared	0.103	0.0314	0.00809	0.0143		
Mean dep. variable	0.452	0.452	0.0426	0.0426	0.452	0.452
Controls				✓		✓

Notes: Robust standard errors, clustered at the parish level, in parenthesis. Controls include ruggedness, elevation, slope, latitude, wheat suitability, log distance to London, log distance to nearest port, log distance to the coastline, log distance to nearest navigable river, log distance to nearest urban center and index of market integration. We report the first stage effective F-statistic following Olea and Pflueger (2013); the critical value for a maximum 10% relative bias is 23.109. *AR CIs* are identification-robust Anderson-Rubin confidence intervals. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table C.5. Industrialization and other petitioning campaigns

Dependent variable	Log number of petitions			
	Abolition	Parliamentary reform	Catholic rights	All others
	(1)	(2)	(3)	(4)
	Panel A: Coal			
Coal area×Coal consumption	0.256***	0.0824***	0.0558***	0.145***
	(0.0357)	(0.0171)	(0.0125)	(0.0303)
Observations	127876	127876	127876	127876
R-squared	0.391	0.182	0.233	0.272
Mean dep. variable	0.0488	0.00583	0.0133	0.0213
	Panel B: Water mills, OLS			
Log water mills×Industrial output	0.00877***	0.00421***	0.00166***	0.00693***
	(0.00161)	(0.000958)	(0.000460)	(0.00145)
Observations	127876	127876	127876	127876
R-squared	0.390	0.182	0.233	0.272
Mean dep. variable	0.0488	0.00583	0.0133	0.0213
	Panel C: Water mills, 2SLS			
Log water mills×Industrial output	0.154***	0.0726***	0.0582***	0.163***
	(0.0342)	(0.0167)	(0.0129)	(0.0352)
Effective F-statistic	29.798	29.798	29.798	29.798
AR CIs	[0.110,0.250]	[0.0469,0.118]	[0.0384,0.0944]	[0.108,0.262]
Observations	127876	127876	127876	127876
Mean dep. variable	0.0488	0.00583	0.0133	0.0213

Notes: All columns include parish and year fixed effects, as well as controls from column 2 of Table 3 interacted with year fixed effects. In Panel C we also control for flow accumulation interacted with year fixed effects. We report the first stage effective F-statistic following Olea and Pflueger (2013); the critical value for a maximum 10% relative bias is 23.109. Robust standard errors, clustered at the parish level, in parenthesis. *AR CIs* are identification-robust Anderson-Rubin confidence intervals. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table C.6. Signature order in the Manchester petition by occupation

Dep. variable	Page number	Column number (within-page)	Entry number (within-column)	Entry number (within-page)	Average order
	(1)	(2)	(3)	(4)	(5)
Industrialist	-2.442***	-0.954***	-6.093***	-75.06***	-0.0859***
	(0.447)	(0.266)	(1.999)	(10.85)	(0.0131)
Textile worker	-0.951***	-0.230	0.120	-12.06	-0.0201
	(0.368)	(0.293)	(2.483)	(15.71)	(0.0135)
Merchant	-3.223***	-0.474	-9.356***	-62.81***	-0.0696***
	(0.565)	(0.355)	(2.452)	(13.54)	(0.0135)
Dealer	-2.421***	-1.064***	-10.75***	-74.92***	-0.0653***
	(0.503)	(0.410)	(2.327)	(14.81)	(0.00997)
Warehouseman	0.0866	0.375	-3.647	-9.505	-0.00255
	(0.665)	(0.538)	(2.721)	(25.75)	(0.0148)
Tailor	0.463	-1.801***	-0.651	-85.98***	-0.0296***
	(0.630)	(0.344)	(4.215)	(16.69)	(0.00684)
Joiner	0.930	-0.885**	-3.118	-41.86**	-0.0111*
	(0.597)	(0.420)	(3.852)	(18.85)	(0.00648)
Shopkeeper	0.180	-0.551	-0.785	-23.86	-0.00812
	(0.685)	(0.519)	(4.151)	(29.91)	(0.0128)
Shoemaker	0.563	0.299	10.28**	11.25	0.0190**
	(0.711)	(0.658)	(4.988)	(23.98)	(0.00739)
Attorney	-2.070*	1.032	-7.785*	10.22	-0.0102
	(1.151)	(0.645)	(3.986)	(34.96)	(0.0115)
Other	-0.439	-0.111	-3.832**	-15.61	-0.0295**
	(0.274)	(0.231)	(1.648)	(11.81)	(0.0139)
Observations	2348	2348	2348	2348	2348
R-squared	0.0535	0.0128	0.0168	0.0216	0.0429
Mean dep. variable	5.613	3.750	23.66	153.2	0.000

Notes: The table displays OLS estimates from regressions of various measures of signature order on signatory occupation. The sample consists of individuals who signed the 1806 Manchester petition. The base category is individuals of unknown occupation who could not be linked to contemporaneous trade directories. Robust standard errors in parentheses. Significance levels: *** p< 0.01, ** p< 0.05, * p< 0.1.

Table C.7. Newspaper political orientation and industrial activity

Dep. Variable	Conservative				
	(1)	(2)	(3)	(4)	(5)
Coal area	-0.166				
	(0.106)				
Has coal		0.227			
		(0.146)			
Log water mills			-0.0685		
			(0.117)		
Has watermill				-0.0840	
				(0.117)	
Share in manufacturing					3.964
					(2.818)
Observations	73	73	73	73	73
R-squared	0.00727	0.0410	0.00685	0.00579	0.0332

Notes: The dataset consists of newspapers that published articles mentioning slavery between 1787 and 1833 and whose political orientation could be identified. *Share in manufacturing* is the share of male employment in manufacturing in 1831. Robust standard errors clustered at the CRD level in parenthesis. Significance levels: *** p< 0.01, ** p< 0.05, * p< 0.1.